GEOHAZARD RISK MANAGEMENT PROGRAM
North Central Region – Edson / Stony Plain Area

2020 Inspection Report

Site Number	Site Name		Hwy	km
NC11	North of Hinton		40:30	5.6
Legal Land Description	NW 1-51-26-W5M			
UTM Coordinates (NAD 83)	Zone 11U	N5914208	E453022	
Operational Site Instrumentation	**Slope Inclinometers**		2	
	Pneumatic Piezometers		0	
	Vibrating Wire Piezometers		0	
	Standpipe Piezometers		0	
Date of Last Instrumentation Readings	May 27, 2019			

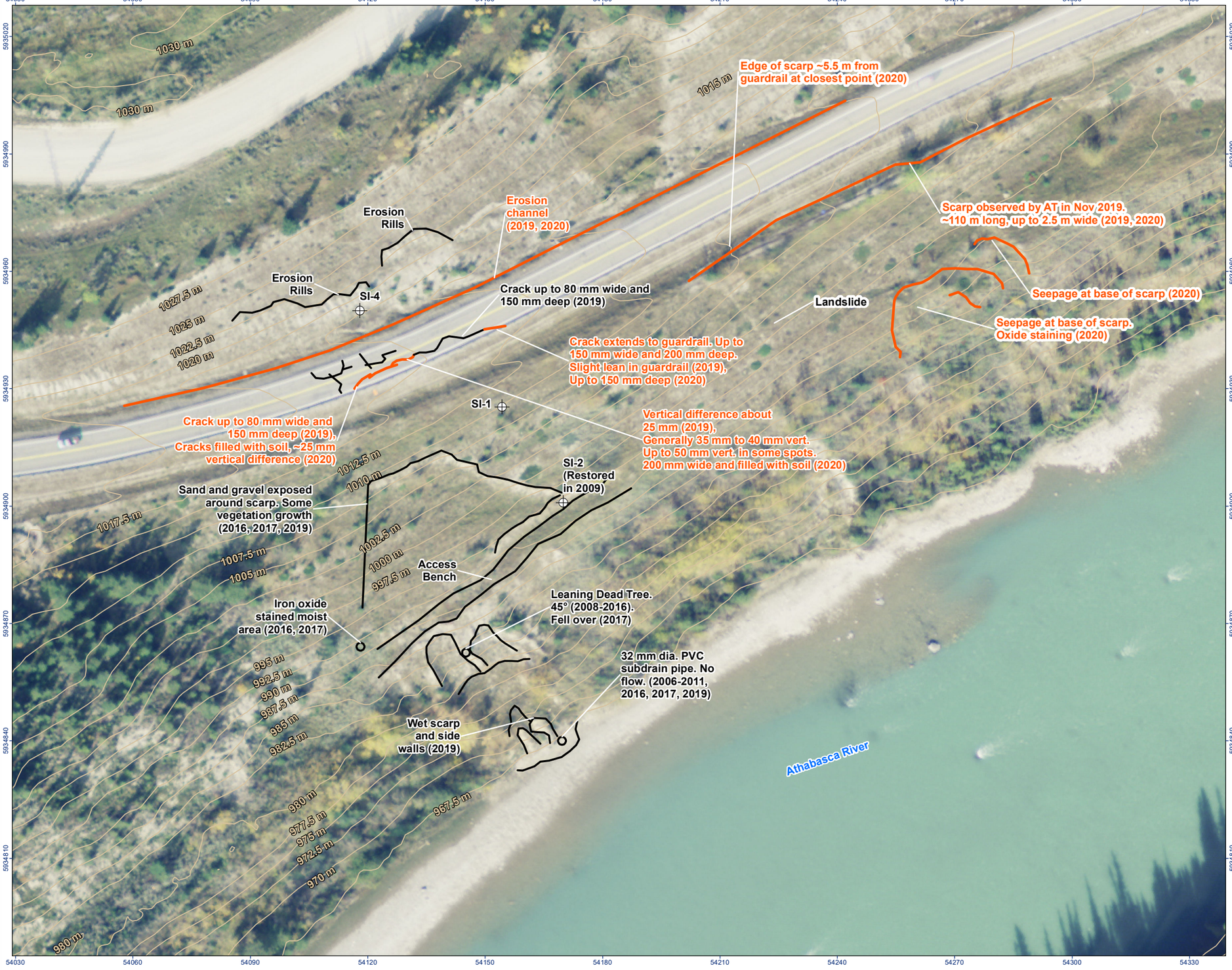
Risk Assessment	Date	PF	CF	Risk Ranking
Current Inspection	May 26, 2020	13	8	104
Previous Inspection	October 23, 2019 (Call-Out)	12	8	96
Report Attachments	☒ Photographs (15 photos)	☒ Site Plans (1 page)		

	Stantec	Alberta Transportation
Inspected By	Leslie Cho	Kristen Tappenden, Kathleen Davis, and Howard Hawley
Date of Remediation	n/a	

Recent Maintenance	2009 – Spray patch of Highway 40		
Primary Site Issue	Slope movement downslope from highway		
Observations	**Description and Location**	**Change from Previous Inspection**	
☒ Pavement Distress	Pavement cracking on both westbound and eastbound lanes with 25 mm of vertical difference near SI4.	☒ Yes	☐ No
☐ Culvert Distress		☐ Yes	☐ No
☐ Bridge Distress		☐ Yes	☐ No
☒ Slope Movement	Tension crack on highway between SI4 and SI1. Retrogressive slide about 80 m northeast of SI1 and SI2.	☒ Yes	☐ No
☒ Erosion	Erosion upslope from SI4 and SI2	☐ Yes	☒ No
☒ Seepage	Seepage in retrogressive slide.	☒ Yes	☐ No
☐ Other		☐ Yes	☐ No

Discussion	A Call-Out Inspection was completed for this site in October 2019 due to sudden slope movements resulting in larger pavement cracks up to 80 mm wide, 150 mm deep with 25 mm of vertical difference. During the current inspection, the pavement cracks have increased to up to 150 mm wide and 200 mm deep at localized spots. The vertical difference remained at about 25 mm. Some cracks were also infilled with soil. The pavement cracking on Highway 40 are shown in Photos 1 to 3. A new scarp was observed by AT in November 2019 approximately 80 m northeast of the pavement cracking as shown in Photo 4 to 6. The scarp is estimated to be about 110 m wide and up to 2.5 m high. At its closest point, the guardrail is about 5.5 m from the edge of scarp. The highway upslope from the scarp currently does not appear to be affected as shown in Photos 7 and 8. Retrogressive slides were observed downslope from the new scarp as shown in Photos 9 to 12. Seepage was observed at the base of the scarps within these slides. The landslide downslope from SI2 appeared relatively similar to the Call-Out Inspection in October 2019 as shown in Photos 13 and 14. The river levels appeared to be relatively higher than previous inspections with the floodplain underwater as shown in Photo 15.

Assessment	The relatively higher amount of precipitation received in 2019 may have resulted in additional erosion and slumping at the toe of the slope. This reduced the resistance at the toe leading to additional overall slope movements. Higher piezometric levels as suggested by possible seepage observed during the 2019 Call-Out may have also contributed to further instability. The scarps observed by AT in December 2019 is believed to be an old scarp. Historical imagery from Google Earth indicates the scarp has been present since at least 2010 and appears relatively unchanged until recent observations from AT. It is likely that landslide movements at this location have reactivated, possibly due to higher piezometric levels as suggested by the observed seepage. The slope failure has resulted in an irregular pavement surface with more pathways for water infiltration. In addition, the extended pavement cracks may be impacting the guardrail. It is expected that the landslide will continue to progress downslope (south), especially after snow melt and during periods of heavy rainfall.
Recommendations	Short term recommendations should consist of sealing any pavement cracks to reduce surface water infiltration into the slope and pavement structure. Speed reductions and other warning signs should be implemented along the affected section of Highway 40. The Maintenance Contractor should regularly inspect the highway. Should the slide progress further, lane closure should be considered. Remedial design options discussed with AT included relocating Highway 40, construction of a micropile wall or conventional pile wall with anchors, reconstructing Highway 40 with lightweight fill, and installation of horizontal drains. Instrumentation monitoring should return to the original semi-annual frequency. Site inspections should also return to the original annual frequency.



Stantec

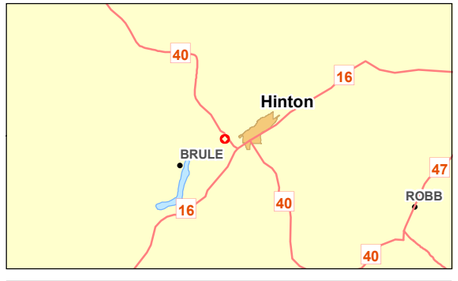
- Approximate Slope Inclinometre Location
- 2020 Observation
- Previous Observation / Site Detail

N

0 15 30 metres

(At original document size of 11x17)
1:1,000

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Imagery: Valtus, Imagery 2012



Project Location
Hinton, Alberta

Prepared by MK on 2020-06-11
Quality Review by LC on 2020-06-19
Independent Review by XL on 2020-06-19

Client/Project
123312435
Alberta Transportation
Geohazard Monitoring Program
NC11 Highway 40 North of Hinton

Figure No.
1

Title
Site Plan

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Reference: 2020 Annual Inspection Photographs at NC11 – North of Hinton
File Number: 123312435

Photo 1: Pavement cracking. Looking northeast.

Photo 2: Pavement cracking. Looking northeast.

Reference: 2020 Annual Inspection Photographs at NC11 – North of Hinton
File Number: 123312435

Photo 3: Pavement cracking. Looking northeast.

Photo 4: West end of scarp near highway. Looking northeast.

Reference: 2020 Annual Inspection Photographs at NC11 – North of Hinton
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Photo 5: West end of scarp near highway. Looking southwest.

Photo 6: East end of scarp along highway. Looking west.

Reference: 2020 Annual Inspection Photographs at NC11 – North of Hinton
File Number: 123312435

Photo 7: Highway 40 upslope from scarp. Looking west.

Photo 8: Highway 40 upslope from scarp. Looking west.

Reference: 2020 Annual Inspection Photographs at NC11 – North of Hinton
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Photo 9: Series of retrogressive slides downslope from scarp near Highway 40. Looking east.

Photo 10: Seepage at base of scarp. Looking east.

Reference: 2020 Annual Inspection Photographs at NC11 – North of Hinton
File Number: 123312435

Photo 11: Slide about 20 m northeast of landslide in Photo 7. Seepage at base of scarp. Looking east.

Photo 12: Between the two slides in Photos 7 and 8. Looking west.

Reference: 2020 Annual Inspection Photographs at NC11 – North of Hinton
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Photo 13: Overall Slope from toe. Looking northwest.

Photo 14: Overall Slope from toe. Looking north.

Reference: 2020 Annual Inspection Photographs at NC11 – North of Hinton
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Photo 15: Athabasca River shoreline. Looking northeast.