

**ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – HIGH LEVEL
2016 INSPECTION**



Site Number	Location	Name	Hwy	km
PH005-1	North of Manning, AB	Meikle River (km 25.21)	35:08	25.51
Legal Description		UTM Co-ordinates		
SW7-94-22-W5M		11U E 467,717	N	6,332,466

	Date	PF	CF	Total
Previous Inspection:	12-June-2014	13	4	52
Current Inspection:	13-June-2016	3	4	12
Road AADT:	1590		Year:	2016
Inspected By:	Rishi Adhikari, TRANS Ed Szmata, TRANS		Ken Froese, Thurber	
Report Attachments:	<input checked="" type="checkbox"/> Photographs	<input checked="" type="checkbox"/> Plans	<input type="checkbox"/> Maintenance Items	

Primary Site Issue:	Slope movement	
Dimensions:	50 m long with 32 m main active zone	
Date of Remediation:	2015: 28 m long pile wall and waler constructed.	
Maintenance:	Pre-remediation: ACP patch in 2011, milled in 2013. 2016: Overlay of Highway 35 including this site.	
Observations:	Description	Worsened?
<input checked="" type="checkbox"/> Pavement Distress	Crack pattern still visible in roadway surface though overlay will cover.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Crack pattern similar to 2014.	<input type="checkbox"/>
<input type="checkbox"/> Erosion		<input type="checkbox"/>
<input type="checkbox"/> Seepage	Wet area previously seen on sideslope not visible due to re-grading during construction.	<input type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert Distress		<input type="checkbox"/>
<input type="checkbox"/> Other	Guardrail was removed at the time of the inspection so previous deflection not observed.	<input type="checkbox"/>

Instrumentation:	
Previous	SI63 sheared off at 5.5 m depth between May and October 2007; SI64 sheared off at 6 m depth between October 2008 and May 2009.
2014	TH14-2 and -3 destroyed during construction; TH14-4 has cyclic trend and has increased slightly overall to about 2.5 m below ground surface in Fall 2016.
2015	SI-14, SI-23, and SI-32 installed in the corresponding piles: cumulative deflection measured in Fall 2016 was between 2.9 mm and 3.7 mm.

Assessment:

A slope failure occurred in 1998 resulting in a 3 m high backscarp close to the highway. Ongoing movement had begun to extend the failure into the highway surface. In 2015, the site was remediated with the construction of 47 cast-in-place concrete tangent piles of 1.2 m diameter and 15.8 m depth. A concrete waler was constructed across the piles incorporating sleeves for future tie-back anchors, if required. The site was regraded with a bench on the downslope side of the wall to reduce driving forces on the main slide. There is a concrete gutter on the upslope side of the wall which directs surface water to a half-culvert downpipe at the south end. Both the downpipe and the subdrain from behind the waler drain to a splash pad located at the tree line. Three slope inclinometers were installed in the wall to monitor future movements. The Project Summary Report has been added to Section G of the site binder.

There has been some minor movement of the wall recorded in the year since construction with the total cumulative movements less than 5 mm in Fall 2016. This movement is expected as the wall comes to equilibrium and should decrease in the future. The remaining piezometer (TH14-4) shows a cyclic pattern with water levels higher in the fall than the spring although more readings will be required to confirm this. As of Fall 2016, the water level was at the highest level recorded of 2.5 m below ground (elevation 413.10 m) in the two years it has been operation.

Based on the inclinometer readings and the absence of change in the crack pattern, it appears that the pile wall is acting as expected to reduce the movement at the highway. The site was milled and overlaid in the summer of 2016 after the GeoHazard Assessment visit so crack patterns that may be seen in future visits should reflect movements that would have resulted since the pile wall was constructed.

Recommendations:










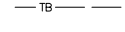
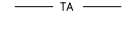
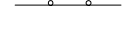

- As noted earlier, there are plans to place an ACP overlay on the highway through this site.
- Measures should be implemented to protect traffic from the sharp drop off at the new wall if the new guardrail has not been installed yet as part of the overlay contract.

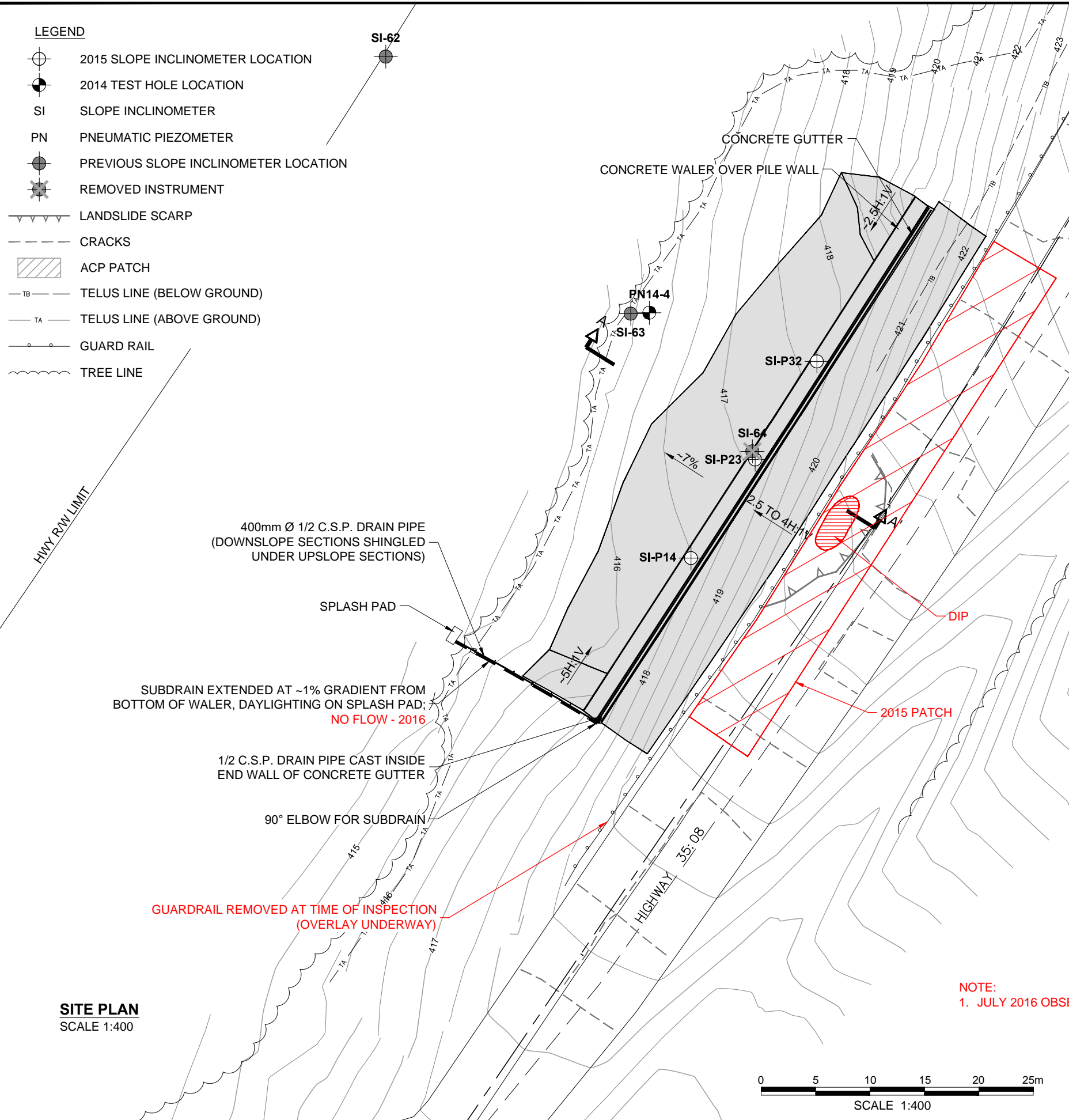
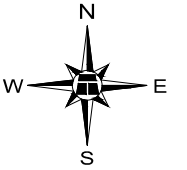
Ongoing Investigation:

- It is recommended that the annual GeoHazard inspection should continue as scheduled for at least one more year. If no adverse conditions are noted during the 2017 inspection, this site could be removed from the inspection program. It is recommended that the instrumentation reading program continue as scheduled for at least the duration of the current contract.

H:\13000\13351 Geohazard Assessment - Peace River High Level (CON0017602)\Drafting\KEF\13351-PH005-1-1.dwg - 5 - Dec. 07, 2016

LEGEND

-  2015 SLOPE INCLINOMETER LOCATION
-  2014 TEST HOLE LOCATION
-  SLOPE INCLINOMETER
-  PNEUMATIC PIEZOMETER
-  PREVIOUS SLOPE INCLINOMETER LOCATION
-  REMOVED INSTRUMENT
-  LANDSLIDE SCARP
-  CRACKS
-  ACP PATCH
-  TELUS LINE (BELOW GROUND)
-  TELUS LINE (ABOVE GROUND)
-  GUARD RAIL
-  TREE LINE



400mm Ø 1/2 C.S.P. DRAIN PIPE
(DOWNSLOPE SECTIONS SHINGLED
UNDER UPSLOPE SECTIONS)

SPLASH PAD

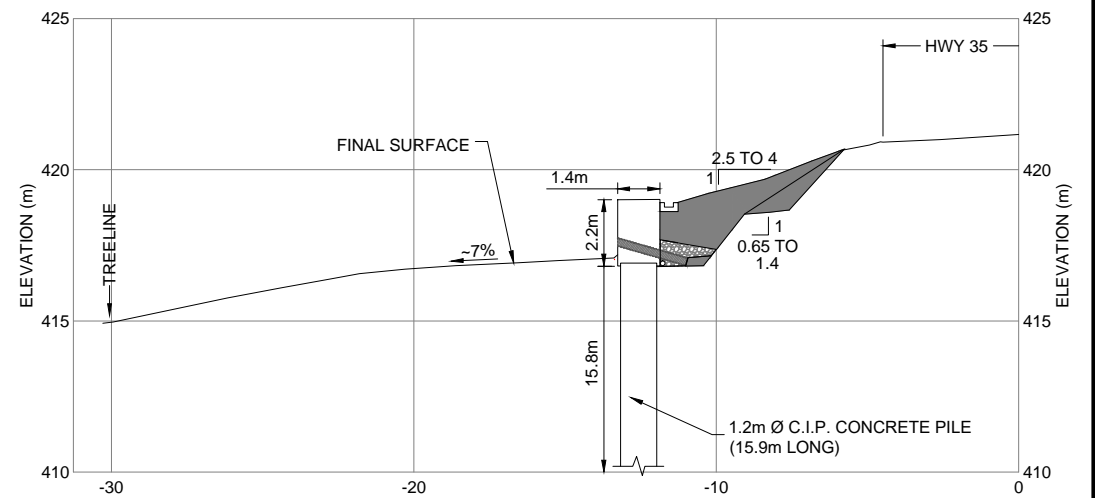
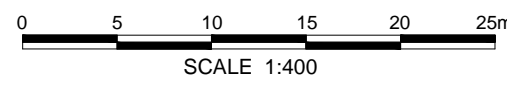
SUBDRAIN EXTENDED AT ~1% GRADIENT FROM
BOTTOM OF WALER, DAYLIGHTING ON SPLASH PAD;
NO FLOW - 2016

1/2 C.S.P. DRAIN PIPE CAST INSIDE
END WALL OF CONCRETE GUTTER

90° ELBOW FOR SUBDRAIN

**GUARDRAIL REMOVED AT TIME OF INSPECTION
(OVERLAY UNDERWAY)**

CONCRETE GUTTER
CONCRETE WALER OVER PILE WALL



CROSS-SECTION A-A'
SCALE 1:250

NOTE:
1. JULY 2016 OBSERVATIONS SHOWN IN RED

BASE PLAN PROVIDED BY WSP (THURBER AS-BUILT DRAWING. PROJECT 15-16-354)



PEACE REGION (PEACE RIVER / HIGH LEVEL) 2016

**PH005-1: HWY 35:08 (km 25.5) - MEIKLE RIVER SLIDE
GEOHAZARD ASSESSMENTS**

DWG No. 13351-PH005-1-1

DRAWN BY	ML
DESIGNED BY	KEF
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	DECEMBER 2016
FILE No.	13351



SITE PLAN
SCALE 1:400



Photo 1 – Looking north along rebuilt slope with pile wall. Guardrail was removed as part of the milling and overlay contract underway on Highway 35.



Photo 2 – Looking northeast at north end of the pile wall. Note the plates along the bottom of the water covering the sleeves for future tie-back installation, if required.



Photo 3 – Looking south along pile wall.



Photo 4 – Looking west along half-culvert down drain at the south end of the water.