

SITE NUMBER AND NAME: S008 Fisher Creek Pile Wall		HIGHWAY & KM: 762:02, 2.125	PREVIOUS INSPECTION DATE: May 9, 2023	INSPECTION DATE: May 28, 2024
LEGAL DESCRIPTION: 09-10-21-04 W5M	NAD 83 COORDINATES: UTM Northing Easting 11 5627342 678866		RISK ASSESSMENT: PF: 10 CF: 6 TOTAL: 60	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 1090 (north) & 1380 (south) (Reference No. 65170 & 60180)			CONTRACTOR MAINTENANCE AREA (CMA): 27	

SUMMARY OF SITE INSTRUMENTATION: 5 slope inclinometers installed into the concrete pile wall. LAST READING DATE: May 8, 2024	INSPECTED BY: Chris Grapel (KCB) Peter Roy (KCB) Alex Frotten (TEC) Renato Macciotta (U of A) Kristen Tappenden (TEC) Maury Siddons (TEC)
--	---

PRIMARY SITE ISSUE: Settlement of the embankment slope downslope of the existing pile wall by up to 0.85 m, and development of a dip in the pavement north of the existing pile wall.

APPROXIMATE DIMENSIONS: Pre 2017: 130 m long slide area in an earth slope approximately 12 m high (embankment slopes vary from 3H:1V to 4H:1V). Previous reports indicated a sliding plane 5 m below the highway. The landslide was repaired with a concrete pile wall. In 2020, settlement and new pavement cracking was observed north of the previous slide and the site extents have therefore been extended 20 m northwards.

DATE OF ANY REMEDIAL ACTION: January 2017 – a concrete pile wall installed on west side of highway. The pile wall consists of cast-in-place, 1.2 m diameter and 18 m long concrete piles anchored in bedrock. Some piles encountered water bearing sand and gravel that required concrete to be tremied into place. Fall 2017 – pavement was resurfaced and the installation of a HTCB. Fall 2022 – pavement at the north end of the pile wall was resurfaced.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Pavement cracking is 6 m long and up to 15 mm wide in the northbound lane, approximately 24 m north of the existing pile wall. Cracking showing through new overlay completed in 2022	X	
Slope Movement	X		Slope movement downslope of pile wall and sinkholes at individual pile locations.	X	
Erosion	X		Downstream slope is well vegetated with grass. Erosion is visible between the concrete piles where downstream slope has settled.	X	
Seepage		X	N/A – none observed		X
Culvert Distress		X	N/A – none observed		X

COMMENTS

A high-tension cable barrier (HTCB) is installed along the east (southbound) edge of the highway and extends across the whole length of the pile wall.

<p>The height of the highway embankment is approximately 5 m to 6 m and well vegetated.</p>
<p>During the 2024 inspection, the east (upslope) ditch was well vegetated, dry, and in good condition.</p>
<p>There is negligible movement being recorded in the pile-wall slope inclinometers and no pavement cracking has been observed directly upslope of the pile wall. However, pavement cracking and settlement in the highway approximately 24 m north of the pile wall (15 m north of the HTCB) has been observed since 2020. The previous pavement cracking observed during the 2022 inspection was visible through the asphalt overlay completed in fall 2022.</p>
<p>The pavement cracking and settlement north of the pile wall could indicate the slide has begun to outflank the pile wall.</p>
<p>In 2018, fill on the west side of the highway began settling around the concrete piles, creating tension cracking downslope of the pile wall and some localized sinkholes above the pile wall.</p>
<p>During the 2024 inspection, cracking and settlement of the embankment downslope of the pile wall was visible and the ground surface had dropped by up to 850 mm, creating a ledge that could potentially pond water, leading to increased infiltration.</p>
<p>Surface water runoff has enlarged existing sinkholes at the pile locations and contributed to embankment settlement downslope of the pile wall.</p>
<p><u>Discussed Remedial Actions:</u></p> <p><u>Short-Term</u></p> <ul style="list-style-type: none"> • The pavement cracks should be sealed to reduce surface water infiltration. • The voids between the pile walls should be backfilled to reduce infiltration and potential erosion undermining the east (southbound) lane. • The site should be regularly inspected as part of the Southern Region Section B inspections and instruments read as part of the Section C instrumentation monitoring. • A borehole should be drilled through the pavement north of the pile wall and a slope inclinometer and piezometer(s) should be installed to monitor movement and groundwater conditions, respectively. A proposal for this work was initially submitted on December 15, 2022. A refreshed proposal was submitted on July 16, 2024. <p><u>Long-Term</u></p> <ul style="list-style-type: none"> • The pile wall could be extended to the north, so the slide doesn't outflank the existing pile wall; or • Stabilize the highway embankment by excavating and replacing embankment fill with geogrid reinforced granular fill.

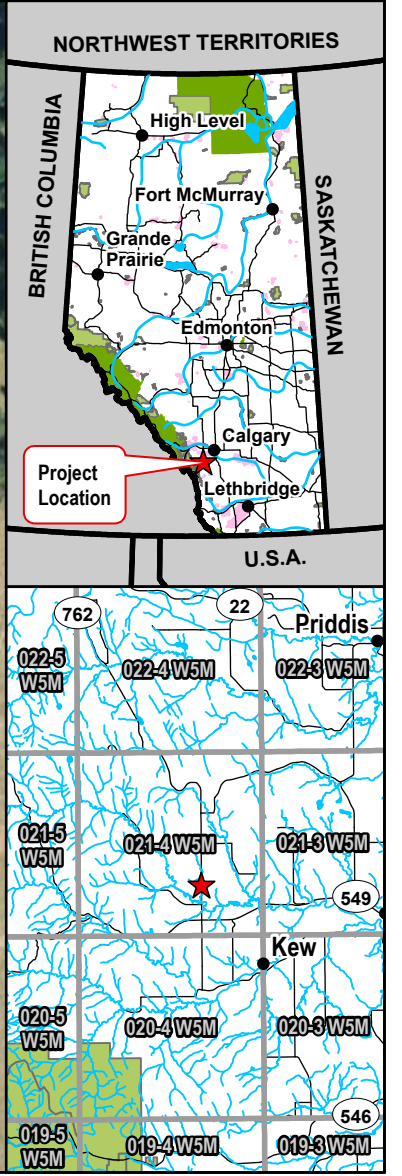
This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Alberta Transportation and Economic Corridors (Client) for the specific application to the Southern Region Geohazard Risk Management Program (Contract No. CON0022161) and it may not be relied upon by any other party without KCB's written consent.

KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

- (i) The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.
- (ii) The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
- (iii) The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
- (iv) KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.
- (v) This report is electronically signed and sealed and its electronic form is considered the original. A printed version of the original can be relied upon as a true copy when supplied by the author or when printed from its original electronic file.

Peter Roy, P.Eng.
Civil Engineer



- Legend**
- Slope Inclinometer (SI)
 - Crack
 - Fence

NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM ZONE 11N
 3. IMAGE SOURCE: MAXAR 2024

CLIENT

PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM		
TITLE Site Plan S008 - Fisher Creek Pile Wall Hwy 762.02, km 2.125		
SCALE 1:1,500	PROJECT No. A05116A03	FIG No. 1

Photo 1 Pavement cracking north of the pile wall. Cracking through patch installed in 2022. Photo taken facing southeast on May 28, 2024.



Photo 2 Cracking in the northbound lane. Photo taken facing south on May 28, 2024



Photo 3 Settlement downslope of pile wall, exposed concrete pilea. Photo taken facing north on May 28, 2024.



Photo 4 Settlement downslope of pile wall, exposed concrete pilea. Photo taken facing southeast on May 28, 2024.

