

**ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – SWAN HILLS
2019 INSPECTION**



Site Number	Location	Name	Hwy	km
SH023-10	Little Smoky River	Little Smoky River Valley, North Hill – Site #10	744:02	20.20-20.40
Legal Description		UTM Co-ordinates		
NE21-76-22-W5M		11U E 478,074	N	6,161,918

	Date	PF	CF	Total
Previous Inspection:	20-Jun-2018	7	3	21
Current Inspection:	12-Jun-2019	7	3	21
Road AADT:	240		Year:	2019
Inspected By:	Roger Skirrow, TRANS Ed Szmata, TRANS		Ken Froese, Thurber Niels Rasmussen, Thurber	
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input type="checkbox"/> Maintenance Items			

Primary Site Issue:	Highway traverses deep-seated, retrogressive landslides with ongoing creep movements due partly to erosion at toe by the Little Smoky River and Peavine Creek resulting in cracking and sagging of the pavement surface at numerous locations. Approx. 4 km of the highway crosses this unstable north valley slope. Site #10 is 55 m above and 480 m away from the Peavine Creek.	
Dimensions:	135 m length of highway affected by cracking and distortion	
Date of Remediation:	2000: Subdrain pipe from Site #11 installed in downslope ditch. 2006: Both ditches regraded and lined with riprap. 2013: ACP patch placed. 2019: Patch over south portion	
Maintenance:	Routine ACP crack sealing, milling, and patching, when required.	
Observations:	Description	Worsened?
<input checked="" type="checkbox"/> Pavement Distress	Most of this site was patched in 2013 and again in 2019. Numerous longitudinal and few transverse cracks are present.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Site is located on an active deep-seated landslide moving toward the Peavine Creek. This site crosses over and along a main scarp.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	Gully below riprap ditch outlet at south end of site extends south into a sag pond located about 110 m from the highway. Erosion gullies have started to form at the culvert outlet and at end of riprap.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	Upslope ditch at northeast end of site has been historically wet and poorly drained.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert Distress	Culvert at km 20.22: inlet has separated resulting in two sinkholes about 1.5 m from pavement edge. Inlet is also partially obstructed with riprap.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>

Instrumentation:

None.

Assessment:

The overall valley slope is moving as several separate slide blocks in response to the toe erosion and downcutting of two different rivers resulting in numerous scarps, sag ponds, and differential movement zones going in slightly different directions. The highway intersects the scarps of these blocks at several locations resulting in an uneven highway surface and cracking.

Although this Site #10 is located on the unstable valley slope with a significant sag pond located below the site, landslide movements have not been consistently observable at this site with most cracking being transverse or longitudinal. However, the minor vertical distortion at the northeast end of the Site appears to be collapsing into a definable pattern though it may also be related to soft subgrade soils given the historically wet upslope ditch. The angled crack noted about 35 m northeast of the northeast end of the patch may be scarp-related. Portions of the 2013 ACP patch had been breaking out at the centerline and was recently patched. Historically, there has also been problems with erosion of the ditches following high precipitation events. The erosion gully forming away from the highway below the riprap apron had noticeable deteriorated since 2018. There is now a second sinkhole forming near the culvert inlet but the size of the initial sinkhole appears relatively unchanged since 2018.

Recommendations:**Short-Term:**

- Road maintenance should continue as necessary to maintain a safe roadway surface and may consist of ACP milling, patching, and crack sealing.

Medium-Term:

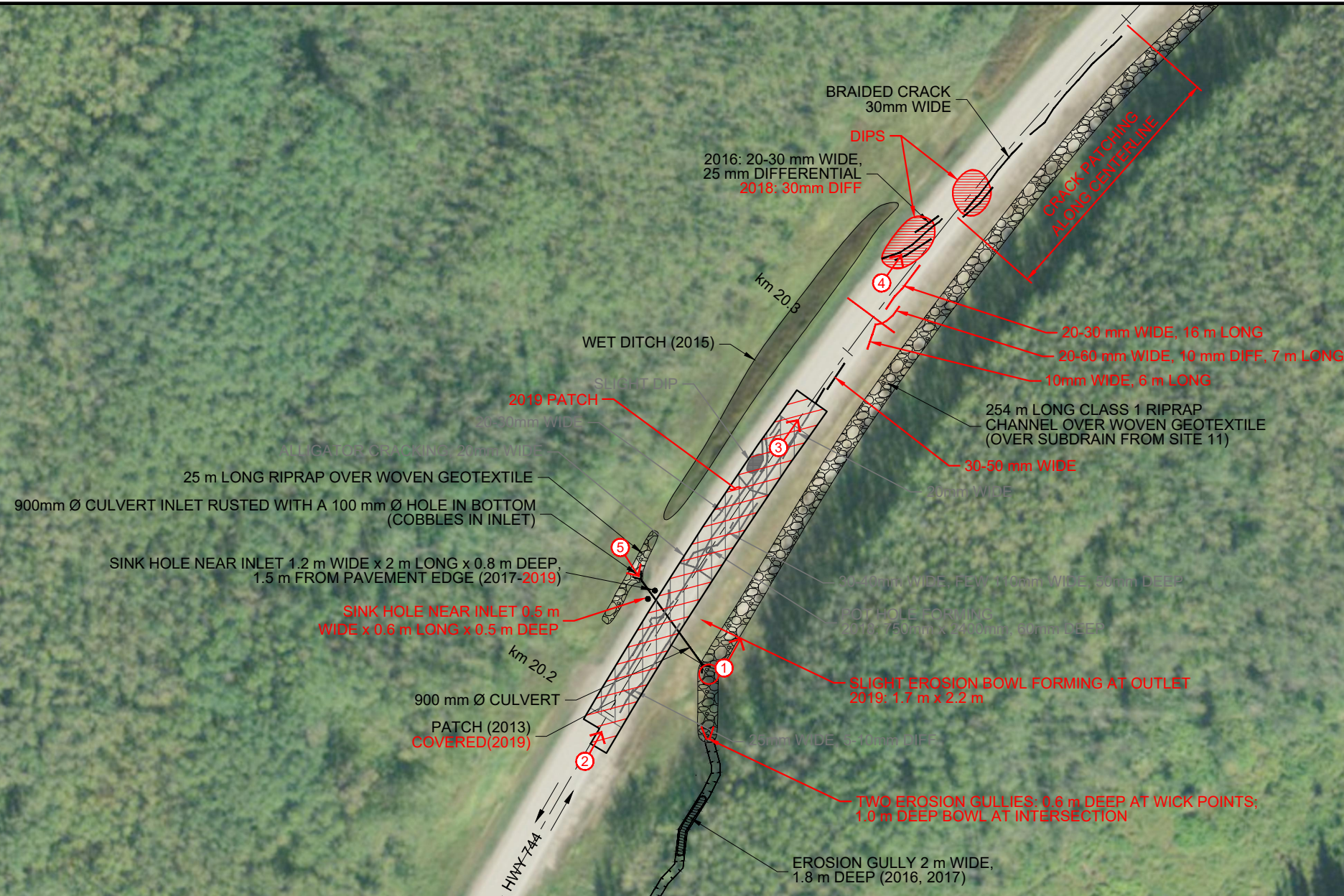
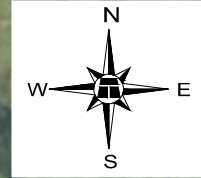
- The culvert inlet at km 20.22 should be repaired to prevent subsurface infiltration and/or piping.
- An asphalt overlay could be applied throughout the length of the valley crossing to “reset” the road surface, although cracks and distortions will re-appear over time.

Long-Term:

It is understood that, at this time, the only long-term remediation option under consideration is realignment of the entire north hill section of Highway 744. However, given the high cost of this option and as it is a low volume highway, it is unlikely that realignment will be undertaken in the near future. Consideration is also being given to a shorter realignment which would include both of the SH023 sites as they currently require frequent maintenance.

Ongoing Investigation:

- It is recommended that the annual GeoHazard inspection should continue as scheduled.

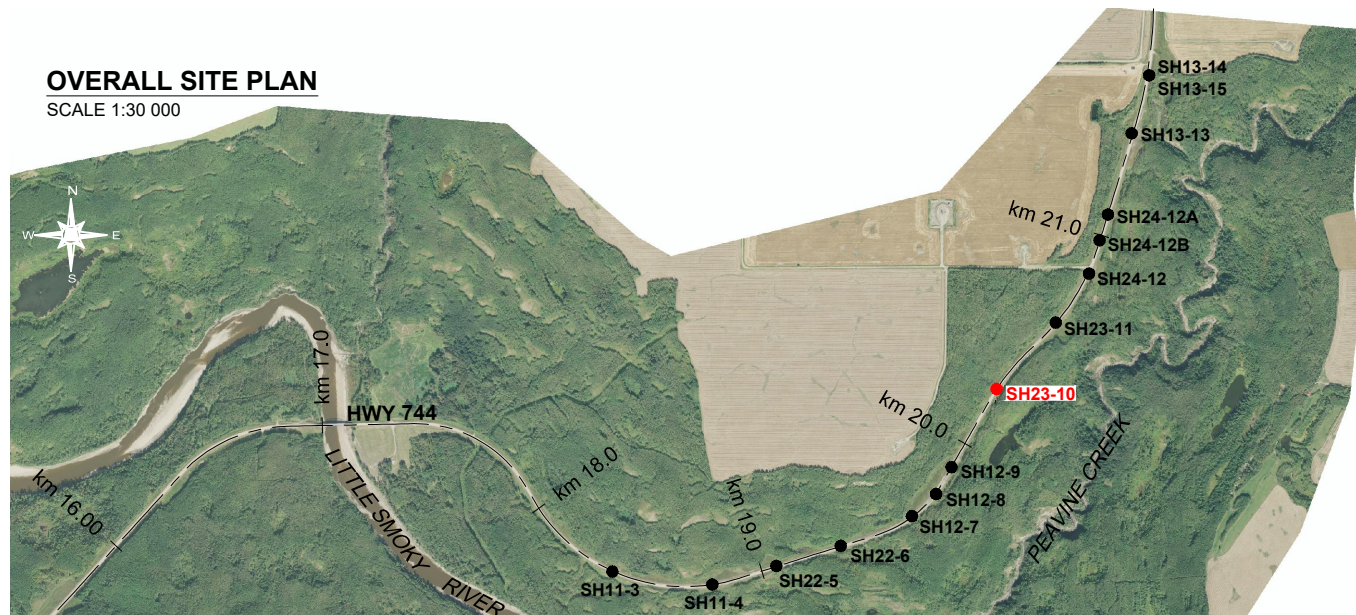


DETAILED SITE PLAN

SCALE 1:1250

OVERALL SITE PLAN

SCALE 1:30 000

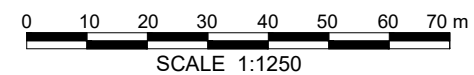


LEGEND

- CULVERT
- ASPHALT PATCH
- DIRECTION AND NUMBER OF PHOTO

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. PREVIOUS OBSERVATIONS SHOWN IN BLACK (2013-2015 FROM AMEC FIGURE 1, PROJECT EG10030, PROVIDED BY ALBERTA TRANSPORTATION).
3. JUNE 2019 OBSERVATIONS SHOWN IN RED.
4. CRACKS IN AREA OF 2019 PATCH WERE NOT VISIBLE AT TIME OF SITE INSPECTION



SATELLITE IMAGE FROM VALTUS IMAGERY (DATED 2014)



PEACE REGION (SWAN HILLS)

SH023-10: HWY 744:02 LITTLE SMOKY RIVER VALLEY 2019 SITE INSPECTION PLAN

DWG No. 13355-SH023-10

DRAWN BY	KLW
DESIGNED BY	KEF
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	DECEMBER 2019
FILE No.	13355





Photo 1 – Looking northeast along downslope ditch.



Photo 2 – Looking northeast from southwest end of recent patch and Site. Note longitudinal cracking.



Photo 3 – Looking northeast at longitudinal cracking near northeast end of recent patch and Site.



Photo 4 – Looking northeast at scarp crack northeast of patched section.



Photo 5 – Looking at culvert inlet distress: partial obstruction with cobbles from ditch lining and sinkhole (not visible in photo) forming near edge of the highway shoulder.