



Project: 20021

June 26, 2020

Regional District of Central Okanagan  
1450 KLO Road  
Kelowna, BC V1W 3Z4

Attention: Wayne Darlington, Manager Parks Planning & Capital Projects

**Re: Mission Creek Greenway Cedars Bridge – 2020 Flood Damages**

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The following flood damage assessment has been prepared in support of EAF 8001 regarding the recent flood damages in the vicinity of the Cedars Bridge on the Mission Creek Greenway and the threats to the bridge and public safety.

### **1. Background**

The Cedars Creek bridge is part of the Mission Creek Greenway Regional Park (Phase 2) and is located approximately 1.2km upstream of the East Kelowna Road Bridge (Figure 1). During the 2020 spring freshet in Mission Creek, likely during the peak flows on May 31-June 1 of ~107cms, the right bank upstream of the bridge was eroded over ~80m extending downstream to the bridge abutment (Photos 1&2).

### **2. Risk Assessment**

The bridge is situated in a moderate bend in the creek channel (Figure 2). The erosion has occurred on the outside of the bend. The right bank shows recent abrasion starting ~90m upstream of the bridge with obvious bank erosion at ~80m upstream with the bank eroded back ~1m on average over the first 50m and increasing to ~3m back over the last 30m (Photos 3&4). Currently the erosion stops ~3m upstream of the riprap protecting the right bank bridge abutment (Photo 5).

Bank heights range from ~1.5m over the upstream 50m and ~3m over the downstream 30m (Photo 6). Bank materials are primarily unconsolidated fluvial sands and gravels. The bank erosion also caused mature Ponderosa pines along the stream bank to fall into the stream.

The recent erosion has put the Cedars Bridge at risk. The downstream end of the eroding bank has eroded the bank back by ~3m with the end of the erosion within 3m of the armour at the right bank abutment. Unless the bank is restored and armoured the erosion will continue during future high flows and there is a high risk that the erosion will extend behind the existing riprap compromising the bridge abutment.

### **3. Restoration Options**

The preferred restoration plan is to restore the pre-flood bank alignment over the ~30m section immediately upstream of the bridge and armour the restored bank with riprap. The riprap should extend upstream for an additional 50m to protect the section of bank that was also eroded this spring to ensure that the section of most susceptible natural bank line is protected for further erosion. The Greenway walking trail is located on the floodplain along this section and is vulnerable if there was future erosion.

A less desirable option would be to extend the cut-off wall of riprap on the upstream side of the bridge abutment back into the floodplain to protect the abutment. Since the current erosion would likely

continue during future high flows, this option, although less expensive, would not protect the walking trail where it approaches the bridge. The future erosion would likely create a hook in the bank line, due to its location on the bend in the channel, that would cause damage to the trail and further trail repairs.

#### 4. Access

Access to the site with suitable equipment and delivery of riprap may be challenging as there is a large, active slope failure immediately east of the site.

#### 5. Conclusion

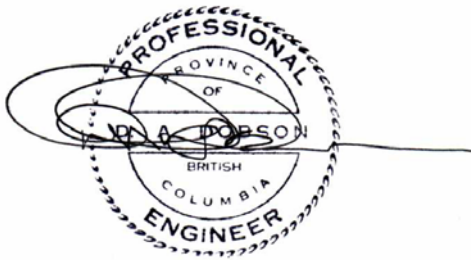
The bank erosion that occurred during the 2020 spring freshet in Mission Creek caused bank erosion that is threatening the Cedars Bridge on the Greenway walking path. If this erosion is not stopped and the damaged bank restored, there is a high risk that the right abutment will be destroyed during future high flows and the bridge will fail. There are high risks to infrastructure and public safety should the bridge fail.

#### 6. Recommendations

It is recommended that the preferred restoration option be implemented with the design work completed as soon as possible so that the repairs could be completed during the instream timing window this year that is August 7-23.

If you have questions regarding the results of this assessment, please contact me.

Sincerely,



D.A. Dobson, PEng.



Figure 1 – Location of Cedars Bridge on Mission Creek Regional Park Greenway





Figure 2 – Mission Creek at Cedars Creek Bridge 2020 erosion





**Photo 1 – Extent of 2020 erosion on right bank at Cedars Bridge**



**Photo 2 – View looking upstream from bridge at right abutment**





Photo 3 – Section of eroded bank near abutment showing 3m loss of back



Photo 4 – Section of bank eroded back ~1m





Photo 5 – Erosion ends ~3m upstream from riprap at right abutment



Photo 6 – Eroded bank heights from June 26<sup>th</sup> water level