

**BF 76515**

**Nov 22, 2004**

**Little Puskwaskau River Bridge Culvert**

SSW 04-075-26-5

**Structure Details**

(a) 4.3m soil cover; Total fill at approxi. 8m.

(b) 4.4m dia. Culvert @54.8m length constructed in 1966-67

© 3.6m dia. Liner @70m length constructed in 1966; outlet bevel extended 4.3m; inlet bevel extended 4.3m.

**Infrastructure Chronology**

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|--------------------------|--|
| 2004 September           | <b>Slide failure at d/s slope.</b> MCI Bruce Henderson's report.   |
| 1998 March               | Inspection indicated d/s outlet extension being swashed in on both sides.<br>Signs of d/s slope movement   |
| 1998 March<br>1998 April | Inspection Picture taken by Brian Pientsch<br>BIM inspection report<br>indicates:<br>Sign of stress shown for most culvert rings (total ring : 24 rings) : <ul style="list-style-type: none"><li>• cracking of a number of rings; bolts pushed in; bolts pulled through.</li></ul> Apparently, backfill around culvert is questionable and foundation condition is questionable. Apparently, leakage of water into surrounding soil should be happening. |
| 1996 July                | Picture shown <ol style="list-style-type: none"><li>(1) Slide repaired with apparently loosely placed fill with steep toe at culvert ends.</li><li>(2) Squashed new culvert towards the inlet</li><li>(3) Side wall with loose joints</li><li>(4) Drift wood hung up in coupler protruding into/between the rings.</li></ol> <b>Apparently the culvert liner construction and slide repair were undertaken in a questionable manner.</b>                 |
| 1996 June                | Picture shown. Inspection by Stew Hagan <ol style="list-style-type: none"><li>(1) Massive slope failure at culvert inlet</li><li>(2) Massive slope failure at culvert outlet</li><li>(3) Strong flow at above spring line (above half height) of liner</li></ol> <b>Can this be indicative of under-capacity of the culvert</b>  |
| 1995 Nov                 | AT Note to File and Culvert Authorization recorded installation of 3.6m dia. Liner (70m length) for the 4.3m culvert already installed   |

1995 Aug AT Note to File recorded 15 cracked rings in the 4.3m dia. Culvert with cracks varying from 50mm to 135mm. Rusting was noted along the invert from 4 to 8 o'clock positions as well as rusting of bolt holes at 2 and 10 o'clock positions.

- This can be indicative that highwater can be at 2 and 10 o'clock positions. Is possible that culvert is under capacity for extreme flow events? Or the soil type or groundwater acidic to render a very corrosive environment?

1989 August Inspection Photo by Bill Gorman

- 4.3m dia culvert
- invert moderately rusted at 4:00 to 8:00 o'clock position throughout
- Seepage evident as high as 2:00 & 10:00 o'clock positions.
- Comments on "either poor backfill material or poor compaction combined with improper laps have led to early distress"
- Incorrectly lapped seams. Cracking evident at 11:00 positions

This observations served to indicate seepage and poor construction in both fill and culvert assembly.

1967 March AT memo by A.W. Weber, AT Soil Engineer

- advises on sub-excavate subgrade for culvert bedding by 5 ft and replace with pit run gravel.
- Apparently there is a zone of stiff clay at 8 ft elevation

- Apparently, there was foundation issue of soft subgrade at original construction times.
- It should be investigated whether piping and/or soft foundation conditions may contribution to slope failures. In the times of extreme flow, leakage and under-scour of bedding material causing fill instability should be investigated.
- For this culvert, it is questionable whether good backfill was constructed correctly  
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1996 Aug Authorization to construct 4.3m dia. Culvert.

END of Chrono

By Karl Li