ATTACHMENT #3

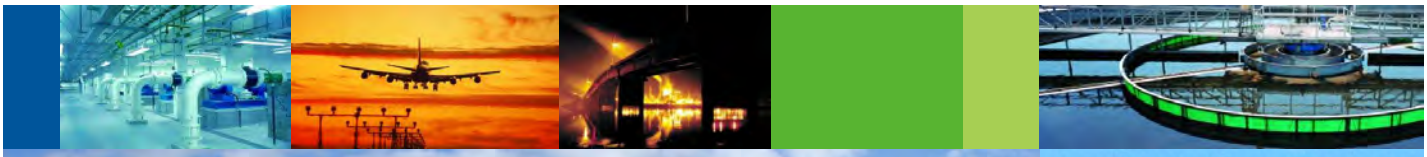
Report

Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

City of Medicine Hat

South West Connector Route Options

April 2013



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1 Introduction

1.1 INTRODUCTION

Associated Engineering (AE) has been retained by the City of Medicine Hat (City) to undertake a route options assessment for the proposed South West Connector Road that links South Boundary Road with Highway 3 or 10th Avenue SW in the southwest of the City.

1.2 BACKGROUND

In 2010, the City retained AE to update the 2005 Roadway Systems Master Plan (RSMP) resulting in the development of a 2010 RSMP. This project included updating the City Transportation network model (EMME) with input from the updated Municipal Development Plan and updating the roadway network needs for the current, 75,000 (75K) and 95,000 (95K) population horizons. The South West Connecter Route Options Assessment forms part of the RSMP update.

South Boundary Road is an east-west arterial roadway that borders Medicine Hat's South City Limits. The City constructed the east segment of South Boundary Road to support development in Southlands, The Hamptons and South Vista Heights.

The City has already completed a functional design study for South Boundary Road extension to Highway 3 on a direct east west alignment. In support of recent thinking, the City has asked for a review of this and other alignments to determine the most effective route for the ultimate connector.

The RSMP roadway network traffic projection work indicates that this link would not be required until Cimarron is fully built-out; however, given the higher level of community expectations and service, this connector may be provided earlier during the Cimarron development, so that the area is consistent with the rest of the City in terms of accessibility and service levels.

1.3 METHODOLOGY

The methodology for evaluating the proposed South West Connector Route Alignment involved an assessment of the following factors:

- Background Review of previous relevant reports and modelling
- Develop alternative routes and short list to a maximum of three viable options
- Determine the evaluation criteria to be used to assess each option
- Analyse each of the 3 route options based on the selected evaluation criteria
- Select a preferred route for the South West Connector.

1.4 STUDY ASSUMPTIONS

In undertaking this report we based the assessment and results on the following:

- Only p.m. peak hour traffic was used for all traffic analysis
- EMME forecasted 95K population horizon traffic volumes would be the basis for the traffic analysis
- No individual or group stakeholder input was included.

2 Existing and Future Condition Analysis

2.1 STUDY AREA LOCATION AND DESCRIPTION

The study area is located to the south west of Medicine Hat within and/or adjacent to the Cimarron ASP and includes the following road network:

- Highway 3
- South Boundary Road
- South Ridge Drive South East
- 30th Street South West
- 10th Avenue South West
- Range Road 62.

The study area falls primarily within the Cimarron Area Structure Plan (ASP) adopted by the City in 2009. The suburban neighbourhoods of Saamis Heights and Cottonwood are located in the northeast portion of the site adjacent to 10th Avenue SW. Cottonwood Coulee Golf Course is located immediately east of 10th Avenue SW with access provided via 10th Avenue SW. There are commercial/industrial developments located in the northern portion of the study area with access to the City from 10th Avenue SW and Highway 3. The residential area of South Vista Heights is located to the east of the study area while Desert Blume development is located to the SW of the study area.

Currently the majority of the lands are being utilized for agricultural operations like grain farming and/or cattle grazing. The site also functions as an amenity for the City as there are a number of trails located within the site. The City airport is located north of the subject site north of the Seven Persons Creek Valley. There are current plans in place that suggest the Airport runway could be extending at some point in the future.

Within the study area there are a number of transmission corridors, including electric lines, potable water transmission lines, and natural gas production and distribution lines.

2.2 CIMARRON ASP

Medicine Hat's population growth has averaged just under 900 new residents per year over the past twenty years and it is projected to grow from 61,000 today to between 71,000 and 78,500 by 2025 and between 81,500 and 95,000 by 2040 (source, City of Medicine Hat Municipal Development Plan April 2012). In order to accommodate this growth the City has developed ASP's to provide policy guidance for the plan area to confirm orderly development over a 20 year planning horizon.

The Cimarron ASP is the statutory plan for the study area that would be impacted by one or more of the options proposed for the South West Connector. At the time the ASP was being considered there was provision for extending 10th Avenue SW across the Seven Persons Creek Valley so it could serve as the South West Connector.

2.3 HIGHWAY 3

Highway 3 is currently a primary highway that serves as a major east-west southerly route through Alberta. Within the City of Medicine Hat, Highway 3 is a four lane arterial roadway from Holsom Road north and east to Highway 1. The road is a free flow roadway in this segment except for a traffic signal at 10th Avenue S.W. The speed limit is 100 km/h as Highway 3 enters the City from the SW and it becomes 70 km/h north of 30th Street SW then it reduces to 50 km/h just west of 10th Street SW.

2.4 SOUTH RIDGE DRIVE

South Ridge Drive is to be upgraded to a four lane arterial roadway north of Strachan Road in 2012/2013. At present, South Ridge Drive is four lanes north of Sprague Way and a two lane collector roadway south of Sprague Way. South Ridge Drive is generally a free flow 50 km/h roadway with the exception of traffic signals at Strachan Road and Sprague Way. All other connecting roadways are unsignalized stop controlled intersections. South Ridge Drive is unsignalized and stop controlled at South Boundary Road.

Intersection improvements to South Ridge Drive were made at Sprague Way in 2008. These improvements included traffic signal installation and widening the southbound approach to two lanes: a left turn lane, a through lane and a through/right lane.

2.5 SOUTH BOUNDARY ROAD

South Boundary Road is currently a two lane arterial roadway with a rural cross section from Range Road 62 to South Ridge Drive. South Boundary Road was upgraded to 2 lanes of an ultimate 4 lane arterial between South Ridge Drive and Southlands Drive in 2008/2009. The 2008/2009 project also upgraded South Boundary Road to a 4 lane arterial from Strachan Road to South Ridge Drive. In 2011, the City constructed a new bridge over Seven Persons Creek between Highway 3 and South Boundary Road.

2.6 10TH AVENUE SW

10th Avenue SW is currently a 4 lane industrial roadway between 19th Street SW and Highway 3 and a 2 lane industrial roadway between 19th Street SW and the access to Cottonwood Coulee Golf Course. There are traffic signals at Highway 3 and a three way stop at 30th Street SW. At present 10th Avenue dead ends just north of Seven Persons Creek. South of Seven Persons Creek 10th Avenue SW is a two lane gravel road between South Boundary Road and the Seven Persons Creek Valley.

With regard to a potential connection from South Boundary Road to 10th Avenue SW, the Cimarron ASP States:

"The City's current Roadways Master Plan does not contemplate a connection at 10th Avenue SW over the Seven Persons Creek. The decision to establish a connection through the Seven Persons Creek valley will be completed independently of this ASP by the City and the decision shall be reflected in the conceptual scheme for the affected lands. At this time two connections through the Seven Persons Creek valley are not contemplated only the connection at Highway 3 is planned".

2.7 RANGE ROAD 62

Range Road 62 is currently a two lane free flow roadway with a 50 km/h speed limit with a stop sign at Highway 3. A portion of the road has a 30 km/h curve and steep decline/incline through the Seven Person Creek Valley. At present, Range Road 62 provides a road link from Highway 3 to South Boundary Road.

Figure 2-1
Existing Road Layout

2.8 FUTURE ROAD IMPROVEMENTS

In the 95K modelled scenarios the following changes to the City's road network are planned within the study area:

Highway 3 will have traffic signals at the following locations:

- Holsom Road
- Viscount Avenue
- 10th Avenue SW
- Highway 1 Interchange Ramps.

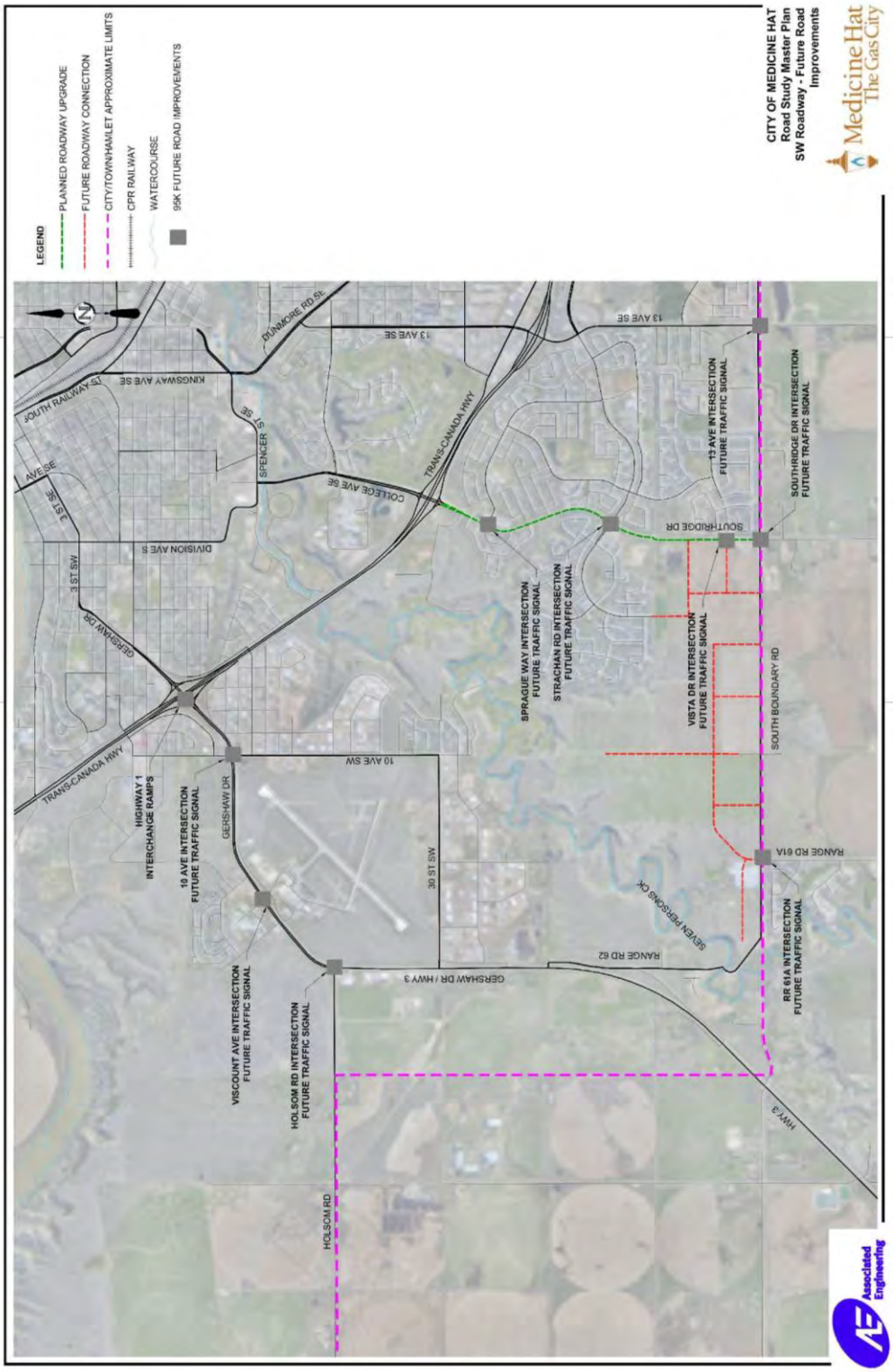
South Ridge Drive is four lanes the entire length of the roadway. Auxiliary lanes are likely to be constructed at Strachan Road and South Boundary Road. The following intersections will be signalized in the 95K scenario:

- Sprague Way
- Strachan Road
- Vista Drive
- South Boundary Road - auxiliary lanes to be added.

South Boundary Road has been identified as a future four lane roadway

- Traffic signals at Range Road 61A, South Ridge Drive, Vista Drive and 13th Avenue SW
- South Boundary Road is identified as a 4 lane arterial roadway.

Figure 2-2
95K Future Road Network



2.9 EXISTING GEOTECHNICAL CONDITIONS

When considering the connector roadway alignment options geotechnical conditions are important considerations. The following is a brief summary of the existing geotechnical constraints extracted from the Cimarron Area Structure Plan and the "Preliminary Assessment on Site Suitability for Proposed Seven Persons Creek Crossing 10th Avenue SW" undertaken by AMEC Environmental and Infrastructure. The full AMEC report is attached in **Appendix A** of this report for information.

Topography: The Seven Persons Creek Valley is a significant topographic feature with substantial slopes within the study area. Seven Persons Creek is roughly 2.5 km long and flows in a general northeast direction. The creek meanders within a 250 m to 500 m wide valley which is bounded by coulee slopes rising to table lands at an overall height of about 30 m above the creek elevation. AMEC environmental undertook a review of the slope crest regression within the creek over the last 60 years. Within the study area the slope crest regression was most apparent near the north end of the study area. In particular, the slopes along the north side of the creek west of 10th Avenue appear to have regressed by up to 25 m during the course of the last 60 years.

During the AMEC geotechnical desktop review and site walk through of the study area some evidence of slope instability was evident predominantly to the creek slopes near the north extent of the study area along 15th Avenue SW and 32nd Street SW.

Biophysical Assessment: The majority of the lands within the study area have been extensively cultivated. The Cimarron ASP notes that there are small portions of undisturbed natural grasses adjacent to the Seven Persons Creek Valley and Naismith Coulee.

Seven Persons Creek Valley: The Seven Person Creek Valley system is a significant feature in the study area. Most of the valley is undeveloped and could potentially be home to sensitive plant and animal species. Currently there a number of recreational formal and informal trails within the valley.

Geotechnical: The Cimarron ASP notes that the soil within the plan area is primarily comprised of clay and clay till. At lower depths (10 m - 23 m) silty sand is present. For the majority of the plan area the groundwater is 6 m or deeper.

History/Archaeology: There is no information in the current ASP's regarding historical or archeological sites within the study area.

3 Proposed South West Connector Route Alignment Options

3.1 SOUTH WEST CONNECTOR ROUTE ALIGNMENT OPTIONS

The City of Medicine Hat is looking to determine the best location for a South West Connector Roadway between South Boundary Road and Highway 3. The purpose of the South West Connector is to improve traffic flow and connectivity and help reduce traffic congestion in the South West sector of the City as it continues to grow.

The RSMP roadway network evaluation work indicates this link would not be required until after Cimarron is fully built-out; however, there could be other reasons that drive the need for this connector sooner like emergency response to neighborhoods south of Highway 1, South Ridge neighborhood concerns with traffic along South Ridge Drive and pedestrian safety along South Ridge Drive to name a few.

Initially we looked at six potential alignments for the South West Connector. In order to short list and evaluate these options we defined a comprehensive evaluation criteria that considered both technical and non-technical issues. This criteria was selected in consultation with the City and Swanson Transportation. The evaluation criteria selected was as follows:

- Impacts on Built-out Property
- Cost
- Social Impacts on Amenities
- Environmental Impacts
- Noise impacts
- Safety Impacts
- Geotechnical Impacts
- Travel Time Savings
- Impacts on the Existing Roadway Network
- Road Network Connectivity
- Impacts on the Cimarron ASP.

We evaluated the options based on a scale of 1-3 to simplify the process. The South West Connector Roadway Alignment Options were short listed from 6 to 3 using this process. The three short listed options are shown in Figure 3-1 in **Appendix B** and are as follows:

Option 1 - 10th Ave Connection: Links South Boundary Road to 10th Avenue SW and is located west of Saamis Heights and immediately west and south of the Cottonwood residential area and on the west edge of the Cottonwood Coulee Golf Course.

Option 2 - North Highway 3 Connection: Links South Boundary Road with Highway 3 and transcends the Cimarron ASP diagonally in a southwest/northeast direction. Option 2 follows the alignment of the existing gas production line that runs through the ASP area. On this alignment, it would reduce the impact on the Cimarron ASP. The alignment of the gas production line is detailed in Figure 4 in "Man Made and Environmental Constraints" within the Cimarron ASP.

Option 3 - South Highway 3 Connection: This route links South Boundary Road with Highway 3, extending directly west along the existing alignment of South Boundary Road. Option 3 ties into Highway 3 north of the Highway 3/Township Road 121 intersection and it passes through a country residential neighborhood on the west side of the creek. The alignment would likely need to run north of the existing road allowance where the alignment crosses the creek to avoid a long bridge crossing or to avoid constructing more than one bridge.

The South West Connector options were analysed to identify which alignment offers the greatest benefit to the City. These were looked at from a high level functional perspective as well as a quantitative perspective using the City's EMME travel demand model (Traffic Model) for a population threshold of 95,000 (95K) population. The traffic model is a high-level roadway system analysis tool that is typically suited to network analysis, alternative scenario analysis and identifying the need for corridor level improvements. The 95K population is the population level at which the Cimarron ASP will be built out and represents the extents of planned development in the South sector of the City.

The results in the traffic modelling are detailed in **Appendix C** of this report. The methods used to assess the impacts on the adjacent road network included:

- A comparison in traffic volumes to see how the traffic pattern within the study corridor changes as a result of the changes to the road network. (Volume Plot Comparison).
- Identify travel time savings and gains within the City resulting from the introduction of each alignment option. (Travel Time).
- Assess capacity in terms of the impacts each option has on the study corridor. (Volume/Capacity Ratio).

3.2 DO NOTHING SCENARIO

The Do Nothing Scenario shows all planned roads for the 95K population except the SW Connector. This sets the baseline for comparison with other options and establishes the need for a SW Connector.

Under this scenario the following roadways within the South West quadrant of the city are operating with congestion:

- Highway 1 between the Highway 1/Highway 3 Interchange and Highway 1 South Ridge Drive interchange

- Highway 1 between the Highway 1 South Ridge Drive interchange and Highway 1 and 13th Ave SW interchange
- South Ridge Drive intersections with Sprague Way, Strachan Road and South Boundary Road
- 13th Avenue SW intersection with Strachan Road.

3.3 OPTION 1 (10TH AVENUE)

Option 1 route alignment follows a north/south alignment and links South Boundary Road with 10th Avenue SW.

Option 1 provides the most direct route to and from the SW Sector of the City to central and north Medicine Hat. Consequently it attracts the most traffic and provides the greatest relief to South Ridge Drive. It connects to the existing 10th Avenue north of Seven Persons Creek which was not constructed to handle the additional traffic from the southwest. Upgrades to this road would need to occur to accommodate the extra traffic. The proposed road would also need to be located immediately adjacent to a golf course and new residential homes which would create social and environmental impacts that would be difficult to mitigate.

While the new connection would provide some relief in capacity, the following roads would continue to experience some congestion:

- Highway 1 between the Highway 1/Gershaw Interchange and Highway 1 / South Ridge Drive interchange
- South Ridge Drive intersection with Sprague Way SE
- South West Connector/10th Avenue/30th Street SW intersection.

Positive Features that support the South West Connector Option 1

- Follows the alignment provision for extending 10th Avenue SW in the Cimarron ASP thereby minimizing disruption to the ASP
- Limits traffic growth on South Ridge Drive to the greatest extent possible
- Increases traffic capacity on parts of the road network in the South West quadrant of the City
- Most direct travel route, reduces travel times in and out of the area by up to two minutes per trip.

Negative Features that support the South West Connector Option 1

- Social and environmental impacts adjacent to an existing residential area and golf course (10th Avenue SW)
- Existing intersections on 10th Avenue will have to be redesigned to accommodate the increase in traffic.
- Challenging location to cross Seven Persons Creek.

3.4 OPTION 2 (NORTH HIGHWAY 3 CONNECTION)

The South West Connector Option 2 links South Boundary Road with Highway 3 south of the Highway 3 / Range Road 62 intersection.

Similar to Option 1, but to a lesser extent, Option 2 reduces forecast traffic volumes on South Ridge Drive, 13th Avenue SE and South Boundary Road. Traffic volumes on Highway 3 north of Gershaw Drive SE would be higher than in Option 1.

As alignment Option 2 is not located in the vicinity of any existing residential development, the social and safety impacts associated with this route alignment are minor. Part of the road network would still operate over capacity, these include:

- Highway 1 / 16th Street Intersection (currently operating over capacity)
- Highway 1 between 16th Street intersection and South Ridge Drive
- Highway 3 / South West Connector intersection.

Positive Features that support the South West Connector Option 2

- Increases traffic capacity on parts of the road network in the South West quadrant of the City
- Less social and environmental impacts than Option 1
- Follows the existing gas pipeline right of way to minimize the impact on the Cimarron ASP
- Best location to cross Seven Persons Creek.

Negative Features that support the South West Connector Option 2

- Requires a revision to the Cimarron ASP to facilitate the alignment
- Slightly less effective route that Option 1.

3.5 OPTION 3 (NORTH HIGHWAY 3 CONNECTION)

Option 3 follows the existing South Boundary Road alignment and connects with Highway 3 immediately north of Highway 3/Township Road 121 intersection.

Similar to the previous two alignment options, but to a lesser extent, Option 3 shifts traffic from other roads in the SW Sector and spreads out traffic. Forecast traffic volumes are lower on South Ridge Drive and on 13th Avenue SE. Forecast traffic volumes are higher on Highway 3 north of the Township Road 121 intersection. The reduced traffic volumes increases capacity on the adjacent road network, however parts of the road network are still operating over capacity, these include:

- Highway 1/16th Street Intersection (currently operating over capacity
- Highway 1 between 16th Street intersection and South Ridge Drive.

Positive Features that support the South West Connector Option 3

- Increases traffic capacity on parts the road network in the South West quadrant of the City
- Minimizes disruption to the Cimarron ASP.

Negative Features that support the South West Connector Option 3

- Increased Traffic Volumes adjacent existing rural residential area
- Least direct travel route, reducing travel in and out of the area by up to one minute per trip
- Challenging location to cross Seven Persons Creek.

4 Route Option Analysis - Other Considerations

4.1 INTRODUCTION

The three short listed options were assessed based on the following evaluation criteria:

- Impacts on Property
- Cost
- Social Impacts on Amenities
- Environmental Impacts
- Noise Impacts
- Safety Impacts
- Geotechnical
- Impact on Existing Road Network
- Network Connectivity
- Impacts on Cimarron ASP.

A Preliminary Geotechnical Assessment was undertaken by AMEC Environmental and Infrastructure to assess on site conditions for each of the short listed options. The results from this visual inspection were used for the preliminary assessment of the South West Connector Route Options.

The cost for the three route alignments was based on a “per square metre” price derived from recent City of Medicine Hat roadway construction projects. A 5% increase was added to account for inflation. The cost of the bridge structures is included in the tabulated cost. These cost estimates are high level estimates that could change subject to detailed geotechnical and environmental site investigations. A reasonable allowance has been included for property acquisition.

A number of issues arose during discussions on each of these options based on the selected assessment criteria and we have presented the highlights in tabular format below.

Table 4.1 on the following page outlines the findings of the preliminary assessment for the three connector options.

Table 4-1
Preliminary Route Analysis

	Option 1 (10th Avenue)	Option 2 (Cimarron)	Option 3 (SBR)
Impact on Property	This route will result in significantly higher traffic volumes adjacent to the existing Cottonwood Coulee residential development on the north side of Seven Persons Creek. It will also add traffic along 10th Avenue SW which will have an impact on businesses along 10th Avenue south of Highway 3.	No impact on existing residential properties. This route will impact land owners interested in future development of their property.	This option will impact existing residential properties in Desert Blume that back onto SBR and the country residential properties west of Seven Persons Creek. This would also impact farm properties north of the SBR right of way through the Seven Persons Creek Valley.
Order of Magnitude Costs (millions)	$30.5	$25	$30
Social Impacts on Amenities	There are a few well used but unofficial pedestrian trails in the Seven Persons Creek Valley just below the Cottonwood Coulee residential development and west of the Cottonwood Coulee Golf Course that would be impacted by this route as would the quality of life for the residents in this development and for the properties on the escarpment on the north side of the creek valley. Views would also be impacted for the Cottonwood Coulee residents who back onto the creek valley. This would also add noise and potentially impact local pedestrian traffic.	Very little if any impact as this route passes through undeveloped property away from built up areas of the City. The only impact might be how this route would impact those involved in the Cimarron ASP development.	This route will impact existing farm operations north of the SBR road allowance through the creek valley, residents in the country residential neighborhood west of the creek with respect to traffic that doesn't exist today if this route were selected. It would change views for existing developed properties. It will impact the quality of life for those residents in proximity to this alignment.

	Option 1 (10th Avenue)	Option 2 (Cimarron)	Option 3 (SBR)
Environmental Impacts	The creek valley is quite wide at this location and the escarpment is quite high so the impact of constructing a roadway on this alignment would cut a significant foot print in the creek valley and the banks of the creek. This is the shortest connector route so it would likely have fewer emissions than the other two routes.	This route has low escarpment banks and a narrow creek valley and the adjacent properties are farmed closer to the creek valley so it has the smallest environmental disturbance zone by a large margin. Escarpment cuts would be small in comparison to the other options.	This option has the widest creek valley to cross as the creek runs somewhat parallel to the road right of way and it has the highest escarpment banks. This creates a large disturbance footprint within the creek valley and significant cuts through the escarpment banks.
Noise Impacts	This alignment runs beside residential properties in Cottonwood on the east side of 10th Avenue SW north of Seven Persons Creek and there is very little road right of way available to construct a sound barrier without purchasing commercial businesses and/or residential residences.	Noise impacts for this option would involve proper design of the roadway through Cimarron and other future neighborhoods. This option provides the opportunity to define what sound attenuation is needed before the developments are in place.	This option would have noise concerns for residents in Desert Blume who back on the SBR right of way and for existing residents in the country residential neighborhood on the west side of the creek.
Safety Impacts	This alignment would impact safety along 10th Avenue SW north of Seven Persons Creek where 10th Avenue SW passes by the Cottonwood neighborhood and a number of intersections between Seven Persons Creek and Highway 3.	This option will have safety concerns where it passes through Cimarron and other future neighborhoods but the City has the opportunity to control this aspect in the design where that's not possible where existing development already exists as in the other options.	The only safety aspect for this alignment would be the front access for the country residential properties on the west side of the creek. These properties would likely have to front onto the connector roadway or some type of service road arrangement would be needed to change access conditions.

	Option 1 (10th Avenue)	Option 2 (Cimarron)	Option 3 (SBR)
Geotechnical	Slope stability on the steeper sections of the creek escarpment will be a concern as will the length of creek valley that has to be crossed.	This option has very gradual and low slope escarpment conditions and a narrow creek valley to cross resulting in favourable conditions for a road crossing.	Option 3 has the highest escarpment banks and the widest creek valley to cross which results in higher risk of unfavourable soil condition in the creek valley and potential slope stability concerns where excavating through the escarpments.
Existing Road Network	Being that 10th Avenue SW is an existing roadway, there is a good chance 10th Avenue SW north of Seven Persons Creek will need to be upgraded to handle the added traffic volume. We confirmed Highway 3 / Gershaw Drive can handle the added traffic to the 95,000 population horizon without any upgrades so there is no impact on these roadways. This is the same for all options.	Because there are no capacity concerns with Highway 3 and Gershaw Drive to the 95,000 population horizon this option has no existing roadway network concerns.	Similar to Option 2 this option has no existing roadway network concerns other than the issue of passing through the existing country residential neighborhood west of the creek.
Network Connectivity	This connector route has the shortest and best connectivity to the existing built-out areas of the City. It would be the most favourable connection from a roadway user point of view in terms of travel time and fuel consumption.	Option 2 provides the second best connectivity conditions in terms of keeping the connector close to existing development so the public uses the roadway and provides good travel time and fuel consumption conditions.	This option has the longest travel time, is the farthest distance out from the City so usage could be affected but it still provides good connectivity overall as the difference in travel times is not significant.

	Option 1 (10th Avenue)	Option 2 (Cimarron)	Option 3 (SBR)
Impacts on Cimarron ASP	The only impact on Cimarron is to make sure sufficient road right of way is dedicated to construct a major connector.	This option dissects Cimarron ASP on an angular alignment which could be considered challenging from an urban development perspective. The alignment does run along a gas production line easement within Cimarron to minimize impacts but it does have a significant impact on the Cimarron ASP.	This alignment would have the least impact on the Cimarron ASP as the only impact would be a roadway dedication of additional road right of way along the south limit which has been accounted for in the Cimarron ASP already.

4.2 PUBLIC PROCESS / FEEDBACK

This section describes the public consultation process used on the 2010 RSMP, the Assessment of the Alberta Transportation Highway 1 and 3 Proposed Improvements and the Southwest Connector.

The information presented to the public was separated into the following three sections:

1. The Roadway System Master Plan

2. The proposed sequencing strategy for implementing the Alberta Transportation proposed Highway 1 and 3 improvements between Seven Persons Creek and the South Saskatchewan River

3. Alignment options for a South West Medicine Hat Connector between South Boundary Road and Highway 3 or some other location in the SW quadrant of the City.

The public consultation process was performed in the following ways to ensure all interested parties had an opportunity to comment on the plan:

- The City received assistance from the Chamber of Commerce to draw land owners and businesses from within the SW Industrial Area of the city to a public meeting. This meeting was held on January 15, 2013 at the Best Western Inn on Redcliff Drive. Details on the 2010 RSMP were shared with this key segment of the community.
- The City of Medicine Hat contacted individual land owners that would be impacted by the proposed

options for the SW Connector. Contact was made through meetings and/or phone calls and results of these discussions were documented.

- The City held an open house specifically for residents who fronted on or resided adjacent to 1st Street SW. This open house was held on January 16, 2013 from 3 pm to 8 pm at the Studio Theater in the Esplanade.

- A public open house was also held on January 23, 2013 at Higdon Hall on the exhibition grounds from 3 pm to 8 pm. This was a citywide open house that was well advertised on the radio, TV stations, newspapers and on street sign boards.

In general terms, the public appeared to be supportive of the direction the City is taking on the RSMP. Some of the concerns raised by the public specific to the SW Connector Options are presented as follows:

- The majority of the land owners affected by the SW Connector alignments had either minor concerns or no concerns related to the impact the alignments have on their property from a future development perspective. One land owner west of Seven Persons Creek had a significant concern with Option 2 because of the way it bisected his land.

- Some concern was raised that Option 2 will compromise the Cimarron Area Structure Plan

- Discussions with the owner of the Cottonwood Coulee Golf Course did not identify major concerns although the owner did mention Option 1 would have pretty significant environmental impacts on the Seven Person Creek Valley

- The land owner east of Seven Persons Creek did not express any major concerns with any of the Options presented

- The land owner west of Seven Persons Creek expressed concerns with Option 2 in that it severed his parcel of land; however, he indicated he would be fine if the acceptable financial terms could be negotiated

- Overall more support was shown to Option 2 considering there was no impact on already built-up areas of the City and there is less impact on the environment. Some members of the public also supported the lower cost of Option 2. There was some support for Option 1 particularly for those residents who live south of Highway 1 and work in the SW Industrial or SW Agro Areas.

- We received many valuable comments through the public process and many of them can be incorporated into future planning for changes to the roadway network.

A binder containing a summary of the comments received from the three events together with sign in sheets, all the actual comment forms, email responses and responses fed through the Chamber of Commerce is available for viewing at the City of Medicine Hat Municipal Works Department.

A summary of the comments received at the 2 Open Houses and the Public Meeting are enclosed in **Appendix D** for information. There is also a Public Process Binder at the City Municipal Works Department that has the summary information and all the actual comment forms and sign-in sheets that were collected during the public forums.

We have also enclosed a copy of the Presentation Boards used at the Public Open Houses. These are provided in **Appendix E**.

4.3 CITY OF MEDICINE HAT - TECHNICAL COORDINATING COMMITTEE (TCC) COMMENTS

The City circulated this report through a number of departments within the City and comments received were collected and distributed through the Technical Coordination Committee. The following is a summary of the comments received:

Electrical Department

- Minor Relocation of MH-20L transmission line with Option 2 (Approximate Cost $100,000)

Environmental Utilities

- Take note of new water trunk planned to run along Range Road 62 and South Boundary Road. New alignments could impact this new line.

Fire Department

- No concerns on the SW Connector Report.

Gas Department

- Whichever option is selected it will need coordination with the Gas Department to ensure it is incorporated into long term servicing plans
- Option 1, could require lowering of NGPR pipeline at the undeveloped road allowance
- Option 2, similarly the NGPR line could require lowering or upgrading at new road crossing locations
- Option 3, NGPR line may be okay where it is.

Parks and Outdoor Recreation

- The trail planned for connecting south of 10th Avenue SW to Cimarron may need to be modified to suit options.

Planning Services

- Options 1 and 3 are in line with the current MDP City Growth Management Strategy and the Cimarron ASP
- Option 2 would require further review from a planning perspective to identify the impacts on the current City growth management study.

Transit

- Option 1 keeps close connectivity with where the people are located
- Option 2 and 3 would require large areas of development before there would be people to support Transit.

5 Summary and Conclusion

5.1 SUMMARY

AE was retained by the City to evaluate alternative routes for the proposed South West Connector Roadway on lands in the SW of the City of Medicine Hat.

In assessing the most effective alignment, a number of possible options were identified and considered. Following consultation with the City and Swanson Transportation these alignments were narrowed down to three potential routes. These include:

- Option 1 follows a north-south alignment and links South Boundary Road with 10th Avenue SW west of Cotton Wood Coulee Golf Course
- Option 2 follows a southeast-northwest alignment and links South Boundary Road with Highway 3 south of the Highway 3/30th Street SW intersection
- Option 3 follows an east west alignment and links South Boundary Road with Highway 3 south of the Highway 3/Range Road 62 intersection.

A preliminary desktop review of the site by AMEC Environmental and Infrastructure on behalf of AE identified alignment Option 2 from a geotechnical site suitability assessment as the best location of the three alignment options for the bridge crossing Seven Persons Creek. The report also identified a number of topographical constraints associated with alignment Option 1. Other potential constraints that were identified were slope stability and slope crest regression concerns.

From a traffic assessment point of view, it is clear that the construction of the South West Connector improves traffic circulation and capacity in the South West of the City. The introduction of the South West Connector reduces travel times within the City. Within the context of the overall travel times within the model there is little variance between the alignment options with Option 1 providing the most savings, followed by Options 2 and 3 respectively.

AE in conjunction with the City and Swanson Transportation assessed the social, environmental, cost, network connectivity and impact on Cimarron ASP impacts associated with the three route alignment options. Table 5-1 on the following page provides a summary ranking for the 3 South West Connector alignment options following this assessment. Options are ranked on a scale of 1-3 with the 1 being the most favourable and 3 being the least favourable.

Of the three short listed alignment options we found, Option 2 (Cimarron) has the most favourable score based on our assessment followed by Option 3 (SBR) and then Option 1 (10th Avenue).

It's important to note that all three of these options are viable in terms of constructability and all three could be implemented depending on the specific needs of the community.

Table 5-1
South West Connector Route Alignment Options Summary

Route Alignment Options			
	Option 1	Option 2	Option 3
Impacts on Property	3	1	2
Cost	3	1	2
Social Impacts on Amenities	3	1	2
Environmental Impacts	2	1	2
Noise Impacts	3	1	2
Safety Impacts	3	1	2
Geotechnical	3	1	2
Travel Time Savings	1	2	3
Existing Road Network	3	1	2
Network Connectivity	2	1	3
Impacts on Cimarron ASP	1	3	1
Total	27	14	23

5.2 CONCLUSION

Depending on the needs of the community, Option 2 appears to be the most favourable option; however, this assessment did not account for all possible impacts to the community.

As noted in Section 4 there were a number of comments received on the 3 connector options during the Public Open Houses and the Public Meeting. Overall we believe most of the residents supported Option 2; however, others showed support for Option 1. City Municipal Works also contacted the land owners affected by these options and found that in general terms they were not totally opposed or totally accepting of any of the options presented. One land owner west of Seven Persons Creek was opposed to Option 2 because of how this option severed his land.

The City's TCC had a mix of comments on the SW Connector with the key issue being the need to look at how Option 2 impacts the City's current Growth Management Strategy.

Certification Page

City of Medicine Hat, South West Connector Route Options

The Services provided by Associated Engineering in the preparation of this report were conducted in a manner consistent with the skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

PROFESSIONAL ENGINEER ALBERTA
MONIQUE KEALEY

April 10, 2013

Monique Kealey, P.Eng.
Transportation Engineer

p.p. Randy Stevenson
Manager, Transportation Infrastructure

ASSOCIATED ENGINEERING
QUALITY MANAGEMENT SIGN-OFF
Signature:
Date: 2013-4-10

APEGA Permit to Practice P 3979

A Appendix A - AMEC Report

December 16, 2011

AMEC File: BX06174

Associated Engineering
#3, Strachan Bay SE
Medicine Hat, Alberta T1B 4Y2

Attention: Mr. Shane Hemenway, P.Eng.

RE: Preliminary Assessment on Site Suitability for Proposed Seven Persons Creek Crossing near 10th Avenue SW, Medicine Hat, Alberta

1. INTRODUCTION

As requested, AMEC Environment & Infrastructure, a division of AMEC Americas Limited (AMEC) has carried out a preliminary desktop and site review in order to identify potential bridge crossing locations along Seven Persons Creek near the south west extent of Medicine Hat, Alberta.

Based on information provided by the client, it is understood that the City of Medicine Hat is preparing long term plans for a new crossing of Seven Persons Creek in conjunction anticipated expansion of residential development along the south City extent. Based on the information provided, it is understood that a crossing which would tie into the alignment of 10th Avenue SW would be preferred from a traffic modelling standpoint; however, it is understood that consideration will also be given to alternate alignments as far south/west as the South Boundary Road alignment.

The Terms of Reference for the current assessment were based on discussions between AMEC and Associated Engineering and referenced in email correspondence dated October 12, 2011. As discussed, the scope of work for the current assessment generally included a desktop review of geological and topographical maps, aerial photographs, and available soils information for the area to identify potential crossing routes, a site reconnaissance to provide visual review of these potential routes, and a letter report summarizing the results of the study. Accordingly, this report summarizes the results of the desktop review and site reconnaissance.

2. DESKTOP REVIEW AND INDENTIFICATION OF POTENTIAL CROSSING LOCATIONS

As indicated above, the general area assessed during the current study included the portion Seven Persons Creek extending from about the 10th Avenue SW alignment westward to about the South Boundary Road alignment. The study area is illustrated on Figure 1, attached.

To support the current desktop study, the following information was reviewed:

- Recent aerial photography / GIS information provided by the City of Medicine Hat;
- Report on Geotechnical Study Relative to Slope Stability Aspects – City of Medicine Hat Open Space Policy (Hardy Associates (1978) Ltd, October 1984);

AMEC Environment & Infrastructure
A division of AMEC Americas Limited
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Medicine Hat, AB, CANADA T1A 8G3
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Fax +1 (403) 528-3860
www.amec.com

- Report on the Bank Stabilization Study, Seven Persons Creek, Medicine Hat, Alberta (EnviroGeo Testing Sabatini, May 1999);
- Geotechnical Site Assessment, Proposed Water Transmission Line and Reservoirs, Medicine Hat, Alberta (AGRA Earth & Environmental Ltd., November, 1997);
- Slope Stability Assessment, Proposed SW Transmission Line, South Boundary Road, Medicine Hat, Alberta (AMEC Environment & Infrastructure, November 2011);
- Map of Quaternary Geology, Southern Alberta (Alberta Research Council, 1987); and
- Aerial photographs dated 1951, 1972 and 1991.

As outlined on Figure 1, the subject portion of Seven Persons Creek is roughly 2.5 km long, and trends in a generally northeast direction. The creek meanders within a 250 m to 500 m wide valley which is bounded by coulee slopes rising to table lands at an overall height of about 30 m above the creek elevation.

Based on cursory review of historical aerial photographs in comparison with recent aerial photography, only very minor stream alignment differences are apparent. Historical oxbows were identified at the east end of the study area, and appear to have been partially infilled in conjunction with the existing golf course development located within the valley area east of the 10th Avenue alignment. Some slope crest regression was apparent at extreme bends in the creek at points where the stream was cutting into the coulee slopes and adjacent table lands. The slope crest regression was more apparent near the north end of the project area. In particular, the slopes along the north side of the creek just west of the 10th Avenue alignment appear to have regressed up to about 25 m during the course of the last 60 years.

Based on quaternary mapping for the area[1], the subject area is characterized by lacustrine deposits of coarse sand and silt with local ice-rafted stones and local water sorted materials to depths of as much as about 40 m. The surface is described as flat to gently undulating. The creek flats are described as fluvial deposits of fine sand, silty and clay with minor gravel deposits up to 20 m thick.

Based on bedrock geology mapping[2], the overburden deposits in the study area are generally underlain by grey continental sedimentary bedrock (Oldman and Foremost Formations) of the Mesozoic Era.

The borehole information available was generally consistent with the quaternary mapping for the area. Based on review of borehole logs for the area, the subsurface strata along the north side of the study area (i.e., in the 10th Avenue SW area) is generally comprised of silt and sand extending to depths of up to about 9 m below the table land, and overlies stiff to very stiff medium plastic clay till. Creek flat areas are generally characterized by sand and silt deposits. Lacustrine deposits do not appear as predominant on the table lands south of the creek near the 10th Avenue alignment as clay till deposits were noted from the ground surface in this area. At the southwest extent of the study area (near South Boundary Road), silt and sand deposits were also encountered from the ground surface / table land elevation, extending to about 8 m below grade, and underlain by stiff to very stiff clay till.

Some evidence of slope instability was also noted during the desktop review, and appeared predominantly limited to the north creek slopes near the north extent of the project, adjacent to

1 Shetson, I (1987) *Quaternary Geology, Southern Alberta.* Alberta Research Council, Natural Resources Division.
2 Jackson, P.C. (1981) *Geological Highway Map of Alberta.* The Canadian Society of Petroleum Geologists.

developed areas of the City along 15th Avenue SW and 32nd Street SW. It is possible that the increase in slope instability in this area is related to post-development shallower groundwater conditions along the north side of the creek area.

In identifying potential crossing routes, preference was given to those areas characterized by (1) a relatively straight and apparently stable streambed alignment, and (2) moderately inclined slopes with low evidence of slope failure activity. On this basis, a total of seven potential route alternatives were identified and have been illustrated on Figure 1, attached. These potential routes were reviewed in the field during a follow-up site reconnaissance, and are discussed further in Section 3.

3. SITE RECONNAISSANCE AND REVIEW OF POTENTIAL CROSSING ROUTES

The site reconnaissance was carried out on October 27, 2011 by John Lobbezoo, P.Eng. of AMEC. A follow-up reconnaissance was also carried out on December 15, 2011 which focused on a crossing along the current South Boundary Roadway alignment. Select photographs of the potential crossing locations are provided in Appendix A for reference.

In general, the site reconnaissance supported the findings of the desktop review. Detailed comments and review of each of the potential crossing routes are outlined in the following paragraphs.

Route 1 – 10th Avenue SW Extension

As indicated previously, it is understood that, from a traffic modelling perspective, a crossing near the alignment of 10th Avenue SW would be preferred. Accordingly, two alternative routes have been suggested along the 10th Avenue SW alignment, and are illustrated on Figure 1 as Routes 1A and 1B. The crossing locations are further illustrated on Photographs 1 to 5 (Appendix A).

It is noted that these two route present obvious conflict with the existing golf course development.

The north slopes along Route 1 exhibit some signs of movements, and seepage from these slopes would have to be accommodated as part of the roadway design in order to maintain stability of the roadway structure traversing the north slopes along Route 1. As noted previously, there is evidence of significant regression of the slope immediately to the west of the 10th Avenue alignment, and a suitable separation distance would have to be maintained between this active slope failure area and the new roadway alignment.

At the proposed creek crossing itself along Route 1, the creek bed is relatively straight and stable. It is noted that to maintain suitable separation from the active failure area to the west, the roadway would likely have to cross the creek at a skew.

Some geotechnical challenges should also be anticipated traversing the new roadway across the valley floor along Route 1 in light of the presence of historical oxbows in the area south of the creek, some of which appear to have been partially infilled in conjunction with the development of the adjacent golf course.

While the south coulee slopes appear relatively stable with no evidence of active movements, these slopes are relatively steep along the 10th Avenue alignment, particularly toward the west (Route 1A). An alternative route which traverses much gentler coulee slopes further to the west has been illustrated on Figure 1 as Route 1B, and could also be considered as an option less intrusive to the south coulee slopes.

Route 2 – West of 10th Avenue SW

As illustrated on Figure 1, Route 2 traverses the valley in a relatively stable coulee area about 400 m west of Route 1, just west of the large active slope failure area at the west side of 10th Avenue SW. The crossing area is further illustrated on Photographs 5 to 8 (Appendix A).

The north coulee slopes are somewhat gentler and appear more stable than at Route 1, with less evidence of seepage from these slopes. However, the table land portion of this route would likely have to wrap around the large active slope failure area just west of 10th Avenue, and a suitable separation distance between the new roadway alignment and the failure area would have to be maintained, resulting in some conflict with existing development at the north side of the crossing. It is noted that while seepage was not indentified on the south facing coulee slopes, given the adjacent slope seepage issues it is anticipated that seepage would be encountered when cutting the new roadway into the north coulee slopes, and that this potential would likely also have to be incorporated into the roadway design in this area.

As illustrated on Photograph 7, the creek alignment is relatively straight, and the bridge crossing would likely be fairly straight forward at this location. No evidence of historical oxbows was noted in the historical aerial photographs within this area, and geotechnical issues with traversing the valley floor area itself are not anticipated based on the current review. The south coulee slopes, as illustrated on Photograph 5, are characterized by a very shallow coulee draw, and only minor earthworks would be anticipated to facilitate the roadway through this area.

Route 3 – Near 15th Avenue SW

A third alternative to crossing the Seven Persons Creek in the vicinity of 10th Avenue SW has also been suggested, and is illustrated on Figure 1 as Route 3. The route is further illustrated on Photographs 9 and 10 (Appendix A).

The north slopes at Route 3 are marginally stable, with various dugouts and ponds present on these slopes. The route also encroaches on a second large and active slope failure area present south and east of 32nd Street SW and 15th Avenue SW. Accordingly, adequate separation between the new roadway and this failure area would have to be maintained, and would conflict with a significant amount of existing development north of the crossing location. Similar to Routes 1 and 2, seepage issues in these slopes area also anticipated, and would likely have to be addressed during design and construction in this area.

Similar to Route 2, the creek bed is relatively straight and stable at Route 3 and no significant geotechnical issues traversing the valley floor in this area would be anticipated. The south/east coulee slopes are also relatively stable; however, traversing these slopes would require more earthworks effort than at Route 1B/2.

Route 4 – NW-4-12-6-W4

As illustrated on Figure 1, Route 4 traverses Seven Persons Creek in the area south and west of 15th Avenue SW, in an area currently entirely undeveloped. The crossing area is further illustrated on Photographs 11 to 13.

From a geotechnical and slope stability perspective, Route 4 is likely the preferred option. Coulee slopes along both sides of the creek are very gently inclined, and would require minimal earthworks to facilitate the roadway crossing. The creek bed is also appears relatively straight and stable through this area, and it is anticipated that a bridge crossing in this area would be relatively straight forward.

Route 5 - SW-4-12-6-W4, north of South Boundary Road

As illustrated on Figure 1, Route 5 traverses Seven Persons Creek in the area just north of South Boundary Road. The crossing area is further illustrated on Photographs 14 to 16 (Appendix A).

The west coulee slopes are gently inclined, and appear to be relatively stable; however, localized areas exhibiting signs of seepage from the side slopes were identified, and appropriate drainage measures would have to be incorporated into the new roadbed in this area. Some conflict with existing development would also be incurred with a crossing at this location.

At the creek crossing itself, the stream bed is gently arced, and may require additional armouring at the bridge abutments.

While the east coulee slopes appear relatively stable in this area, the level of earthworks on the east slopes would be higher than at Route 4.

Route 6 – NW/SE crossing near existing South Boundary Road

As illustrated on Figure 1, Route 6 traverses the Seven Persons Creek just west of the existing South Boundary Road crossing. The crossing area is further illustrated on Photographs 17 to 19 (Appendix A).

As illustrated on Figure 1, the eastern portion of Route 6 follows a similar alignment as does the existing South Boundary Road as it traverses the east coulee slopes. It is noted that, as illustrated on Photograph 18, the existing roadway alignment encroaches on a vertical eroded soil face just south of the current roadway alignment. Accordingly, sufficient lateral separation between this eroded face and the new roadway alignment at this location would have to be maintained.

At the proposed crossing location itself, the creek bed is relatively straight, and no significant geotechnical issues traversing the creek valley floor in this area would be anticipated.

The west coulee slopes are characterized by a shallow coulee draw at this location. While slope stability issues at this location were not readily apparent, there is some evidence erosion through the shallow coulee draw with deposition on the west edge of the creek in this area. Vegetation and trees in this area also indicate excess groundwater supply to these slopes. Further

investigation of the west coulee slopes at this location would be warranted in conjunction with further consideration of Route 6.

Route 7 – South Boundary Road Alignment

As illustrated on Figure 1, Route 7 traverses the creek near the section line, along the north side of the east-west South Boundary Road ROW. The crossing is further illustrated on Photographs 17 and 20.

The east coulee slopes along Route 7, as illustrated on Photograph 17, are relatively steep, and would require significant earthworks to traverse these slopes.

As illustrated on Photograph 20, the creek itself is relatively straight, and no significant geotechnical issues traversing the creek or valley floor in this area would be anticipated.

The west coulee slopes, also illustrated on Figure 20, are relatively gentle, and minimal earthworks would be anticipated to traverse these slopes.

4. SUMMARY COMMENTS

In general, Route 4 is considered most preferable from the perspective of the current preliminary geotechnical site suitability assessment. Route 7 is also considered favourable from the perspective of the current assessment.

A crossing in the area of 10th Avenue SW is likely feasible, either along Routes 1A/1B or Route 2; however, a crossing in this area would require significant more effort than a crossing along Route 4. Further geotechnical investigation of the 10th Avenue SW area will be required, specifically in conjunction with the stability of the north coulee slopes, and the valley floor in the area of the historical oxbows.

For a tie-in to 10th Avenue SW area, Route 3 is likely the least preferable option. Further investigation regarding the stability of the north slopes in this area would be required to support further consideration of a crossing in this area.

For a crossing near South Boundary Road, two feasible options have been identified, with a third option (Route 5) just north of the South Boundary Road area. Based on the current preliminary assessment, some seepage issues along the west coulee slopes at Routes 5 and 6 will require further geotechnical investigation; however, no significant geotechnical issues which would preclude any one of the three proposed South Boundary Road routes are anticipated.

5. CLOSURE

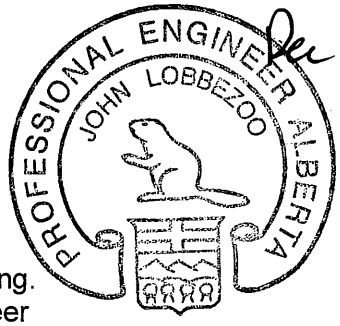
The discussion and preliminary assessment given in the previous sections are based on interpreted conditions found during AMEC's desktop review and during the October 27, 2011 site reconnaissance by AMEC. Should information other than that presented in this report become available, AMEC should notified and provided opportunity to revise the discussions and recommendations presented herein accordingly.

This report has been prepared for the exclusive use of the City of Medicine Hat and their designers (Associated Engineering) for the specific application to the work described in this report. Any use that a third party makes of this report, or any reliance or decisions based on this report are the sole responsibility of those parties. This report has been prepared in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

We trust that this report is satisfies your present requirements, and we look forward to assisting you in the completion of this project. Should you have any questions, please contact the undersigned at your convenience.

Respectfully,

AMEC Environment & Infrastructure
A division of AMEC Americas Ltd.



Dec 19, 2011

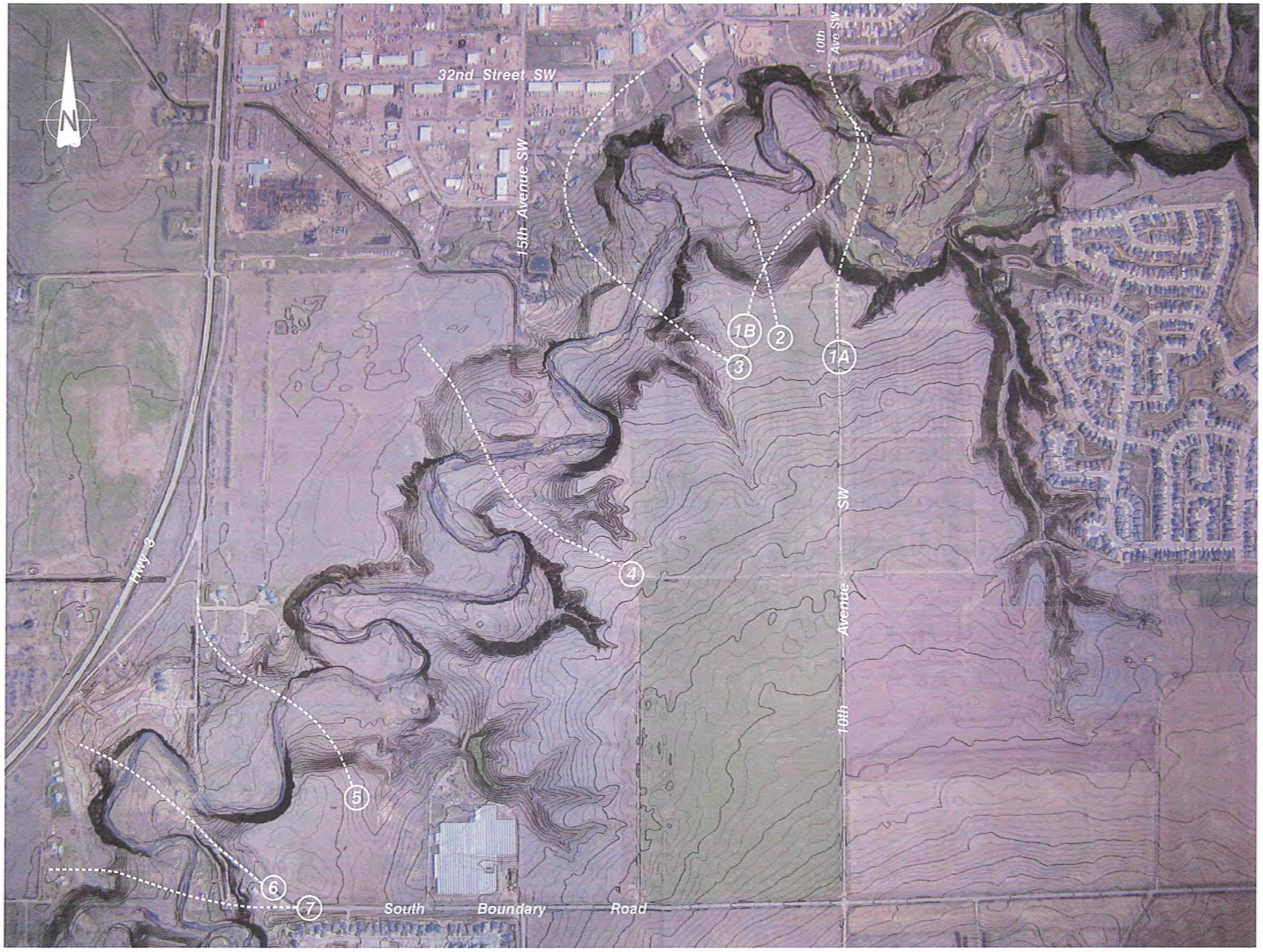
John Lobbezoo, P.Eng.
Geotechnical Engineer

Reviewed by;

Georgina Griffin, M.Eng., P.Eng.
Associate Geotechnical Engineer

APEGGA PERMIT P04546

Attachments:
Figure 1 – Potential Seven Persons Creek Crossing Locations
Appendix A – Site Photographs



	CLIENT LOGO: Associated Engineering	CLIENT: Associated Engineering	DWN BY: BJ	TITLE: POTENTIAL SEVEN PERSONS CREEK CROSSING LOCATIONS	DATE: DECEMBER 2011
			CHK'D BY: JL		PROJECT NO: BX06174
			DATUM: NA	PROJECT: Proposed Seven Persons Creek Crossing Southwest Medicine Hat, Alberta	REV. NO.: A
			PROJECTION: NA		FIGURE 1
			SCALE: NTS		

AMEC Environment & Infrastructure
469 - 40th Street South
Lethbridge, Alberta CANADA T1J 4M1
Tel. (403) 327-7474
Fax (403) 327-7682

This drawing was originally produced in colour.

APPENDIX A

Site Photographs

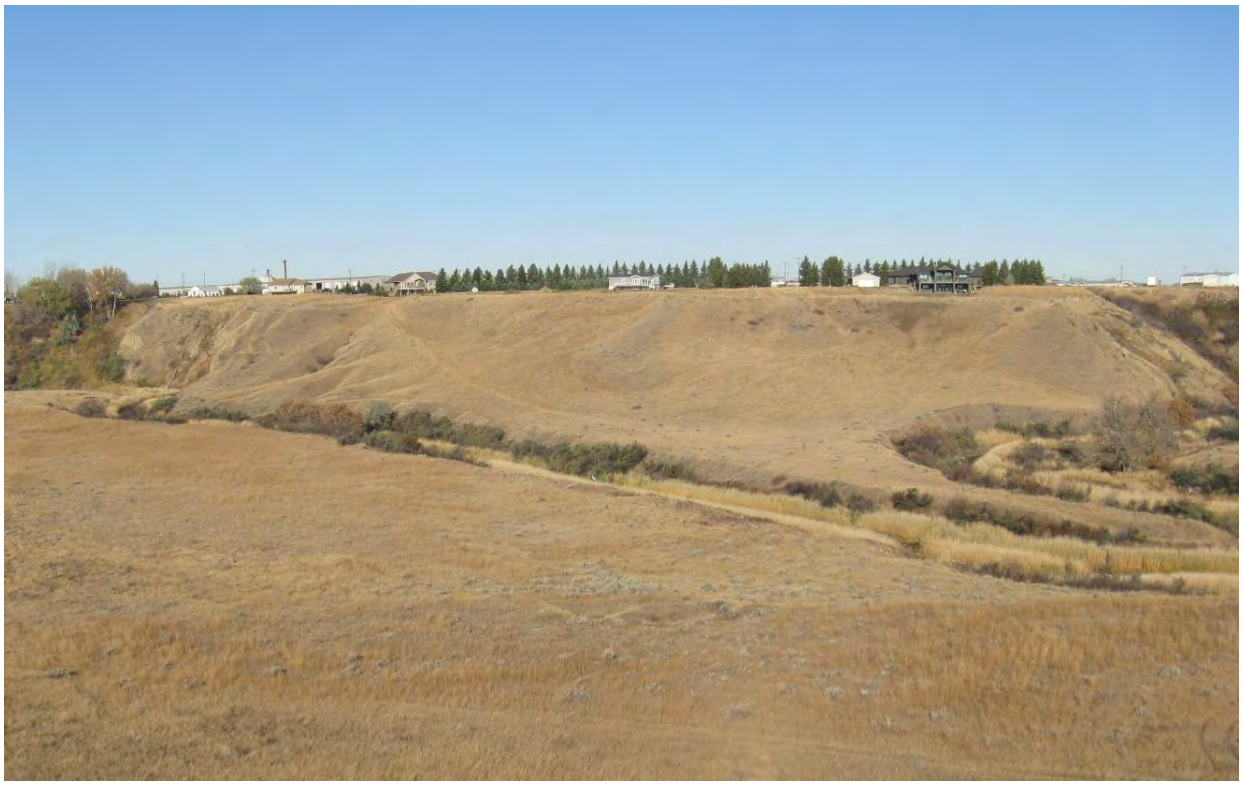
Photograph 1: Looking north at Seven Persons Creek and the north coulee slopes at Route 1

Photograph 2: Looking southeast at Seven Persons Creek and the valley area at Route 1

Photograph 3: South coulee slope area at Route 1A

Photograph 4: Looking northwest at the valley area at Route 1.
Note historical oxbows in foreground.

Photograph 5: South coulee slopes along Route 1B and Route 2



Photograph 6: Looking northwest at the valley area and north coulee slopes at Route 2

Photograph 7: Looking west at Seven Persons Creek at the Route 2 crossing

Photograph 8: Looking northeast at the north coulee slopes at Route 2

Photograph 9: Looking north at Seven Persons Creek and north coulee slopes at Route 3

Photograph 10: Looking northeast at east coulee slopes at Route 3

Photograph 11: Looking south at the east coulee slopes at Route 4

Photograph 12: Looking southwest at Seven Persons Creek at the Route 4 crossing

Photograph 13: Looking southwest at the west coulee slopes along Route 4

Photograph 14: Looking north at the west coulee slopes along Route 5

Photograph 15: Looking west at Seven Person Creek at the Route 5 crossing

Photograph 16: Looking northwest at the Route 5 alignment

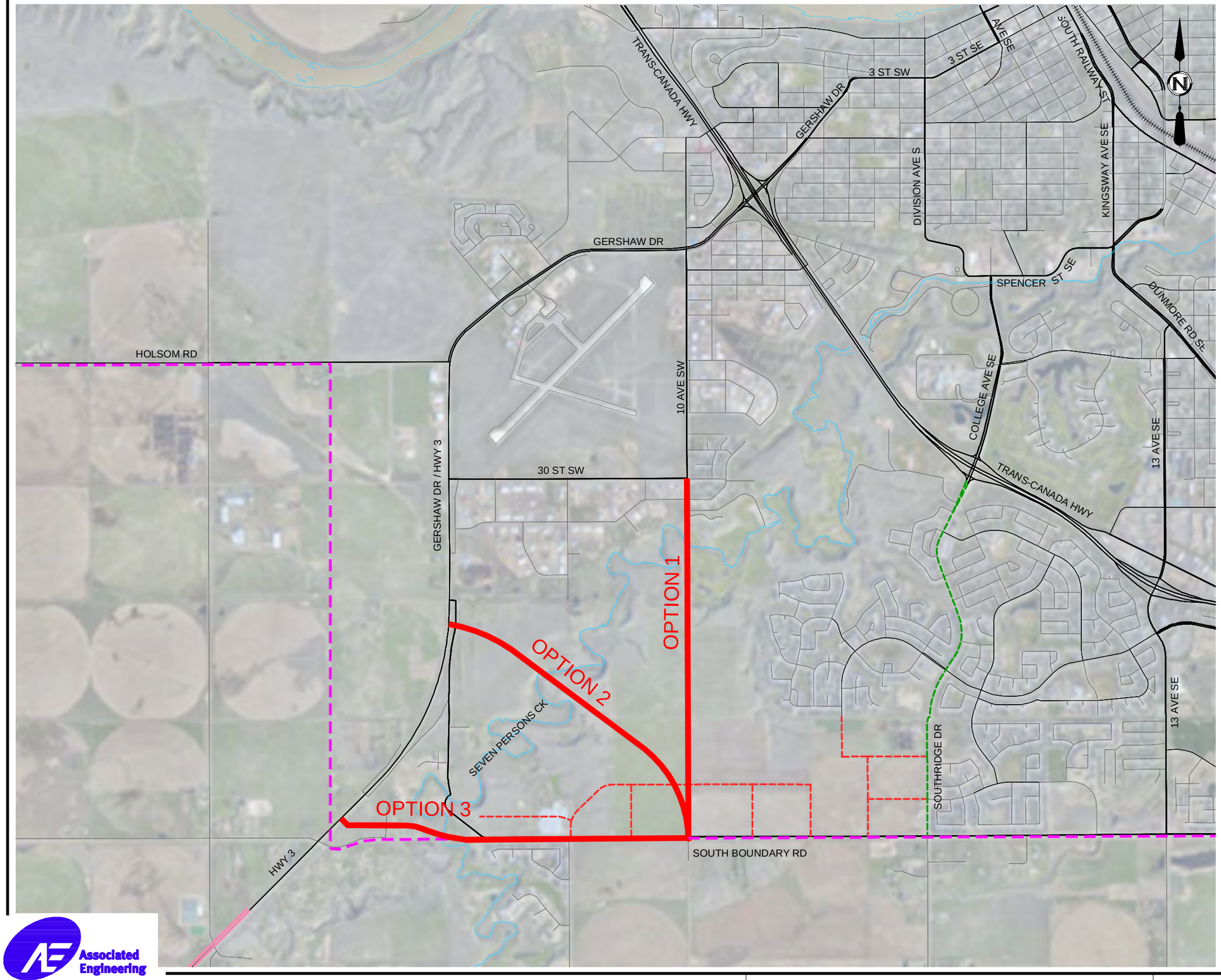
Photograph 17: Looking southeast at the east coulee slopes at Routes 6 and 7

Photograph 18: Looking east at the east side of Route 6 alignment.
Note the vertical eroded face adjacent to the existing roadway.

Photograph 19 – Looking northwest at the northwest coulee slopes along the Route 6 alignment

Photograph 20: Looking west at the creek and west coulee slopes along the Route 7 alignment

B Appendix B - Figures



LEGEND

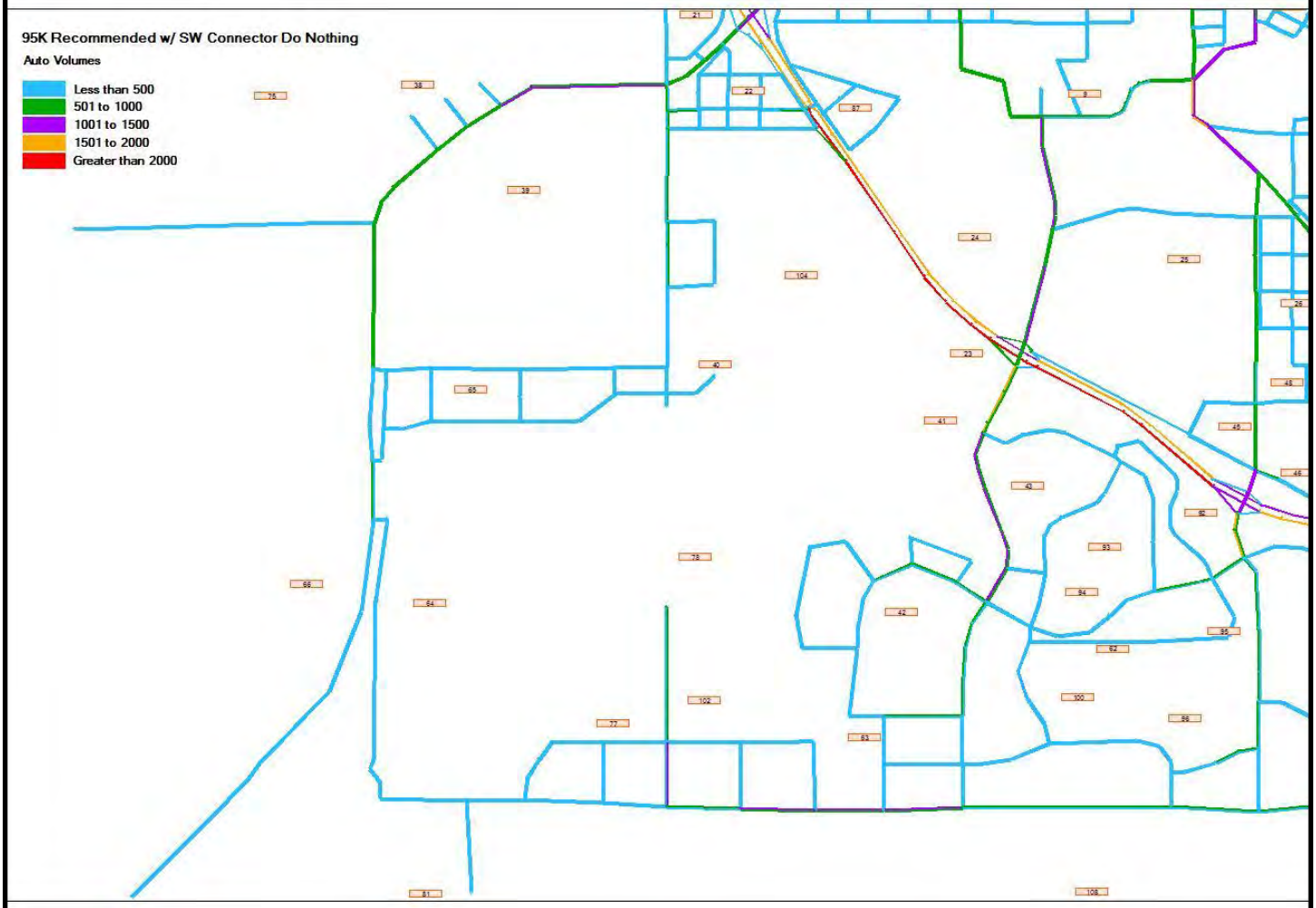
- ALBERTA TRANSPORTATION BYPASS
- PLANNED ROADWAY UPGRADE
- FUTURE ROADWAY CONNECTION
- CITY/TOWN/HAMLET APPROXIMATE LIMITS
- CPR RAILWAY
- WATERCOURSE
- POTENTIAL SEVEN PERSONS CREEK CROSSINGS
- SOUTH WEST CONNECTOR ROUTE OPTONS

Associated Engineering

CITY OF MEDICINE HAT
Road Study Master Plan
SW Roadway Network

Medicine Hat
The Gas City

C Appendix C - Traffic Modelling Results

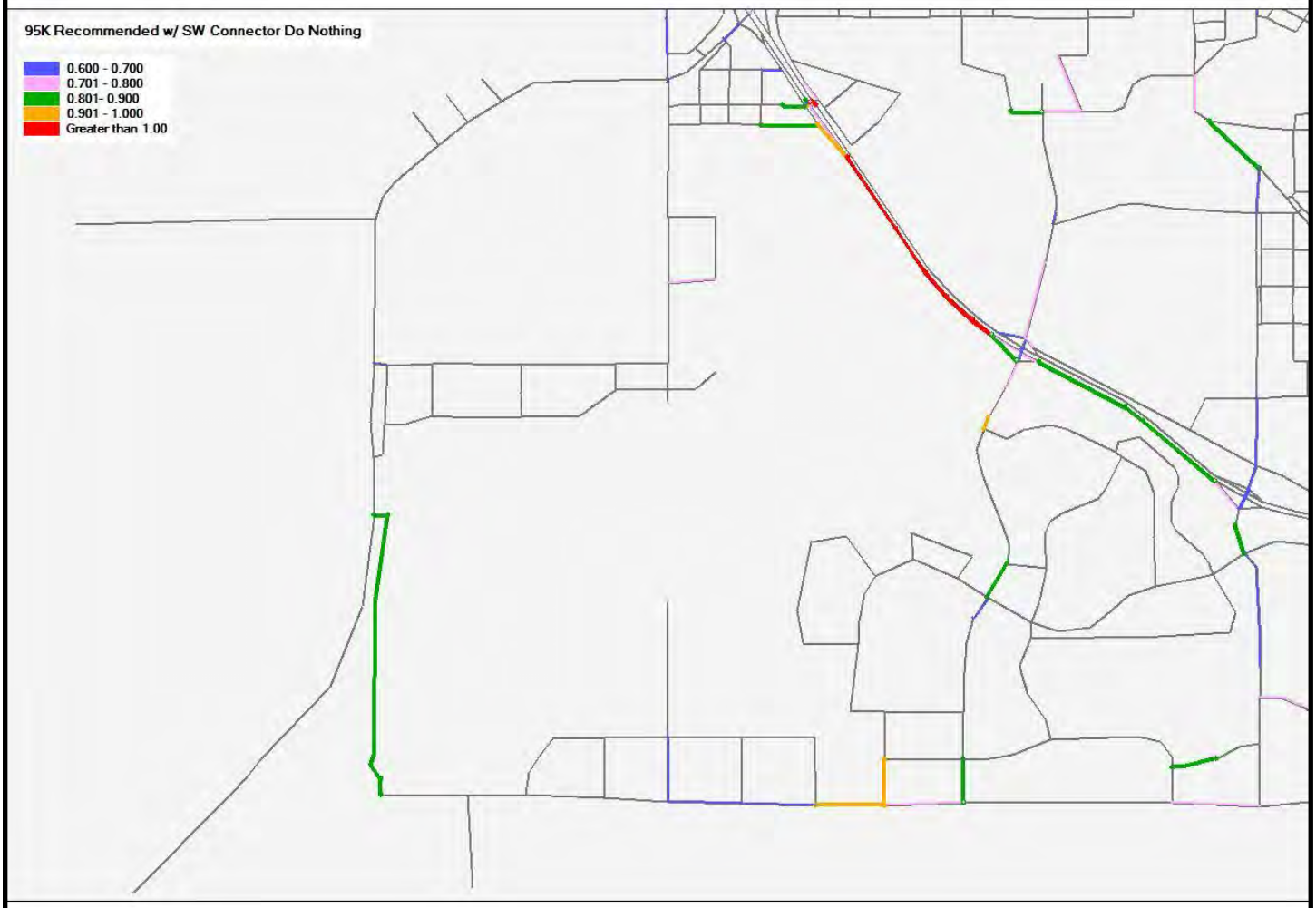


PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.2

Associated Engineering

SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K RECOMMENDED TRAFFIC VOLUMES



PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.3

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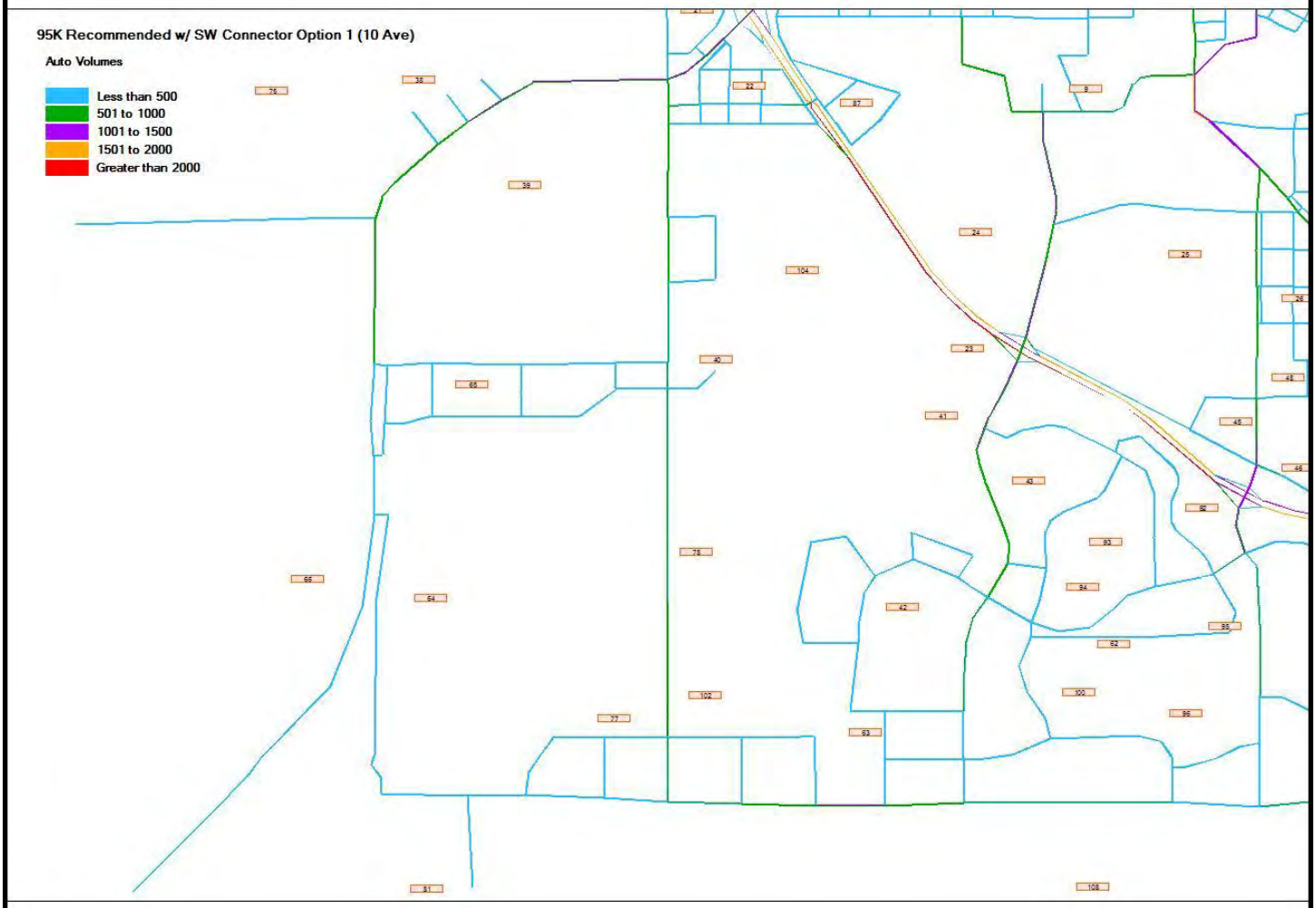
SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K RECOMMENDED VOLUME CAPACITY RATIO

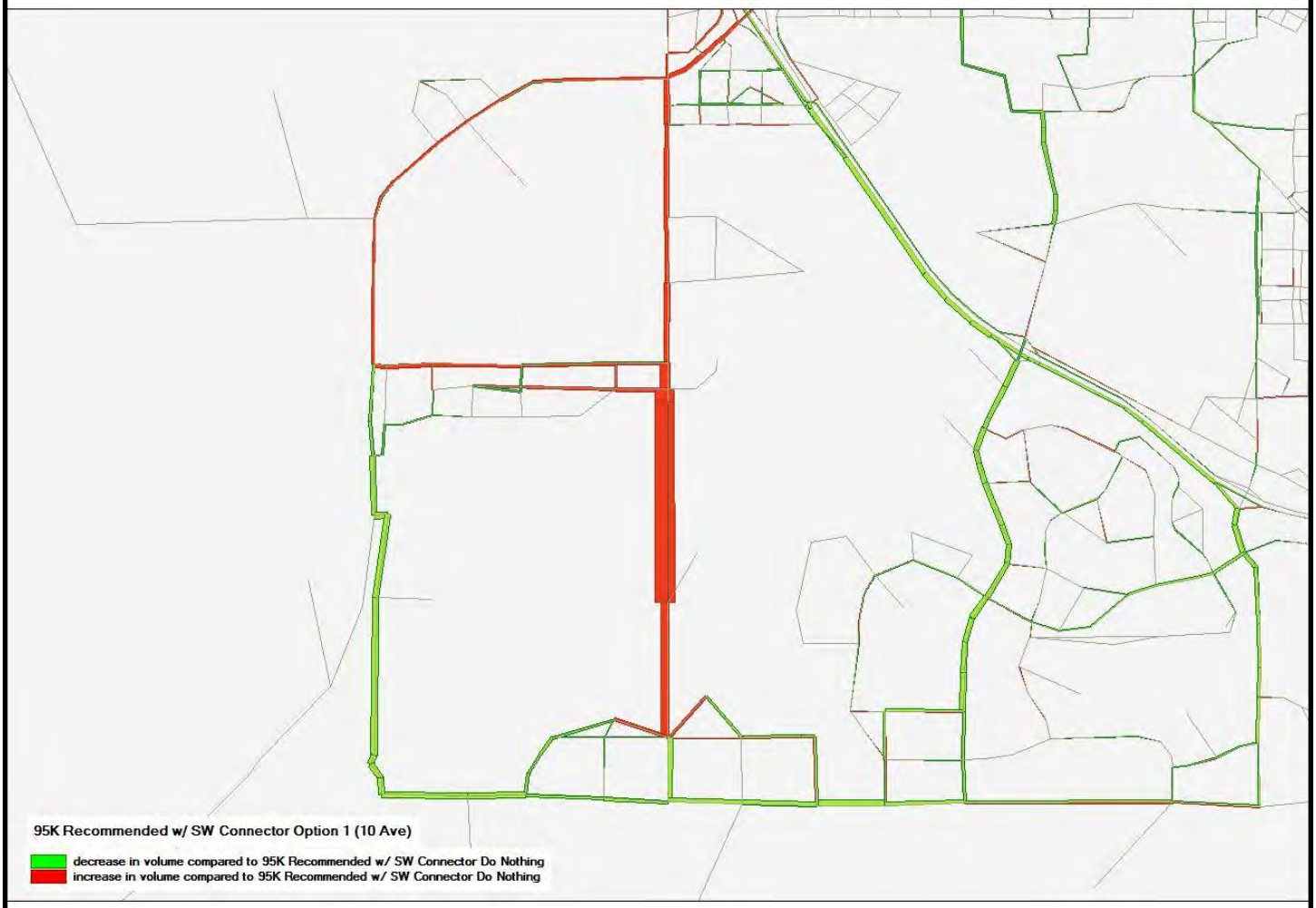


PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.4

Associated Engineering

SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K - OPTION 1 TRAFFIC VOLUMES

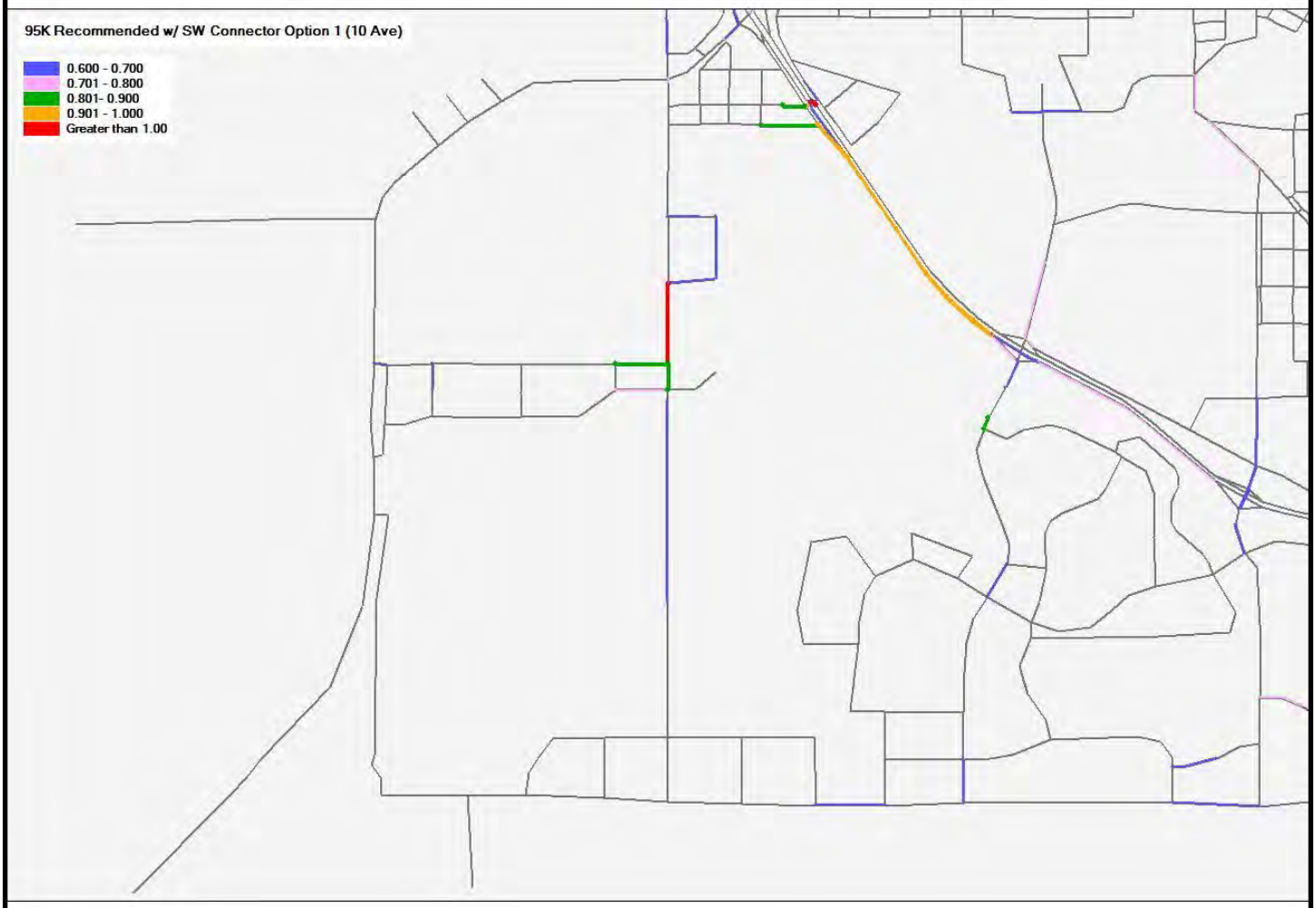


PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A5

Associated Engineering

SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K OPTION 1 VOLUME PLOT COMPARISON



PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.6

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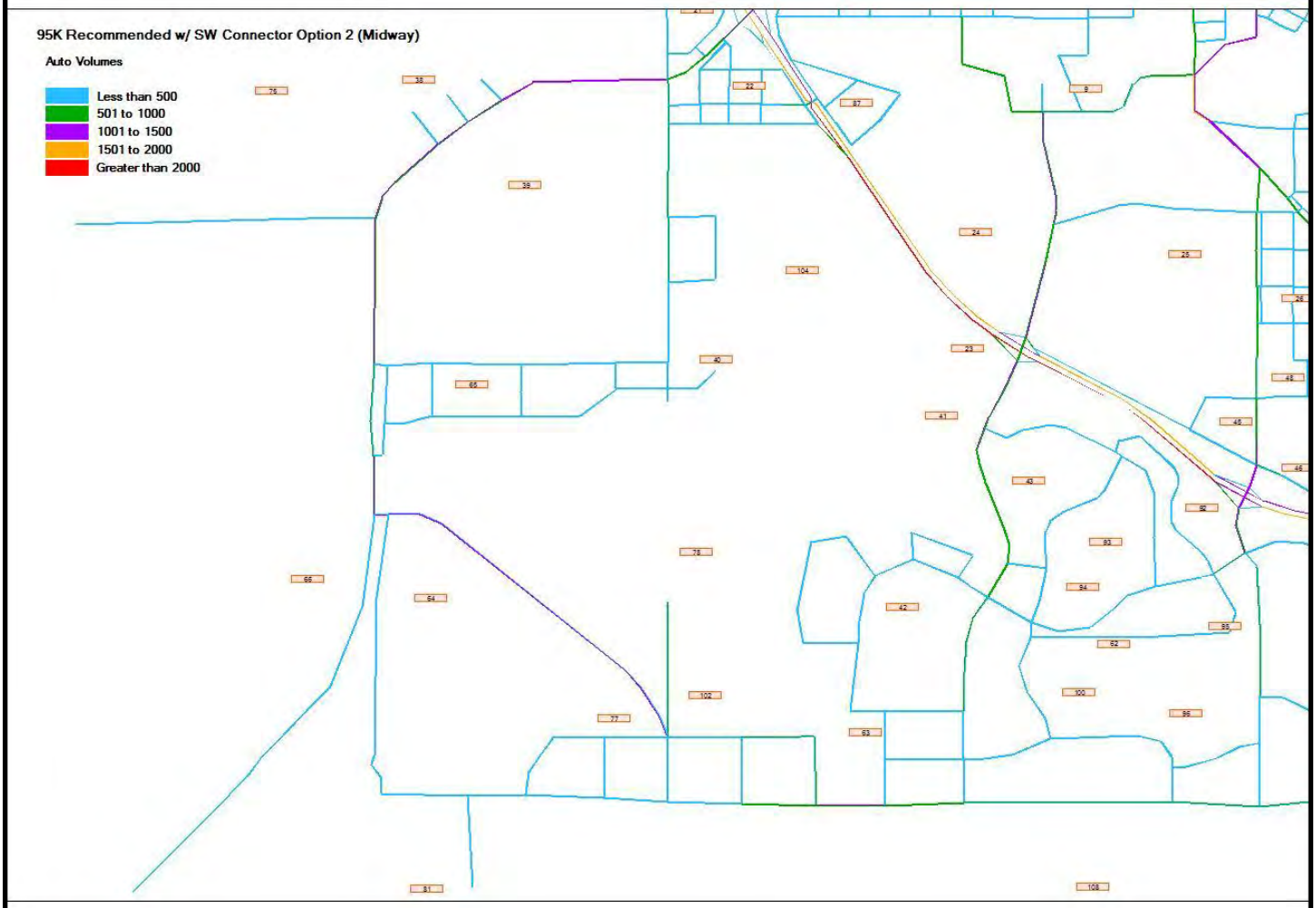
SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K - OPTION 1 VOLUME CAPACITY RATIO

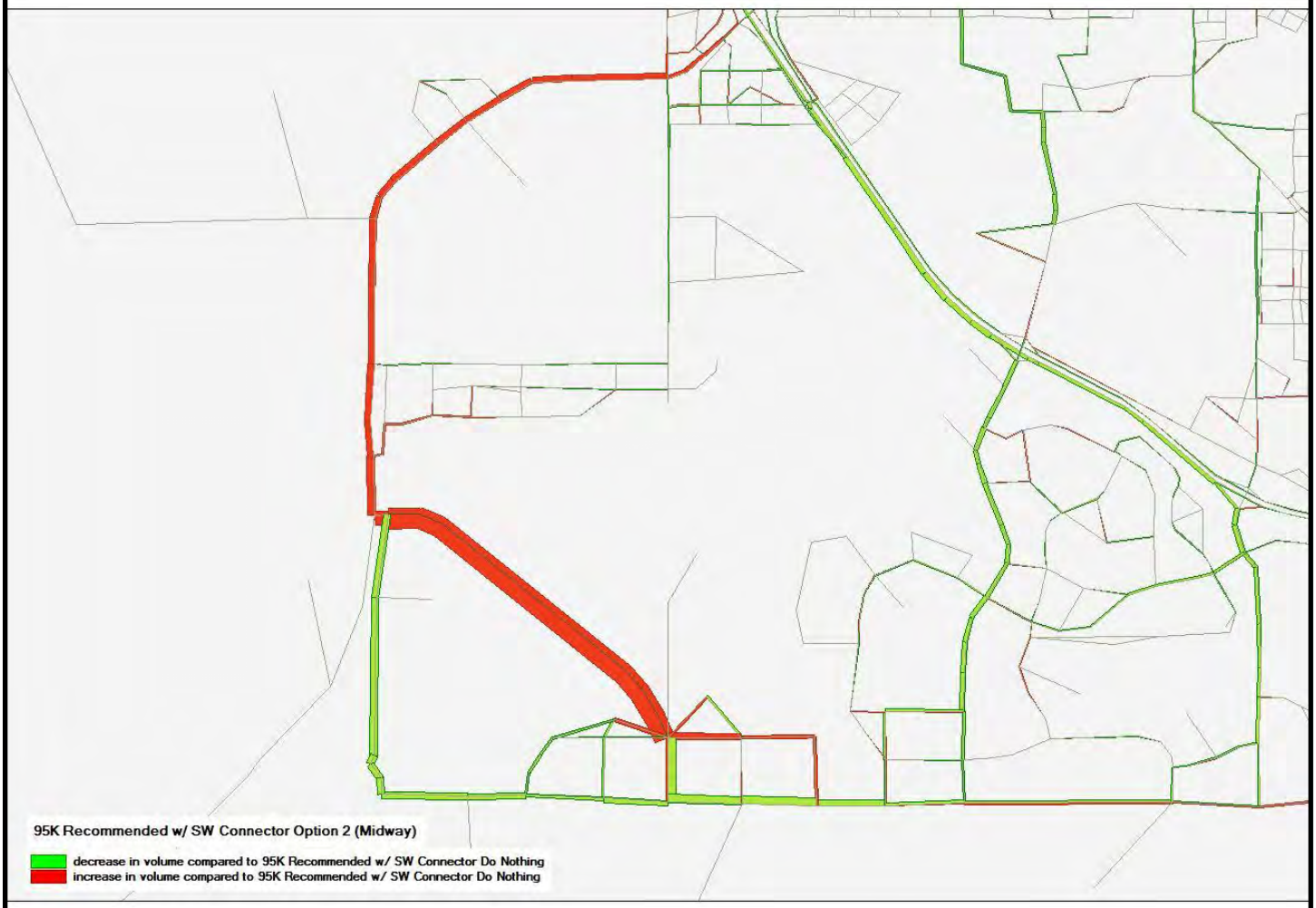


PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.7

Associated Engineering

SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K - OPTION 2 TRAFFIC VOLUMES

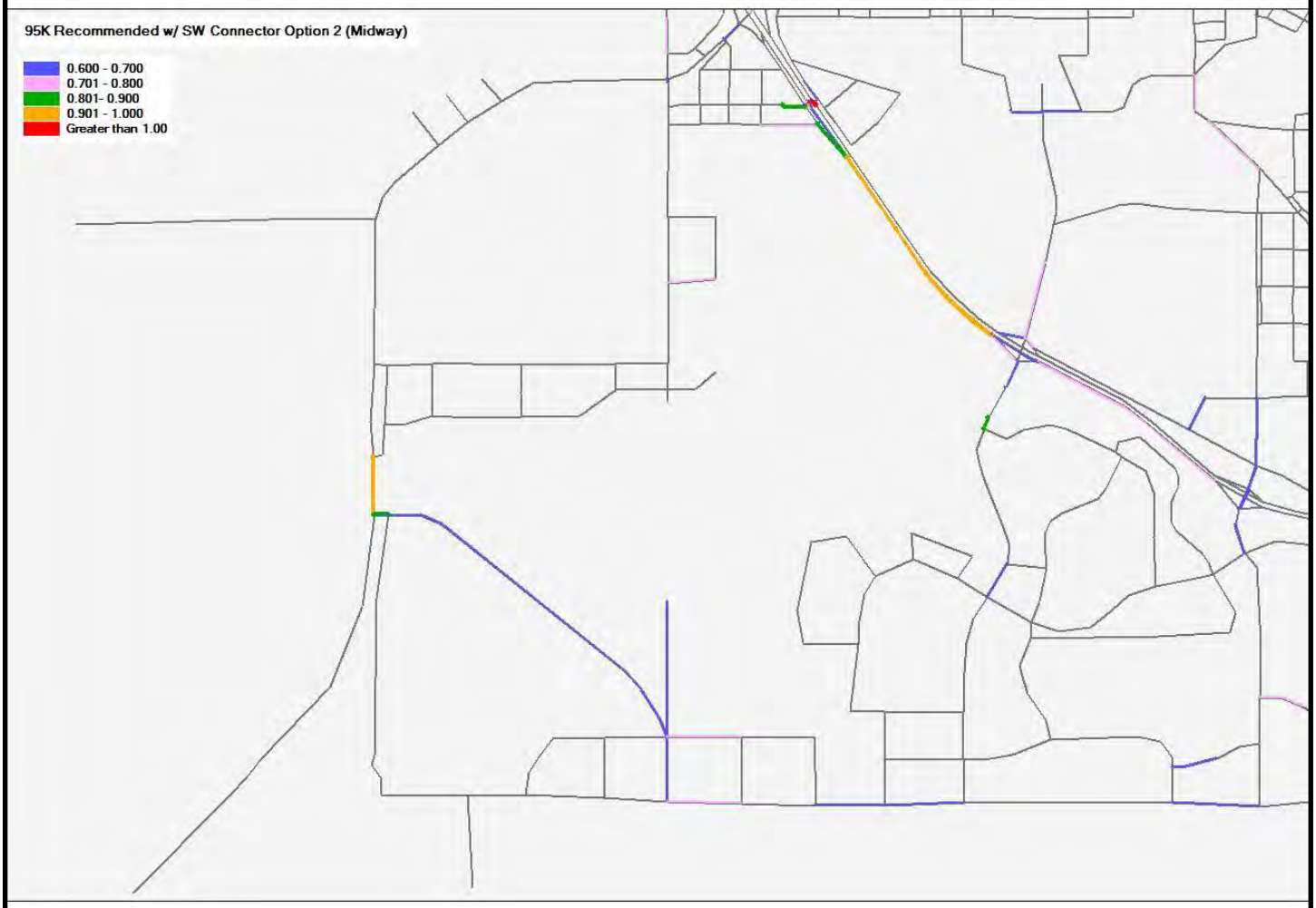


PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.8

Associated Engineering

SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K OPTION 2 VOLUME PLOT COMPARISON

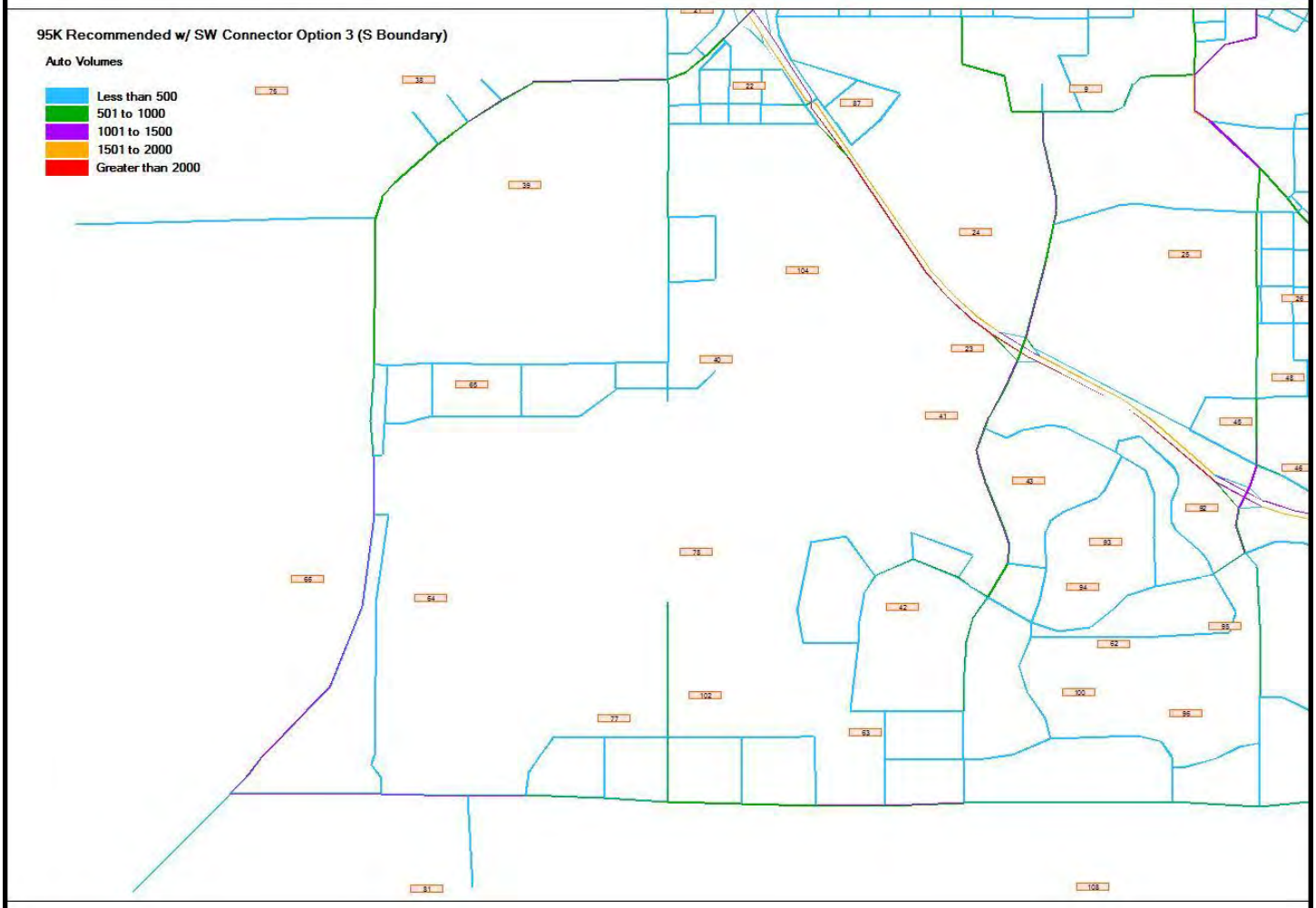


PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.9

Associated Engineering

SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K - OPTION 2 VOLUME CAPACITY RATIO



PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.10

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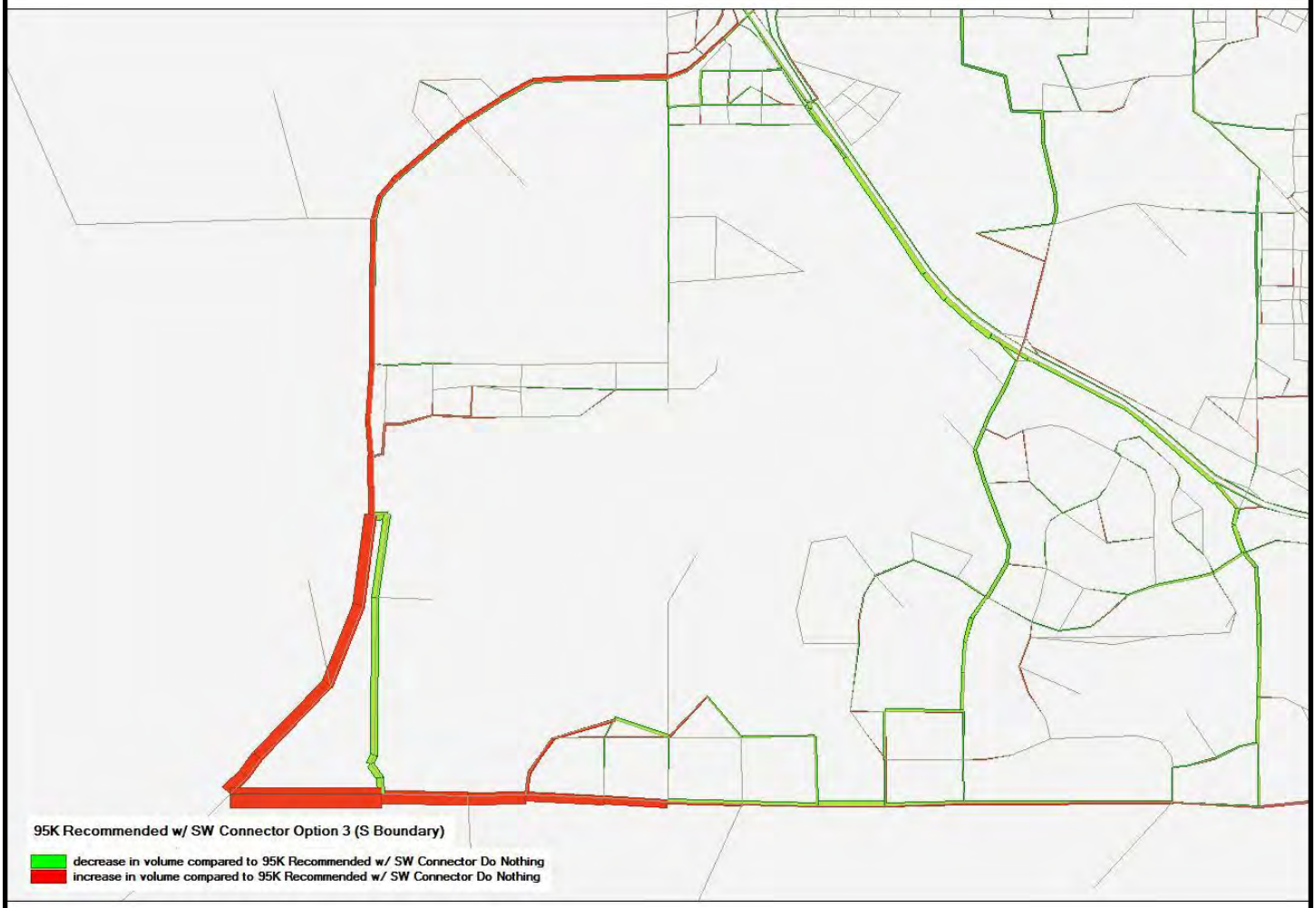
SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K - OPTION 3 TRAFFIC VOLUMES



PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.11

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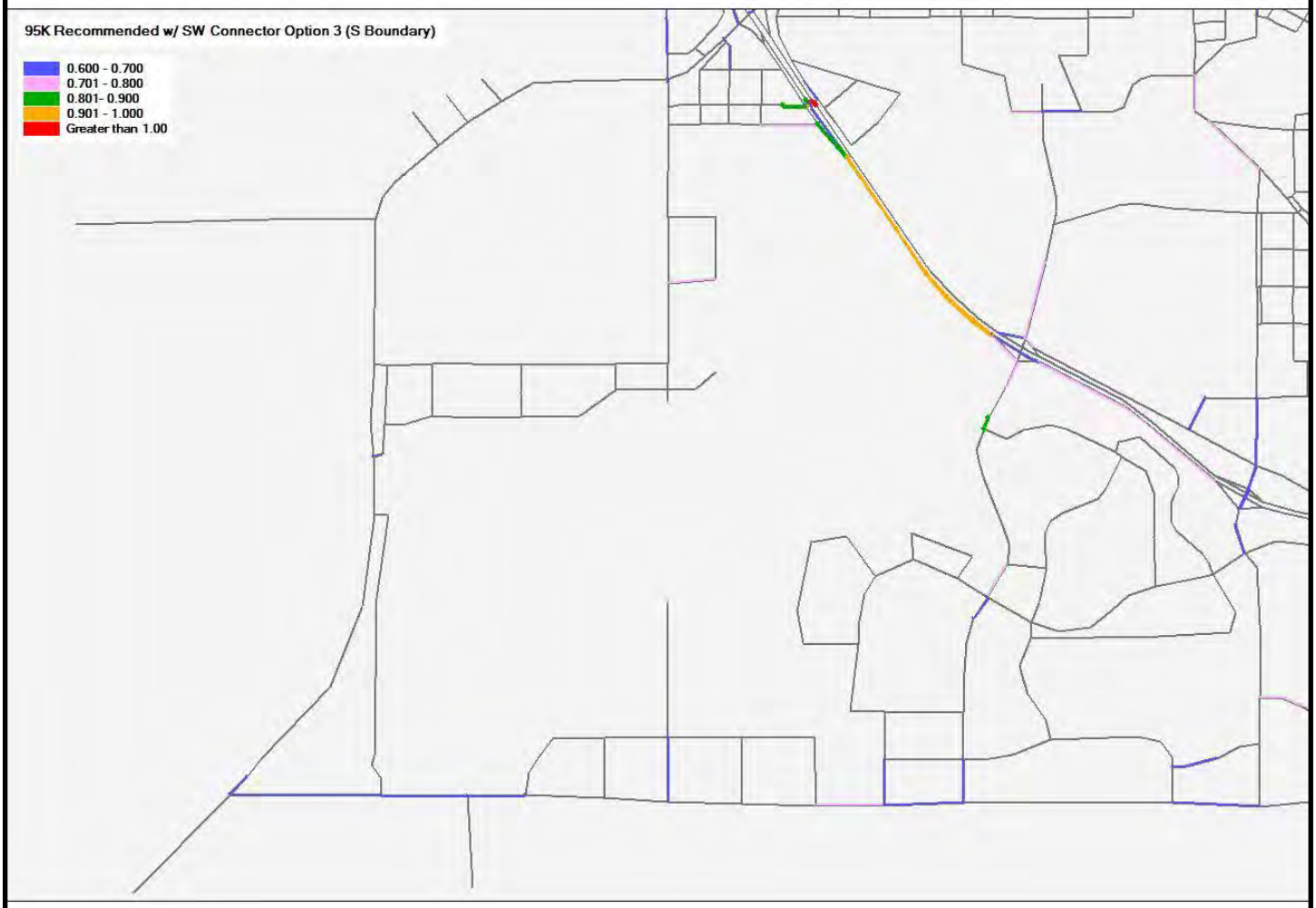
SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K OPTION 3 VOLUME PLOT COMPARISON



PROJECT No.	20103999
DATE:	April 2012
APPROVED:	M. Kealey
SCALE:	NTS
DWG. No.	FIGURE A.12

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SOUTH WEST CONNECTOR ROUTE OPTIONS ASSESSMENT

95K - OPTION 3 VOLUME CAPACITY RATIO

D Appendix D - Public Comments Summary

Public Meeting - Chamber of Commerce
Location: Best Western Inn on Redcliff Drive
Date Jan. 15, 2013
Number of Participants 48
Participant Comments

AT Corridor	*Number of Responses*
More information requested for proposed options for hospital & 16 Street SW intersection.	1
Concerns on the lack of discussion and information on the Highway 1 and 6th Street SW intersection.	1
RSMP	*Number of Responses*
General positive feedback.	1

1st Street SW Open House
Location: Esplanade - Studio Theatre
Date Jan. 16, 2013
Number of Participants 72
Participant Comments

AT Corridor	*Number of Responses*
Concerns on the potential traffic volume on 1 Street SW.	10
Concerns on the speed limit on 1 Street SW. Feels that drivers are going too fast.	2
Concerns on the potential noise pollution on 1 Street SW.	2
Concerns on closing of 6 Street SW and Red Deer Drive access from Highway 1 which will negatively impact local businesses.	3
Concerns on the speed limit on 6 Street SW.	1
Concerns on the closing of highway 1 and 16 Street intersection.	1
Suggestion for a service road to the Power Plant on the west side of Highway 1.	1
Positive feedback on the interim changes to Highway 1 and 1st Interchange.	3
Positive feedback on the phasing of work with opportunity for input from the public.	3
RSMP	*Number of Responses*
Positive feedback on the 4 way stop implemented at Division Avenue.	1
Concerns on the timeline of the phasing and plan. Request more information on the estimated cost.	4
Concerns on the lack of a signal light at Redcliff Drive.	1
Suggests directing traffic from Highway 1 onto Township Road 120.	1
Suggests seeking alternative to direct crescent height traffic away from Highway 1.	1

RSMP Public Open House
Location: Exhibition Grounds - Higdon Hall
Date Jan. 23, 2013
Number of Participants 138
Participant Comments

AT Corridor	*Number of Responses*
Concerns on potential traffic volume on 1 Street SW as it is a historical road.	5
Concerns on the potential noise pollution on 1 Street SW.	1
Positive feedback on the overall Highway 1 and Highway 3 upgrades. Agrees with closure of 16 Street SW and 6 Street SW.	3
Concerns on the closure of the hospital exit ramp, and 6 Street SW exit as it is very highly used. Very concerned on the affect it will have on local businesses.	4
Suggestion on removing left turn lane concrete median on Highway 1.	1
Concerns on the timeline of the phasing of the plan. Taking way too long to implement.	3
RSMP	*Number of Responses*
Request more information on airport expansion, no additional comment.	1
Request more information on Crescent Heights area, no additional comment.	1
Request more information on estimated cost of the overall plan.	1
Positive feedback on overall plan. The sooner the better.	3

Post Public Meeting - Online Survey Comments Collected By Chamber of Commerse
Date "January 2013"
Number of Participants 9
Participant Comments

AT Corridor	*Number of Responses*
Concerns on the closure of the hospital exit ramp as it is very highly used. Concern on the affect it will have on local businesses.	3
Positive feedback on overall Highway 1 upgrades, concerns on timeline.	2
Suggests removing left hand turns and traffic lights at the intersection and adding off ramp from Highway 1 to Redcliff Drive SW.	1
SW Connector	*Number of Responses*
South Boundary Road to Highway 3 is a good idea, Option 2 (middle alignment) is the most ideal.	1

Email Information from Contact with the Public and Private Property Owners
Date "January 2013"
Number of Participants 4
Participant Comments

AT Corridor	*Number of Responses*
Concerns with making Bomford Crescent a one way (eastbound) access as it will take out the one and only street exit for businesses.	2
Safety concerns with respect to access for ambulance and fire services.	1
Concern on the 16 Street and Highway 1 intersection, suggest possibilty to divert large truck traffic onto Township Road 120.	1
Museum land property currently owned by new owners, portion associated with Bomford is no longer a roadway.	
SW Connector	*Number of Responses*
Unsure of the need for the 3 options for SW Connector.	1
A landowner west of Seven Persons Creek was concerned with Option 2 severing his parcel of land & making development difficult	

E Appendix E - Presentation Boards used at Open Houses

Medicine Hat
The Gas City

A Community of Choice




ROADWAY SYSTEM MASTER PLAN (RSMP) UPDATE

Public Open House - January 23, 2013

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WHAT IS A ROADWAY SYSTEM MASTER PLAN?

- Roadway Network that aligns with the Municipal Development Plan
- Updates City of Medicine Hat Computer Traffic Model
- Identifies Roadway System Improvements (10 Year Capital Plan)
- Identifies Long Range Road Network Improvements
- Identifies Impacts of Highway Connections to the community
- Studies other critical aspects of the City Road Network (e.g. Downtown Parking Study)
- Reviews / Updates City of Medicine Hat Transportation Bylaw

WHAT'S IN THE CITY OF MEDICINE HAT'S ROADWAY SYSTEM PLAN?

- Downtown Parking Study (approved by Council)
- Cycling Master Plan (approved by Council)
- Assessment of converting Downtown one-way streets to two-way streets (approved by Council)
- Installation guidelines for traffic control devices (i.e. stop/yield, school & playground zone, pedestrian crossings, and parking restrictions)
- Preliminary assessment for the Southwest Medicine Hat connector
- Assessment of proposed AT upgrades along TCH corridor
- Assessment of interim measures/upgrades and phasing of AT's proposed upgrades along TCH corridor

RSMP UPDATE - KEY FINDINGS

The RSMP identified the following roadway upgrades, in support to projected MDP growth in the City.

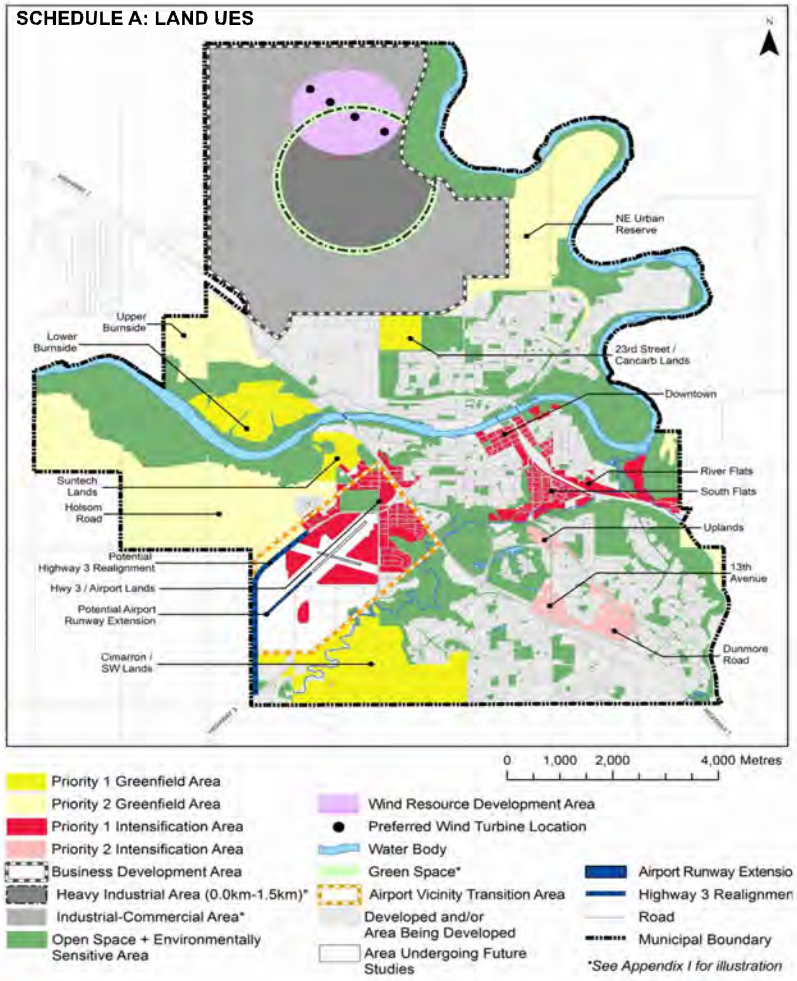
ROADS:

- West Boundary Road
  (TCH to Box Springs Blvd)
- Box Springs Road NW
  (Brier Park Road to 23rd Street NW)
- Box Springs Road NW
  (23rd Street NW to Box Springs Street NW)
- 13th Avenue SE
  (Strachan Road to South Boundary Road)
- 11th Avenue SW
  (extension to TCH)
- South Boundary Road
  (South Ridge Drive to Range Road 61)
- Southwest Connector
  (between South Boundary Road and Highway 3)
- Burnside Drive
  (TCH to Redcliff Way)

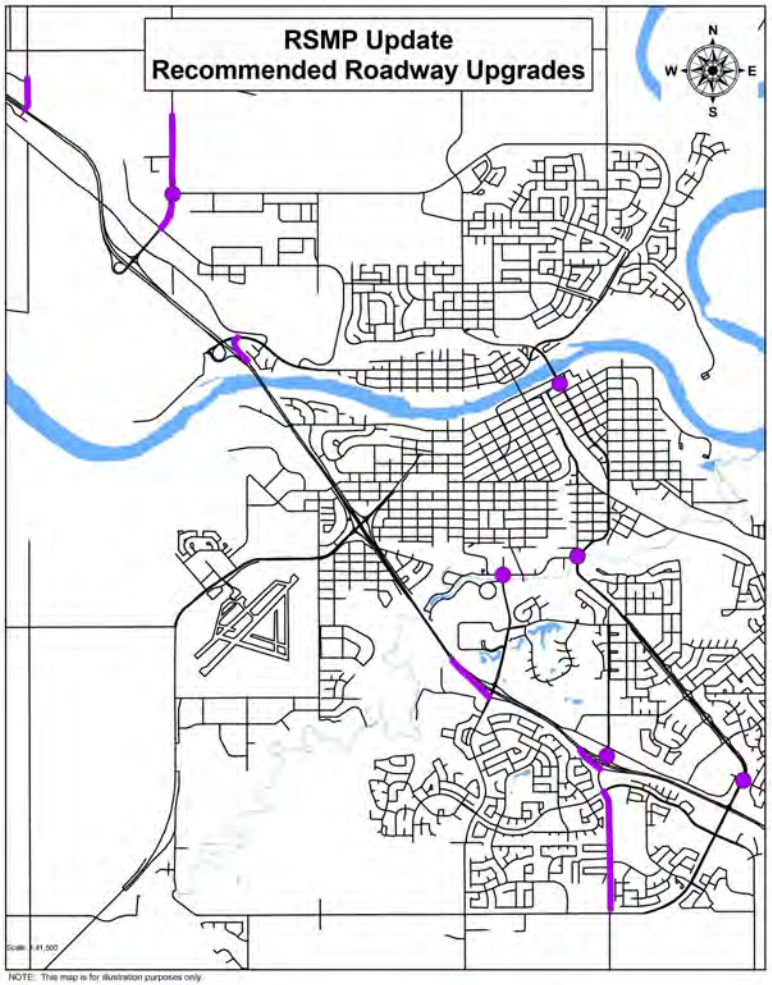
INTERSECTIONS:

- Maple Avenue and 1st Street SE
- College Avenue and Kipling Street
- 23rd Street and Box Springs Road NW
- Kingsway Avenue and Spencer Street SE
- 13th Ave and TransCanada Way
- Dunmore Road and TransCanada Way
- 3rd Street NW - Highway 1 off ramp
- TCH and 6th/7th Street SW
  (AT jurisdiction)
- TCH and 16th Street SW
  (AT jurisdiction)
- Eastbound TCH off-ramp at 13th Avenue SE
  (AT jurisdiction)
- Eastbound off-ramp at TCH & South Ridge Drive
  (AT jurisdiction)

City of Medicine Hat
Municipal Development Plan



City of Medicine Hat
Roadway System - 10 year Capital Improvement Plan



WHAT ARE ALBERTA TRANSPORTATIONS PROPOSED IMPROVEMENTS TO HIGHWAY 1?

- Close 16th Street, 6th Street and 7th Street SW intersections on Highway 1
- Upgrade the Highway 1 and Highway 3/Gershaw Drive interchange
- Construct an interchange at Highway 1 and 1st Street SW.

ALBERTA TRANSPORTATION PROPOSED UPGRADES

- Full interchange at Highway 1 and 1st Street SW
- Closing of 6/7th Street SW intersection on Highway 1

ALBERTA TRANSPORTATION PROPOSED UPGRADES

- Highway 1 and 3 interchange upgrades
- Closing of 16th Street SW Intersection on Highway 1

SEQUENCING OF ALBERTA TRANSPORTATION UPGRADES TO HIGHWAY 1

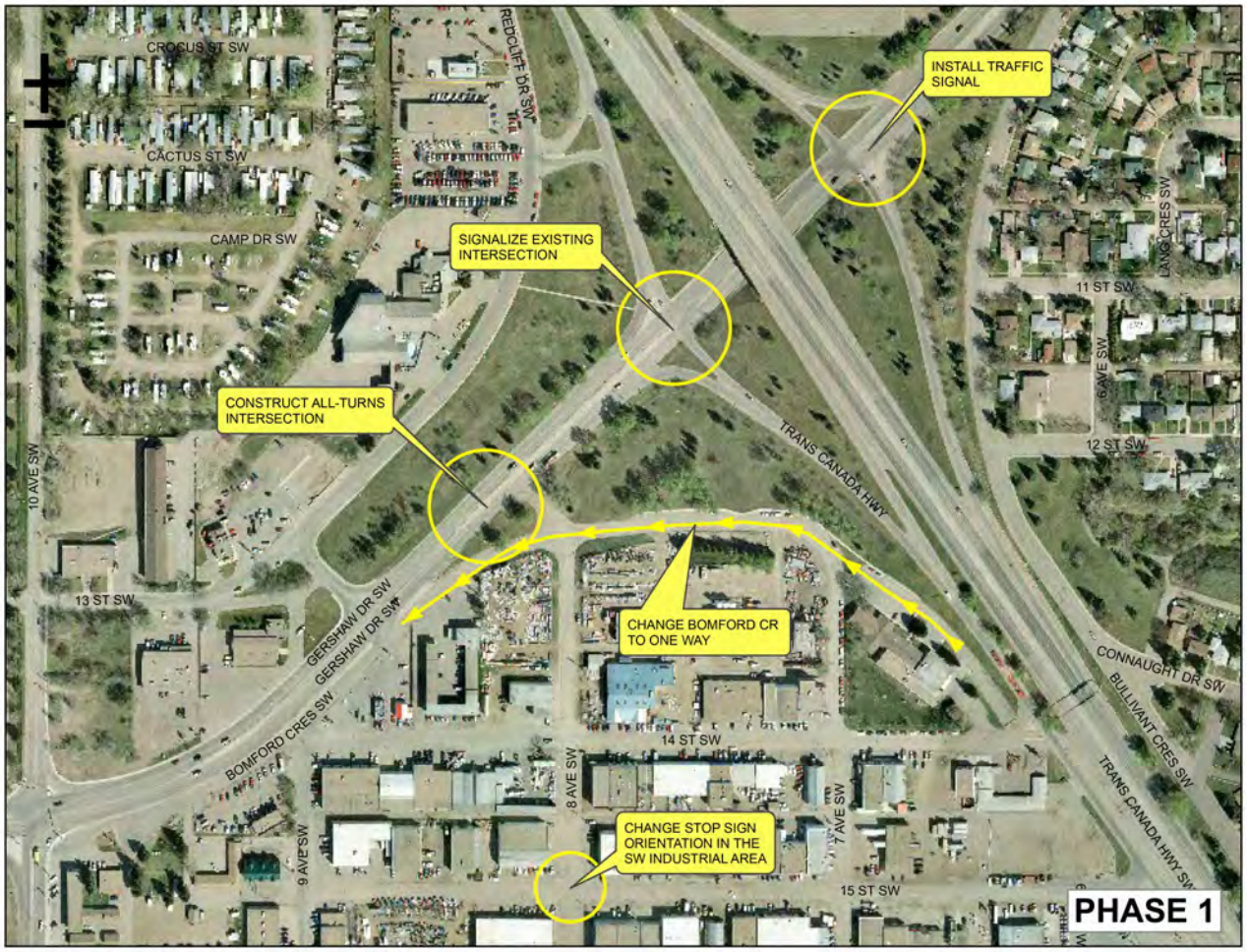
WHY:

- There may be funding constraints
- There's a need to make improvements along Highway 1 now
- Improved community access needs
- Intersections are currently congested & failing
- Improves safety
- Improvements will benefit city of Medicine Hat roadways
- Provides for the future growth of the City
- Community concerns

ARE THERE INTERIM MEASURES THAT CAN BE IMPLEMENTED? Yes

- Changes at Highway 1 & 3 Interchange
- All turns intersection at 8th Street SW & Highway 3
- Changes at 16th Street SW Intersection at Highway 1
- Changes at 1st Street SW Intersection at Highway 1
- Provision of a service road from 1st Street SW to Suntec area

Alberta Transportation Phasing Plan - Phase 1
Upgrades to Highway 1 & 3 Interchange



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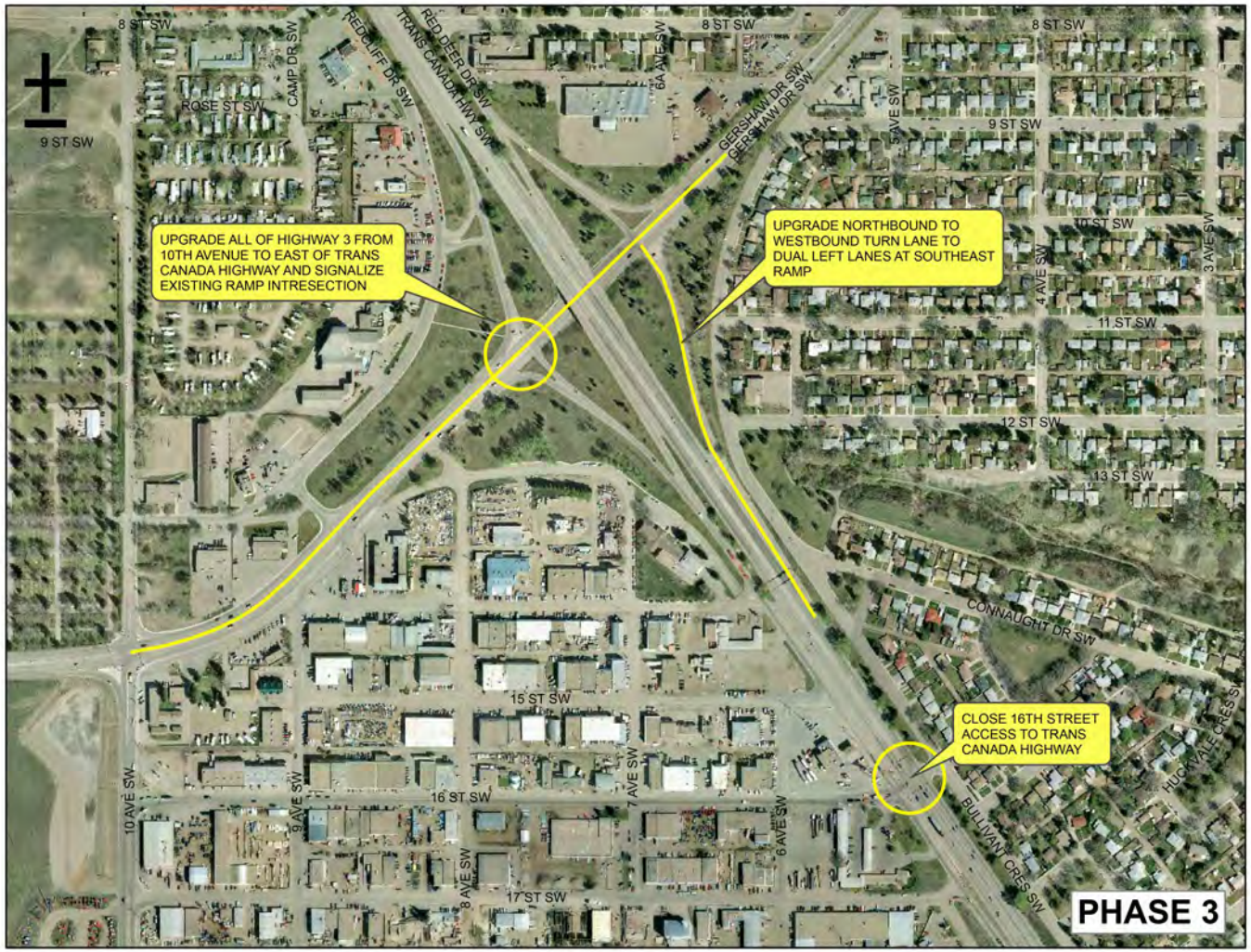
Alberta Transportation Phasing Plan - Phase 2
Changes at 16th Street Intersection

Alberta Transportation Phasing Plan - Phase 3
Upgrades to Highway 1 & 3 Interchange & 16th Street Intersection



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Alberta Transportation Phasing Plan - Phase 4
Upgrades to Highway 1 & 3 Interchange & Close 6th and 7th Street Intersection

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Alberta Transportation Phasing Plan - Phase 5
1st Street SW & Highway 1 intersection upgrades

INTERIM IMPROVEMENTS - 1 STREET SW

Why?

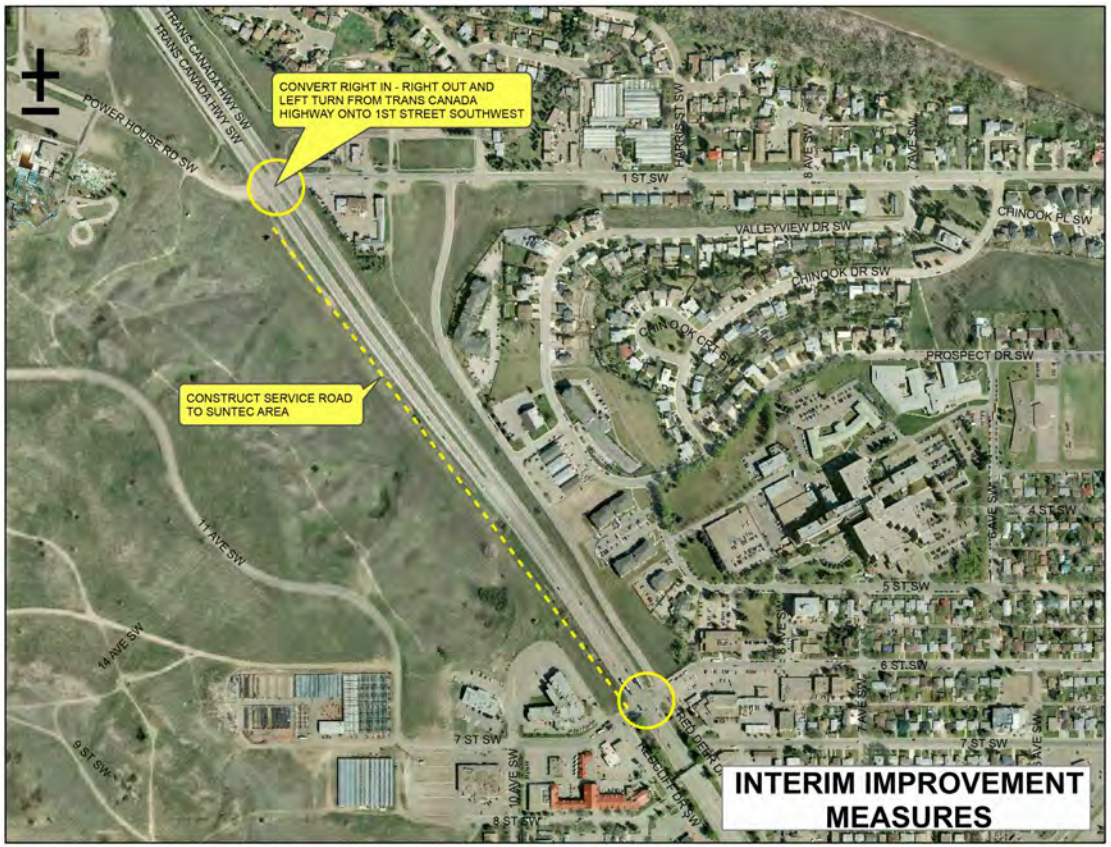
- Community concerns
- Left Turn Safety concerns from Highway 1

CONCEPTUAL DESIGN LAYOUT FOR LEFT TURN ACCESS FROM HIGHWAY 1

WHY DO WE NEED A SERVICE ROAD TO SUNTEC?

- Connectivity
- Facilitate a connection to future development
- Access to Suntec

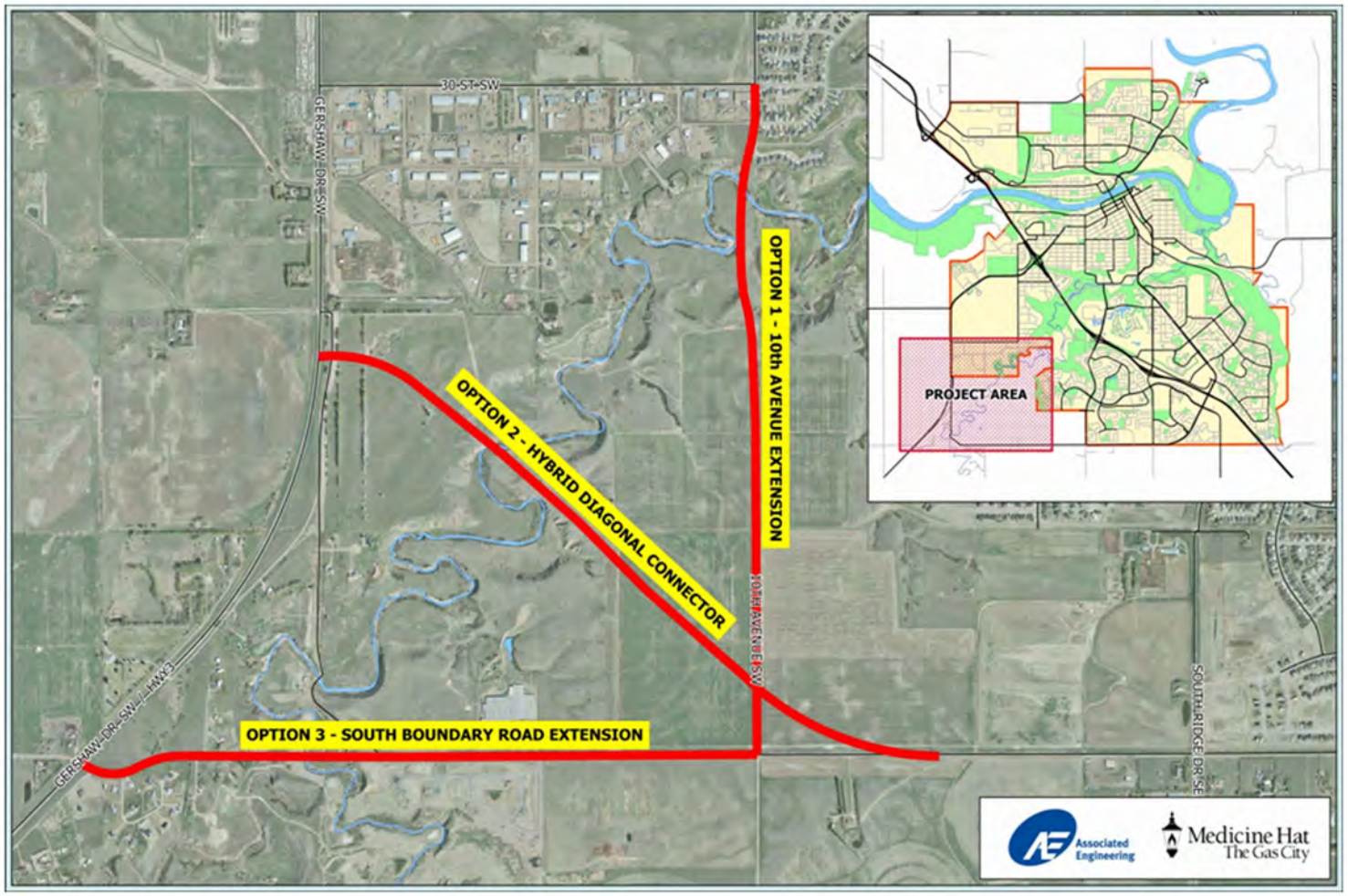
OTHER INTERIM IMPROVEMENTS



WHY THE NEED FOR THE SOUTH WEST CONNECTOR?

- Facilitate growth in the Southwest
- Improve roadway connectivity to the City
- Reduce traffic on existing roadways within the Southwest

SOUTHWEST CONNECTOR OPTIONS



SOUTHWEST CONNECTOR ANALYSIS

- Assessment of future preferred alignment for connecting South Boundary Road to Highway 3

- Transportation model suggests that the SW connector would not be required until Cimarron development is well underway (2025)

- Assessment included:
  - Analysis and identification of alternative alignments
  - Area Structure Plan/Neighbourhood/Property impacts
  - High level cost estimates
  - Environmental and geotechnical considerations
  - Travel time forecast and road network connections

- All three options are viable

SOUTHWEST CONNECTOR OPTIONS

Consultant evaluation of Impacts

Options Evaluation Criteria	Option 1	Option 2	Option 3
Impacts on Property	High	Low	Medium
Cost	High	Low	Medium
Social Impacts on Amenities	High	Low	Medium
Environmental Impacts	High	Low	Medium
Noise Impacts	High	Low	Medium
Safety Impacts	High	Low	Medium
Geotechnical	High	Low	Medium
Travel Time Savings	Low	Medium	High
Existing Road Network	High	Low	Medium
Network Connectivity	Medium	Low	High
Impacts on Cimarron ASP	Low	High	Low

NEXT STEPS

- Solicit Public Feedback (January 2013)
- Finalize Roadway System Master Plan Report (March 2013)
- Present Report to Council (April 2013)