Highway 3:16 Future Twinning Study
West of Seven Persons to Range Road 63

Executive Summary
R-1122

November 6, 2013

CORPORATE AUTHORIZATION

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Date Nov. 21, 2013
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PROFESSIONAL ENGINEER ALBERTA
S. C. WILLIS
Nov 21, 2013

Corporate Permit

Sean Willis, P. Eng.
Project Manager

Executive Summary

STUDY PURPOSE

The purpose of this study is to define the twinning of Highway 3 from Range Road 71 to West of Seven Persons, including the development of future interchange plans at the junction with Highway 887 (see Figure E.1 for study key map). In addition, this project will provide additional details pertaining to the twinning of Highway 3 from Range Road 71 to the Medicine Hat West City Limits, which was identified in a previous study. This includes a review of the interchange at the junction of Highway 3 and Range Road 70 (Y-ber Road). The main study objectives are:

- Develop twinning alignment from Range Road 71 to the Cypress County West Boundary;
- Develop interchange plan/profiles at the junction of Highways 3 and 887;
- Develop interchange plan/profiles at the junction of Highway 3 and Range Road 70 (Y-ber Road)
- Develop recommended plan/profiles for Highway 3 from Range Road 63 to the Cypress County West Boundary;
- Develop initial and ultimate stage access management plans for Highway 3 from Range Road 63 to the Cypress County West Boundary;
- Develop storm water drainage master plan for Highway 3 from Range Road 63 to the Cypress County West Boundary
- Develop right-of-way plans;
- Develop initial and ultimate stage 'A' level opinion of probable cost; and
- Undertake public consultation process.

EXISTING INFRASTRUCTURE

Highway 3, within the study area, is currently a two-lane undivided roadway with a 13.0 – 13.1 m surface top within a 60 m right-of-way. In addition, there are two sections of highway with passing lanes constructed in 2008. These are located between km 7.7 to 9.2 and km 11.1 to 12.8. The posted speed limit along Highway 3 throughout the study area is 100 km/h. The average annual daily traffic on this portion of Highway 3 ranges from 3,200 to 4,500 vehicles per day. The percentage of commercial vehicles averages 17.6%, which is slightly higher than the provincial average of 15%.

Along Highway 3, between the Cypress County West Boundary and Range Road 71 there are:

- 10 Public Road intersections;
- 18 Private Driveways/Field Access intersections; and
- 3 Canal Accesses.

Highway 887 is a north/south undivided two lane highway located just east of the Hamlet of Seven Persons and south of Highway 3. Within the study area, Highway 887 has a 9 m paved surface top located within a 30 metre right-of-way. The posted speed on this highway is 100 km/h. Daily traffic volumes are less than 500 vehicles per day, and have remained fairly constant for several years.

PRELIMINARY ASSESSMENTS

As part of this assignment, a historical resources overview, an initial environmental assessment, and traffic analysis were undertaken.

Historical Resources Overview

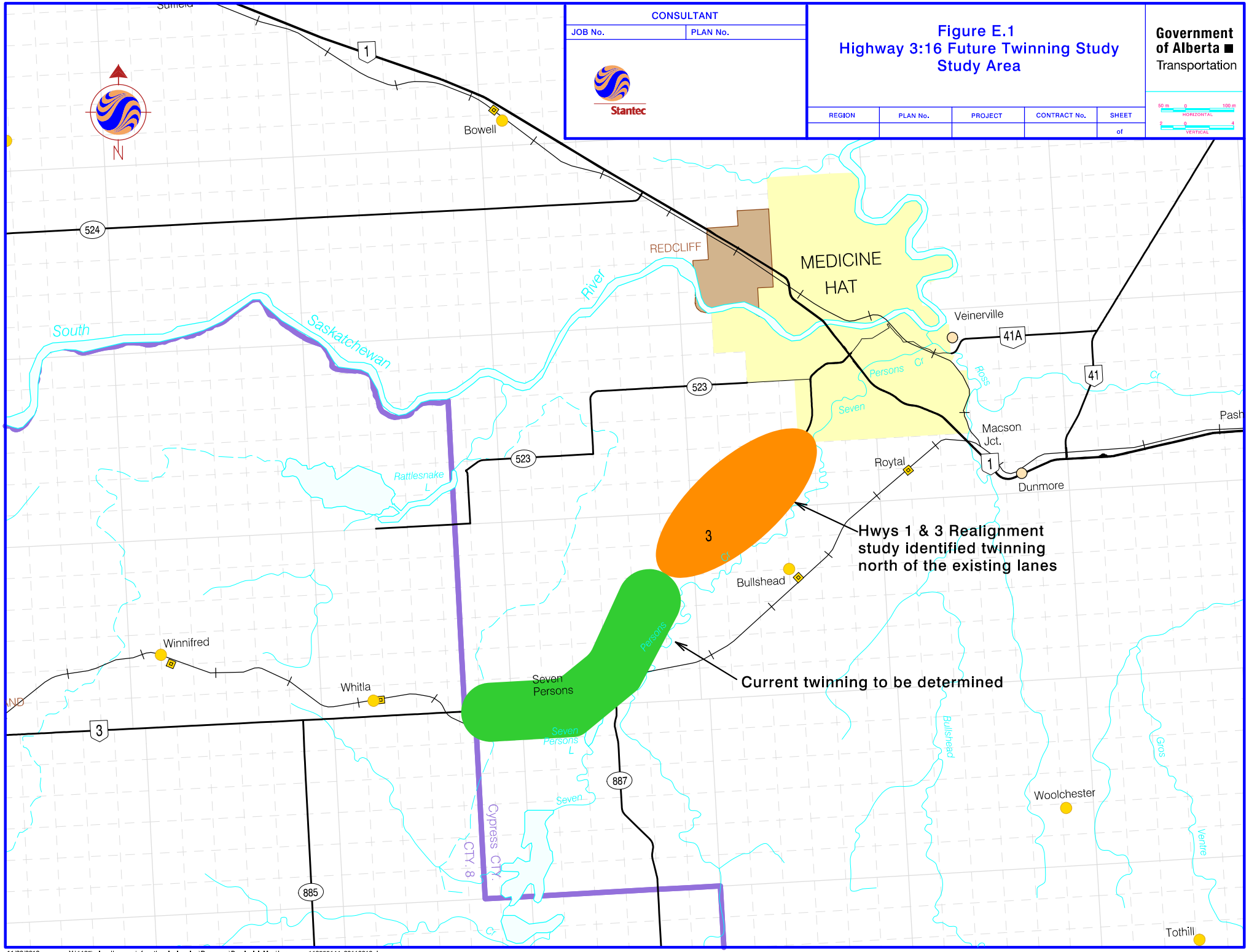
The historical resources overview identified the following:

- Two sites along located less than 100 metres from Highway 3 with potential for archaeological finds that could be impacted by future twinning.
- There are two historic period sites within the study area, but it is unlikely that either will be impacted by future twinning.
- There are no known palaeontological sites within the study area.
- The study area includes six areas where Highway 3 either crosses or is in close proximity to lands with native prairie grass. Areas of native prairie grass are considered to have moderate to high historical resources potential.
- A historical resource impacts assessment will be required at the detailed design stage should any of these sites be impacted by future highway improvements.

Initial Environmental Overview

The initial environmental overview identified the following:

- Nearly all vegetation within the study area consists of cereal or hay crops; however, there are small patches of remnant native vegetation that occurs in several locations.
- There is one wetland within the study area, south of Highway 3 and west of Seven Persons. The wetland shows no evidence of wetland vegetation, and it appears the wetland dries up all or most summers.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JOB No.
PLAN No.
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Figure E.1
Highway 3:16 Future Twinning Study
Study Area
REGION
PLAN No.
PROJECT
CONTRACT No.
SHEET
of
Government of Alberta
Transportation
50 m 0 100 m
HORIZONTAL
2 0 4
VERTICAL
N
Bowell
1
524
REDCLIFF
MEDICINE HAT
South Saskatchewan River
Veinerville
41A
41
523
Persons Cr
Ross Cr
Seven
Macson Jct.
Roytal
Dunmore
Pash
Rattlesnake L
3
Hwys 1 & 3 Realignment study identified twinning north of the existing lanes
Bullshead
Current twinning to be determined
Winnifred
Whitla
ND
Seven Persons
Seven Persons L
Persons
887
Cypress CTY.
CTY. 8
885
Seven
Bullshead
Woolchester
Gros Ventre
Tothill
11/22/2013
V:\1135\miscellaneous_functional_planning\Resource\ProvIncial_Map\basemap_113555144_20110218.dgn

- There are no records of rare plants or plant communities in the vicinity of Highway 3. The probability of occurrences of rare plants is very low within the study area, with the exception of within remnant stands of native vegetation.
- Within the study area, there is the potential for nine wildlife species listed federally or provincially as a species at risk. This includes the Burrowing owl, Ferruginous hawk, Northern leopard frog, Loggerhead shrike, Sprague's pipit, Long-billed curlew, Short-eared owl, McCown's longspur, and Prairie rattlesnake.
- Highway 3 crosses three unnamed creeks and the Stornham Coulee, all with the potential to provide fish habitat. However, there are no records of fish occurring in any of these streams.

Traffic Analysis

The traffic analysis identified the following:

- Barring any major developments within the study area, the at-grade intersection of Highway 3 and Highway 887 will continue to operate within acceptable Levels of Service well beyond 2030.
- An interchange at Highways 3 and 887 will not likely be required when Highway 3 is initially twinned, and can be staged as required.
- An interchange at Highway 3 and Range Road 70 will not likely be required when Highway 3 is initially twinned, and can be staged as required.

IMPROVEMENT ALTERNATIVES AND EVALUATION

Design Standard

All improvements on Highway 3 have been developed to a 130 km/h design speed using a four-lane divided highway with a 40 metre centerline spacing. The cross-section ultimately allows flexibility for the roadway to be upgraded to a six or eight lane divided highway, if ever required. Refer to Figure E.2 for the typical cross-section on Highway 3 in the development of improvement alternatives.

On Highway 887 and Range Road 70, a 90 km/h design speed has been used in the vicinity of the future interchanges with Highway 3.

Improvement Alternatives

The most logical twinning alternatives would be for the new lanes on Highway 3 to parallel the existing highway, either to the north or to the south. In the vicinity of the Hamlet of Seven Persons, which is located directly south of Highway 3, twinning to the north was the only possible alternative. Once past Seven Persons on either side, twinning either north or south was possible.

In the vicinity of Seven Persons, the major issue with twinning along the existing highway is the impacts of an interchange at the existing junction of Highways 3 and 887. Currently, Railway Avenue, which is the major entrance off Highway 887 into the Hamlet of Seven Persons, is located approximately 390 metres to the south of the Highways 3 and 887 intersection. In addition, a Canadian Pacific Railway line crosses Highway 887 approximately 160 metres south of the Railway Avenue and Highway 887 intersection. Providing access to the Hamlet of Seven Persons via the Highway 887 and Railway Avenue intersection is critical, as ultimately this will be the only direct access into the hamlet. A spread diamond interchange configuration at the existing intersection would require the relocation of the Railway Avenue intersection off Highway 887, which is problematic due to the close proximity of the railway crossing.

Due to these impacts, options were developed that relocated Highway 3 north of the existing alignment, which in turn shifted the future Highway 3 and 887 interchange to the north and provided the separation necessary to maintain the Highway 887 and Railway Avenue intersection. For the purposes of this study, because twinning to the north of the existing lanes was already recommended from Range Road 71 to Medicine Hat as part of the *Highway 1 Realignment Study*, the options focused on Highway 3 between Range Road 71 and the Cypress County boundary located west of Seven Persons.

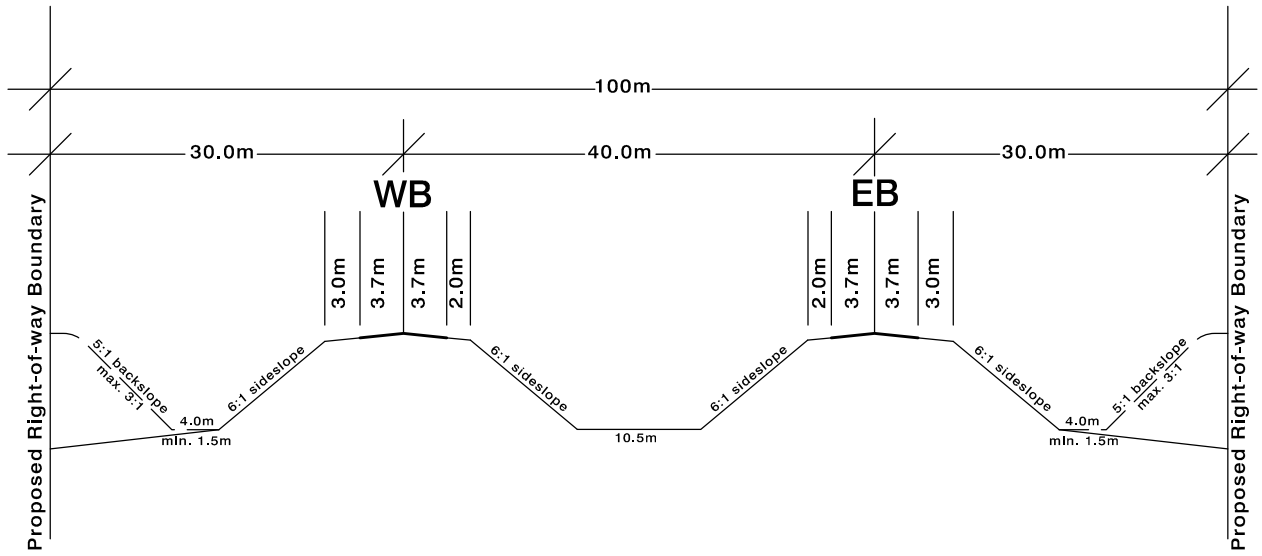
In addition, although not part of this project scope, Stantec looked beyond the study area to the west to consider how Highway 3 will be twinned west of Seven Persons to Bow Island. Due to the increased developments south of the highway, it was agreed by the Technical Review Committee that twinning west of the study area would likely occur to the north of the existing lanes.

Therefore, based on the above information, the following assumptions have been made:

- Twinning of Highway 3 from west of the Hamlet of Seven Persons to Bow Island will be to the north of the existing lanes;
- Twinning of Highway 3 from east of Range Road 71 to the City of Medicine Hat will be to the north of the existing lanes; and
- The Highways 3 and 887 interchange cannot be constructed at the current junction of these two highways as it negatively impacts the future main access point (Railway Avenue) into the Hamlet of Seven Persons.

Overall, the following options were developed to address the issues in the vicinity of the Hamlet of Seven Persons:

- **Option 1 (North Twinning)** – A curvilinear realignment that utilizes three successive curves to shift the junction of Highways 3 and 887 to the north, thereby requiring an approximate 4.2 km realignment of Highway 3. This option allows the Highway 887 and Railway Avenue intersection to remain open without interfering with interchange ramp tapers. This option considered twinning to the north of the existing lanes from Range Road 72 to Range Road 71.



Typical 40m Divided Cross-Section

Scale: NTS

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Transportation

Figure E.2
Highway 3:16 Future Twinning Study
West of Seven Persons to RR 63
Proposed Typical Cross-Section

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- **Option 1 (South Twinning)** – Same as above, but this option considered twinning to the south of the existing lanes from Range Road 72 to Range Road 71.

- **Option 2 (North Twinning)** – This option shifts Highway 3 approximately 500 metres to the north and parallels the alignment of the existing Highway 3. The overall length of realignment is approximately 5.9 km. This option allows the Highway 887 and Railway Avenue intersection to remain open without interfering with interchange ramp tapers. This option considered twinning to the north of the existing lanes from Range Road 72 to Range Road 71.

- **Option 2 (South Twinning)** – Same as above, but this option considered twinning to the south of the existing lanes from Range Road 72 to Range Road 71

- **Option 3 (NOT RECOMMENDED)** – This option reroutes Highway 887 to the west side of the Hamlet of Seven Persons requiring portions of Range Road 75 and Township Road 104 be designated as Highway 887. By doing so, Highway 3 could be twinned along its existing alignment, but would require approximately 6.4 km of upgrades to Range Road 75 and Township Road 104. This includes right-of-way purchase, grade widening, paving, a new bridge structure, horizontal geometry improvements, and the realignment of three local road intersections. Through discussions with the Technical Review Committee, it was determined that due to the significant upgrades required to Range Road 75 and Township Road, the impacts to the local road intersections, and overall increase in development impacts, that this option should not be pursued further

These options are illustrated in Figures E.3 to E.7.

Evaluation of Alternatives

The following set of evaluation criteria was used in the analysis of alternatives:

- Preliminary Construction Costs
- Environmental Impacts
- Historical Resource Impacts
- Road User Costs
- Development Impacts
- Irrigation Impacts; and
- Improvement Staging.

Table E.1 below summarizes the results of the evaluation matrix. Based on the results of this analysis, **Option 2 with North Twinning** is considered the **Technically Recommended Improvement Option.**

Table E.1
Highway 3:16 Twinning Study
Range Road 71 to West of Seven Persons
Evaluation Matrix

		Option 1 w/		Option 2 w/	
		North Twinning	**South Twinning**	**North Twinning**	**South Twinning**
Preliminary Construction Estimate *(Construction, Development Impact, Irrigation Impacts, Utilities, Canals, Interchange, Right-of-Way)*	$M	78.7	81.6	79.9	82.5
	Rank *	**1.5**	**3.5**	**1.5**	**3.5**
Environmental Impact					
	Rank	**2.5**	**2.5**	**2.5**	**2.5**
Historical/ Archaeological Impact					
	Rank	**3.5**	**3.5**	**1.5**	**1.5**
Road User Cost	$M/year	6.48	6.48	6.35	6.35
	Rank **	**2.5**	**2.5**	**2.5**	**2.5**
Development Impact					
w/in 100 metre ROW + 10 metre setback (Direct Impact)		3	4	2	3
DIRECT IMPACT POINTS (1 point)		3	4	2	3
40 metres beyond setback (Indirect Impact)		2	3	2	3
INDIRECT IMPACT PONTS (0.5 point)		1	1.5	1	1.5
TOTAL POINTS		4	5.5	3	4.5
	Rank	**2**	**4**	**1**	**3**
Agricultural Impacts					
Unsalvagable Irrigated Lands (acres)		577	580	713	716
	Rank**	**1.5**	**1.5**	**3.5**	**3.5**
Improvement Staging					
	Rank	**3.5**	**3.5**	**1.5**	**1.5**
	TOTAL	**17**	**21**	**14**	**18**
	Overall Rank	**2**	**4**	**1**	**3**

* Assumed equal if construction costs are within 2% of each other.

** Assumed equal if road user costs & agricultural impacts are within 10% of each other.

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Figure E.3
Highway 3 Future Twinning Study
Range Road 71 to West of Seven Persons
Option 1 North Twinning

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REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
Southern				1 of 1

HORIZONTAL 0

VERTICAL 0

N

Rge Rd 81

Rge Rd 80

Rge Rd 75

Rge Rd 74

Rge Rd 73

Rge Rd 72

Rge Rd 71

Rge Rd 70

Rge Rd 65

Twp Rd 114

Twp Rd 112

County of Forty Mile

Cypress County

Highway 3

Seven Persons

Highway 887

DATE | BY | PROCESS | TO IDMS | TO GIS | MICROFILMED

PLAN DESCRIPTION

BAR CODE

COORDINATE DATA | PLAN No. | CONTRACT No. | NAD 83 | BASE LONGITUDE | PLAN LOCATION

PHOTO No. | TITLE SEARCH DATE | GRAPHICS FILE

DATE | BY | SURVEYED | DESIGNED | CHECKED | DRAWN

REVISION | DATE | BY | No.

11/25/2013

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CONSULTANT

JOB No. 1135 55144 | PLAN No.

Stantec

Figure E.4
Highway 3 Future Twinning Study
Range Road 71 to West of Seven Persons
Option 1 South Twinning

Government of Alberta ■ Transportation

REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
Southern				1 of 1

HORIZONTAL 0

VERTICAL 0

N

Rge Rd 81

Rge Rd 80

Rge Rd 75

Rge Rd 74

Rge Rd 73

Rge Rd 72

Rge Rd 71

Rge Rd 70

Rge Rd 65

Twp Rd 114

Twp Rd 112

County of Forty Mile

Cypress County

Highway 3

Seven Persons

Highway 887

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PLAN DESCRIPTION

BAR CODE

COORDINATE DATA: PLAN No. | CONTRACT No. | NAD 83 | BASE LONGITUDE | PLAN LOCATION

PHOTO No. | TITLE SEARCH DATE | GRAPHICS FILE

DATE | BY | SURVEYED | DESIGNED | CHECKED | DRAWN

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Figure E.5
Highway 3 Future Twinning Study
Range Road 71 to West of Seven Persons
Option 2 North Twinning

Government of Alberta ■ Transportation

REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
Southern				1 of 1

0 HORIZONTAL

0 VERTICAL

N

Rge Rd 81

Rge Rd 80

Rge Rd 75

Rge Rd 74

Rge Rd 73

Rge Rd 72

Rge Rd 71

Rge Rd 70

Rge Rd 65

Twp Rd 114

Twp Rd 112

County of Forty Mile

Cypress County

Highway 3

Seven Persons

Highway 887

No.	REVISION	BY	DATE

DRAWN

CHECKED

DESIGNED

SURVEYED

BY

DATE

GRAPHICS FILE

TITLE SEARCH DATE

PHOTO No.

BASE LONGITUDE

NAD 83

COORDINATE DATA

PLAN LOCATION

CONTRACT No.

PLAN No.

MICROFILMED

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PLAN DESCRIPTION

BAR CODE

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JOB No. 1135 55144 | PLAN No.

Stantec

Figure E.6
Highway 3 Future Twinning Study
Range Road 71 to West of Seven Persons
Option 2 South Twinning

REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
Southern				1 of 1

Government of Alberta ■ Transportation

0 HORIZONTAL

0 VERTICAL

N

Rge Rd 81

Rge Rd 80

Rge Rd 75

Rge Rd 74

Rge Rd 73

Rge Rd 72

Rge Rd 71

Rge Rd 70

Rge Rd 65

Twp Rd 114

Twp Rd 112

County of Forty Mile

Cypress County

Highway 3

Seven Persons

Highway 887

PROCESS | DATE | BY
TO IDMS
TO GIS
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PLAN DESCRIPTION

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COORDINATE DATA | PLAN No. | CONTRACT No. | PLAN LOCATION
NAD 83 | BASE LONGITUDE

PHOTO No.
TITLE SEARCH DATE
GRAPHICS FILE

DATE | BY | SURVEYED | DESIGNED | CHECKED | DRAWN

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JOB No. | PLAN No.

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Figure E.7
Highway 3:16 Future Twinning Study
Range Road 70 ot West of Seven Persons
Option 3

Government of Alberta ■
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REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
				of

0 HORIZONTAL

0 VERTICAL

Twp Rd 112

Rge Rd 80

Rge Rd 75

Rge Rd 74

Rge Rd 73

Rge Rd 72

Rge Rd 71

Highway 3

Seven Persons

N. Railway Avenue

Highway 887

Rge Rd 81

Twp Rd 104

Rge Rd 70

PROCESS: TO IDMS | TO GIS | MICROFILMED

DATE | BY

PLAN DESCRIPTION

BAR CODE

PLAN No. | CONTRACT No. | PLAN LOCATION

COORDINATE DATA: NAD 83 | BASE LONGITUDE

PHOTO No. | TITLE SEARCH DATE | GRAPHICS FILE

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REVISION | DATE | BY | No.

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PUBLIC CONSULTATION

As part of this study, a public consultation strategy was implemented including two rounds of open houses, council presentations and landowner meetings. Between the two open houses, a total of 116 people attended and 42 questionnaires/ comment forms were returned. Landowner meetings were conducted prior to each open house. In total, 33 landowners were invited to meet one on one with the planning team, of which 13 meetings were conducted. Overall, no significant issues arose from either open house or landowner meetings that would preclude the implementation of the recommended improvement strategy.

Two presentations were made to Cypress County Council, one following the first open house and one prior to the second open house. Following the second presentation, County Council issued an email indicating a preference for Option 1 because of the reduced impact to irrigated lands and the belief that an interchange would be constructed sooner under this option. At the time of this report, council endorsement had not been received and Alberta Transportation continues to discuss this matter with the Cypress County.

TECHICALLY RECOMMENDED IMPROVEMENT STRATEGY

Figure E.8 illustrates the overall ultimate stage recommended plan.

Initial Stage Recommendations

It is envisioned that Highway 3 will twinned long before interchanges will be required at either Highway 887 or Range Road 70. When twinned, all existing field accesses, private driveways, and canal accesses on Highway 3 will require closure. In addition, four of the ten existing Range Road/ Township Road intersections along Highway 3 are recommended for closure. Table E.2 below summarizes the remaining access locations on Highway 3 during the initial stages. It is envisioned that these intersections can remain open until such time as operational or safety concerns arise and/or the interchanges at Highway 887 and Range Road 70 are constructed.

Table E.2
Initial Stage Access Locations

Access Location (km)	Access Type	Notes
1.2	Range Road 81 North	
6.25	Range Road 74	Close north leg of intersection. Keep south leg open for access to Seven Persons.
7.6	Highway 887	
15.85	Range Road 70 (Y-ber Road)	
19.1	Township Road 120	Minor realignment required to improve intersection angle
22.53	Range Road 63	Minor realignment required to square up intersection

With the closure of existing accesses, alternate access to properties has been provided via a system of fronting service roads, existing local roads, and private driveway extensions. In total, this access management strategy requires 31 km of service road/local road construction and 1.8 km of private roadway extensions.

Ultimate Stage Recommendations

In the ultimate stage, Highway 3 will be upgraded to a freeway with all remaining at-grade intersections closed and interchanges constructed at the junctions with Highway 887 and Range Road 70 (Y-ber Road).

The Highways 3 and 887 interchange has been protected as a spread diamond configuration with the flexibility to convert to a Parclo configuration should future traffic volumes dictate the need for free flow loop ramps in any two of the interchange quadrants. Highway 887 will be raised overtop of Highway 3 with a design speed of 90 km/h.

The Highway 3 and Range Road 70 (Y-ber Road) interchange configuration and right-of-way footprint was originally identified in the *Highways 1 & 3 Realignment Study*. The configuration of this interchange is a Parclo A with free flow loop ramps provided for the northbound to westbound and southbound to eastbound traffic movements. Range Road 70 will be raised overtop of Highway 3 with a design speed of 90 km/h.

Stormwater Management Drainage Concept Plan

A conceptual drainage plan was developed for the recommended improvements. The following table (Table E.3) summarizes the conceptual location, size, length and estimated cost to supply and install centreline culverts.

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Figure E.8
Highway 3:16 Future Twinning Study
West of Seven Person to Range Road 63
Overall Recommended Plan

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REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
Southern	P-3392-01	Hwy 3:16		of

300m 0 600 HORIZONTAL

PLAN DESCRIPTION: P-3392-01

BAR CODE

PROCESS: TO IDMS | TO GIS | MICROFILMED

COORDINATE DATA: NAD 83 | BASE LONGITUDE

PLAN No. | CONTRACT No. | PLAN LOCATION

PHOTO No. | TITLE SEARCH DATE | GRAPHICS FILE

SURVEYED | DESIGNED | CHECKED | DRAWN

REVISION | BY | DATE | No.

City of Medicine Hat Boundary

Twp Rd 122

Twp Rd 120

Twp Rd 112

Twp Rd 110

Rge Rd 81

Rge Rd 80

Rge Rd 75

Rge Rd 74

Rge Rd 73

Rge Rd 72

Rge Rd 71

Rge Rd 70

Rge Rd 65

Rge Rd 64

Rge Rd 63

Rge Rd 62

Highway 3

Highway 887

Existing Highway 3

Canadian Pacific Railway

Seven Persons Creek

Seven Persons

Railway Avenue

County of Forty Mile

Cypress County

SCALE: 1: 30,000

11/22/2013

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Table E.3
Centreline Culvert - Location, Size, Length & Opinion of Probable Cost

Culvert Location	Size (mm)	Length (m)	Unit Cost ($/m)	Estimated Cost ($)	Notes
km 5.98	800	79	1,130	89,270	
km 8.15	800	100	1,130	113,000	
km 8.86	2 - 1600	190	3,765	715,350	
km 9.74	1400	105	2,860	300,300	
km 10.18	1100 x 700	50	1,557	77,850	Extension of existing culvert
km 11.84	1200	64	2,280	145,920	
km 13.97	1600	89	3,765	335,085	
km 16.71	800	77	1,130	87,010	
km 17.16	800	50	1,130	56,500	Extension of existing culvert
km 20.44	3800 x 2300	95	11,160	1,060,200	
km 101.82	2 - 1500	66	3,297	217,602	Highway 887
km 103.49	1200	51	2,280	116,280	Highway 887
km 151.74	800	33	1,130	37,290	Range Road 70 (Y-ber Road)
				3,351,657	

In addition, Table E.4 summarizes the conceptual location of median culverts/manholes to provide outlet opportunities for water in the median. All median culverts are anticipated to be 600 mm in diameter. At five locations, manhole inlets have been included to drain water from the median into the centreline culvert at these locations.

Table E.4
Proposed Median Culverts/Manholes

Location (km)	Culvert (C) /Manhole (M)	Flow Direction	Location (km)	Culvert (C) /Manhole (M)	Flow Direction
0.265	C	South	12.000	C	South
0.765	C	South	12.300	C	South
1.265	C	South	12.920	C	South
1.890	C	South	13.000	C	South
2.420	M	South	13.700	C	South
2.500	C	South	13.967	M	South
3.440	C	South	14.050	C	South
3.800	C	South	14.850	C	South
3.940	C	South	15.100	C	South
4.680	C	South	15.720	C	South
5.180	C	South	16.350	C	North
5.680	C	South	16.500	C	North
6.000	C	South	17.155	M	North
6.140	C	South	17.350	C	North
6.400	C	South	18.070	C	South
7.400	C	South	18.570	C	South
7.900	C	South	19.070	C	South
8.400	C	South	19.570	C	North
8.862	M	South	20.070	C	North
9.200	C	South	20.444	M	South
9.425	C	South	20.570	C	South
9.600	C	South	20.960	C	South
10.500	C	South	21.960	C	South
11.000	C	South	22.460	C	South
11.500	C	South			

Stormwater ponds are recommended in the northeast quadrant of both the future Highway 3 and Highway 887 and future Highway 3 and Range Road 70 interchanges. The pond at Highway 3 and Highway 887 occupies approximately 50 acres (20 ha) with an active pond volume of 198,000 m^3. The pond at Highway 3 and Range Road 70 occupies approximately 38 acres (15 ha) with an active pond volume of 150,400 m^3. Both include the potential for maintenance strips around the pond as well as fencing.

Historical Resource Requirements

The technically recommended improvement strategy has the potential to impact two previously recorded archaeological sites, which are located near the west study limits in close proximity of Highway 3. In addition, although the majority of the study area is irrigated farm or grazing lands,

the recommended plans traverse through 8 areas of native vegetation. These areas have a moderate to high potential for historical resources. For the above reasons, a Historical Resource Impact Assessment will be required prior to construction. Application for Historical Resources Act Clearance was submitted to Alberta Culture. Alberta Culture is in agreement with the findings and recommendations of the Historical Resource Overview, and has provided Historical Resources Act Clearance.

Opinion of Probable Cost

Table E.5 shows the opinion of probable cost of the technically recommended initial stage improvement strategy for a four-lane divided highway, while Tables E.6 and E.7 show the ultimate stage interchange costs at the junctions of Highway 3 with Highway 887 and Range Road 70 respectively. The initial stage improvements are estimated at $100.9M, based on current construction costs. In the ultimate stage, the Highways 3 and 887 interchange is estimated at $22.6M, and the Highway 3 and Range Road 70 (Y-ber Road) interchange is estimated at $29.1M. This includes 10% for miscellaneous items (i.e. signage, culverts, pavement markings, etc.) and 15% for engineering and contingency.

Table E.5

Highway 3 - Cypress County West Boundary to Range Road 63

Initial Stage Improvements

Opinion of Probable Cost

Major Items	Amount	Unit	Unit Cost ($/unit)	Cost ($M)
Stripping				
Highway 3	395,860	m^3	5.1	**2.0**
Highway 887/Range Road 73	35,013	m^3	5.1	**0.2**
Range Road 70 (Y-ber Road)	20715	m^3	5.1	**0.1**
Borrow Excavation				
Highway 3	92,000	m^3	6.6	**0.6**
Highway 887/Range Road 73	0	m^3	6.6	**0.0**
Range Road 70 (Y-ber Road)	0	m^3	6.6	**0.0**
Common Excavation				
Highway 3	760,000	m^3	6.0	**4.5**
Highway 887/Range Road 73	100,000	m^3	6.0	**0.6**
Range Road 70 (Y-ber Road)	50,000	m^3	6.0	**0.3**
Over Haul (Assume 1 km Distance)	92,000	m^3 km	0.7	**0.1**
GBC (Assume 300 mm Thickness)				
Highway 3	353,000	tonnes	26.0	**9.2**
Highway 887/Range Road 73	44,300	tonnes	26.0	**1.2**
Range Road 70 (Y-ber Road)	28,400	tonnes	26.0	**0.7**
ACP (Assume 170 mm Thickness)				
Highway 3	191,700	tonnes	84.0	**16.1**
Highway 887/Range Road 73	22,300	tonnes	84.0	**1.9**
Range Road 70 (Y-ber Road)	14,400	tonnes	84.0	**1.2**
Bridge on Main SMRID Canal	175	m^2	4,500	**0.8**
Culverts				
Centreline Culverts		Lump Sum ($M)		**3.4**
Median Culverts	44	per culvert	24,320	**1.1**
Manholes	5	per manhole	15,000	**0.1**
Service Roads/Local Roads	31.2	km	500,000	**15.6**
Private Driveway	1.8	km	100,000	**0.2**
At-grade Intersections	6.0	per intersection	200,000	**1.2**
Canal Impacts		Lump Sum ($M)		**1.5**
Irrigated Land Impacts		Lump Sum ($M)		**2.3**
Utilities		Lump Sum ($M)		**2.1**
Right-of-way (Hwy and Service Road including Property Impacts)		Lump Sum ($M)		**13.0**
Total Roadwork Components				**79.8**
Engineering & Contingency (15%)				**12.0**
Miscellaneous (10%)				**9.2**
Opinion of Probable Cost*				**100.9**

*Costs do not include Environmental Mitigation Costs

Table E.6
Highway 3 & Highway 887 Interchange
Ultimate Stage Improvement
Opinion of Probable Cost

Major Items	Amount	Unit	Unit Cost ($/Unit)	Cost ($M)
Stripping	50,000	m^3	5.1	**0.3**
Borrow Excavation	673,000	m^3	6.6	**4.4**
Common Excavation	55,000	m^3	6.0	**0.3**
Over Haul (Assume 1km Distance)	673,000	m^3 km	0.7	**0.5**
GBC	48,400	tonnes	26.0	**1.3**
ACP	23,500	tonnes	84.0	**2.0**
Bridge	2,039	m^2	4,500	**9.2**
Total Roadwork Components				**17.9**
Engineering & Contingency (15%)				**2.7**
Miscellaneous (10%)				**2.1**
Opinion of Probable Cost*				**22.6**

*Assumes that all right-of-way, utilities, and irrigation impacts have been dealt with under initial twinning

Table E.7
Highway 3 & Range Road 70 Interchange
Ultimate Stage Improvement
Opinion of Probable Cost

Major Items	Amount	Unit	Unit Cost ($/Unit)	Cost ($M)
Stripping	72,400	m^3	5.1	**0.4**
Borrow Excavation	487,500	m^3	6.6	**3.2**
Common Excavation	90,000	m^3	6.0	**0.5**
Over Haul (Assume 1km Distance)	487,500	m^3 km	0.7	**0.3**
GBC	85,400	tonnes	26.0	**2.2**
ACP	40,800	tonnes	84.0	**3.4**
Bridge	2,863	m^2	4,500	**12.9**
Sub Total				**23.0**
Engineering & Contingency (15%)				**3.4**
Miscellaneous (10%)				**2.6**
Opinion of Probable Cost*				**29.1**

*Assumes that all right-of-way, utilities, and irrigation impacts have been dealt with under initial twinning