

**ALBERTA TRANSPORTATION AND
ECONOMIC CORRIDORS
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION (PEACE RIVER DISTRICT)
2024 INSPECTION**



Site Number	Location	Name	Hwy	km
PH092-1	North of Manning	Gravina Creek	692:02	3.13-3.30
Legal Description		UTM Co-ordinates		
SW15-95-22-W5M		11 E 491,100	N	6,425,466

	Date	PF	CF	Total
Previous Inspection:	28-Apr-2022	11	4	44 (Erosion)
Current Inspection:	30-May-2024	11	4	44
Road AADT:	140		Year:	2024
Inspected By:	Rocky Wang, TEC Robert Senior, TEC		Ken Froese, Thurber Tyler Clay, Thurber	
Report Attachments:	<input checked="" type="checkbox"/> Photographs	<input checked="" type="checkbox"/> Plans	<input type="checkbox"/> Maintenance	

Primary Site Issue:	Deep, wide, and actively enlarging erosion gully adjacent to the highway embankment is destabilizing the embankment.	
Dimensions:	The erosion gully is about 70 m long, 20 m wide and up to 4 m deep.	
Date of Remediation:	None	
Maintenance:	2018: Approach and culvert at km 2.845 replaced and paved 2021: Riprap replaced and grouted at km 2.845 (see Photos 1 and 2)	
Observations:	Description	Worsened?
<input type="checkbox"/> Pavement Distress	Highway overlaid in Fall 2023 including new strong-post guardrail installation.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Downcut of gully has caused shallow slides within the embankment fill above the erosion. The slides have retrogressed towards the highway at about 0.6 m to 0.7 m per year until about 2021.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	Aggressive downcutting at NW corner of embankment fill at BF74654 has undermined gabion mattress that lined the ditch and transition slope along the fill and valley slope. The steep slope is now unprotected against erosive flows.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Seepage		<input type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert	800 mm Approach Culvert (km 2.845): intact but has washed out twice previously; inlet invert corroding. BF74654 (3.495m, km 3.333): culvert in good condition, gully forming at inlet	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Other	There may be downstream impacts related to the transport of sediment from the eroded ditch. These impacts have not been assessed.	<input type="checkbox"/>

Instrumentation: None

Assessment:

The Gravina Creek culvert, BF74654, and associated embankment fill were installed in 1983. The north ditch leading into the creek valley from the west was lined with a gabion mattress, perhaps as part of the culvert project. The mattress extends from the eroded area site to about 130 m to the west towards a farm approach at km 2.845. There may have been additional robust erosion control measures placed along the steeply dipped intersection between the native valley slope and the embankment fill. The distress at this site is understood to have started some time before 2015 and began as erosion in this the northwest corner. The ongoing erosion has progressed and led to shallow slumping of the highway embankment sideslope. A GRMP call-out was done in 2022, followed by a geotechnical investigation in 2023. A preliminary engineering assessment was subsequently provided in a Thurber report dated February 29, 2024. Input from a hydrotechnical consultant in the ongoing design of the repair measures suggests that the high gradients could have led to piping failure below the previous erosion measures which would have undermined the structures causing the collapse and complete failure seen now. Regardless of how it started, once erosion began at some point in the system, this failure would have resulted and will continue to regress until a new equilibrium is reached or a repair is implemented (targeting construction in 2025).

At the time of the call-out in 2022, Mr. Kurz, the Maintenance Contract Inspector (MCI) for the area, reported that the slumping of the highway embankment had not gotten worse since 2021. The conditions observed in 2024 also noted that there had not been significant retrogression of the erosion features to the west or south. The locations of the edges of the erosion gully were noted for future reference. Comparisons to the 2022 call-out were difficult as grading and guardrail replaced had occurred since then. An erosion gully was noted near the inlet of the Bridge File culvert which had not be observed in 2022.

The flow in this ditch also resulted in the approach culvert at km 2.845 washing out in 2018. The approach was rebuilt, paved (to increase erosion resistance if overtopped again), and additional riprap placed. It was repaired again in the fall of 2021 when the culvert became plugged with displaced riprap. As part of this repair, the riprap at the culvert inlet was grouted in place. At the time of 2024 inspection, this approach and culvert appeared to be stable.

Recommendations:

Short-Term:

- Routine monitoring by MCI or Maintenance Contractor to confirm that the erosion and embankment deterioration has not undermined the guardrail or the highway. This will be particularly important during the spring snow melt.

Long-Term:

- Detailed design is underway to reconstruct the ditch and install new erosion control measures.

Ongoing Investigation:

- No additional investigation is required at this time. Inspection under the GRMP will not be required until after construction is complete. A call-out inspection can be done if conditions rapidly deteriorate.

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, M.Sc., P.Eng.
Senior Geotechnical Engineer

Ken Froese, P.Eng.
Associate | Senior 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.

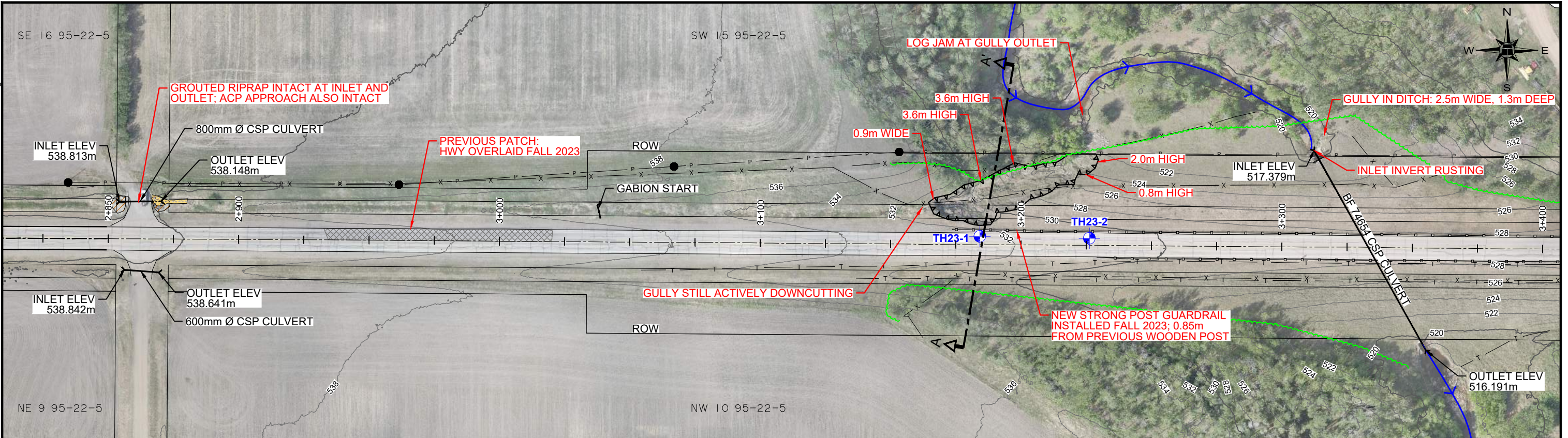
6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

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 PH092.dwg - 1 - Oct. 07, 2024



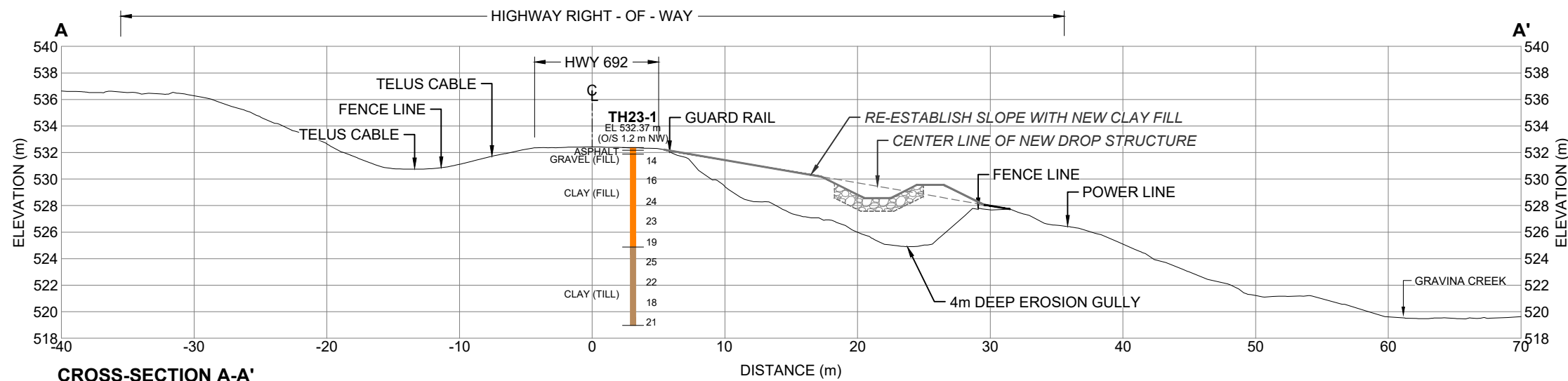
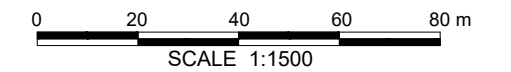
SITE PLAN
SCALE 1:1500

LEGEND

- | | | | | | | | |
|--|--------------------|--|-------------|--|------------|--|---|
| | TEST HOLE LOCATION | | FENCE LINE | | ACP PATCH | | GROUND SURFACE CONTOUR
(CONTOUR INTERVAL = 2m) |
| | EROSION AREA | | TELUS CABLE | | RIPRAP | | GRAVINA CREEK |
| | GUARD RAIL | | POWER LINE | | GROUT AREA | | DIRECTION AND NUMBER OF PHOTO |
| | TREE LINE | | POWER POLE | | | | |

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. MAY 2024 OBSERVATIONS SHOWN IN RED.



CROSS-SECTION A-A'
SCALE 1:400

LEGEND

15 SPT N VALUE

GROUND SURFACE CONTOURS AND ORTHOMOSAIC FROM 2023-05-27 UAV SURVEY BY McINTOSH PERRY



PEACE REGION (PEACE RIVER DISTRICT)

PH092: GRAVINA CREEK HWY 692:02 km 2.85 - km 3.30
2024 SITE INSPECTION PLAN

DWG No. 32121-PH092-1

DRAWN BY	KLP
DESIGNED BY	KEF
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	OCTOBER 2024
FILE No.	32121





Photo 1 – Grouted riprap at inlet of culvert at km 2.845 approach.



Photo 2 – Standing water at outlet of culvert at km 2.845 approach.



Photo 3 – Looking east at start of erosion gully in northwest corner of the highway embankment.



Photo 4 – Looking east where erosion gully slumping is closest to the highway.



Photo 5 – Looking west at the nick point at the top of the erosion gully where the damaged gabion mattress and underlying nonwoven geotextile is exposed.



Photo 6 – Looking west near the bottom of the fill where remnants of a gabion basket check dam are visible on the right-hand side of the photo.



Photo 7 – Looking south where the erosion gully discharges into Gravina Creek.



Photo 8 – Looking west at the erosion gully forming near the BF culvert inlet.



Photo 9 – Looking west along the north slope of the highway embankment fill which shows no evidence of slumping.



Photo 10 – Similarly, there was no evidence of slumping visible through the recent highway overlay.