



THURBER ENGINEERING LTD.

ALBERTA TRANSPORTATION NORTH CENTRAL REGION – ATHABASCA AREA INSTRUMENTATION MONITORING RESULTS

FALL 2011

SECTION C

SITE NC9: HWY2:48 CANYON CREEK

1. OBSERVATIONS

1.1 Field Program and Instrumentation Status

Three slope inclinometers (SI2, 3, and 6) and two pneumatic piezometers (PN2 and 5) were read at the Hwy 2:28 Canyon Creek site on September 20, 2011, by Mr. Justin Sousa, C.E.T. and Mr. Francis O'Brien, E.I.T., of Thurber Engineering Ltd. (Thurber).

The SI's were read using a RST probe with 2 ft wheelbase and a RST hand-held readout. Inclinometer reading depths were defined as per cable markings with respect to the top of the inclinometer casing. The pneumatic piezometers were read using a RST C108 pneumatic piezometer reader.

2. INTERPRETATION

2.1 General

SI plots for the A and B directions are presented in Section D and are summarized below. Where movement has been recorded the resultant plot (X direction) and rate of movement have also been provided. Pneumatic piezometer results are also provided in Section D.

2.2 Zones of Movement

A zone of new movement was observed in SI-6 over 4.9 m to 6.1 m depth since the last set of readings in the spring of 2011.



Zones of old movement are summarized in Table NC9-1 at the end of this report. Table NC9-1 also provides a historical account of the total movement, the depth of movement, and the maximum rate of movement that has occurred at this site since the initialization of the slope inclinometers.

2.3 Interpretation of Monitoring Results

Since the readings in the spring 2011 readings, SI2 shows a rate of movement of 11.8 mm/yr, 5.1 mm/yr and 17.9 mm/yr over 12.1 m to 13.9 m depth, 13.9 m to 15.8 m depth and 15.8 m to 18.2 m depth, respectively. SI3 showed a rate of movement of 18.8 mm/yr and 19.9 mm/yr over 5.7 m to 6.9 m depth and 7.5 m to 10.8 m depth, respectively. SI6 showed a rate of movement of 33.9 mm/yr over 4.9 m to 6.1 m depth.

The accelerated movements observed during the fall readings at this site could be in response to a loss of vegetation due to a forest fire that occurred in May 2011.

The ground water level has increased in PN2 and PN5 by 0.01 m and 0.02 m, respectively, since the spring 2011 readings.

Tables NC9-1 and 2 summarize the instrumentation reading results.

3. RECOMMENDATIONS

3.1 Future Work

The instruments should be read again in the spring of 2012.

3.2 Instrumentation Repairs

No repairs are recommended at this time.



**TABLE NC9-1
FALL 2011 – HWY 2:48 CANYON CREEK
SLOPE INCLINOMETER READING SUMMARY**

Date Monitored: September 20, 2011

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS OF SI	DATE OF PREVIOUS READING	INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI-2	Jan. 27, 1993	18.7 over 12.1 m to 13.9 m depth in 344 ^o direction	11.8 between May and Sept. 2011	Operational	May 31, 2011	3.6	11.8	10.4
		3.3 over 13.9 m to 15.8 m depth in 344 ^o direction	5.1 between May and Sept. 2011			1.6	5.1	4.9
		4.6 over 15.8 m to 18.2 m depth in 344 ^o direction	17.9 between May and Sept. 2011			5.5	17.9	17.9
SI-3	Jan. 27, 1993	5.4 over 5.7 m to 6.9 m depth in 345 ^o direction	18.6 between May and Sept. 2011	Operational	May 31, 2011	5.4	18.6	18.3
		6.6 over 7.5 m to 10.6 m depth in 345 ^o direction	19.9 between May and Sept. 2011			5.8	19.9	20.8
SI-4	Jan. 27, 1993	13.7 over 6.2 m to 8.0 m depth in 18 ^o direction	5.6 between May and Oct. 1997	Damaged	Oct. 4, 2004	N/A	N/A	N/A
SI-6	Jan. 27, 1993	11.0 over 4.9 m to 6.1 m depth in 341 ^o direction	33.9 between May and Sept. 2011	Operational	May 31, 2011	9.9	33.9	32.4



**TABLE NC9-2
FALL 2011 – HWY 2:48 CANYON CREEK
PNEUMATIC PIEZOMETER READING SUMMARY**

Date Monitored: September 20, 2011

INSTRUMENT #	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	MAXIMUM PORE PRESSURE (kPa)	MEASURED PORE PRESSURE (kPa) (piezo elev.) (Fall 2011)	PREVIOUS READING (kPa) (piezo elev.) (Spring 2011)	CHANGE IN GROUNDWATER ELEV. SINCE PREVIOUS READING (m)
<i>PN 1 (34445)</i>	<i>Jan. 27, 1993</i>	<i>86.81</i>	<i>N/A</i>	<i>Destroyed</i>	<i>40.7 on Oct. 28, 1997</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
PN 2 (34441)	Jan. 27, 1993	91.00	N/A	Active	7.5 on Oct. 7, 2005	3.5 (91.36 m)	3.4 (91.35 m)	0.01
<i>PN 4 (34453)</i>	<i>Jul. 5, 1996</i>	<i>86.81</i>	<i>N/A</i>	<i>Destroyed</i>	<i>10.3 on Jun. 5, 1998</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
PN 5 (34442)	Jan. 27, 1993	93.5	N/A	Active	6.9 on May 12, 1999	0.2 (93.52 m)	0.0 (93.50 m)	0.02

Figures 1A in section D provides a sketch of the approximate location of the monitoring instrumentation for this site.

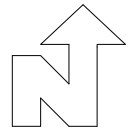


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**SECTION D
DATA PRESENTATION**

SITE NC9: HWY2:48 CANYON CREEK



S13
⊖ NM

S16
⊖

PN #2
⊕

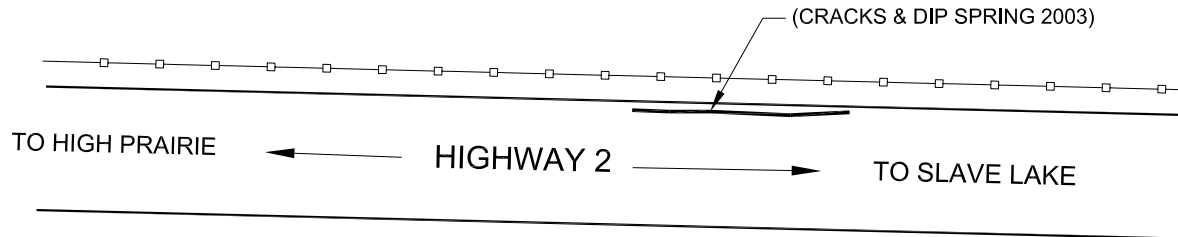
S12
⊖

PN #5
⊕

PN #1
⊗

PN #4
⊗

S14
⊗



LEGEND

- ⊖ SI CASING
- ⊕ PNEUMATIC PIEZOMETER

- ⊗ DESTROYED OR DAMAGED

NC9 : HWY 2:48
CANYON CREEK
SITE PLAN N.T.S
 UPDATED: SEPTEMBER 2011
 THURBER PROJECT #15-16-260

FIGURE 15-16-260 NC9



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