

SITE NUMBER AND NAME: S031 I & II Mystery Culvert		HIGHWAY & KM: 762:02, 8.187 & 17.660	PREVIOUS INSPECTION DATE: July 8, 2020	INSPECTION DATE: July 5, 2021
LEGAL DESCRIPTION: 07-19-022-04 W5M	NAD 83 COORDINATES: UTM Northing Easting 11 5639613 672917		RISK ASSESMENT: PF: 1 CF: 1 TOTAL: 1 (Site I) (Not visited) PF: 11 CF: 4 TOTAL: 44 (Site II)	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 720 (north) (Ref No. 65170), 1420 (south) (Ref. No. 60180)			CONTRACTOR MAINTENANCE AREA (CMA): 27	

SUMMARY OF SITE INSTRUMENTATION: None LAST READING DATE: N/A	INSPECTED BY: Chris Morgan (KCB) Chris Grapel (KCB) Roger Skirrow (AT) Alex Frotten (AT)
--	--

PRIMARY SITE ISSUE: Monitoring of two repaired embankment failures. Prior to repair, the embankment failures were impacting the southbound lane at both site I and II.

APPROXIMATE DIMENSIONS:
Site I – Approximately 45 m wide, up to 3 m into the highway. Cracking previously observed to the middle of the highway.

Site II - Approximately 40 m wide, up to 2 m into the highway. Most of the cracking was observed on the west shoulder. The embankment is approximately 4 to 5 m high. Prior to the construction of the toe berm, the embankment was approximately 6 m high.

DATE OF ANY REMEDIAL ACTION: Repairs were completed at Site I and II in fall 2017. The Site I repair included excavation and replacement of embankment material and improved drainage. Site II was repaired using a toe berm, however new pavement cracking was observed within a year, and the pavement required patching in June 2020.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Cracking in southbound lane at Site II. Settlement of area patched in June 2020. Site I not inspected.		X
Slope Movement	X		Slight bulge in slope at Site II. No apparent changes since previous inspection.		X
Erosion		X			X
Seepage	X		Wetland area at the toe of the embankments at both sites.		X
Culvert Distress	X		Culvert at Site II appears deformed.		X

COMMENTS

During the drive-by, Site I appeared to be in good condition following 2017 repairs. Vegetation is establishing on the slope and no distress was observed in pavement. The riprap armoured drainage ditch at Site I was previously not graded properly (centre of channel is higher than outside edges), however the MCI reported that the ditch had been repaired since the previous inspection. Site I can be visited once per contract cycle.

Site II appears to have ongoing movement. The site was repaired in 2017 using a toe berm and repaving, and the pavement cracked within the warranty period. In 2019, a tension crack was observed in the pavement and has continued to enlarge. The MCI reported that the pavement had settled approximately 200 mm vertically and required patching in June 2020. During the 2020 inspection, mid-slope tension cracking was noted along the west embankment between the north and south culverts. The side slopes appear well vegetated. There is a slight bulge in the slope but no apparent change from the 2020 inspection.

During the 2021 inspection, it was noted that the patched area at Site II had settled approximately 1 to 1.5 cm. Cracking of the pavement in the southbound lane is offset 1.7 m from the white line on the shoulder. The length of the tension crack appears to have extended to the north and south, by up to 10 m. Site II should be visited annually.

Two culverts are present at Site II. The southernmost culvert was replaced as part of the 2017 repair work, and the north culvert is outside the site limits. Both culverts appeared deformed and bowed beneath the highway embankment. The east ditch is poorly drained.

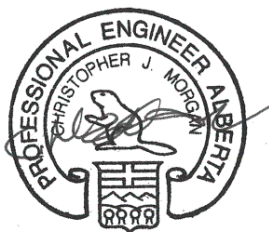
Candidate repair option for Site II: excavate and replace embankment fill with geogrid reinforced granular fill with a shear key. Could reduce embankment loading using lightweight fill (Cematrix or polystyrene) in the upper third of the slope. Repair work could be completed by the maintenance contractor using a memo prepared by KCB.

This report is an instrument of service of Klohn Crippen Berger Ltd. (KCB). The report has been prepared for the exclusive use of Alberta Transportation (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.

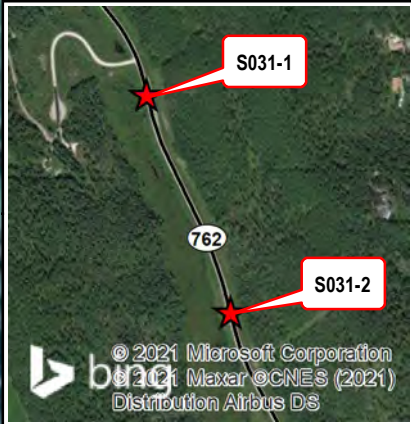
Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

- (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) KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.



2021-11-24

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



Legend

- ✕—✕ Barbed Wire Fence
- < Culvert

NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM Zone 11N
 3. IMAGE SOURCE: 2020 Google Earth, 2020 CNES/Airbus. Source Date August 4, 2019

CLIENT

PROJECT
 SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE
 Site Plan
 S031-2 - Mystery Culvert
 Hwy 762.02

SCALE 1:2,500 PROJECT No. A05116A03 FIG No. 1

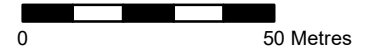


Photo 1 S031 Site II – Minimal change visible to pavement patch placed in June 2020. Photo was taken facing south on July 5, 2021.



Photo 2 S031 Site II – Pavement cracking north of slide repair. Photo was taken facing southwest on July 5, 2021.



Photo 3 **S031 Site II – Pavement cracking halfway into the southbound lane. Photo was taken on July 5, 2021.**

