NORTH CENTRAL REGION GRMP
EDSON / STONY PLAIN
SITE INSPECTION FORM

SITE NUMBER AND NAME:	HIGHWAY AND KM:	PREVIOUS INSPECTION:	CURRENT INSPECTION:
NC080 – Fickle Creek Slide	47:06, km 39.608	June 17, 2022	June 12, 2024
LEGAL DESCRIPTION:	**NAD83 COORDINATES:**		**RISK ASSESSMENT:**
SE-24-51-19-W5	UTM11U 5918635N, 522484E		PF: 7 CF: 7 Total: 49
AVERAGE ANNUAL DAILY TRAFFIC (AADT):		**CONTRACTOR MAINTENANCE AREA (CMA):**	
1,200 (2023)		508	

SUMMARY OF INSTRUMENTATION:	INSPECTED BY:
One slope inclinometer and two pneumatic piezometers functional **LAST READING DATE:** May 13, 2024	Stantec: Leslie Cho, Sonja Pharand AT: Kristen Tappenden, Kathleen Davis

PRIMARY SITE ISSUE:
Embankment failure likely associated with precipitation and erosion around culvert.

APPROXIMATE DIMENSIONS:
60 m wide x 30 m long

DATE OF ANY REMEDIAL ACTION:
Driven steel pile wall constructed in Fall 2013. Side slope regraded and tension cracks filled in Fall 2014. 1200 mm diameter culvert relined in winter 2014. Milled and paved in September 2015.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICEABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Cracks reflecting through overlay on northbound lane (NBL). Dip in NBL.		X
Slope Movement	X		Cracks reflecting though pavement overlay. Dip in pavement towards southeast. Slope movement continues to be observed in SI13-01	X	
Erosion	X		Deeper scour hole above 760 mm dia. culvert outlet, exposing separation in culvert. Creek bank erosion/slump at 1200 mm dia. culvert outlet has progressed. Erosion northeast of 1200 mm dia. culvert inlet. Erosion below 400 mm diameter down drain outlet. Erosion channel north of 1200 mm dia. culvert inlet.	X	
Seepage	X		Moisture appeared to be coming out of arched pavement cracks	X	
Bridge/Culvert Distress	X		Inlet of 760 mm dia. culvert lifted above ground. Water flowing under culvert and entering culvert at the next segment. Separation near outlet of 760 mm dia. culvert.	X	

COMMENTS

- The pavement cracking (Photos 1 and 2) appeared to be similar to the 2022 inspection and generally consisted of:
  - Approximately 40 m long curvilinear crack along NBL.
  - Approximately 25 mm dip to the southeast in the south third of the curvilinear crack. The dip was similar to what was observed during the 2022 inspection.
- The scour hole above the 760 mm diameter culvert remains 1.2 m wide. A void was observed below the ground in the scour hole 1.1 m deep bringing the total depth of scour to 2.3 m. The void has progressed to expose a 90 mm wide separation in the culvert and flow through the culvert can be seen (Photo 3).

- The erosion near the outlet of the 1200 mm dia. culvert progressed. The scarp has receded to 4.2 m behind the edge of creek and is about 8 m wide and 1.2 m deep (Photo 4).
- SI13-01 showed an incremental movement of 5 mm since the last reading taken in Spring 2023, corresponding to a current movement rate of 5 mm/year, increased from the less than 1 mm/year rate between Fall 2020 and Spring 2023. This SI is installed downslope of the pile wall and may not be indicative of movement upslope of the wall.
- Groundwater levels in both piezometers increased from the last readings taken in Spring 2023. PN13-01 increased by 1.1 m to 1.9 m below ground surface, and PN13-02 increased by 0.6 m corresponding to 6.0 m below ground surface.
- The erosion gully north of the 1200 mm dia. culvert inlet was observed to be a similar width and depth (up to 2 m wide and 1 m deep) as previous inspections, however a portion of the slope on the west side has slid into the gully (Photo 5).
- The smaller erosion gully upslope from the erosion gully north of the 1200 mm dia. culvert inlet was observed to be in a similar condition to the previous inspection in 2022. The smaller erosion gully was about 500 mm wide and 450 mm deep and extended to about 2 m short of the north tree line (Photo 6).
- A 1.2 m deep scour hole exists at the 400 mm diameter down drain and appears unchanged from the 2021 and 2022 inspections. Water was trickling from the down drain at the time of the inspection (Photo 7). A new erosion gully is developing between the 400 mm downdrain and the 760 mm diameter culvert outlet.
- The 760 mm diameter culvert inlet was lifted with water flowing under the culvert. The condition appears similar to the previous inspection in 2022 (Photo 8).
- A Probability Factor of 7 has been given to this site due to observed slope movements on both the east and west sides of the highway. The Consequence Factor is also 7 as the result of a slide occurrence would result in closure of the highway and would be likely to affect drainage through the culverts under the highway embankment.

RECOMMENDATIONS

- All pavement cracks should be sealed to reduce surface water infiltration into the slide mass. Mill and fill may also be completed to improve the rideability of the highway (i.e. smoothen dips and repair cracks) and to avoid additional loading on the ground surface.
- Since there are no functional instruments above the pile wall, two lines of survey control points can be installed to monitor movement of the embankment above the pile wall. Alternatively, replacement inclinometers can be considered to monitor pile wall performance.
- Riprap or gravel can be placed at the downdrain to reduce scouring. If left unchecked, the erosional scour may remove additional material and trigger a slope failure on the west side of the highway.
- Riprap can be placed along the creek at the outlet of the 1200 mm dia. culvert to reduce toe erosion of the slump. This slump should be backfilled and reseeded.
- The scour hole above the 760 mm diameter culvert outlet should be backfilled and reseeded, after repairing the separation in the culvert.
- The 760 mm diameter culvert should be inspected using CCTV to determine if the pipe is broken. A replacement culvert may be required to facilitate creek flow.
- A french drain could be considered on the shoulder of the highway to help with surface drainage of the highway. The estimated cost of construction for a 60 m long, 3 m deep French drain is $80,000 to $120,000 excluding the cost of engineering.
- The site should continue to be inspected every two years with the next visit in 2026.
- Instrumentation monitoring should continue annually in the spring.

NORTH CENTRAL REGION GRMP
EDSON / STONY PLAIN
SITE INSPECTION FORM

PREPARED BY: Sonja Pharand, P.Eng.	**REVIEWED BY:** Xiteng Liu, M.Sc., P.Eng., PMP	**PERMIT TO PRACTICE:**
		**PERMIT TO PRACTICE** **STANTEC CONSULTING LTD.** Signature _____ Date 2024-10-15 **PERMIT NUMBER: P 0258** The Association of Professional Engineers and Geoscientists of Alberta

522425 522450 522475 522500 522525 522550

5918675 5918650 5918625 5918600

Erosion up to 450mm deep, 500mm wide extending to ~2m from north treeline (2021, 2022, 2024)

Portion of slope west of gully slid into gully (2024)

Erosion gully up to 300mm wide (2016)
Vegetation growing in gully (2017, 2018)
1.5m wide, 1m deep (2019)
Up to 2m wide, 1m deep (2020, 2021, 2022, 2024)

Culvert lifted, water flowing under culvert (2018)
Some water entering from next segment approx. 2-3m in (2019, 2022, 2024)

Erosion channel leading from 400 mm downdrain (2024)

1.2 m erosion below pipe (2016-2019)
Drain flowing, high water below (2020)
Dry (2021)
Intermittent flow (2022)
Trickling flow (2024)

400 mm dia. downdrain

Erosion gully, vegetated (2022)

Soft sponge like ground (2015)

1200 mm dia. culvert

760 mm dia. culvert

0-5 mm wide, no diff (2015)

Milled and filled (2015)
No cracks (2016, 2017)

0-5 mm wide, no diff (2015)

Pile wall installed (Fall 2013)

Shoulder cracks (2014)

Toe bulge

Slough around guard rail post (2015)

PN13-1
PN13-2

SI13-02

SI13-01

Dip in pavement (2015)

Crack (2019)
Cracks up to 20 mm wide (2020, 2021, 2022)
10 mm wide, 5-10 mm diff
Moisture coming out of cracks (2024)

Slight dip to east (2020)
~25 mm dip (2021)
~50 mm dip (2022, 2024)

Pavement cracks (2018)

Toe bulge (2016)

Crack (2019)
10 mm wide, no diff. (2024)

Hairline cracks outside of guardrail (2021)

Crack resurfaced (2020)

0-25 mm wide, no diff (2015)

Ponded water on temporary bench (2014)
Dry (2016)

Erosion extended downslope (2019)

Surface erosion (2016-2020)

Culvert re-lined (2014)
Riprap around culvert (2016)
Draining (2017-2019)

Slump 2 m wide, 1 m deep scarp (2020)
Scarp 4 m back from edge of creek and 1.2 m deep (2021)
Progressing south (2022)
Slump progressed to approx. 8 m wide, 4.2 m back from edge of creek and 1.2 m deep (2024)

Surface erosion (2018)
Minor slumping (2019)

1.2 m wide and deep scour hole/erosion. Saturated (2020, 2021)
Max 2.2 m deep, 1.2 m wide (2022)
Max 2.3 m deep, exposed culvert separation of 90 mm (2024)

522425 522450 522475 522500 522525 522550

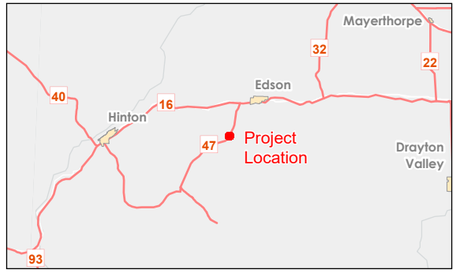
Stantec

- Instrument (Operational)
- Instrument (Non-operational)
- Photo and Direction
- Previous Observation
- 2024 Observation
- Culvert
- Watercourse
- Quarter Section

N

0 9 18 metres
(At original document size of 11x17)
1:500

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 11N
2. Data Sources: Geogratis, ©Department of Natural Resources Canada, All rights reserved. altaLIS.
3. Background: Light Gray Base: Esri Canada, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, NRCan, Parks Canada
Google Satellite: © OpenStreetMap (and) contributors, CC-BY-SA
4. Contours: LiDAR contours obtained from client.



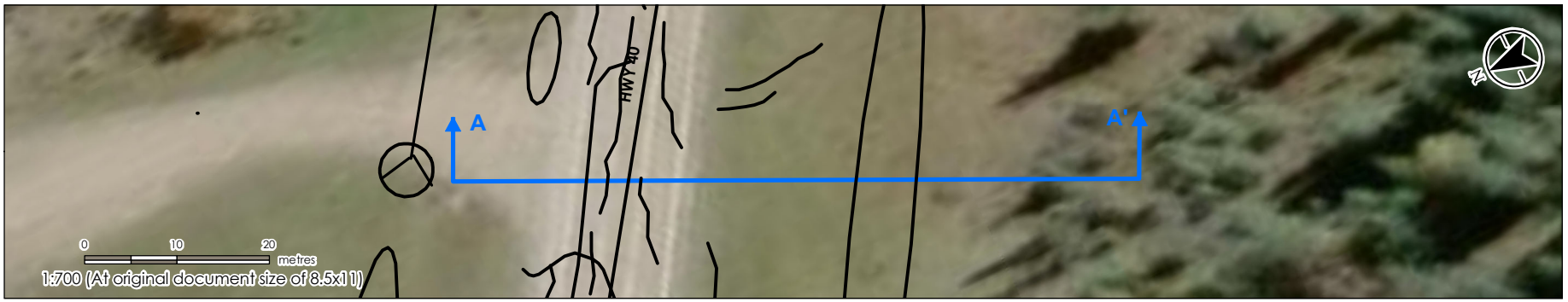
Project Location
SE-24-051-19W5, Alberta

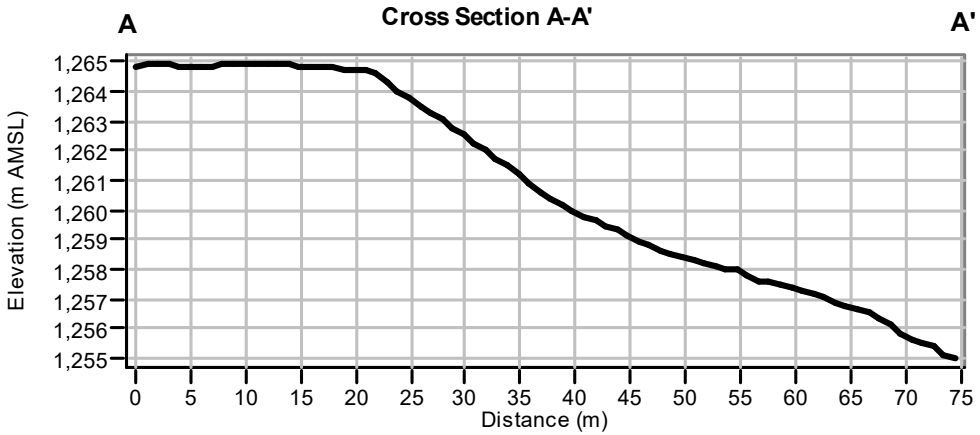
Prepared by SP on 2024-09-20
TR by LC on 2024-09-20
IR by XL on 2024-09-20

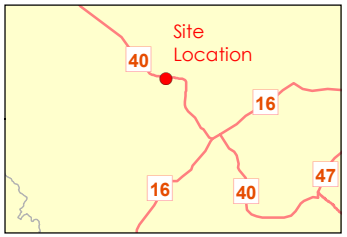
Client/Project
123315222
Transportation and Economic Corridors
Geohazard Monitoring Program
NC80 Fickle Creek Slide

Figure No.
1

Title
Site Plan







Approximate Culvert Location
Previous Observation
Cross Section Location

Notes
1. Coordinate System: NAD 1983 UTM Zone 11N
2. Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved.
3. Imagery: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Stantec

Project Location
SE 8-53-27 W5M
Yellowhead County, Alberta

123315222
Prepared by SP on 2024-08-25
Quality Review by LC on 2024-08-25
Independent Review by XL on 2023-08-25

Client/Project
Transportation and Economic Corridors
Geohazard Monitoring Program
NC83 – West of Wildhay River

Figure No.
2

Title
Ground Profile of Section A-A'

2024 Site Inspection Photos at NC080

Photo 1: Arched crack near SI13-02. Looking southwest.

Photo 2: Pavement dip near south end of overlay. Looking southwest.

2024 Site Inspection Photos at NC080

Photo 3: Scour hole exposing 90 mm separation in 760 mm diameter culvert. Looking west.

Photo 4: Retrogressing slump/erosion at outlet of 1200 mm diameter culvert. Looking east.

2024 Site Inspection Photos at NC080

Photo 5: Erosion gully north of 1200 mm diameter culvert inlet. Portion of slope has slid into gully. Looking southwest.

Photo 6: Erosion gully leading to old gully shown in Photo 5. Looking southwest.

2024 Site Inspection Photos at NC080

Photo 7: Outlet of 400 mm down drain. Looking south

Photo 8: Outlet of 760 mm culvert. Looking southeast.

2024 Site Inspection Photos at NC080

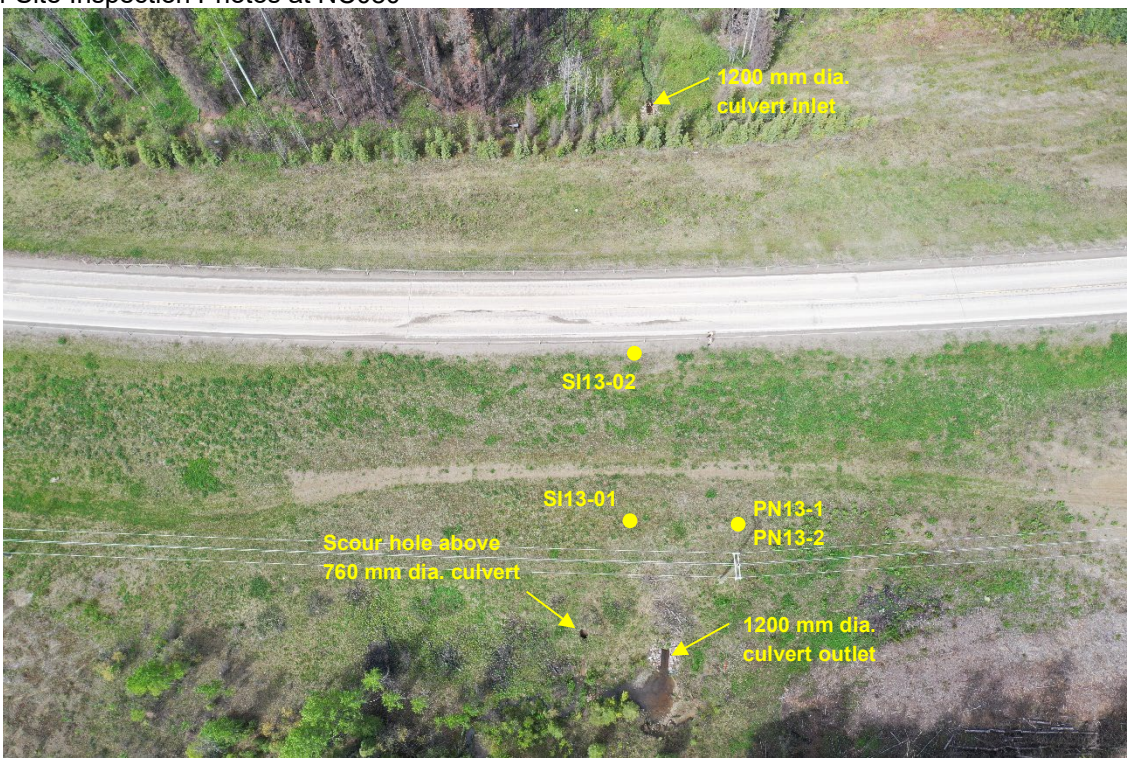


Photo 9: Overview of site. Photo taken by drone, looking northwest.

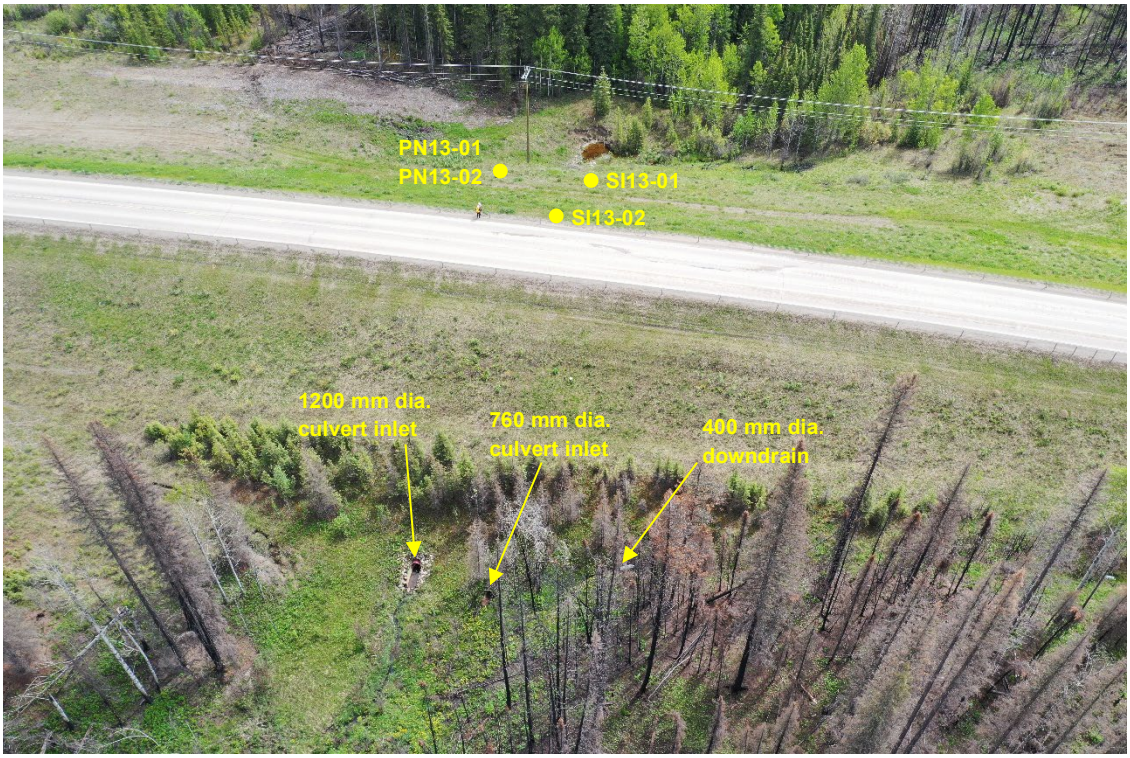


Photo 10: Overview of west side of site. Photo taken by drone, looking east.