

## GEOHAZARD RISK MANAGEMENT PROGRAM

### North Central Region – Edson / Stony Plain Area

#### 2017 Inspection Report

Site Number	Site Name		Hwy	km
NC75	Frost Heave near Robb		47:06	0.4
Legal Land Description	SW 33-48-21-W4M			
UTM Coordinates (NAD 83)	Zone 11U	N5892678	E499010	
Operational Site Instrumentation	Slope Inclinometers		0	
	Pneumatic Piezometers		0	
	Vibrating Wire Piezometers		0	
	Standpipe Piezometers		0	
Date of Last Instrumentation Readings	n/a			

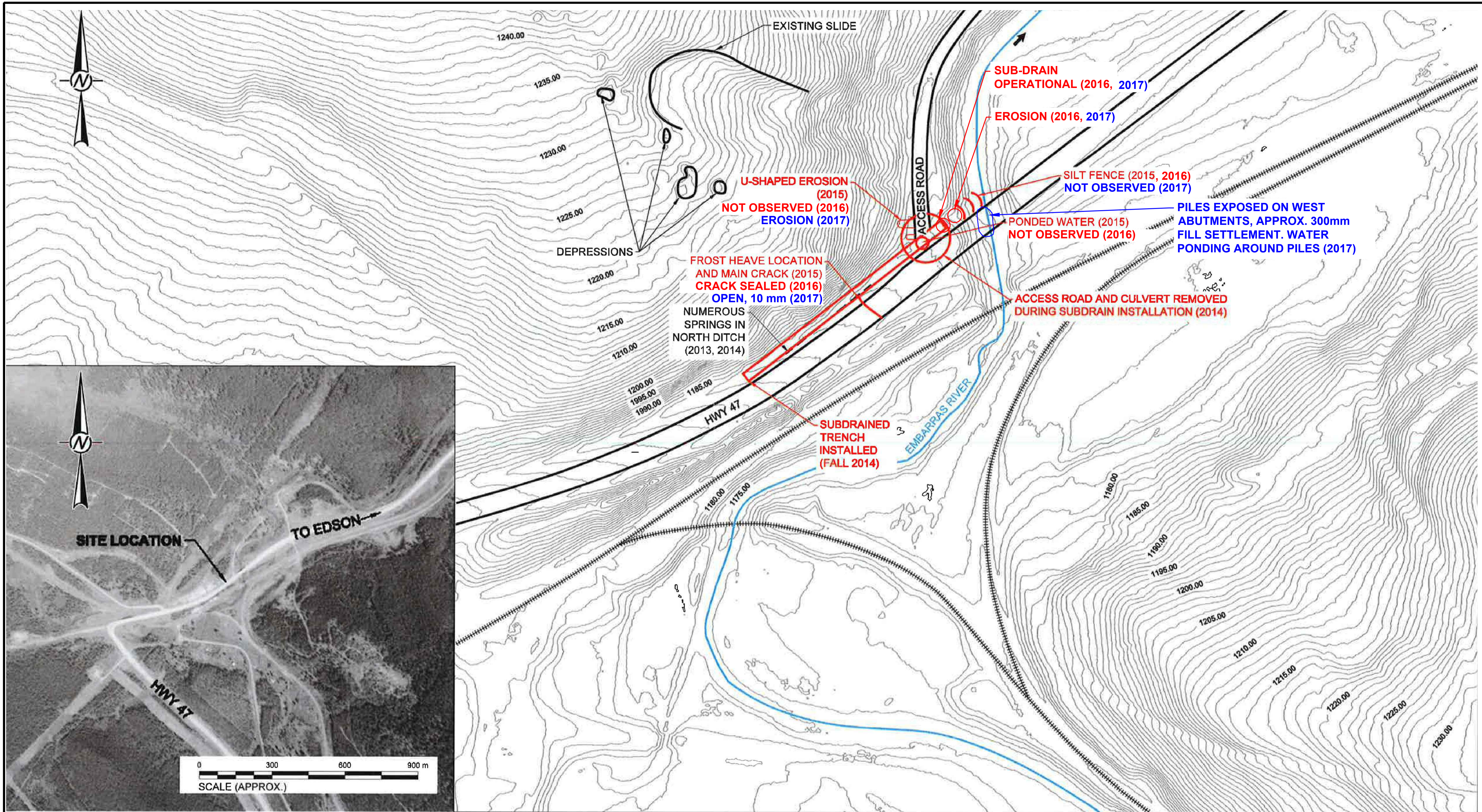
Risk Assessment	Date	PF	CF	Risk Ranking
Current Inspection	July 13, 2017	7	2	18
Previous Inspection	June 8, 2016	9	2	18
Report Attachments	<input checked="" type="checkbox"/> Photographs (6 Photos)		<input checked="" type="checkbox"/> Site Plan (1 Page)	

	Stantec	Alberta Transportation
Inspected By	Carrie Murray and Leslie Cho	Roger Skirrow and Ali Khalid
Date of Remediation	September 2014 – 130 m long trench drain installed in the north ditch of the highway	
Recent Maintenance	Guard rail extended on the north side of the highway beyond the access road. Milled and	

	filled in 2015. Highway patched end of May 2016.		
<b>Primary Site Issue</b>	Water seepage through coal outcrop causing frost heave and pavement distresses.		
<b>Observations</b>	<b>Description and Location</b>	<b>Change from Previous Inspection</b>	
<input checked="" type="checkbox"/> Pavement Distress	Previously sealed crack approximately 70 m west of bridge abutment re-opened.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Culvert Distress		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input checked="" type="checkbox"/> Bridge Distress	Fill settlement under west abutment	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> Slope Movement		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input checked="" type="checkbox"/> Erosion	Scour hole north of concrete spillway on west abutment.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> Seepage		<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input checked="" type="checkbox"/> Other	Water in north ditch	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

<b>Discussion</b>	<p>The previously sealed transverse crack approximately 70 m west of the bridge abutment has re-opened as shown in Photo 1. This crack has a width of about 10 mm and coincides with the location of the previously observed frost heave. It is understood that the frost heave previously reached up to 200 mm in 2013. Frost heave in 2014 was observed to be up to 50 mm. No frost heaving was observed during winter 2015 or 2016.</p> <p>A small amount of water was observed in the north ditch as shown in Photo 2. Very little vegetation was observed along the ditch slopes. The silt fences downstream of the ditch were not observed during this site inspection.</p> <p>A scour hole was observed at the base of the concrete spillway on the northside of the west abutment as shown in Photo 3. Ponded water was observed in the scour hole.</p> <p>The trench drain installed in 2014 appeared to be functional with water flowing out of the subdrain as shown in Photo 4.</p> <p>The fill settlement on the west abutment was unchanged and remained at approximately 300 mm as shown in Photos 5 and 6. Signs of erosion were also observed at the west abutment. Ponded water was also observed at the exposed H-piles as shown in Photo 6.</p> <p>The previously observed springs and ponded water were not observed during this inspection.</p>
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<b>Assessment</b>	<p>Water is believed to infiltrate into and through the coal seam. Water is then able to infiltrate under the highway causing frost heave in the winter months. It is also possible that frost susceptible soils lie beneath the highway.</p> <p>The reduction in frost heave since the trench drain installation suggests that the trench drain is functioning well and as intended. However, the reduction in frost heave in 2014 may have been due to a milder winter compared to 2013. Furthermore, the winter of 2015 saw even milder temperatures and may have contributed to the frost heave reduction. The recent opening of the sealed crack and colder winter in 2016 indicates that the frost heave may still be on-going.</p>
<b>Recommendations</b>	<p>Short term recommendations include placing riprap at the abutment trough drain, repairing the erosion and inspecting the new trench drain and its ability to convey water. Reseeding the north ditch may also be considered given that very little vegetation has grown since the drain construction.</p> <p>Any open pavement cracks should also be sealed to reduce surface water infiltration. The pavement surface should also be monitored regularly for vertical differential to assess the effectiveness of the drain. It is also recommended that the fill settlement at the bridge abutment be checked by a bridge engineer.</p> <p>This site should continue to be inspected annually. Monitoring of the frost heave should continue in winter to assess the trench drain performance particularly during colder winters.</p>



**LEGEND**

- ➔ FLOW ARROW
- CONTOUR (5 m INTERVAL)
- ##### RAIL NETWORK
- WATER COURSE

**NOTES**

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. PREVIOUS OBSERVATIONS SHOWN IN BLACK.
3. 2015/16 OBSERVATIONS SHOWN IN RED
4. 2017 OBSERVATIONS SHOWN IN BLUE

**REFERENCE**

THURBER ENGINEERING LTD, PROJECT #15-16-266  
DATE MAY 2011, ORIGINAL SCALE 1:3,000



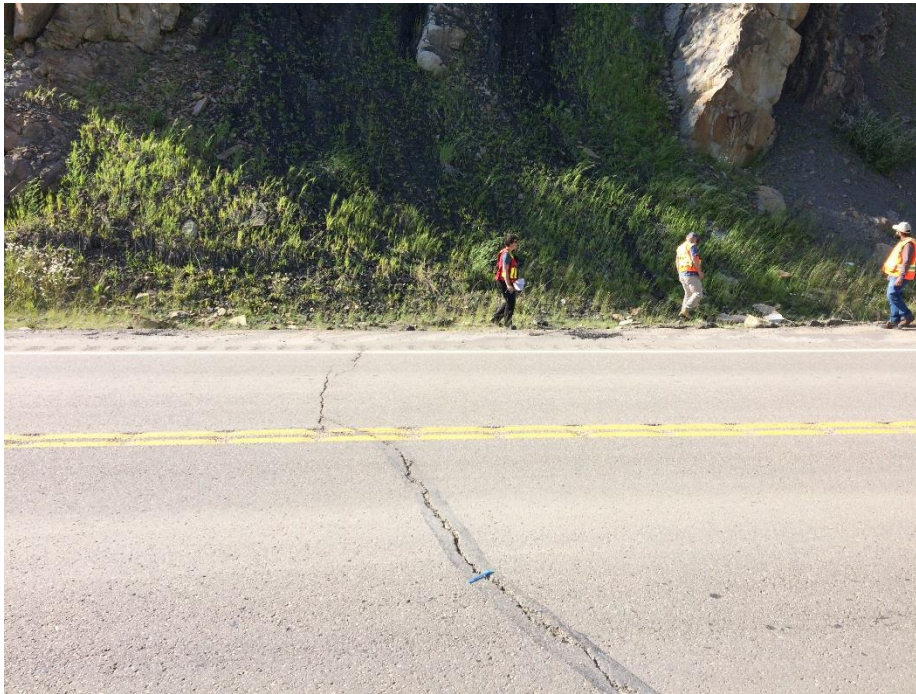
STANTEC CONSULTING  
10160-112 STREET  
EDMONTON ALBERTA CANADA

ALBERTA TRANSPORTATION  
GEOHAZARD MONITORING PROGRAM  
NC75 FROST HEAVE NEAR ROBB  
SITE PLAN

DRAWN	WW / MK	CHECK	CDM	APPROVE	ID
DATE	15 SEP. 2017	SCALE	AS SHOWN	PROJECT #	123312435

FIGURE - 1

Reference: 2017 Annual Inspection Photographs at NC75 – Frost Heave near Robb  
File Number: 123312435



**Photo 1:** Crack sealed in May 2016 has re-opened. Looking north



**Photo 2:** Water in north ditch. Looking northeast.

Reference: 2017 Annual Inspection Photographs at NC75 – Frost Heave near Robb  
File Number: 123312435



**Photo 3:** Scour hole at the base of the concrete spillway on the north side of the west abutment.



**Photo 4:** Water flowing through the subdrain installed in 2014.

Reference: 2017 Annual Inspection Photographs at NC75 – Frost Heave near Robb  
File Number: 123312435



**Photo 5:** Erosion and fill settlement on west bridge abutment. Looking west.



**Photo 6:** Ponded water at exposed piles. Looking west.