

GEOHAZARD RISK MANAGEMENT PROGRAM

North Central Region – Edson / Stony Plain Area

2018 Inspection Report

Site Number	Site Name		Hwy	km
NC33	South of Tomahawk		759:02	15.17
Legal Land Description	SE 26-50-6-W5M			
NAD 83 Coordinates	3TM 114	N5912013	E -50618	
Operational Site Instrumentation	Slope Inclinometers		1	
	Pneumatic Piezometers		2	
	Vibrating Wire Piezometers		0	
	Standpipe Piezometers		0	
Date of Last Instrumentation Readings	May 7, 2018			

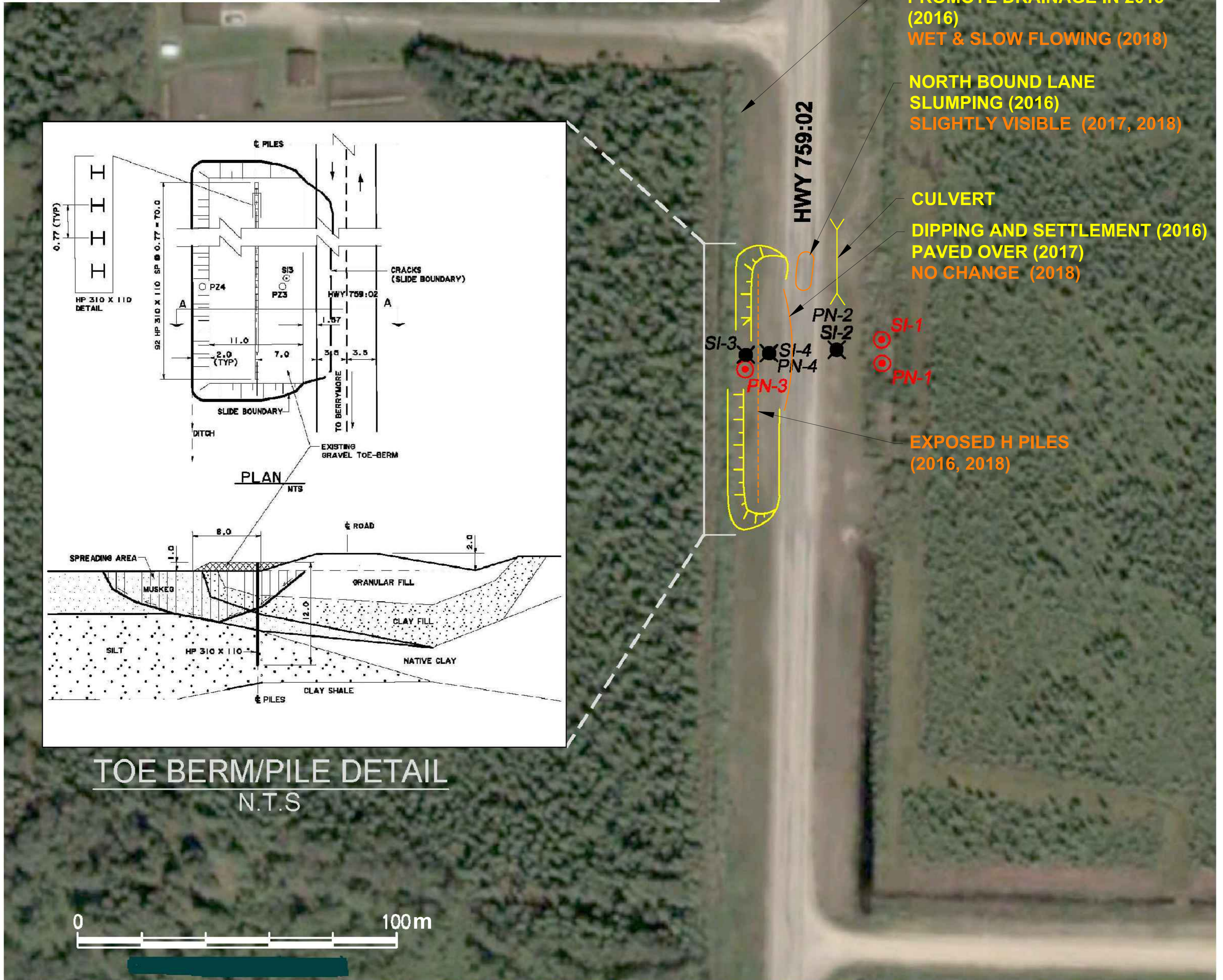
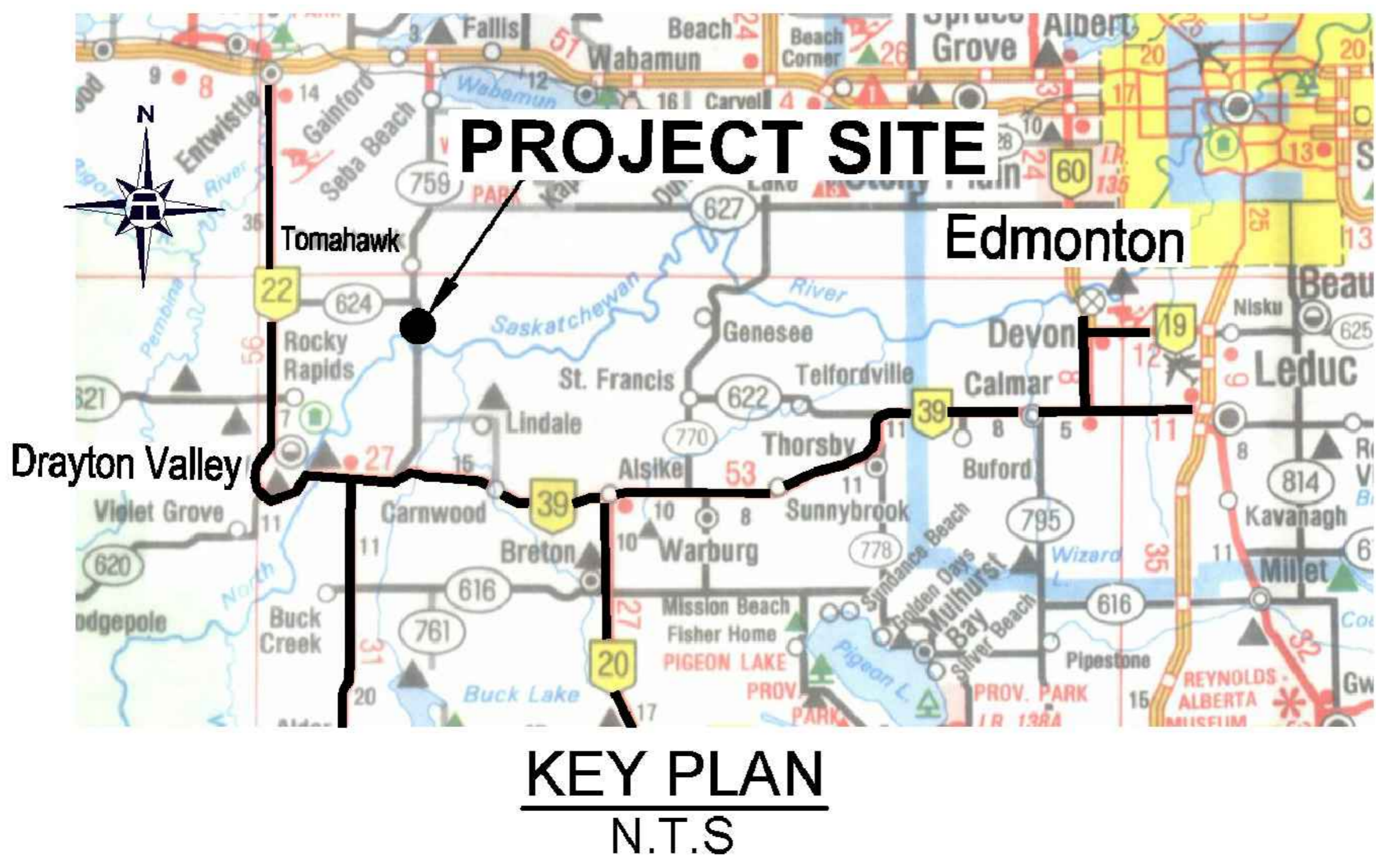
Risk Assessment	Date	PF	CF	Risk Ranking
Current Inspection	May 28, 2018	7	3	21
Previous Inspection	May 25, 2017	9	3	27
Report Attachments	<input checked="" type="checkbox"/> Photographs (6 photos)		<input checked="" type="checkbox"/> Site Plans (1 page)	

	Stantec	Alberta Transportation
Inspected By	Junwen Yang and Leslie Cho	Rishi Adhikari, Brennan Evans, Wilf Cousineau
Date of Remediation	1980s – removal and replacement of muskeg 2012 – toe berm constructed on west side of highway during the summer	

	2013 – Pile wall constructed through toe berm on the west side		
Recent Maintenance	Spring 2013 – pavement overlay Summer 2016 – milled and paved		
Primary Site Issue	Lateral spreading and slope failure due to underlying muskeg		
Observations	Description and Location	Change from Previous Inspection	
<input checked="" type="checkbox"/> Pavement Distress	Slight dip in pavement at south end of pile wall on northbound lane. Pavement dip on northbound lane across from approach to the north near the east ditch grading	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> Culvert Distress		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Bridge Distress		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Slope Movement		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Erosion		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Seepage		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input checked="" type="checkbox"/> Other	Exposed H-piles along the length of the pile wall. Ponded water in excavated west ditch	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Discussion	<p>The pavement was milled and paved in the summer of 2016. Cracking in the pavement was not observed as shown in Photos 1 and 2. A dip in the northbound lane across from the approach was observed as shown in Photo 2.</p> <p>Similar to previous inspections, the excavated west ditch contained slowly flowing water as shown in Photo 3.</p> <p>The top of most of the piles were visible along its alignment. As much as 200 mm of the pile was exposed as shown in Photo 4. Voids were also observed between the flanges of some piles.</p> <p>No signs of visual distress were observed on the west or east sides of the highway as shown in Photos 5 and 6.</p>
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Assessment	<p>The piezometer measurements continued to remain stable with a slight decrease in pore pressure in both piezometers (up to 0.3 m decrease). Both measured pore pressures in PN1 and PN3 remain within historic trends. Site drainage appears to be poor as suggested by the standing water in the west ditch since the site's inception into the monitoring program, however drainage is being promoted since the peat in the ditch was excavated in 2013.</p> <p>SI2 recorded approximately 2 mm of movement since 2007 suggesting that the east embankment slope is relatively stable. There are no remaining operational slope inclinometers on the west slope. Previous slope movements appear to be limited to the southbound lane. This may be due to less muskeg and thicker layers of granular fill underlying the northbound lane.</p> <p>After construction of the pile wall in 2013, pavement cracking along the southbound lane centerline continued to be observed indicating that the slope was still moving. The highway was milled and paved in 2016 with no pavement cracks observed since which suggests that the slope may have stabilized. The movements observed after construction of the pile wall may be due to the piles deflecting to mobilize the resistance against slope movements. Furthermore, AT mentioned that increased heavy traffic volume was observed at the site between 2013 and 2015 which caused additional pavement damage.</p>
Recommendations	<p>Pavement sealing will not be required at this time. It should be noted that the overlay is considered an additional load and will likely lead to more settlement and lateral deformation.</p> <p>Re-grading of the west ditch may be considered to promote surface water drainage.</p> <p>Any voids between the H-pile flanges should be filled to reduce water infiltration. A survey of the H-piles should also be completed to measure the lateral deflection of the pile wall.</p> <p>Slope inclinometers may be installed near the pile wall to monitor its performance.</p> <p>Instrumentation monitoring should continue to be completed semi-annually. During the site inspection, AT and Stantec discussed reducing the frequency of site inspections at NC33 to every two years (i.e. next visit in 2020).</p>



LEGEND

- SI SLOPE INCLINOMETER
- PN PNEUMATIC PIEZOMETER
- INSTRUMENT LOCATION
- ✖ DESTROYED INSTRUMENT

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. INSTRUMENTS ARE SHOWN IN RED.
3. TOE BERM/PILE DETAIL AS PER A.T. DESIGN SKETCH (2012)

NOTES

1. PREVIOUS OBSERVATIONS SHOWN IN YELLOW
2. 2018 OBSERVATIONS SHOWN IN ORANGE



STANTEC CONSULTING
10160-112 STREET
EDMONTON ALBERTA CANADA

ALBERTA TRANSPORTATION
GEOHAZARD MONITORING PROGRAM
NC33 SOUTH OF TOMAHAWK
HWY 759:02 - SITE PLAN

DRAWN	WW	CHECK	CDM	APPROVE	ID
DATE	02 AUG 2018	SCALE	AS SHOWN	PROJECT #	123312435

FIGURE -1

Reference: 2018 Annual Inspection Photographs at NC33 – South of Tomahawk
File Number: 123312435



Photo 1: Highway recently paved with no observable cracks. Looking south.



Photo 2: Pavement dip across from approach. Looking north.

Reference: 2018 Annual Inspection Photographs at NC33 – South of Tomahawk
File Number: 123312435



Photo 3: Standing water in the excavated west ditch flowing slowly. Looking north.



Photo 4: Exposed H-piles at the surface of the toe berm.

Reference: 2018 Annual Inspection Photographs at NC33 – South of Tomahawk
File Number: 123312435



Photo 5: View of the west slope. Looking south.



Photo 6: View of the east slope. Looking south.