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Project/File:	113678316 Lethbridge TMP	Date:	Sept 19, 2022

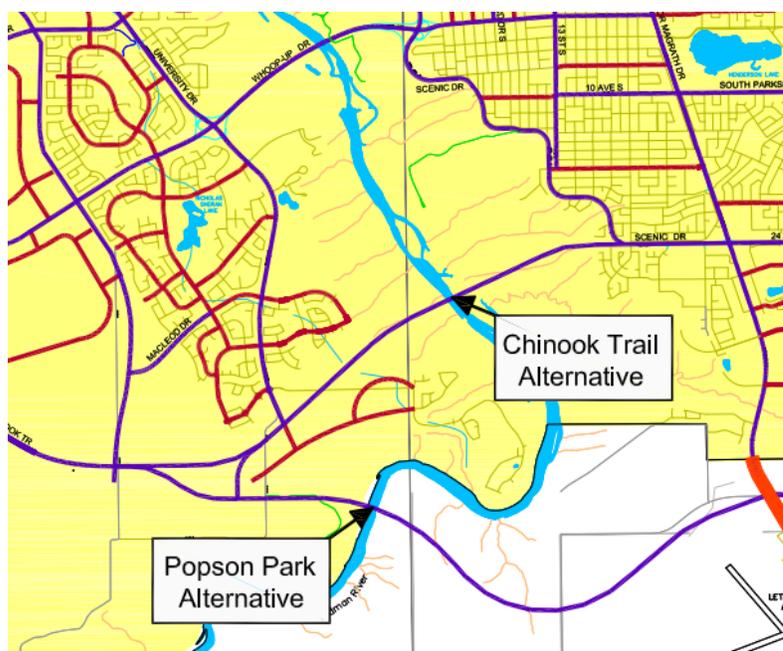
Reference: Lethbridge TMP – Third Bridge River Crossing Review
Purpose

Building on previous work completed by the City of Lethbridge, Alberta Transportation (AT), and AECOM, the purpose of this memo is to summarize the evaluation/findings of that work, provide any updated information since that work, and provide forecasted daily traffic volumes for the crossing options using the transportation demand model developed for the current Transportation Master Plan.

Background

The City of Lethbridge, in partnership with Alberta Transportation (AT), retained AECOM Canada Ltd. To carry out the City of Lethbridge Circulation Road Study. A key purpose of the study was to evaluate and establish the long-term roadway needs of the City of Lethbridge for a potential new circulation road across the Oldman River. Three options were examined in that study:

- Chinook Trail Crossing
- Popson Park Crossing
- No additional Crossing



Source: Figure 9: Alternative Network Connections (AECOM City of Lethbridge Circulation Road Study Executive Report)

Reference: Lethbridge TMP – Third Bridge River Crossing Review

Nine criteria were considered in the evaluation of the bridge option:

- 1) Community Assessment,
- 2) Recreation Impact,
- 3) Environmental Impact,
- 4) Historical Resources Impact,
- 5) Transportation Impact,
- 6) Traffic Noise Impacts,
- 7) Hydraulic Impacts,
- 8) Geotechnical Impacts,
- 9) Fiscal Impacts.

City Council Decisions

At the Regular Meeting of the City Council held on Monday, November 30, 2009, the Transportation Manager provided a presentation with the results of the River Crossing Review. He advised of the following conclusions developed by Administration:

- A significant change in travel behaviour will be required to avoid construction of a new crossing
- If current travel patterns continue, major congestion issues will occur at University Drive, 6th Avenue S, and access points to Whoop-Up Drive, unless a new crossing is constructed
- Popson Park route does not help in relieving the congestion issues on 6th Avenue
- Popson Park will require considerably higher investments than Chinook Trail
- The Popson Park route alignment is not compatible with the existing arterial road network in the southern part of West Lethbridge (connection with University Drive)
- Chinook Trail will attract more traffic than the Popson Park route due to its convenient location, shorter trip times and trip distance
- Chinook Trail provides better opportunities for alternative transportation (i.e. people walking and people riding bikes)

The following Council resolution was presented and carried:

- That Chinook Trail continue to be reserved as the future crossing location, including a future pedestrian commuter corridor and dedicated pedestrian crossing
- That future planning investigate means to delay or eliminate the need for a future river crossing

At the Regular meeting of the City Council held on Monday January 21, 2019, the Transportation Engineering Manager provided a presentation with the results of the Whoop-Up Drive Interchanges Functional Planning Study. He advised the following developed from the report:

Short-term, medium-term and long-term plans were developed for each interchange

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Short-term improvements were recommended regardless of whether the 3rd crossing is constructed

Prior to medium-term upgrades it would be prudent to confirm the timeline and feasibility of Chinook Trail River Crossing

The following Council resolution was presented and carried:

- That staff consider the short term recommended improvements in the future Capital Improvement Program (CIP)
- That the medium and long-term recommendations be referred for a review after 10 years

On December 14, 2021, City Council resolved that Administration:

- investigate further potential site or sites for the third river crossing further South from the current proposed location; and
- assess the approximate cost to construct the third river crossing at the potential site or sites that may be identified; and
- report back to Council as to such proposed site or sites and the anticipated cost to construct the third river crossing at the site or sites identified no later than September 2022.

The following is the result of the investigation into the criteria used when considering the Chinook Trail and Popson Park alignments to determine whether any significant changes that would impact the results of the review have occurred since the 2010 Circulation Road Study.

Community Assessment

At the time of initial assessment, several options were considered including a “no build” scenario, which considered the impacts to the existing bridges and resulting congestion. In addition, an assessment of the public sentiment towards the 3rd bridge was also evaluated. While public opinion regarding the 3rd bridge has arguably been assessed as part of the recent October 2021 public referendum, revised “no-build” scenarios should be undertaken as part of the new transportation model.

No recommendations relative to the community assessment are being made. In the previous study, it was left to the Citizen’s Advisory Committee for evaluation of the defined criteria in this category.

Environmental Impacts/Considerations

Stantec undertook a review of the Westworth Associates Environmental Ltd. 2009 Environmental Overview report. A summary of that review follows.

The concerns related to potential impacts prairie rattlesnake habitat and hibernacula remain important, as do potential impacts to fish and other wildlife. An updated baseline survey is recommended before a decision is made to ensure current conditions and regulatory requirements are captured as the previous environmental surveys were done in 2008.

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Bridge crossings of the Oldman River require approvals under the following Acts, several of which have been updated since the original environmental work was completed. The scope and cost of each regulatory process varies depending on the nature of the bridge (e.g., clear span vs. pillars in the river) and construction plans (e.g., timing, amount of impact to the river and impacts to surrounding slopes). These include:

- Fisheries Act – administered by Fisheries and Oceans Canada
 - Work in the river may require fish habitat offsetting, construction timing restrictions, and/or monitoring depending on bridge design and construction methods
- Canadian Navigable Waters Act – administered by Transport Canada
 - Review needs, costs, and timing depends on selected bridge design and construction methods potential to impact people that may use the river.
- Water Act – administered by Alberta Environment and Parks (AEP)
 - Bridges can often be constructed using a Code of Practice Notification for Watercourse Crossings; however, this depends on the timing and methods of construction.
 - Potential for bridge to impact flood patterns will need to be considered.
 - Impacts of the bridge construction on potential wetlands and drainages also needs considered.
- Public Lands Act – administered by AEP
 - A disposition for crossing the Crown-owned Oldman River will be required.
 - Process includes submission to the Aboriginal Consultation Office that may trigger requirements for consultation requirements with Indigenous communities.
- Migratory Birds Convention Act – administered by Environment and Climate Change Canada (ECCC), Species at Risk Act - administered by ECCC, and Alberta Wildlife Act – administered by AEP
 - Depending on impacts, may require formal approvals for impacts to species of management concern.
 - Construction timing and methods will need to consider potential impacts to wildlife and wildlife habitat in the area in alignment with regulatory requirements.

Recreational Assessment

Stantec reviewed the existing information and has determined that it is unlikely that there would be any change from the original assessment.

Reference: Lethbridge TMP – Third Bridge River Crossing Review

Historical Resources Considerations

Stantec undertook a review of the FMA Heritage Inc. 2008 Historical Resources Overview report. A summary of that review follows.

The Project requires approval under the *Historical Resources Act*. The process for obtaining this has changed since the 2008 document was written and additional historical resources information is also now available. The 2008 HRO does recommend field studies for both archaeology and palaeontology; however, the initial regulatory need is to submit a Historic Resource Application to Alberta Culture and Status of Women (ACSW). ACSW will review the application and issue correspondence, most likely for targeted field assessments. The scope and cost of the historical resources work depends on the requirements. *HRA* Approval is needed before project construction can proceed.

Noise Assessment

This revised noise assessment will need to be undertaken as the traffic volume inputs will have changed. Recommended design noise levels are not to exceed 60 dBA for backyard residential areas.

River Engineering

The previous report concluded that at the Chinook Crossing location the river is flowing against a steeper bank on the west bank and the alignment crosses over Battleship Island and a small side channel on the east bank. The river channel appears to be quite stable and the wetted width during normal flows is about 100m. A theoretical bed-width of 150m (to be verified during future design) is required, and should be set tight against the steep west bank. Riprap bank protection may be required to guide the flows through the bridge opening. The side channel located to the east side of the 'island' does not carry significant flowing water during flood conditions, although it does get flooded with water. From a hydraulic perspective this channel could be closed off, however it likely provides environmental value and this may not be desirable from that perspective. If the side channel remains open it should be crossed with a separate bridge or culvert structure. The structure should be sized based on fisheries or recreational usage requirements and should consider cost-benefit issues. At the Popson Park location the river is flowing against a steep bank on the east bank and has a wider plain area to the west side. The river channel appears to be quite stable and the wetted width during normal flows is about 100m. A theoretical bed-width of 150m (to be verified during future design) is required, and should be set tight against the steep right bank. Riprap bank protection may be required to guide the flows through the bridge opening. Bridge heights should be greater than 7.2m above normal low water flow levels.

The original flood data should be confirmed, as two additional floods have occurred since the last review of water levels. There is also a push to have climate resilience in structures, the report should be updated for current and future flood concerns.

Reference: Lethbridge TMP – Third Bridge River Crossing Review

Geotechnical

Within the previous report, a review of the general subsurface and groundwater conditions, site feature, slope stability, historical mining activity, and geological conditions was conducted. It was determined that there is no sign of significant, recent slope instabilities for either crossing through the analysis of historical records of air photography. Visual observations of the slopes within and adjacent to the proposed project alignments indicate that the slopes are generally “meta-stable”, although evidence of scour within the inverts of the coulee valleys was noted. The findings of the geotechnical overview for the Chinook Trail and Popson Park river crossing alternatives have been incorporated into the preliminary roadway plans for the respective crossings.

The aerial photo review should be updated as previous reviews are using 1999 information.

Traffic Review

Much of the traffic analyses was conducted using the previous EMM model and household travel survey information, with the model being updated with the revised Transportation Master Plan currently underway. This will likely change the traffic volume and distribution assumptions included in the *Circulation Road Study – Traffic Impact Review*. This also includes the updated PEFM data provided by the City and future land use assumptions. This report should be updated based on the current model’s outputs and assumptions.

The newly collected Location-Based Services (LBS) data includes where traffic generated across Lethbridge is traveling from to use both existing bridges. It also includes data related to University traffic, Downtown Lethbridge, the Costco and commercial centres on the east side of Lethbridge, as well as the hospital. Collectively, this data can be used to update assumptions related to the potential 3rd bridge, including the assumptions around the impacts of land uses changes on the west side of Lethbridge (impacts from the introduction of more commercial, etc.).

The Work-From-Home (WFH) conditions of the pandemic have changed how employees work, with more companies considering flexible work schedules. This may also affect trip generation rates, total traffic volumes, peak hour usage (peak hour spread potential), and how people travel across the City’s network. Additionally, the long-term impacts of the pandemic to travel patterns and modal choices is still being understood. This may further impact traffic volumes.

The location of the crossing will have impacts on the existing transportation network. It has been previously suggested during the City Council process that the Popson Park alignment would not alleviate congestion on 6 Avenue South. Similarly, the Chinook Trail alignment will not alleviate pressure on the southernmost section of Scenic Drive. A high percentage of Chinook Trail traffic in both directions will still be using the Scenic Drive and Mayor Magrath Drive intersection, which already carries high traffic volumes. With a dual turn lane in the northbound direction already established, there will likely be a need for additional mitigation measures should the Chinook crossing move forward.

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Cross-sections should be updated if appropriate to align with the City’s current design standards and to ensure Complete Streets principles are incorporated into the proposed design.

Costing

Costing has been updated due to changes in land value, material and construction costs. Previous work from the Circulation Road Study – Traffic Impact Review is shown below.

It is noted that the Popson Park alignment crosses into current Airport controlled land. Should this alignment not be possible for any reason, the resulting alignment shift would create additional costs.

Table 1 shows the 2008 comparative construction and land costs for the two alternative river crossings as well as the difference in the costs between the Chinook Trail and Popson Park alternatives. A negative difference (shown in red), shows where the cost of the Popson Park alternative exceeds the cost of the Chinook Trail alternative.

Table 1: Comparative Construction and Land Costs

Item	Chinook	Popson	Difference
Road	\$33,470,000	\$48,070,000	(\$14,600,000)
Bridge	\$68,010,000	\$65,710,000	\$2,300,000
Earthworks	\$15,280,000	\$55,900,000	(\$40,620,000)
Land	\$540,000	\$3,750,000	(\$3,210,000)
10% Engineering	\$11,730,000	\$17,350,000	(\$5,620,000)
10% Contingency	\$12,910,000	\$19,080,000	(\$6,170,000)
TOTAL	\$141,940,000	\$209,860,000	(\$67,920,000)

The Bank of Canada indicates that the Annual Average Rate of Inflation (AARI) is 2.03% per annum since 2008. This translates to a 32.50% increase in the overall costs since 2008, and the resulting 2022 costs are reflected in **Table 2**-

Table 2: Updated 2022 Comparative Construction and Land costs

Item	Chinook	Popson	Difference
Road	\$44,350,000	\$63,690,000	(\$19,340,000)
Bridge	\$90,110,000	\$87,070,000	\$3,040,000
Earthworks	\$20,250,000	\$74,070,000	(\$53,820,000)

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Land	\$720,000	\$4,970,000	(\$4,250,000)
10% Engineering	\$15,540,000	\$22,990,000	(\$7,450,000)
10% Contingency	\$17,110,000	\$25,280,000	(\$8,170,000)
TOTAL	\$188,080,000	\$278,070,000	(\$89,990,000)

Recent changes in inflation, including material costs and oil prices, could skew the results of a fiscal impact update if these conditions are transitory as indicated by the Central Bank of Canada. If supply constraints and inflation eases in the next several months or years, the fiscal update undertaken today could change again as market conditions normalize.

Potential New Criteria

The October 2021 referendum on the 3rd bridge could be considered an update to the Community Assessment criteria. An update to this document could be a summary of both the referendum results and the public input received during the TMP engagement process.

Indigenous engagement will be included as part of any update and added as a new criterion, as required by the City's recently approved Municipal Development Plan. As identified in the Traditional Knowledge and Use Assessment completed in 2017, the river valley system is an area of significance to the Blackfoot people. In addition to the identification of historic or archeological sites, this engagement will also include a Traditional Knowledge assessment, which includes the identification of sites and vegetation that is of significance to Blackfoot people.

Stormwater could be another criterion, as it pertains to roadway drainage. In flatter terrain, stormwater typically ends up in a dry pond before entering the rivers, but in a floodway, this could be a challenge.

Impacts to existing planning should be considered. As the Chinook Trail alignment has been protected and utilized for land use planning, planning studies, Area Structure Plans and transportation related decisions, any change to the crossing location will have an impact on commercial and residential developers, current and future residents, as well as the Planning and Transportation departments for future land use and transportation planning.

Additional Considerations

The City of Lethbridge Planning Review Team met in late July 2022 and identified several current and relevant risks and opportunities:

- Lethbridge Electrical Utility and Alta Link have been working on plans for future infrastructure on the current Chinook Trail alignment.

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- There is an observatory in Popson Park that requires dark skies. Changing to the Popson Park alignment is likely to result in opposition from this stakeholder group.
- Potential impacts to High Intensity Residential Fire planning requirements if the proposed alignment is moved from the Chinook Trail alignment.
- Other than the Chinook Trail alignment, any other alignment would result in the bridge landing in Lethbridge County. This could result in annexation implications.
- Moving the alignment from Chinook Trail to a different alignment provides the potential to allow additional roadway connections between The Canyons and Riverstone neighbourhoods.
- Popson Park has a lot of fossils. The stratigraphy is also exposed along the banks of the river valley, making it more possible that fossils or archeological resources will be discovered during this project. This could result in construction delays or unsuitable soils.
- Some infrastructure has already been installed in the Chinook Trail alignment.
- Existing outline plans already account for the Chinook Trail alignment. Outlines plans may need to be updated if the alignment is changed.
- The Popson Park alignment would provide improved connectivity from west Lethbridge to the airport.
- The Popson Park alignment (or other alignments) crosses multiple privately owned lands.

2022 Modelling Results

The model was run in four scenarios:

- 2019 Base year
- 2069 Ultimate – no third bridge
- 2069 Ultimate – Chinook Trail alignment
- 2069 Ultimate – Popson Park alignment

The results of the modelling are show in Table 3. These volumes are two-way daily volumes under each of the different scenarios. Note that the 2069 Ultimate model has not been fully validated, however, these two-way volumes are accurate enough for the purposes of decision making as it relates to the third bridge.

Table 3: Modelling Results for 3rd Bridge Alignment Options

River Bridge Crossings	Two-way Volume (Daily)			
	Base Year 2019	2069 – Ultimate – No 3 rd Bridge	2069 – Ultimate – 3 rd Bridge Chinook Trail	2069 – Ultimate – 3 rd Bridge Popson Park
Whoop Up Drive	46,762	80,027	67,242	69,272
Highway 3 Existing	32,695	88,220	69,375	70,140
Highway 3 New Bypass	n/a	10,298	6,497	6,963
Chinook Trail	n/a	n/a	45,472	n/a
Popson Park	n/a	n/a	n/a	37,799
Total	79,457	178,545	188,586	184,174

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As can be expected, the Chinook Trail alignment attracts more traffic than crossing farther south. This is due to the tributary area of the catchment, as well as the longer distances needed to travel to the southern crossing before the southern area have developed. The third bridge crossings both induce additional cross-river demand. About two-thirds of the cross-river traffic appears to be induced, as it will be easier to cross the river with the third bridge in place; essentially “gluing” the two sides of the City together.

Conclusions

There are some characteristics and processes that have emerged since the previous study that may have an influence on the preferred crossing location. Although some, such as the archeological and paleontological restrictions, will affirm Chinook Trail as the preferred crossing, there are some aspects of this study that will promote further debate over the alignments, such as sustained traffic congestion at the intersection of Scenic Drive and Mayor Magrath Drive.

Overall, there is no strong evidence in updating the above criteria to suggest that the preferred Chinook Trail crossing should be abandoned in favour of the Popson Park alignment. In fact, the updated information suggests that Chinook Trail should continue to be the preferred 3rd river crossing.

The Chinook Trail crossing attracts a larger traffic volume than the Popson Park crossing. This coupled with the cost savings of \$90 million would provide better value for dollars spent.

Plans developed by various City departments have moved forward under direction from City Council that Chinook Trail will be the future crossing location (November 30, 2009). Any deviation will result in extra dollars being spent on planning and engineering, as well as to infrastructure already in the ground in anticipation of the future alignment.

Both alignments alleviate congestion on one part of the arterial network, while failing to alleviate pressure on another. Due to the nature of the reduced and limited locations for river crossings, this will stay true for any selected alignment.

Upon reviewing the criteria and updating the parameters, there is no clear evidence that the City should amend the previous Council decision of preserving the Chinook Trail alignment as the future third river crossing.

As development continues west of Old Man River, traffic volumes across the river will continue to grow. According to initial analyses using the newly created Lethbridge Travel Demand Model, even if the third bridge is constructed as a four lane facility (two lanes in each direction) the Whoop Up Drive bridge will still move at a slow speed in the ultimate condition. While the pace of population and employment growth in West Lethbridge as well as the public level of acceptance for congestion will determine the best date to open the third bridge in its proposed location connecting Chinook Trail to Scenic Drive S, preliminary analysis suggests the best date for opening appears to be sometime between 2030 and 2040. By the ultimate buildout, the Third Bridge is estimated to have volumes similar to Whoop Up Drive today if travel behavior continues to be similar to today's conditions.

Reference: Lethbridge TMP – Third Bridge River Crossing Review

Regards,

Stantec Consulting Ltd.

A handwritten signature in black ink that reads "Joe Olson". The signature is written in a cursive style and is positioned above the printed name and contact information.

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