

**ALBERTA TRANSPORTATION AND
ECONOMIC CORRIDORS
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – SWAN HILLS
2024 INSPECTION**



Site Number	Location	Name	Hwy	km
SH011-3 SH011-4	Little Smoky River	Little Smoky River Valley, North Hill – Sites #3 and #4	744:02	18.26-18.52 18.62-18.90
Legal Description		UTM Co-ordinates		
Site 3: SE20-76-22-W5M		11U E 476,536	N	6,161,182
Site 4: SE20-76-22-W5M		11U E 476,872	N	6,161,121

	Date	PF	CF	Total
Previous Inspection:	31-May-2022	- 8	- 3	- Site 4: 24
Current Inspection:	4-Jun-2024	5 9	3 3	Site 3: 15 Site 4: 27
Road AADT:	270		Year:	2023
Inspected By:	Rishi Adhikari, TEC Robert Senior, TEC	Ken Froese, Thurber Roger Skirrow, Thurber		
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input checked="" 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 #3 is 45 m above and 350 m away from the Little Smoky River and Site #4 is 60 m above and 530 m away.
Dimensions:	Site 3: 240 m length of highway affected by cracking and distortion Site 4: 270 m length of highway affected by cracking and distortion
Date of Remediation:	None
Maintenance:	2005: 600t of asphalt overlay 2006: 640t of asphalt overlay Routine ACP crack sealing, milling, and patching, when required. 2019: Milled both lanes at Site 4 2020: Spot patching at Site 4 2021: Highway overlay, sideslopes and ditches regraded

Observations (Site 3):	Description	Worsened?
<input checked="" type="checkbox"/> Pavement Distress	Site was last inspected in 2019 and the highway was overlaid in 2021. Some of the previous longitudinal and transverse cracks have reflected through. Cracks were observed on the patch along the EBL.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Site is located on an active deep-seated landslide moving toward the Little Smoky River.	<input type="checkbox"/>
<input type="checkbox"/> Erosion		<input type="checkbox"/>
<input type="checkbox"/> Seepage		<input type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert	SWSP culverts were likely installed during the 2021 overlay and replaced older CSP culverts. Culvert at km 18.28: Pounded water observed at outlet. Culvert at km 18.44: Erosion gullies observed at inlet and outlet.	<input type="checkbox"/>

<input type="checkbox"/> Other		<input type="checkbox"/>
Observations (Site 4):	Description	Worsened?
<input checked="" type="checkbox"/> Pavement Distress	Some of the previous longitudinal and transverse cracks have reflected through and there are minor pavement undulations due to movement.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Site is located on an active deep-seated landslide moving toward the Little Smoky River.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Erosion		<input type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	Ponded water observed at several locations along north ditch and south of the highway. Ditch drainage appears to be very slow.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert	No culverts within site boundaries	<input type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>
Instrumentation:		
None.		
Assessment:		
<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. Ponded water was observed at the outlet of the culvert at km 18.28. Erosion gullies were observed at the inlet and outlet of the culvert at km 18.44.</p> <p>Site 3: After subsequent years of only minor change, the risk level for Site 3 was lowered in 2019 and the site was not inspected since. Pavement distress was observed so the site was inspected in 2024. Some of the previous longitudinal and transverse cracks have reflected through the 2021 overlay. Cracks were observed on the patch along the eastbound lane.</p> <p>Site 4: In general, the site has deteriorated steadily over the last two years. There were noticeable changes in crack widths and lengths despite the overlay undertaken across the entire site in 2021. Some of the previous longitudinal and transverse cracks have reflected through since the 2022 inspection. Although the differential heights measured across the cracks was mostly eliminated, the cracks are still present and there is still overall unevenness of the driving surface. Ponded water observed at several locations along north ditch and south of the highway. Ditch drainage appears to be very slow.</p>		
Recommendations:		
<p>Short-Term:</p> <ul style="list-style-type: none"> ▪ Road maintenance should continue as necessary to maintain a safe roadway surface and may consist of milling, patching, and crack sealing of the ACP. ▪ Ditches (Site #4) and culvert outlets (Site #3) should be regraded to allow ponded water to drain. <p>Long-Term:</p> <p>It is understood that, currently, the only remediation option under consideration is realignment of the north hill section of Highway 744. A study is currently being undertaken for this purpose. Consideration is also being given to a shorter realignment which will occur farther up the slope and will likely not include Sites #3 and #4.</p> <p>Ongoing Investigation:</p> <ul style="list-style-type: none"> ▪ It is recommended that the bi-annual geohazard inspection continue as scheduled for Site #4 and include Site #3 due to the recent changes observed during the 2024 inspection. ▪ Test holes and instrumentation could be considered in the future in advance of any planned re-alignments or major slide repairs. 		

Closure:

It is a condition of this letter report that Thurber's performance of its professional services will be subject to the attached Statement of Limitations and Conditions.

Roger Skirrow, P.Eng.
Senior Geotechnical Engineer

Mark Gallego, P.Eng.
Geotechnical Engineer



STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

- a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
- c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.
- d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

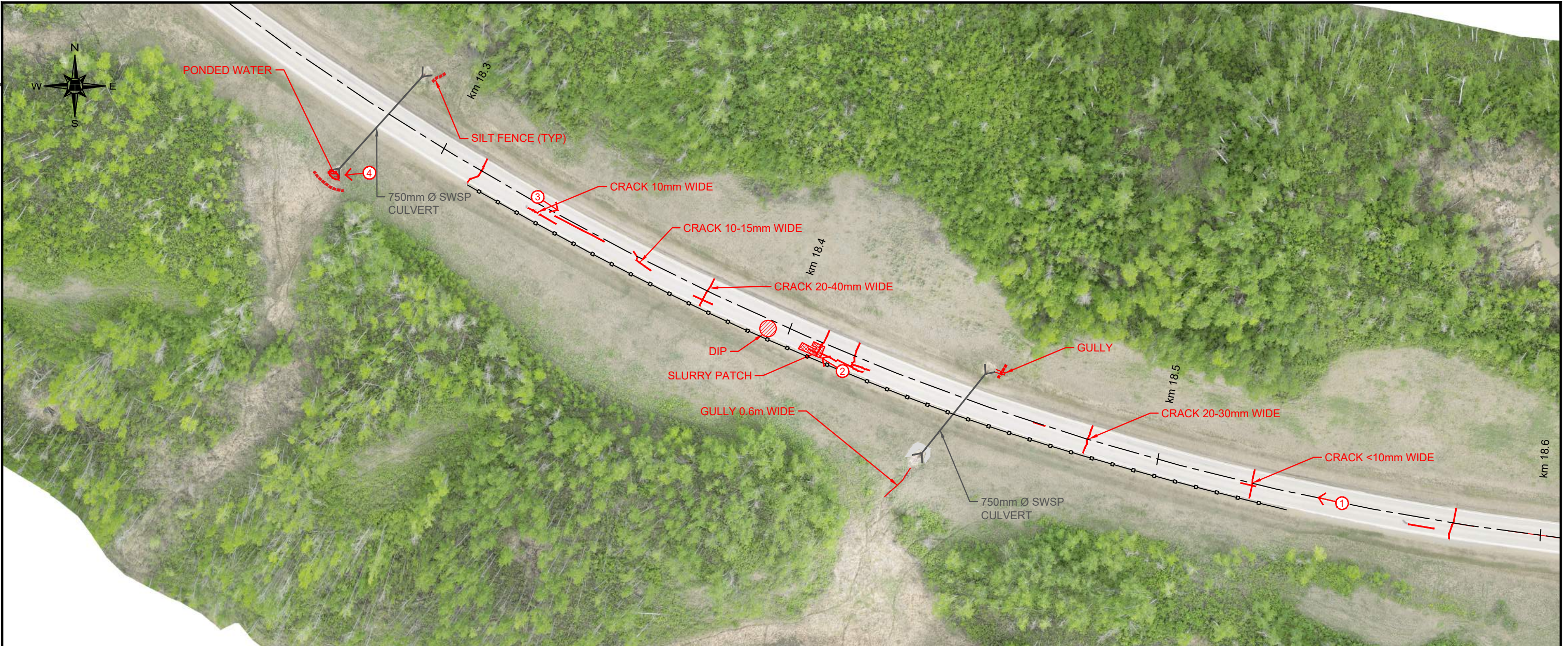
6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

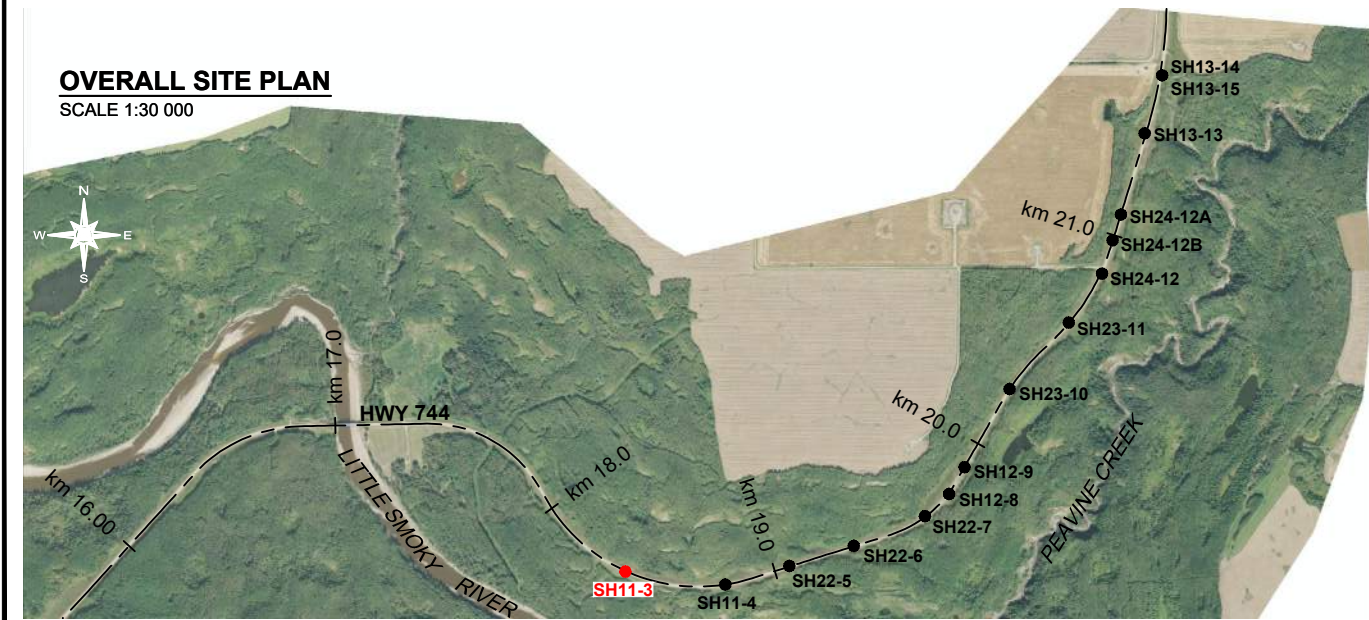
The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

G:\32000\32121 AT GRMP Peace River District\2021-2025\CAD\2024\KEF\32121 SH011-3.dwg - 3 - Oct. 04, 2024



DETAILED SITE PLAN
SCALE 1:1000

OVERALL SITE PLAN
SCALE 1:30 000

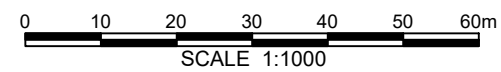


LEGEND

- GUARDRAIL
- CULVERT
- SILT FENCE
- DIRECTION AND NUMBER OF PHOTO

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. JUNE 2024 OBSERVATIONS SHOWN IN RED.
3. CRACK AND PATCH PATTERNS RESET AS HWY 744 WAS OVERLAID IN SUMMER 2021.
4. GUARDRAIL AND CULVERT LOCATIONS TAKEN FROM MCINTOSH PERRY AS-BUILT DRONE SURVEY (JULY 2021).



ORTHOIMAGE DERIVED FROM UAV IMAGERY FLOWN BY THURBER IN JUNE 2024
OVERALL SITE PLANE IMAGE: SATELLITE IMAGE FROM VALTUS IMAGERY (DATED 2014)



PEACE REGION (SWAN HILLS)

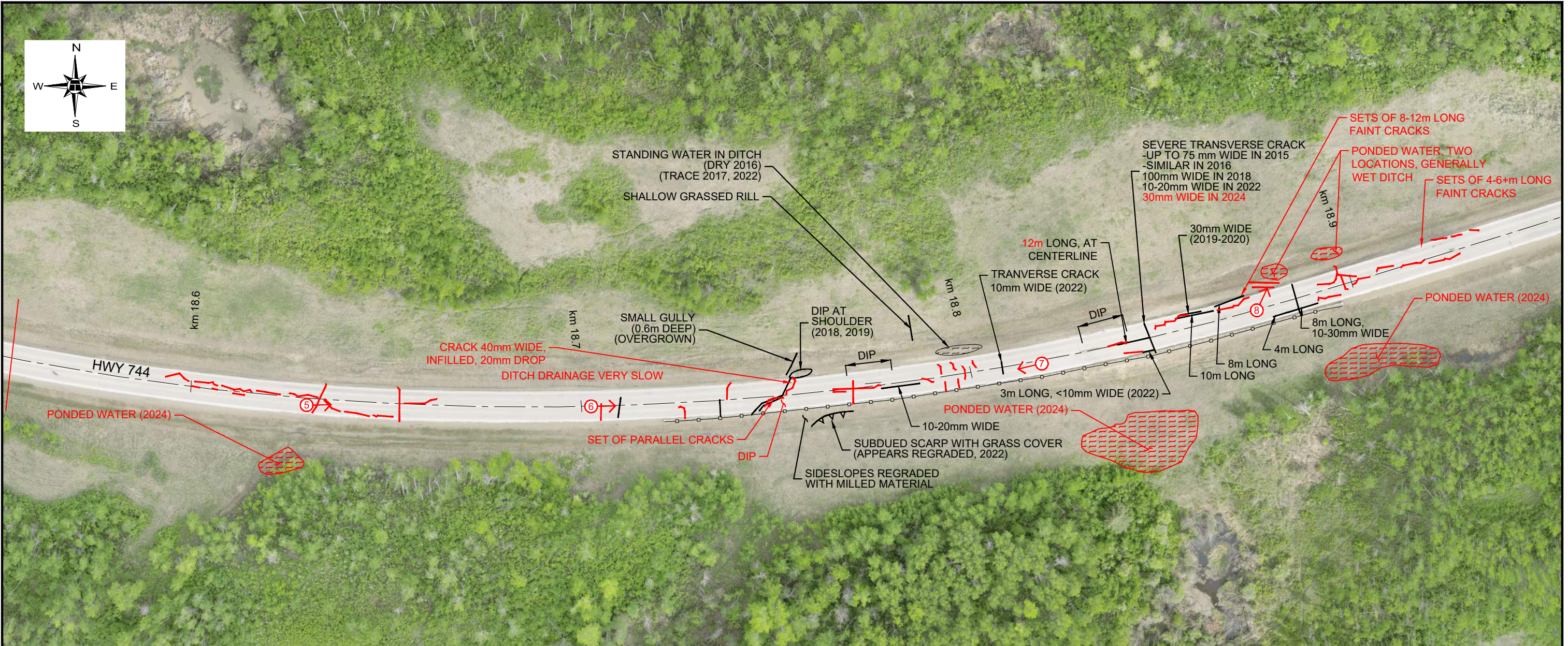
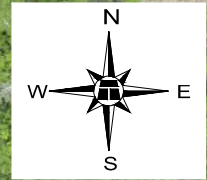
SH011-3: HWY 744:02 LITTLE SMOKY RIVER VALLEY
2024 SITE INSPECTION PLAN

DWG No. 32121-SH011-3

DRAWN BY	DLA
DESIGNED BY	KEF
APPROVED BY	RKS
SCALE	AS SHOWN
DATE	OCTOBER 2024
FILE No.	32121



G:\32000\32121 AT GRMP Peace River District\2021-2025\CAD\2024\KEF\32121 SH011-4.dwg - 4 - Oct. 04, 2024



DETAILED SITE PLAN
SCALE 1:1000

OVERALL SITE PLAN
SCALE 1:30 000

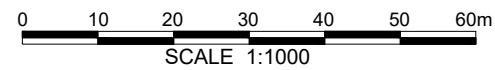


LEGEND

- GUARDRAIL
- DIRECTION AND NUMBER OF PHOTO

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. JUNE 2024 OBSERVATIONS SHOWN IN RED.
3. CRACK AND PATCH PATTERNS RESET AS HWY 744 WAS OVERLAID IN SUMMER 2021.
4. GUARDRAIL AND CULVERT LOCATIONS TAKEN FROM MCINTOSH PERRY AS-BUILT DRONE SURVEY (JULY 2021).



ORTHOIMAGE DERIVED FROM UAV IMAGERY FLOWN BY THURBER IN JUNE 2024
OVERALL SITE PLANE IMAGE: SATELLITE IMAGE FROM VALTUS IMAGERY (DATED 2014)



PEACE REGION (SWAN HILLS)

**SH011-4: HWY 744:02 LITTLE SMOKY RIVER VALLEY
2024 SITE INSPECTION PLAN**

DWG No. 32121-SH011-4

DRAWN BY	DLA
DESIGNED BY	MG
APPROVED BY	RKS
SCALE	AS SHOWN
DATE	SEPTEMBER 2024
FILE No.	32121





Photo 1, Site 4 – Looking northwest from the east end of site.



Photo 2, Site 4 – Looking northwest at cracking on patch along EBL.



Photo 3, Site 4 – Looking southeast at cracking in highway surface at ~km 18.33.



Photo 4, Site 3 –Ponded water observed at culvert outlet at km 18.28



Photo 5, Site 4 – Looking east from the west end of site.



Photo 6, Site 4 – Looking east at ~km 18.73 where dip was observed.



Photo 7, Site 4 – Looking west at ~km 18.82.



Photo 8, Site 4 – Looking northeast at ponded water in north ditch.