

**ALBERTA TRANSPORTATION  
GEOHAZARD ASSESSMENT PROGRAM  
PEACE REGION – SWAN HILLS  
2020 INSPECTION**



| Site Number              | Location           | Name   | Hwy    | km                         |
|--------------------------|--------------------|--|--------|----------------------------|
| SH012-8<br>SH012-9       | Little Smoky River | Little Smoky River Valley,<br>North Hill – Sites #8 and #9 | 744:02 | 19.70-19.83<br>19.83-20.0* |
| <b>Legal Description</b> |                    | <b>UTM Co-ordinates</b>                                    |        |                            |
| Site 8: SW21-76-22-W5M   |                    | 11U E 477,815  | N      | 6,161,486                  |
| Site 9: 21-76-22-W5      |                    | 11U E 477,887  | N      | 6,161,592                  |

|                             | Date  | PF           | CF                  | Total      |
|-----------------------------|---|--------------|---------------------|------------|
| <b>Previous Inspection:</b> | 11-Jun-2019   | 10           | 4                   | Site 8: 40 |
|                             |   | 10           | 4                   | Site 9: 40 |
| <b>Current Inspection:</b>  | 2-Jun-2020  | 10           | 4                   | Site 8: 40 |
|                             |   | 10           | 4                   | Site 9: 40 |
| <b>Road AADT:</b>           | 240   | <b>Year:</b> | 2020                |            |
| <b>Inspected By:</b>        | Rocky Wang, TRANS   |              | Ken Froese, Thurber |            |
| <b>Report Attachments:</b>  | <input checked="" type="checkbox"/> Photographs<br><input checked="" type="checkbox"/> Plans <input type="checkbox"/> Maintenance Items |              |                     |            |

|   |  |                                     |  |
|---|--|-------------------------------------|--|
| <b>Primary Site Issue:</b>                            | 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 #8 is 65 m above and 400 m away from the Peavine Creek and Site #9 is 65 m above and 435 m away. |                                     |  |
| <b>Dimensions:</b>                                    | Site 8: 130 m length of highway affected by cracking and distortion<br>Site 9: 170 m length of highway affected by cracking and distortion<br>(* Extended from 19.95 in 2017)  |                                     |  |
| <b>Date of Remediation:</b>                           | <u>1988:</u> 6 m deep subdrain installed in upslope ditch from Sta. 19+600 to 20+300.<br><u>2011 (Site 9):</u> Sinkhole in highway filled with gravel and the suspect culvert (piping) was replaced.<br><u>Spring 2017:</u> ACP patching, sideslopes regraded; guardrail removed through SH12-9<br><u>Fall 2017:</u> Patch over entire length of both sites<br><u>Spring 2019:</u> Milling over portions of both sites     |                                     |  |
| <b>Maintenance:</b>                                   | Routine crack sealing, milling, and patching (2013, 2014, and 2015), when required.<br>2020: Line painting   |                                     |  |
| <b>Observations (Site 8):</b>                         | <b>Description</b>   | <b>Worsened?</b>                    |  |
| <input checked="" type="checkbox"/> Pavement Distress | Numerous longitudinal and traverse cracks have reflected through 2017 patches and been exposed by 2019 milling. There is moderate surface distortion.  | <input checked="" type="checkbox"/> |  |
| <input checked="" type="checkbox"/> Slope Movement    | Site is located on an active deep-seated landslide moving toward the Peavine Creek. Cracks are reflecting through recent patch.  | <input checked="" type="checkbox"/> |  |
| <input type="checkbox"/> Erosion                      |  | <input type="checkbox"/>            |  |

|  |  |                                     |
|--|--|-------------------------------------|
| <input type="checkbox"/> Seepage   |  | <input type="checkbox"/>            |
| <input type="checkbox"/> Bridge/Culvert Distress   |  | <input type="checkbox"/>            |
| <input type="checkbox"/> Other   |  | <input type="checkbox"/>            |
| <b>Observations (Site 9):</b>  | <b>Description</b>   | <b>Worsened?</b>                    |
| <input checked="" type="checkbox"/> Pavement Distress  | Numerous longitudinal and traverse cracks have reflected through 2017 patches and been exposed by 2019 milling. There is significant surface distortion particularly near the northeast end of the Site. | <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 a sag pond/graben. Cracks are reflecting through recent patch.                                | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Erosion  | Small gully in backslope.  | <input type="checkbox"/>            |
| <input type="checkbox"/> Seepage   |  | <input type="checkbox"/>            |
| <input checked="" type="checkbox"/> Bridge/Culvert Distress  | Culvert at km 19.93: hanging outlet repaired with sideslope regrading in 2017 but is starting to scour again.  | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Other   |  | <input type="checkbox"/>            |
| <b>Instrumentation:</b>  |  |                                     |
| None.  |  |                                     |
| <b>Assessment:</b>   |  |                                     |
| <p>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.</p> <p>Site 8:<br/>The crack widths and lengths have reflected through the 2017 patch and 2019 milling has exposed them further. The crack pattern has extended since 2018 with braided patterns developing and new cracks appearing. It appears that a major scarp crack roughly parallels the highway through this site although the vertical distortion of the pavement surface and the guardrail is not as significant as Site 9 and is mostly manifested in a continuous crack pattern. Given the overall valley condition, continued creep movement is expected which may manifest as increased crack lengths, widths, and height differential as well as vertical pavement distortion.</p> <p>Site 9:<br/>The crack widths and lengths have reflected through recent 2017 patches and 2019 milling has exposed them further. The crack pattern has extended since 2018 becoming more continuous and braided. Some voids were measured in the cracks and new cracks have appeared. It appears that a major scarp crack roughly parallels the highway through this site which will result in significant vertical distortion of the pavement surface despite the recent patching. Given the overall valley condition, continued creep movement is expected which may manifest as increased crack lengths, widths, and height differential as well as vertical pavement distortion.</p> |  |                                     |

**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:

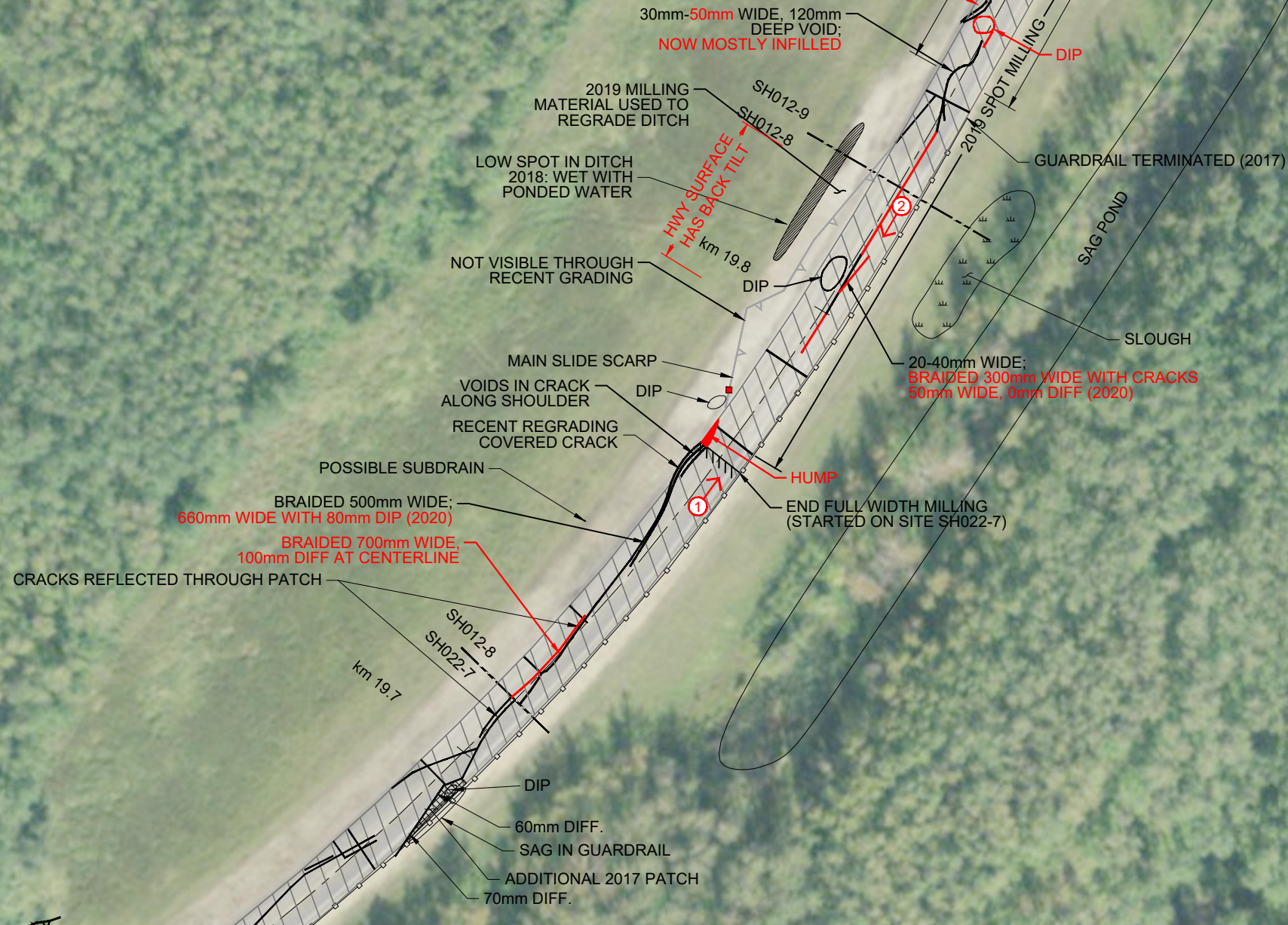
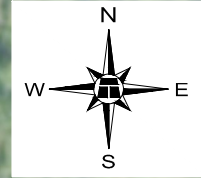
- Culvert outlet at km 19.93 (Site 9): consideration should be given to placing some riprap at the outlet (there is none currently) to minimize downcutting through recently-regraded slope.

## 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 these sites as they currently require frequent maintenance.

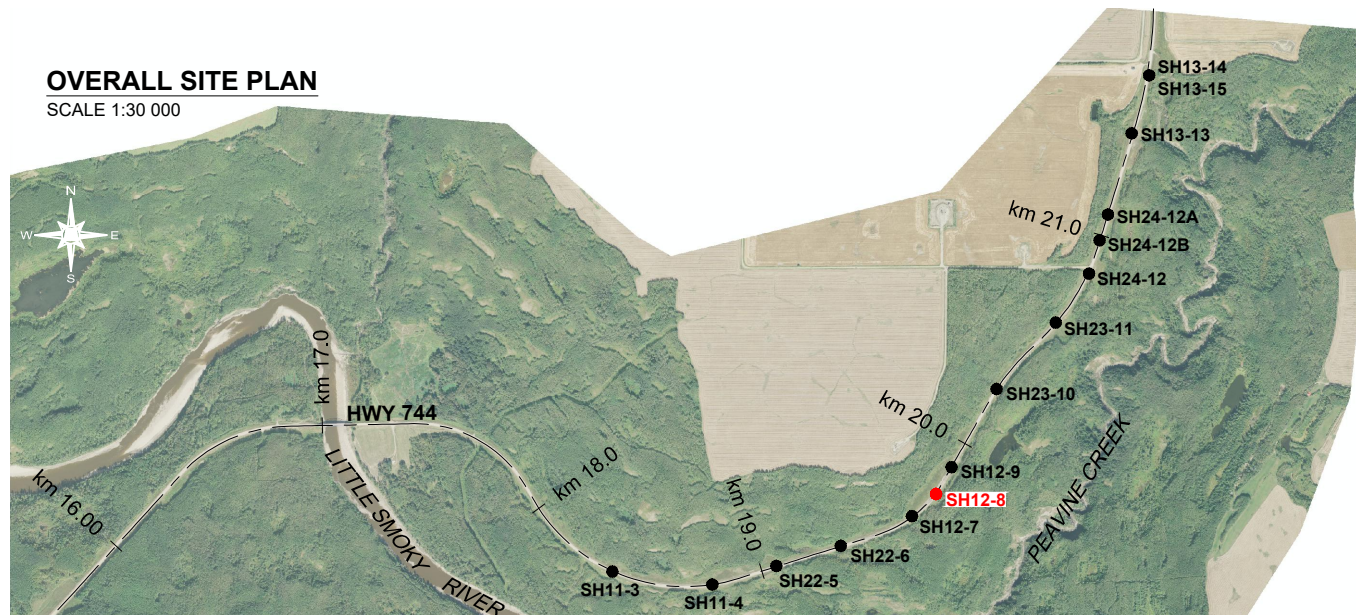
## Ongoing Investigation:

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



**DETAILED SITE PLAN**  
SCALE 1:1000

**OVERALL SITE PLAN**  
SCALE 1:30 000

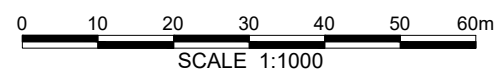


**LEGEND**

- GUARDRAIL
- RED TEMPORARY HAZARD SIGN
- 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 2020 OBSERVATIONS SHOWN IN RED.



SATELLITE IMAGE FROM VALTUS IMAGERY (DATED 2014)



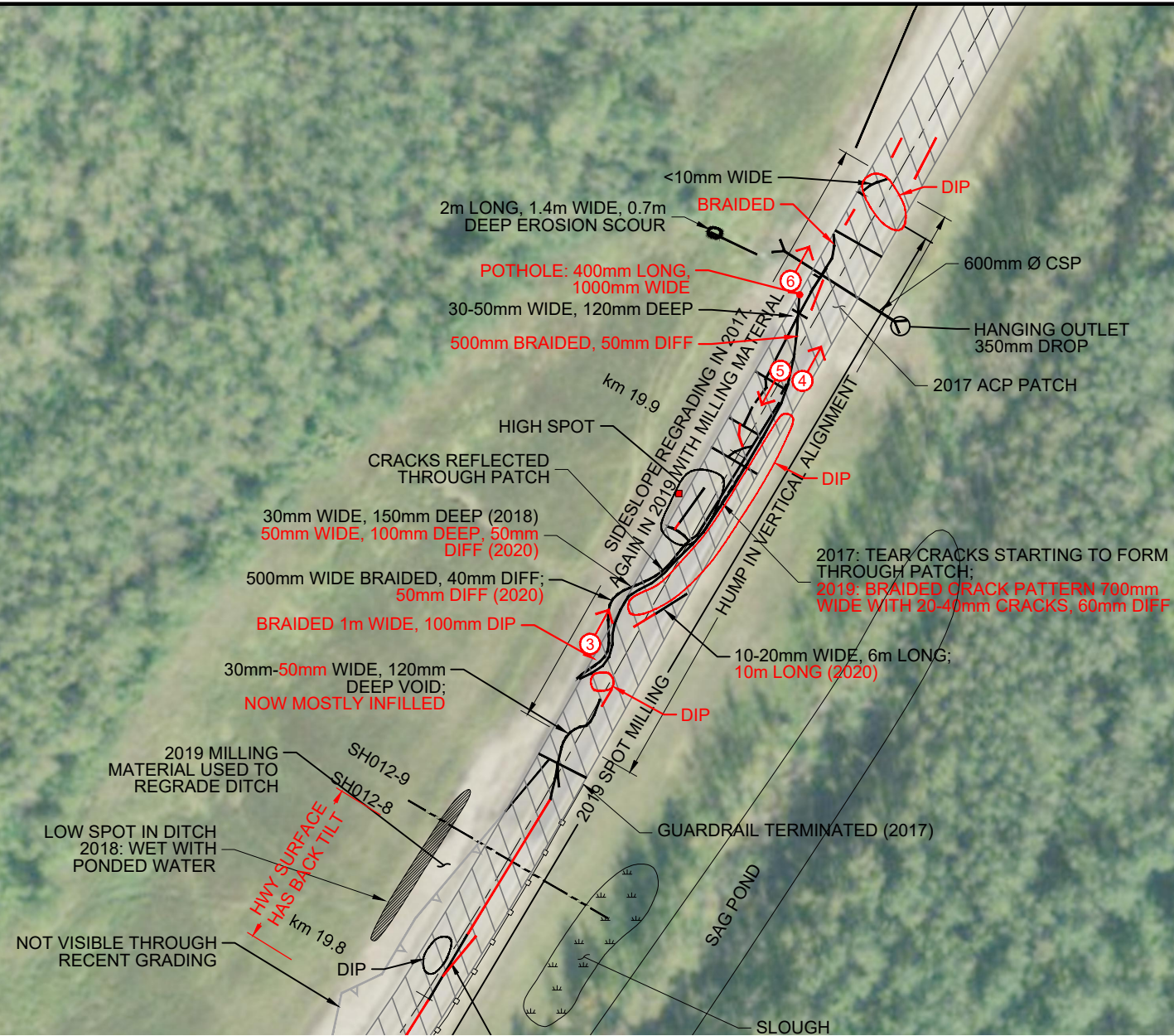
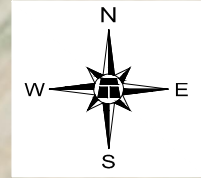
PEACE REGION (SWAN HILLS)

**SH012-8: HWY 744:02 LITTLE SMOKY RIVER VALLEY  
2020 SITE INSPECTION PLAN**

DWG No. 13355-SH012-8

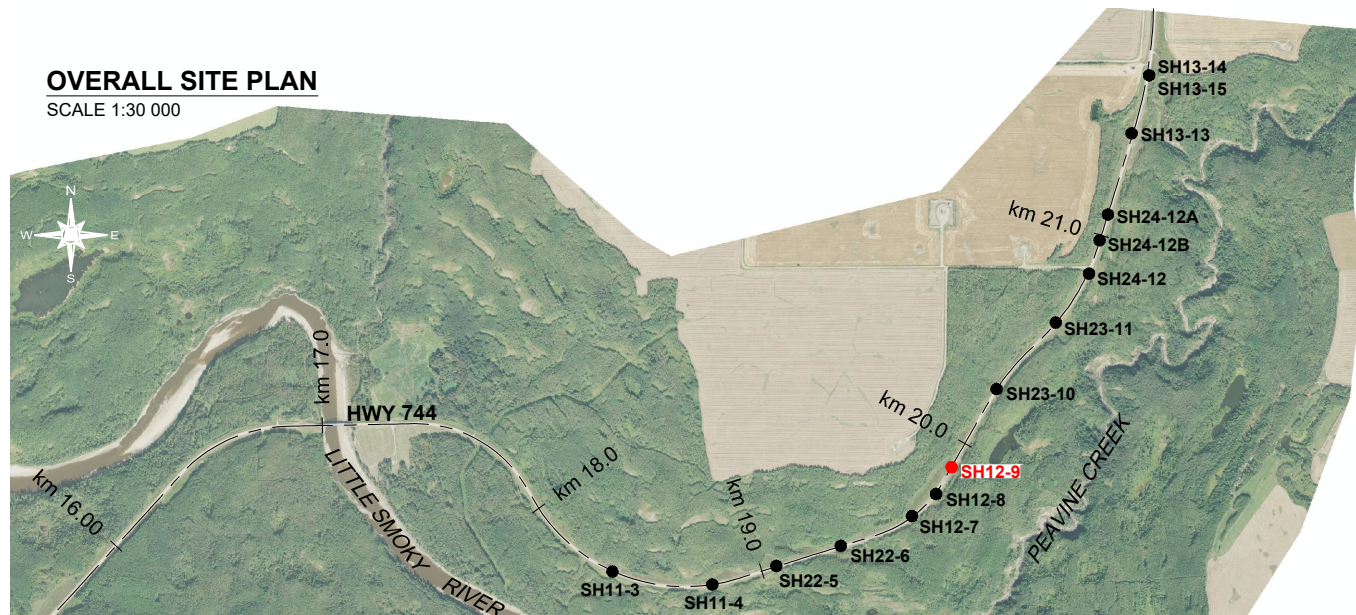
|             |              |
|-------------|--------------|
| DRAWN BY    | KLW          |
| DESIGNED BY | KEF          |
| APPROVED BY | DWP          |
| SCALE       | AS SHOWN     |
| DATE        | OCTOBER 2020 |
| FILE No.    | 13355        |





**DETAILED SITE PLAN**  
SCALE 1:1000

**OVERALL SITE PLAN**  
SCALE 1:30 000

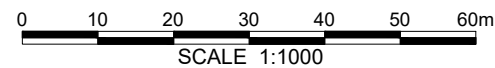


**LEGEND**

- GUARDRAIL
- RED TEMPORARY HAZARD SIGN
- ASPHALT PATCH
- DIRECTION AND NUMBER OF PHOTO

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SATELLITE IMAGE FROM VALTUS IMAGERY (DATED 2014)



**PEACE REGION (SWAN HILLS)**

**SH012-9: HWY 744:02 LITTLE SMOKY RIVER VALLEY  
2020 SITE INSPECTION PLAN**

**DWG No. 13355-SH012-9**

|             |              |
|-------------|--------------|
| DRAWN BY    | KLW          |
| DESIGNED BY | KEF          |
| APPROVED BY | DWP          |
| SCALE       | AS SHOWN     |
| DATE        | OCTOBER 2020 |
| FILE No.    | 13355        |





Photo 1, Site 8 – Looking northeast from the southwest end of the Site along a major scarp crack.



Photo 2, Site 8 – Looking southwest from the northeast end of Site SH012-8. Note main scarp crack has reflected through the new patch.



Photo 3, Site 9: Looking northeast at braided crack in highway surface over main slide scarp.



Photo 4, Site 9: Looking northeast at cracking and milling near northeast end of site.



Photo 5, Site 9: Looking southwest at braided crack along main slide scarp. Note milling material used to regrade sideslope and ditch.



Photo 6, Site 9: Looking northeast near northeast end of site where main slide scarp moves north of highway.