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Cold Spring Creek 2019 Annual Dike Inspection Report

Background

2013

Cold Spring Creek experienced a small debris flow event on June 20, 2013 that deposited material in the creek channel, the small mid-section debris trap and the lower debris trap. Debris material was also deposited behind the Cold Spring Creek Dam which is located upstream of the works. The Cold Spring Creek Dam is not part of the debris containment works and is not owned by the RDEK but debris is contained in the reservoir.

Material removals in 2013 were completed at the Cold Spring Creek Dam reservoir, small mid-section debris trap along the bank protection works, at the last culvert along the bank protected section and in the upstream half of the lower debris trap. All these locations were cleared of transported gravel from the debris flow and the front half of the lower debris trap was also cleared of material that had been deposited over several years. The funding for removal of the transported debris flow material was primarily from Emergency Management BC (EMBC) emergency response funds. The RDEK provided some funds for additional material removal on the lower debris trap.

2015

The July 15, 2012 Fairmont Creek debris flow and June 20, 2013 debris flow events on Fairmont Creek and Cold Spring Creek prompted the need to have a hazard and risk assessment completed for Cold Spring Creek. This assessment was completed by Clarke Geoscience in January 2015 and included some recommendations for debris flow mitigation along the channel.

2016

The downstream half of the lower debris trap and the culvert just upstream of the debris trap was cleared of sediment in August 2016 by the RDEK.

Some vegetation was removed around the debris pond in 2016 prior to the pond clean out to reduce the spread of noxious weeds.

2017

The Cold Spring Creek Dam reservoir was cleaned out again in May 2017 after a small debris flow event that completely filled the reservoir with debris flow material.

2018

There were no events on Cold Spring Creek in 2018 and no maintenance was completed on the creek.

2019

On August 10-12, 2019, a significant weather event (isolated heavy rain) occurred in the Fairmont area. As a result, a debris flood occurred on Cold Spring Creek. The Cold Spring Creek Dam reservoir was filled to capacity, the culverts at the crossings of Fairway Drive and Hot Spring Road were blocked by debris and the creek flowed over the roads and partially through private property before returning to the channel.

The lower debris trap was also filled with debris (gravels and fine grained material). The armouring along the creek channel was not damaged during the event.

May 8, 2019 Cold Spring Creek Dike Inspection

The dike/bank protection works were inspected on May 8, 2018 by Kara Zandbergen, RDEK Engineering Technician. All sections of the works were found to be in good condition with no appreciable changes from 2018.

Upstream Conditions

The channel conditions as far upstream as the Cold Spring Creek Dam are monitored and inspected at the same time as the dike/bank protection works.

The Cold Spring Creek Dam Reservoir is in good condition. The dam is owned and operated by the Fairmont Hot Springs Resort. A small amount of material was removed from the reservoir in late 2015/early 2016 by the contractor that was working just upstream of the dam. The dam was cleaned out again in May 2017 after a small debris flow event that completely filled the reservoir with debris flow material.

Photo 1: Cold Spring Creek Dam Reservoir, May 1, 2019.

All of the culverts between the dam and Highway 93/95 were functioning properly. Additional culvert capacity had been installed by MoTI through the installation of high water culverts at two road crossings.

The water level at the time of the inspection was low and contained in the creek channel however the channel is infilled with debris material and does not have much capacity. Creek avulsion is possible in a moderately high water situation.

The channel from Highway 93/95 to the debris trap (dike/bank protected area) is in good condition. The complete bank protection works were brushed in 2012 which allows for ease of inspection of the rip rap lined banks and maintains the integrity of the works.

Culvert Conditions

The last culvert along Cold Spring Creek before the lower debris trap is experiencing some very minor underflow piping. The situation is being monitored. The same culvert was approximately 30% filled with gravels and was cleaned out in August 2016.

Both upstream culverts along the bank protected works are in good condition and functioning properly.

Debris Trap Conditions

The upstream half of the debris trap was cleaned out in 2013. Some sediment and gravels had been deposited at the inlet to the pond since that time. The downstream half of the debris trap still had

several years of sediment build up. The inlet to the pond and the lower half of the pond were both cleaned out in August 2016.

There is some minor material deposition in the mid-channel debris trap that should continue to be monitored.

Photo 2: The inlet to the lower debris pond, May 8, 2019.

Photo 3: The lower half of the debris pond, May 8, 2019.

August 21, 2019 Cold Spring Creek Dike Inspection

Another inspection was completed on August 21, 2019 after the August 12, 2019 debris flood and was also conducted by Kara Zandbergen, RDEK Engineering Technician. All photos were taken on August 21, 2019 unless otherwise noted.

Photo 4: Cold Spring Creek Dam reservoir immediately after the August 12, 2019 event.

Photo 5: Cold Spring Creek Dam reservoir on August 21, 2019.

Photo 6: Culvert at the crossing of Fairway Dr looking upstream. The culvert was plugged and debris was removed as an emergency measure to restore flow.

Photo 7: Culvert at the crossing of Hot Springs Road looking upstream. The culverts were plugged and debris was removed as an emergency measure to restore flow.

Photo 8: Cold Spring Creek lower debris trap.

Photo 9: Culvert just upstream of the lower debris trap. The culvert is in good condition with very minor piping that is being monitored.

Photo 10: Facing downstream from the culvert in Photo 9 towards the lower debris trap. Very minor gravel deposition in the channel.

Photo 11: Facing upstream from the culvert in Photo 9. Vegetation management is required and will be completed in 2020.

Photo 12: Small debris trap has some woody debris and minor debris flood deposition.

2019 Maintenance

A significant amount of maintenance was completed in 2019, all in response to the August debris flood. The Cold Spring Creek Dam reservoir was cleaned out by Cody McKersie Contracting in September 2019 under the supervision of the Fairmont Hot Spring Resort and the remaining work was completed in November and December, 2019 by Ralph Stewart Contracting under the supervision of the RDEK. The RDEK supervised instream works were authorized under Section 11.

The Cold Spring Creek debris flood infrastructure has been filled to capacity a number of times over the past several years. After the 2019 event, the RDEK asked Northwest Hydraulic Consultants to assess the creek and provide a conceptual design and cost estimate for additional debris flood mitigation on the creek. This report was used to apply for funding under the UBCM CEPF 2019 Structural Flood Mitigation funding stream. The report is included with this report.

Photo 13: Cold Spring Creek Dam reservoir. Photo taken September 18, 2019.

Photo 14: Cold Spring Creek lower debris trap. Photo taken December 19, 2019.

Maintenance Planned for 2020

At this time, the RDEK is planning to complete vegetation removal along the lower sections of the creek in 2020.

If we are successful in our funding application to the Structural Mitigation Program, we will begin the engineering for the proposed works with the construction to follow in 2021.