

<b>SITE NUMBER AND NAME:</b> NC094 – 100 Ave at NB AHD	<b>HIGHWAY AND KM:</b> 216:06, km 20.550	<b>PREVIOUS INSPECTION:</b> June 30, 2022	<b>CURRENT INSPECTION:</b> June 1, 2023
<b>LEGAL DESCRIPTION:</b> NW-32-52-25-W4	<b>NAD83 COORDINATES:</b> UTM12U 5935400N, 323784E		<b>RISK ASSESSMENT:</b> PF: 13 CF: 4 Total: 52
<b>AVERAGE ANNUAL DAILY TRAFFIC (AADT):</b> 3,610 (2022, Traffic from west turning left)		<b>CONTRACTOR MAINTENANCE AREA (CMA):</b> AHD	

<b>SUMMARY OF INSTRUMENTATION:</b> No instrumentation installed at this site. <b>LAST READING DATE:</b> N/A	<b>INSPECTED BY:</b> Stantec: Leslie Cho, Sonja Pharand TEC: Rocky Wang, Amy Driessen, Pramaya Kannel and Brennan Evans
<b>PRIMARY SITE ISSUE:</b> Slumping of the side slope embankment south of 100 Ave between two overpass bridges (81038 S2-7 and 81038 N1-1) for the Anthony Henday Drive (AHD).	
<b>APPROXIMATE DIMENSIONS:</b> 18 m wide x 17 m long x 6 m high	
<b>DATE OF ANY REMEDIAL ACTION:</b> No remedial action completed to date. Jersey barriers anchored into ground at toe of slope in Fall 2022 to temporarily retain landslide.	

ITEM	CONDITIONS EXIST		DESCRIPTION AND LOCATION	NOTICEABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress		X			
Slope Movement	X		Slump on the vegetated embankment south of 100 Ave on-ramp to northbound Anthony Henday Drive, between the two Anthony Henday overpass bridge abutments. Scarp has retrogressed and toe is pushing against jersey barriers.	X	
Erosion		X			
Seepage		X			
Culvert Distress		X			
Other	X		Pooling water at top of slope at tension barrier, light standard, and low area. Pooling water along south ditch of 100 Ave.		X

<b>COMMENTS</b>
<ul style="list-style-type: none"> <li>The overall embankment is about 33 m wide and 8 m high. The slump exists between the two bridge abutments south of the 100 Avenue on-ramp to AHD northbound (Photo 1).</li> <li>The landslide is slightly west of center of the embankment. The scarp appears to have retrogressed, lengthening the slide area by 1.4 m since the previous inspection in late June 2022. The scarp was observed at the upper portion of the embankment and is up to 1.1 m high. The current scarp is 2.6 m from the crest of the embankment, compared to 4.0 m at the time of the last investigation (Photos 1 to 7).</li> <li>The east and west flanks of the landslide are approximately 12.5 m and 4.6 m from the east and west bridge abutment walls, respectively. These measurements have not changed since the previous investigation.</li> <li>The toe bulge has progressed further downslope towards 100 Avenue and has reduced the distance to the edge of pavement from 1.8 m to 1.5 m. The toe bulge is approximately 1.5 m high (Photos 4 and 5).</li> </ul>

- Jersey barriers have been placed around the toe of the landslide and anchored into the ground. The edge of the jersey barrier is 1.3 m from the edge of the pavement and the toe of the slump is pushed against the back of the jersey barriers (Photos 4 and 5).
- One jersey barrier at the far east side of the slump was observed to be toppled and resting against the slope.
- The 1.5 m long dip in the ground above the 2022 scarp was not observed during this inspection.
- The highway surface currently does not appear to be affected by the embankment failure.
- Snow fence previously placed above the slump has shifted down the embankment, and most of the snow fence placed below the slump is now buried beneath the toe bulge.
- Ponding water was observed at the toe of the embankment.
- Four high-tension cable barrier (HTCB) posts closest to the embankment have been abandoned and the cables have been strung from the post closest to the light pole continuing south. Holes around the abandoned posts are 30 cm deep with 20 cm average diameter. It is believed that the scouring may have been related to or caused by overloading during collision (Photo 10).
- The base of the light standard near the crest of the embankment appeared to have settled an additional 2 cm, for a total settlement of 12 cm. No ponding water was observed at the time of the call out inspection (Photo 8).
- No ponding water was observed north of the light standard within the low spot during this site visit. Water appears to be directed to this location from the overpass bridges from both sides of the embankment.
- A portion of the highway median north of the settling light standard was dry with a lack of vegetation established (Photo 9).
- During the previous call-out inspection, the exposed soils appeared wet and pieces of concrete and occasional pockets of grey fill material were observed throughout the slope. The grey fill material is believed to be from the bottom ash used during bridge abutment construction.
- Samples of the exposed soil were collected in June 2022 approximately at mid-slope and near the east corner of the toe. The material appears to be soft clay, mottled brown and grey, and moist to wet. Atterberg limits tests performed on the samples indicate that the material is high plastic with liquid limits of 53% and 58%, and plastic limits of 20% and 19%, for the mid-slope and toe samples, respectively.
- The landslide appears to be a shallow failure limited to the bridge/embankment fill. The landslide may be due to a combination of poor-quality embankment backfill and softening of the embankment fill near mid-slope. In addition, typical bridge and embankment compaction methods often result in less compaction at the slope face since compaction equipment cannot adequately compact the edges and slopes. These less compacted areas could allow water to infiltrate the slope more easily.


**RECOMMENDATIONS**

- The MCI and/or HMC should monitor the slump for progression towards 100 Avenue and the jersey barriers should be adjusted or maintained, as necessary.
- Stantec has completed the landslide remediation design for removal and replace. The design includes excavating the landslide mass in benches with an overall slope of 2H:1V followed by rebuilding the embankment with granular fill. The estimated cost of construction for landslide remediation ranges from \$180,000 to \$210,000 including part-time contract administration fees.
- It is understood that long term remediation is scheduled to take place in 2024. If the remediation work is pushed to another year later, TEC could consider annual surveys to monitor the movement of the slide.
- Site inspection frequency should continue annually.



NORTH CENTRAL REGION GRMP  
EDSON / STONY PLAIN  
SITE INSPECTION FORM



<b>PREPARED BY:</b> Sonja Pharand, P.Eng.	<b>PREPARED BY:</b> Leslie Cho, M.Eng., P.Eng.
	
<b>REVIEWED BY:</b> Xiteng Liu, M.Sc., P.Eng., PMP	<b>PERMIT TO PRACTICE</b>

2023 Site Inspection Photos at NC094



**Photo 1:** Slump on south embankment. Looking southwest.



**Photo 2:** Slump on south embankment. Looking west.



2023 Site Inspection Photos at NC094



**Photo 3:** Mid slope of slump on south embankment. Looking west.



**Photo 4:** Toe bulge of slump with scarping/cracking. Looking northwest.



2023 Site Inspection Photos at NC094



**Photo 5:** Toe of the embankment/slump. Looking southeast.



**Photo 6:** Retrogressing scarps near top of slump. Looking southeast.



2023 Site Inspection Photos at NC094



**Photo 7:** Slumping viewed from the crest of the embankment. Looking north.



**Photo 8:** Scouring/settlement of ground around the light standard closest to the embankment. Looking west.



2023 Site Inspection Photos at NC094

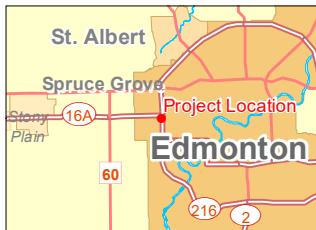
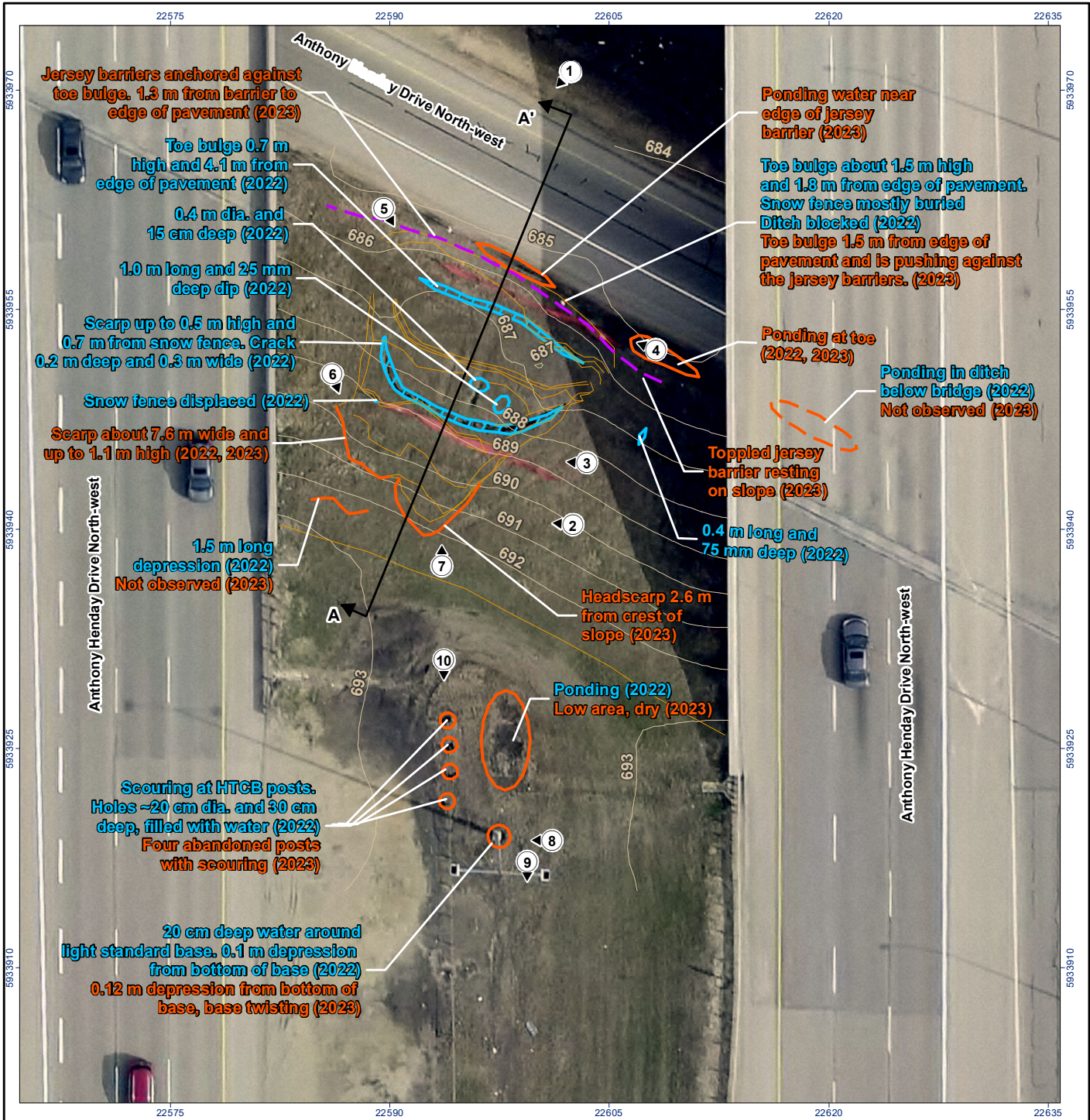


**Photo 9:** Highway median. Looking south.

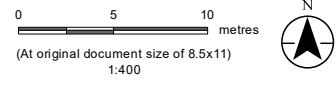


**Photo 10:** Abandoned posts for high tension cable barrier. Looking south.





- Photo Number and Direction
- Jersey Barrier
- 2023 Observation
- 2022 Observation
- 2022 Survey
- Ground Elevation Contour (m AMSL)
- Cross Section



Project Location: City of Edmonton, Alberta  
 Prepared by MK on 2023-07-24  
 QR by LC on 2023-08-28  
 IR by XL on 2023-08-28  
 Client/Project: Transportation and Economic Corridors  
 Geohazard Monitoring Program  
 NC094 – 100 Ave at NB AHD  
 123315222

**Notes**  
 1. Coordinate System: NAD 1983 3TM 114  
 2. Data Sources: Geogratis, ©Department of Natural Resources Canada, All rights reserved.  
 3. Imagery: City of Edmonton, 2022.

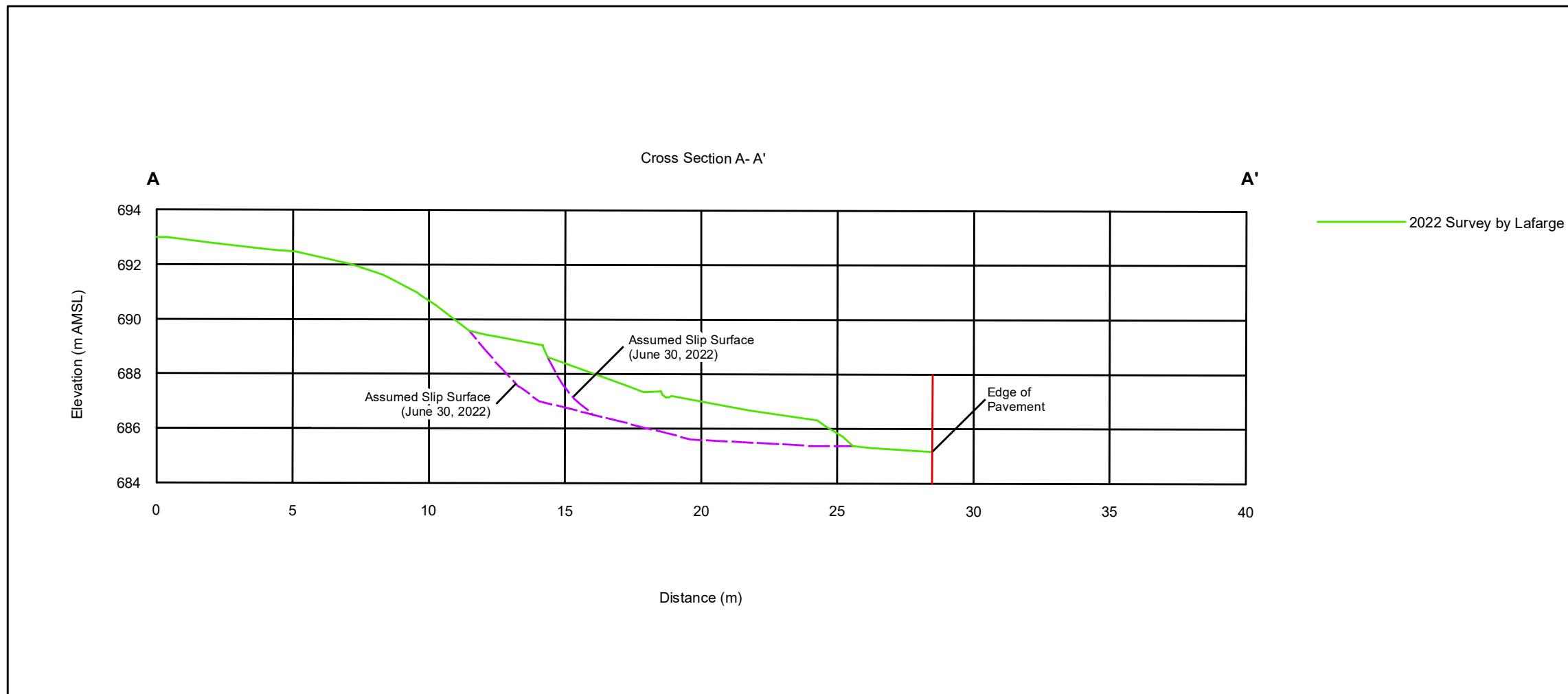
Figure No. 1  
 Title: **Site Plan**

I:\cd\001-c200\workgroup\12331\active\12331\24-35\NC Sites\NC094\Task B Annual Inspection\gis\2023\fig\_1\_site\_plan\_nc094.mxd Revised: 2023-09-05 By: MKuhl

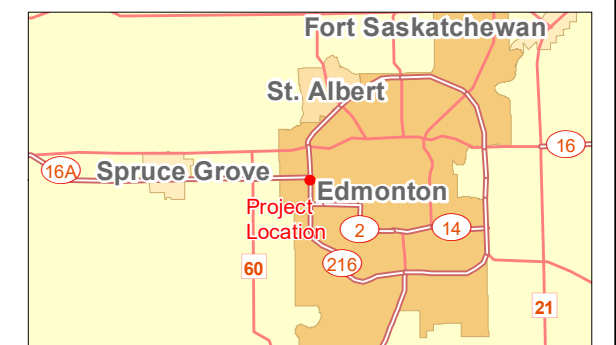
Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.



- Cross Section
- Approximate Ground Surface
- Assumed Slip Surface



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 11N
  2. Data Sources: Geogatis, ©Department of Natural Resources Canada, All rights reserved.
  3. Imagery: City of Edmonton, 2022.



**Project Location**  
City of Edmonton,  
Alberta

Prepared by MK on 2023-07-24  
QR by LC on 2023-08-28  
IR by XL on 2023-08-28

**Client/Project**  
Transportation and Economic Corridors  
Geohazard Monitoring Program  
NC094 – 100 Ave at NB AHD

12331 5222

**Figure No.**  
**2**

**Title**  
**Ground Profile of Section A-A'**