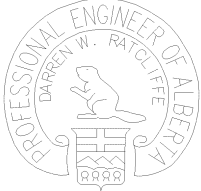


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|---|--|----------------------|---|---|
| SITE NUMBER AND NAME C41 H22:22 Erosion | | HIGHWAY & KM 17.8 | PREVIOUS INSPECTION DATE May 20, 2014 | INSPECTION DATE June 23, 2015 |
| LEGAL DESCRIPTION 7-38-6-W5 | NAD 83 COORDINATES N5791465 E646190 | | RISK ASSESMENT PF: 2 CF: 3 TOTAL: 6 | |

| | |
|--|--|
| SUMMARY OF SITE INSTRUMENTATION: None | INSPECTED BY:  |
| LAST READING DATE: | |

PRIMARY SITE ISSUE: The site is located on the north abutment of the Highway 22 crossing of the Clearwater River. Heavy rain in Southern Alberta in June 2005 and 2013 caused significant flood events and subsequent damage to infrastructure. Erosion has historically occurred on the east and west sides of the north abutment which is at the crest of a steep (estimated 0.5H:1V slope) slope on the outside bend of the river. Repairs were conducted to the erosion site to the west of the abutment, but erosion continues on the east abutment.

APPROXIMATE DIMENSIONS:

DATE OF ANY REMEDIAL ACTION: An HDPE pipe and gabion inlet and outlet structures were installed in the summer of 2007. The culvert east of the road was also repaired.

| ITEM | CONDITION EXISTS | | DESCRIPTION AND LOCATION | NOTICABLE CHANGE FROM LAST INSPECTION | |
|-------------------|------------------|----|---|---------------------------------------|----|
| | YES | NO | | YES | NO |
| Pavement Distress | | | | | |
| Slope Movement | | | | | |
| Erosion | X | X | No erosion is apparent since construction on west side. Slope is eroding below culvert on east side of bridge. | | X |
| Seepage | | | | | |
| Culvert Distress | | X | | | X |
| | | | | | |
| | | | | | |

Continued on next page

| ITEM | CONDITION EXISTS | | DESCRIPTION AND LOCATION | NOTICABLE CHANGE FROM LAST INSPECTION | |
|---|------------------|----|--------------------------|---------------------------------------|----|
| | YES | NO | | YES | NO |
| COMMENTS | | | | | |
| <p>The May 11, 2006 inspection encountered erosion damage on both sides of Highway 22 at the north abutment of the Clearwater River crossing. On the west side there was an eroded channel on the valley slope where surface water flowed to river level. On the east side, a buried 800 mm corrugated steel pipe (CSP) culvert, with concrete inlet structure experienced a separated joint behind the crest of the slope.</p> <p>Repair work was conducted in 2007 and included an HDPE pipe and gabion inlet and outlet structures on the west side of the road. The repair work on the east side of the road consisted of installing a second 800 mm CSP culvert at a relatively flat grade that connected to the inlet structure and replaced the original culvert outfall which was installed at a much steeper grade with a lower outlet elevation. Initially, it was proposed that the damaged culvert area be excavated, the pipe repaired and the ditch re-instated. However, it appears that the poor access and proximity of the work to a near vertical cliff precluded excavation of the original culvert. As a result, it was disconnected and left in place.</p> <p>West Abutment The gabion structures are in good condition. The ditch and slope to the river are well vegetated with no indications of erosion. Minor erosion of the riverbank is occurring below the gabion outlet structure. Riprap placement at this location is recommended.</p> <p>East Abutment Erosion has created a gully downslope of the upper 800 mm diameter culvert outfall and has removed shrubs and ground cover vegetation. The erosion is offset to the west from the culvert outfall which could indicate that the outflow from the upper culvert is landing on the lower decommissioned culvert and being deflected to the west. The horizontal distance from the river bank slope at the upper culvert location to edge of river is approximately 17 m. The estimated height of the upper culvert invert above river level was approximately 13 m.</p> <p>Erosion has created a gully on the slope face by eroding clay or silt till and colluvium. The top of bedrock is located approximately one third of the slope height below the crest of the slope and is exposed in the base of the erosion gully on the lower two thirds of the slope. The depth of the erosion gully is minimal on the lower half of the slope where bedrock is close to or at surface. The erosion present below the outfall is due to the height that water is dropped from the upper culvert. The extent of erosion varies on the slope due to the presence of unconsolidated colluvial deposits on the slope face and underlying till and colluvium which is more erodible than the underlying bedrock.</p> <p>The erosion at this site could be mitigated by conveying the water from the upper culvert outlet down to the point where bedrock is exposed on the slope face. Extending a slope drain to river level may run the risk of high water or ice action causing dislocation, damage or loss of the slope drain. The bedrock is a relatively non-erodible surface. If erosion continues (albeit at a slower rate), an extension could be added to the slope drain to release water closer to river water level; however, the high water level for the river should be considered in locating the elevation of the outlet.</p> | | | | | |



