

SITE NUMBER AND NAME: NC112 - Slide South of TWP 522	HIGHWAY AND KM: 22:30, km 42.513	PREVIOUS INSPECTION: June 14, 2024	CURRENT INSPECTION: May 20, 2025
LEGAL DESCRIPTION: SW-09-52-07-W5M, SE-08-52-07-W5M	NAD83 COORDINATES: UTM11U 5927044 N, 633771 E		RISK ASSESSMENT: PF: 11 CF: 4 Total: 44
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 3,430 (2024)		CONTRACTOR MAINTENANCE AREA (CMA): 509	

SUMMARY OF INSTRUMENTATION: N/A	INSPECTED BY: Stantec: Leslie Cho, Sonja Pharand TEC: Kristen Tappenden
PRIMARY SITE ISSUE: Landslide resulting in differential pavement cracking in the southbound lane	
APPROXIMATE DIMENSIONS: 20 m long x 33 m wide	
DATE OF ANY REMEDIAL ACTION: N/A	

ITEM	CONDITIONS EXIST		DESCRIPTION AND LOCATION	NOTICEABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Differential, curved cracking, totaling up to 300 mm wide in the southbound lane of Highway 22 at south slide.	X	
Slope Movement	X		Two landslides along west slope of Highway 22. South slide is located at the end of the guardrail. North slide is a vegetated slump/depression about 40 m north of the south slide.		X
Erosion		X			X
Seepage		X			X
Bridge/Culvert Distress		X			X
Other		X			X

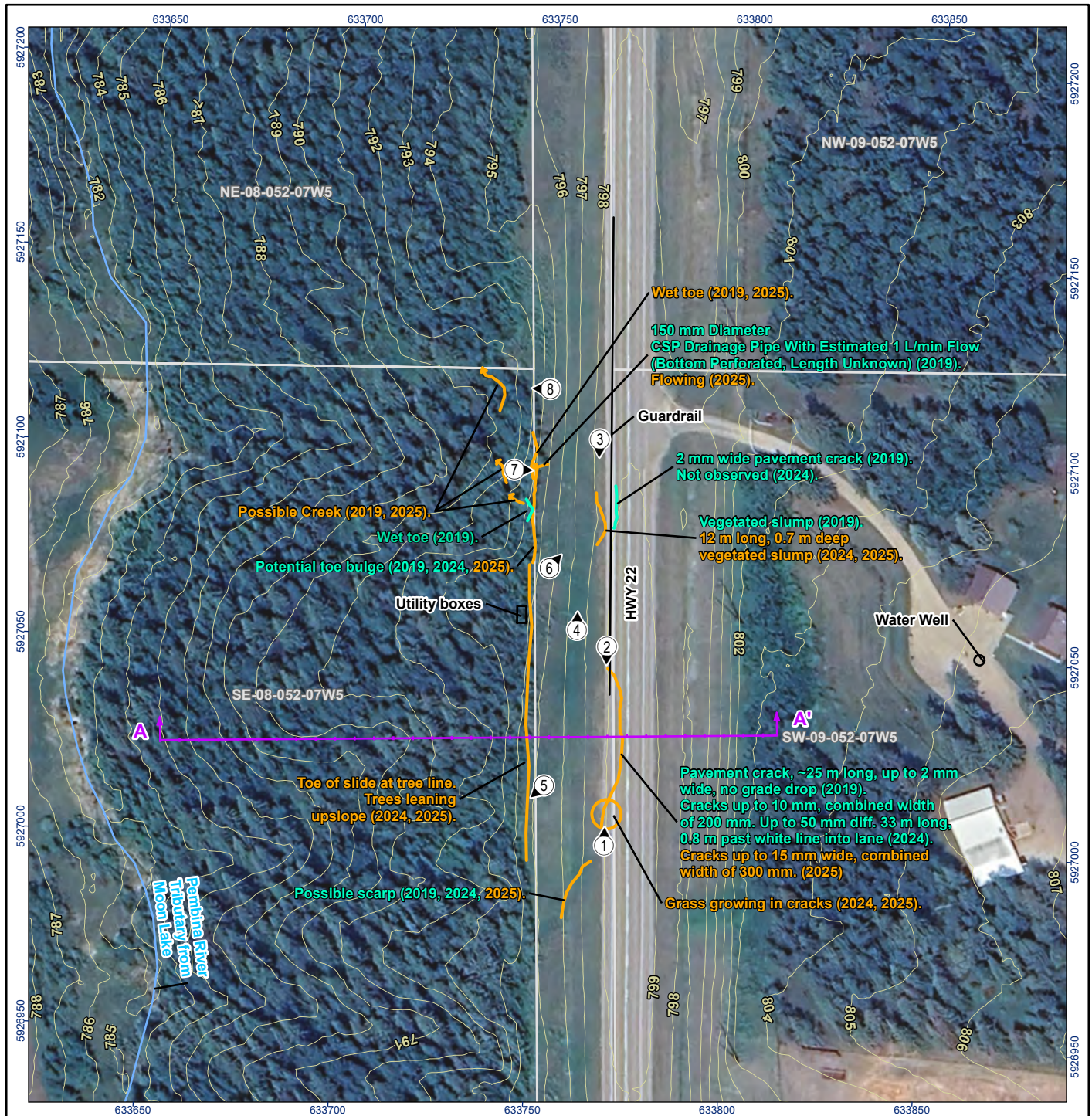
COMMENTS <ul style="list-style-type: none"> Highway 22 appears to be constructed as a sidehill cut-fill based on the surrounding topography (Photos 9 & 10). The crest of the landslide appears to be within the southbound land of Highway 22, approximately 0.8 m east from the painted white line, similar to 2024. Pavement cracking is apparent within the southbound lane of Highway 22, with cracks up to 15 mm wide, collectively creating a curved cracking path up to 300 mm wide and 33 m long. The width of the cracking path has increased approximately 100 mm since the 2024 inspection. A vertical difference up to about 50 mm was observed on either side of the cracks, similar to 2024. The cracks start and stop at the edge of the pavement. Vegetation is growing out of the cracks toward the south end of the crack (Photos 1 & 2). A rough road warning sign is posted approximately at the vegetated slump (north slide) (Photo 3). The west slope is generally vegetated with horsetail, which is a plant that favours moist to wet environments suggesting a potentially wet embankment slope.

- The toe of the landslide appears to be just beyond the western tree/fence line. Many of the trees are leaning upslope (Photos 4 & 5).
- A vegetated slump approximately 12 m long and 0.7 m deep is located on the upper west slope, approximately 0.5 m to 1.0 m from the edge of the pavement. This slump is north from the pavement cracking (Photos 4 & 6). Little to no change was observed at the vegetated slump since 2019.
- A bulge, approximately 0.5 m high and 4 m long is present on the upper west slope to the south of the pavement cracking.
- A 150 mm diameter CSP culvert outlet was observed in 2019 near the toe of the slope within the treed area. This outlet was not observed during the 2024 inspection but was located again during the 2025 inspection. Water was actively flowing from the culvert outlet (Photo 7).
- A potential slow flowing creek appears to be present within the treed area (Photo 8).
- 2014 LiDAR shows two features downslope from the pavement cracking and highway Right of Way that appear to be drainage channels. It is possible that subsurface water continues to flow through the old drainage channels leading to the softening of the foundation soils at this section of Highway 22, and resulting in the observed slope failure.
- A Probability Factor of 11 was assessed since there appears to be active movement, with a moderate but increasing rate of movement. Continued movement may result in partial closure of the highway, and as such a Consequence Factor of 4 was assigned.

RECOMMENDATIONS

- In the short term, the pavement on the highway surface could be milled and re-paved to reduce any hazards the pavement difference and cracking may present to road users. The final paved surface should not be higher than the current roadway surface such that no net addition of load is applied to the embankment slope. Furthermore, pavement crack sealing could be completed to prevent surface water infiltration into the embankment.
- A geotechnical investigation should be undertaken at the site prior to any long-term remediation. It is recommended that at least 2 slope inclinometers are installed, along with piezometers to monitor conditions within the slope as part of the geotechnical investigation to better characterize the landslide for remediation design.
- Long-term landslide remediation could consist of the following:
 - The slide material could be removed and replaced with well-draining granular fill accompanied by subdrains. Assuming just the south slide area is to be repaired, the high-level cost of construction is \$430,000 to \$530,000 including contract administration costs. The cost estimate is based on a 23 m wide x 45 m long excavation and includes repairing the southbound lane of Highway 22.
 - A pile wall could be installed on the west edge of the highway. Assuming a pile wall length of 45 m, the high-level cost for the above is \$1.1 million to \$1.3 million.
- The site did not return any records of historic resources based on a search of the Listing of Historic Resources. However, the remediation activities are not covered by a Land Use Bulletin and therefore the project must be submitted to Alberta Culture for screening under the Historical Resources Act.
- Work taking place between March 15 and August 31 will also require a nest sweep prior to construction.
- The recommended site inspection frequency is once per year.

PREPARED BY: Sonja Pharand, P.Eng.	REVIEWED BY: Leslie Cho, M.Eng., P.Eng.	PERMIT TO PRACTICE



- ① Photos and Direction
- 2025 Observation
- Previous Observation
- Cross Section
- Surface Contour (m AMSL, 1 m Interval)
- Watercourse
- Quarter Section

0 10 20 metres
(At original document size of 8.5x11)
1:1,500



Project Location
SE-08- and SW-09-052-07W5,
Alberta

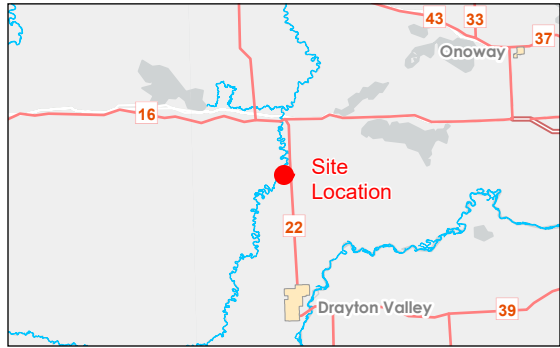
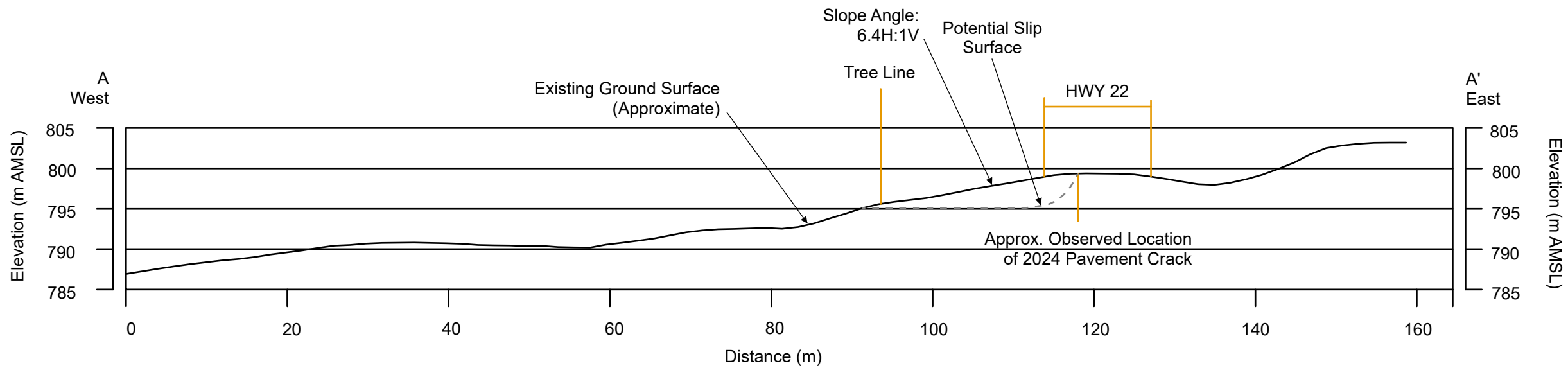
Prepared by MK on 2025-07-11
QR by SP on 2025-07-17
IR by LC on 2025-07-18

Client/Project
Alberta Transportation and Economic Corridors
Geohazard Monitoring Program
NC112 Hwy 22:30 Slide

Figure No.
1

Title
Site Plan

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- ↔ Cross Section
- Surface Contour (m AMSL, 1 m Interval)
- Watercourse
- Quarter Section

0 10 20 metres
(At original document size of 11x17)
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Project Location
SE-08- and SW-09-052-07W5,
Alberta

Prepared by MK on 2025-07-11
QR by SP on 2025-07-17
IR by LC on 2025-07-18

Client/Project
Alberta Transportation and Economic Corridors
Geohazard Monitoring Program
NC112 Hwy 22:30 Slide

123315222

Figure No.

2

Title

Highway 22 Cross-Section

Notes
1. Coordinate System: NAD 1983 UTM Zone 11N
2. Data Sources: Geogratis, ©Department of Natural Resources Canada, All rights reserved.
3. Contours, and Cross Section Profile: Based on 2014 LIDAR (purchased from Hexagon Digital Reality).
4. Background: Light Gray Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
Google Satellite: © OpenStreetMap (and) contributors, CC-BY-SA

2025 Inspection Photos at NC112



Photo 1: Cracking in the southbound lane, south end. Looking north.



Photo 2: Cracking in the southbound lane, north end. Looking south.

2025 Inspection Photos at NC112



Photo 3: Rough road warning sign posted north from the pavement cracking. Looking south.



Photo 4: West embankment slope and tree line. Looking north.

2025 Inspection Photos at NC112



Photo 5: Toe of landslide just behind tree line. Fence present. Looking southwest.



Photo 6: Vegetated slump, looking northeast from tree line.

2025 Inspection Photos at NC112



Photo 7: 150 mm diameter CSP outlet within treed area, on west side of Highway. Looking east.



Photo 8: Possible creek observed within treed area of slope. Looking west.

2025 Inspection Photos at NC112



Photo 9: Aerial photo of Highway 22 cracking and slope, facing northeast. Taken by drone.



Photo 10: Aerial photo of Highway 22 and Pembina River Tributary, facing south. Taken by drone.