

SITE NUMBER AND NAME: GP016 2 km West of Hwy 40 and Hwy 666 Junction		HIGHWAY & KM: 666:02, 34.837	PREVIOUS INSPECTION DATE: May 27, 2020	INSPECTION DATE: July 20, 2021
LEGAL DESCRIPTION: NE 15-70-06-W5M	NAD 83 COORDINATES: UTM Northing Easting 11 6103361 383748		RISK ASSESSMENT: Lower (2): PF: 13 CF: 7 TOTAL: 91 Middle (1): PF: 11 CF: 5 TOTAL: 55 Upper (3): PF: 11 CF: 4 TOTAL: 44	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 2740 (west) & 2740 (east) (Reference No. 28690 & 70000759)			CONTRACT MAINTENANCE AREA (CMA): 504	

SUMMARY OF SITE INSTRUMENTATION: Operational: Four SIs and four PNs were installed between 1989 and 2003. Two SPs, and one VWP were installed in 2014 Inoperable: Two SIs and three PNs were installed between 1989 and 2003. Two PNs, and two VWPs were installed in 2014 LAST READING DATE: June 27, 2021	INSPECTED BY: Chris Gräpel James Lyons Roger Skirrow (AT) Rocky Wang (AT) Ed Szmata (AT) Max Shannon (AT)
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PRIMARY SITE ISSUE: Three landslide features are affecting the embankment of Hwy 666:02 along the south slope of the Wapiti River Valley. The entire south slope of Wapiti River valley is a landslide zone with varying rates of movement.

APPROXIMATE DIMENSIONS:

Lower Slide (Site 2): 300-m-wide backscarp at guardrail, extending 300 m in length to the river valley floor with backscarp extending across roadway into the EBL ditch. Depth to failure plane is assessed to be at about 10 m along the highway and about 20 m approximately 150 m downslope towards the river.

Middle Slide (Site 1): 300-m-wide backscarp, (65 m wide at guardrail) and extends to the centerline. Depth to failure plane is assessed to be about 20 m near the highway.

Upper Slide (Site 3): 250 m wide backscarp and extends 1.5 m past edge of shoulder. Depth to failure plane is assessed to be about 7 m to 11 m at the highway.

DATE OF ANY REMEDIAL ACTION: Milling and paving in 2020, additional milling in 2021

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X			X	
Slope Movement	X			X	
Erosion	X				X
Seepage	X				X
Culvert Distress		X			

COMMENTS
Lower Slide (Site 2)

- Pavement paved fall 2020 and milled in spring this year. Movements started to occur soon after paving.
- The passing lane is decommissioned. The pavement has only been raised on two lanes with two lifts of pavement, pavement is 0.2 to 0.25 m thick where raised above old pavement. The former passing lane is blocked with wooden barricades and orange delineators.

<ul style="list-style-type: none"> - WP087, a void opened through the pavement where landslide deformations created a void or widened a crack at depth that the pavement started to deflect into (a “pothole” or “sinkhole”) 	
<ul style="list-style-type: none"> - WP088 pavement looks like it is 1.5 m thick at edge of pavement 	
<ul style="list-style-type: none"> - 9 cm of vertical movement in latest paved surface near upper (west) barricade. Recent milling done at this location to improve smoothness of surfacing has deflected by 1 to 2 cm since milling. Recent cracks in unmilled pavement are 0.5 cm wide. 	
<u>Middle Slide (Site 1)</u>	
<ul style="list-style-type: none"> - Patched spring 2020. Approximately 2 m of pavement total at edge of pavement 	
<ul style="list-style-type: none"> - Asphalt settled up to 4 cm across backscarp since then, cracking extends through climbing and passing lanes to centreline, cracking approximately 1 cm wide 	
<ul style="list-style-type: none"> - WP089, top of guardrail is at elevation of pavement (second row of old guardrail posts about 1.5 m horizontal below existing edge of pavement 	
<ul style="list-style-type: none"> - Backslope where the road was realigned to the south (i.e., into the slope) has some failures. 	
<ul style="list-style-type: none"> - Very steep and high sharp shoulders at edge of pavement 	
<ul style="list-style-type: none"> - AT will close passing lane, and add more wooden barricades, delineators, sharp shoulder signs and no-passing signs to discourage aggressive driving. 	
<u>Upper Slide (Site 3)</u>	
<ul style="list-style-type: none"> - Backscarp of sliding extends into shoulder 	
<ul style="list-style-type: none"> - Wooden barricades in place to keep drivers away from the shoulder 	
<ul style="list-style-type: none"> - 0.5 to 1.0 m drop off at edge of pavement 	
<u>Other work</u>	
<ul style="list-style-type: none"> - CIMA+ is doing a planning study with Thurber based on Karl's 2016 recommendations. Highway decommissioning is being considered as one of the options. 	
<p>This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Alberta Transportation (Client) for the specific application to the Central Region Geohazard Risk Management Program (Contract No. CON0022166) and it may not be relied upon by any other party without KCB's written consent.</p> <p>KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.</p> <p>Use of or reliance upon this instrument of service by the Client is subject to the following conditions:</p> <ul style="list-style-type: none"> (i) The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report. (ii) The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time. (iii) KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report. 	
<p>Chris Gräpel, M.Eng., P.Eng. Senior Civil Engineer, Associate</p>	



Time: 15:14:37 PM
 Date: October 05, 2021
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Legend

- ▲ GPS Waypoint (July 20, 2021)
- ◆ Pneumatic Piezometer (PN)
- ▣ Slope Inclinometer (SI)
- ◆ Standpipe Piezometer (SP)
- ⊗ Vibrating Wire Piezometer (VW)
- GPS Track (July 20, 2021)
- Culvert
- ▭ Site Extent
- Flow Direction

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<p>NOTES:</p> <ol style="list-style-type: none"> 1. HORIZONTAL DATUM: NAD83 2. GRID ZONE: UTM Zone 11N 3. IMAGE SOURCE: ESRI Basemap 	<p>CLIENT</p>	<p>PROJECT GRANDE PRAIRIE SOUTH REGION GEOHAZARD RISK MANAGEMENT PROGRAM</p> <p>TITLE Site Plan GP016 South of Grande Prairie Hwy 666:02, km 34.837</p> <p>SCALE: 1:5,000 PROJECT No. A05116A01 FIG No. 1</p>
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GP016 Wapiti River Valley Slide – Lower Slide (Site 2)

Photo 1 The asphalt surface was milled in spring 2021 to remove a ridge in the eastbound and westbound lane, caused by settlement. Photo taken July 20, 2021 facing east.



Photo 2 Asphalt cracking observed near the east extent of the lower slide, running diagonally across the highway. Photo taken July 20, 2021 facing east.



Photo 3 Edge of the recent asphalt patches after the highway was realigned approximately 8 ft (2.4 m) upslope (south). The height of the new asphalt is approximately 0.2 m to 0.3 m above the previous road surface. Photo taken July 20, 2021 facing west.



Photo 4 A recent patch at WP 0087 completed in the north (westbound) lane in spring 2021 after cracking and a sinkhole (void under pavement) was observed by the Maintenance Contract Inspector (MCI). Photo taken July 20, 2021 facing south.



Photo 5 Existing asphalt on the north (westbound) shoulder is breaking away from the highway. Photo taken July 20, 2021 facing west.



GP016 Wapiti River Valley Slide – Middle Slide (Site 1)

Photo 6 Asphalt cracking observed in the north (westbound) lane of Hwy 666, after the westbound lane was patched in 2020. Photo taken July 20, 2021 facing west.



Photo 7 Asphalt cracking observed in the north (westbound) lane of Hwy 666, just east of the asphalt cracking shown in Photo 1. Photo taken July 20, 2021 facing east.



Photo 8 A close-up photo of the asphalt cracking observed near the west extent of the asphalt patch (shown in Photo 8). Photo taken July 20, 2021 facing east.



Photo 9 North (downslope) edge of the highway, showing the location of the new and existing guardrail (WP 0089). Photo taken July 20, 2021 facing west.



GP016 Wapiti River Valley Slide – Upper Slide (Site 3)

Photo 10 Longitudinal asphalt cracking observed in the north (westbound) travel lane. Photo taken July 20, 2021 facing west.



Photo 11 The thickness of the asphalt at the upper slide was estimated to be approximately 1.5 m. Photo taken July 20, 2021 facing southeast.



Photo 12 The left flank of the upper slide. Photo taken July 20, 2021 facing northeast.



Photo 13 **The asphalt of the north (westbound) shoulder is failing. Photo taken July 20, 2021 facing west.**

