Annex Dike Improvements

City of Fernie Diking System

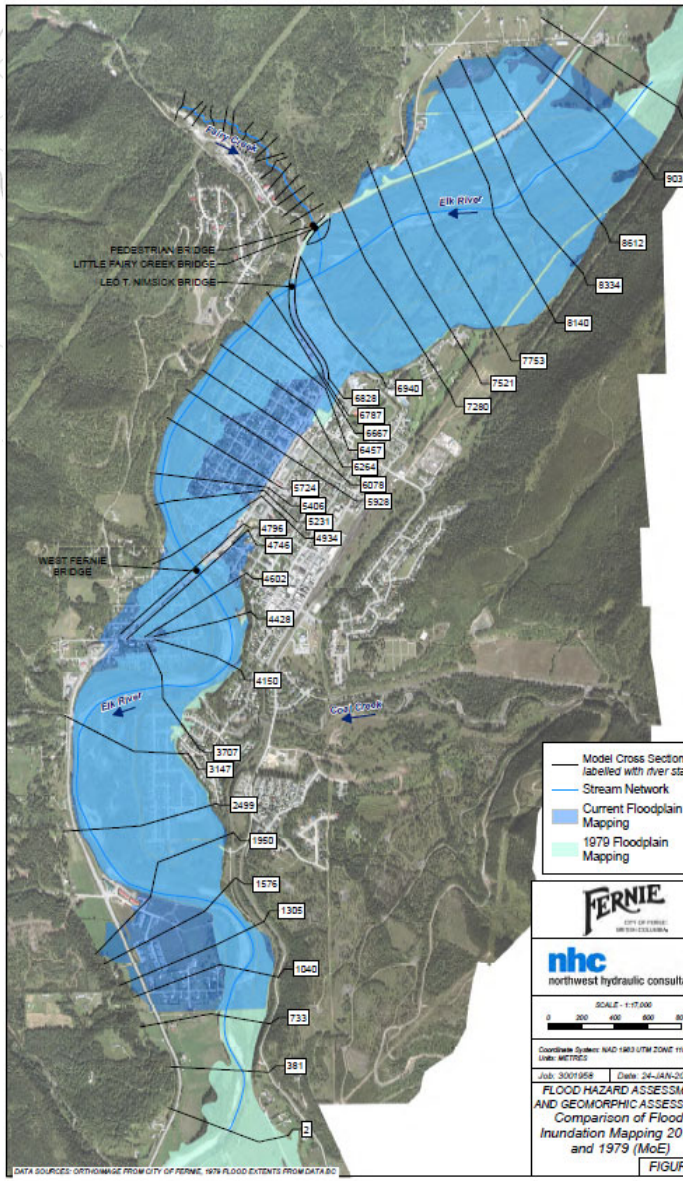
Kevin Mohr, P.Eng.

McElhanney

CANADA BEST MANAGED COMPANIES

Fernie's Flood and Diking History

- The 2013 flood is the largest event on record (approx. 1 in 500 yr. event).
- Floodplain mapping for the City was originally prepared in 1979, which was the bases of the historic diking system.
- The current dike projects are designed to protect against the 2013 flood event, plus climate change



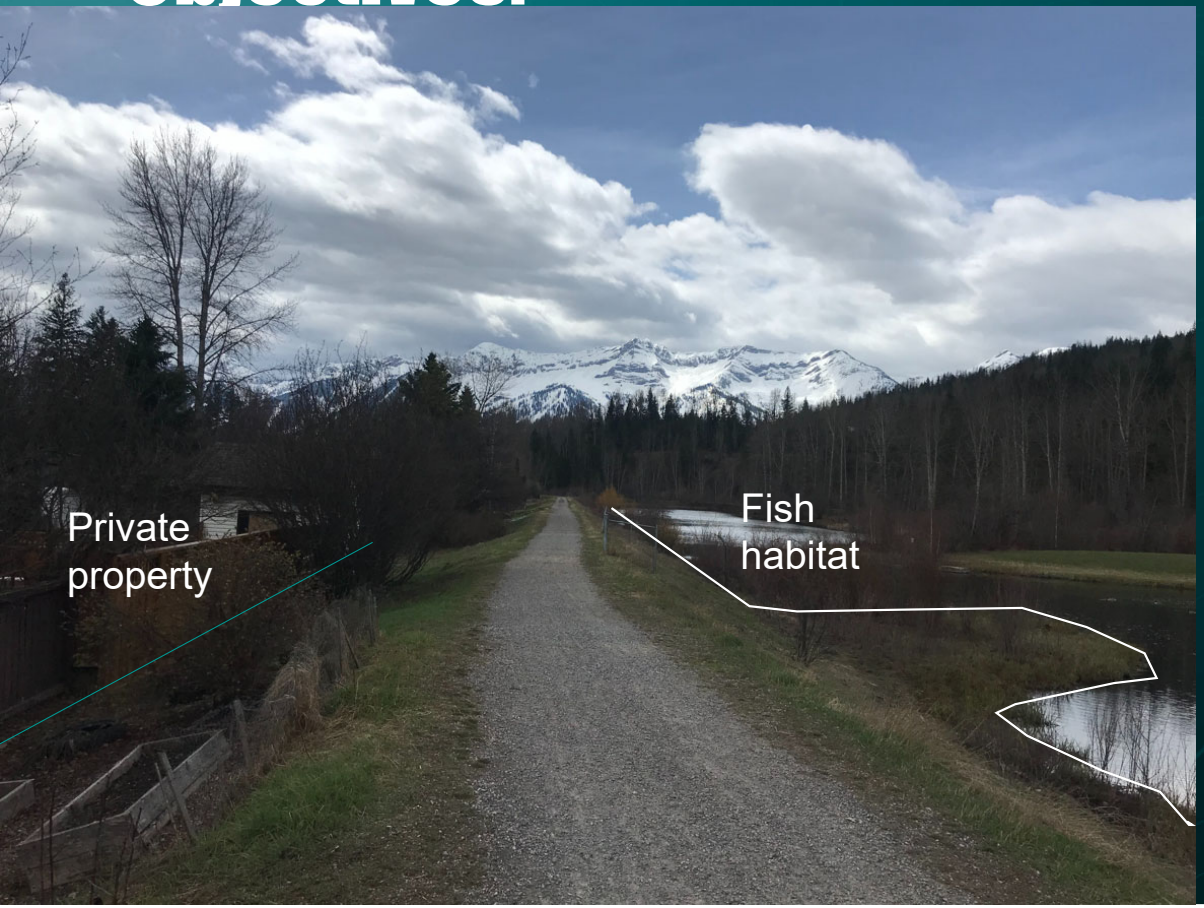
Fernie's Flood Mitigation Projects

City of Fernie Flood Mitigation Plan (NHC, 2019)

- This report assessed the existing flood mitigation systems in Fernie and recommended and prioritized upgrades to meet the new Flood Construction Level derived from the 2013 flood.
- Recommended upgrades to the Northlands (Maiden Lake) dike and the Mountview (Airport) dike have already been completed (McElhanney 2019-Ongoing).
- Annex Dike upgrades were recommended as the City's #2 priority in this report.

Location	Structural Mitigation Measure	Priority Rank	Cost
~~Northlands Dike~~ Complete!	~~Raising, extension, erosion protection~~	~~1~~	~~$ 1,580,000~~
Annex Dike Underway	Raising, erosion protection	2	$ 4,634,000
~~Mountview Dike~~ Complete!	~~Raising, extension, erosion protection~~	~~3~~	~~$ 1,881,000~~
3rd Street	New dike, grading and paving road	4	$ 749,000
~~Shadow Creek at Hwy 3~~ Complete!	~~Install flapgate~~	~~5~~	~~$ 68,000~~
West Fernie Dike	Dike raising, extension (Option A)	6	$ 4,341,000
Riverside Dike	Erosion protection	7	$ 783,000
Coal Creek Bin Wall	Erosion protection	8	$ 69,000
Pine & Park Ave bridges	Erosion protection	-	$74,000
Stormwater outfalls	Install flapgates	-	$ 32,000
Location	**Non-Structural Mitigation Measure**	**Priority Rank**	**Cost**
Citywide	Flood response plan	-	$15,000
Northlands Dike	Dike breach mapping	-	$50,000
Coal Creek watershed	Install Coal Creek gage	-	$50,000
Citywide	Public awareness campaign	-	$40,000
Locations per section 3.2.5	Vegetation removal	-	$20,000

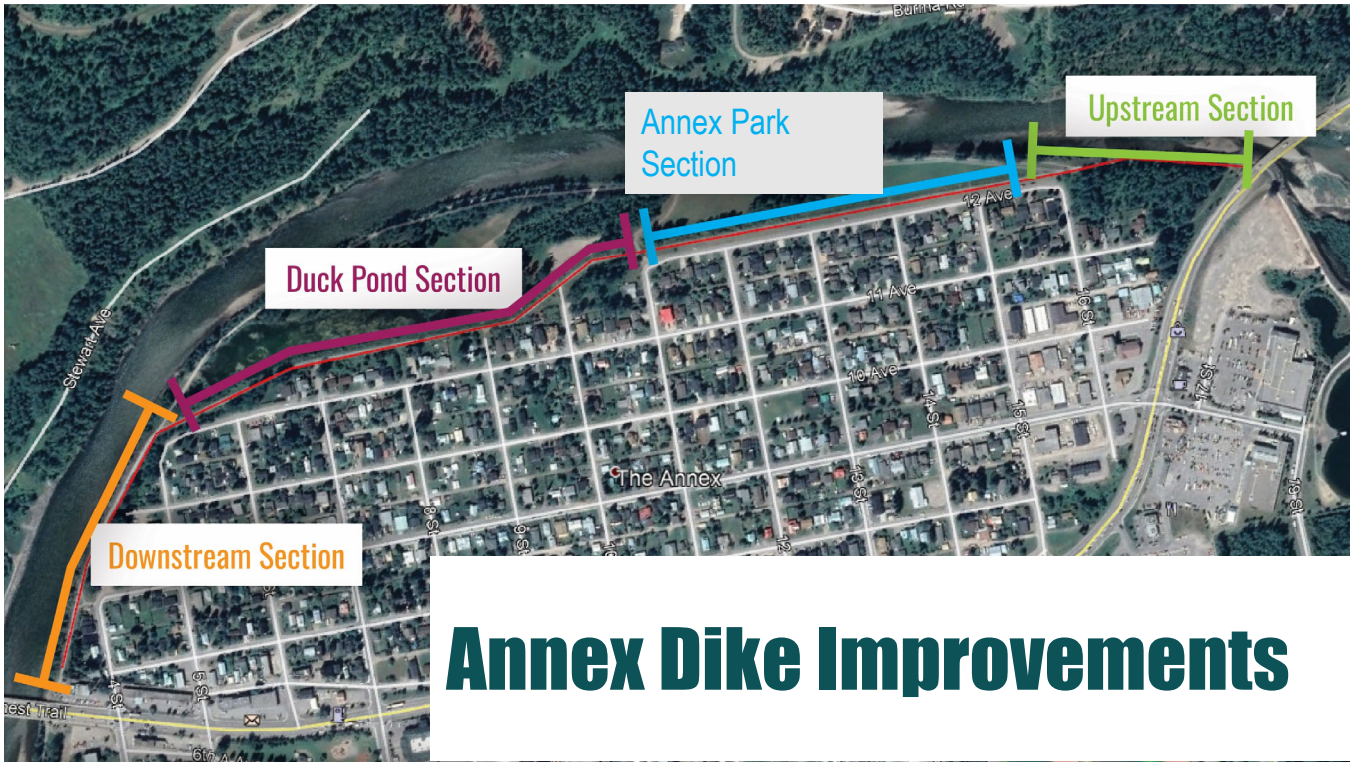
Annex Dike Improvements Design Objectives:



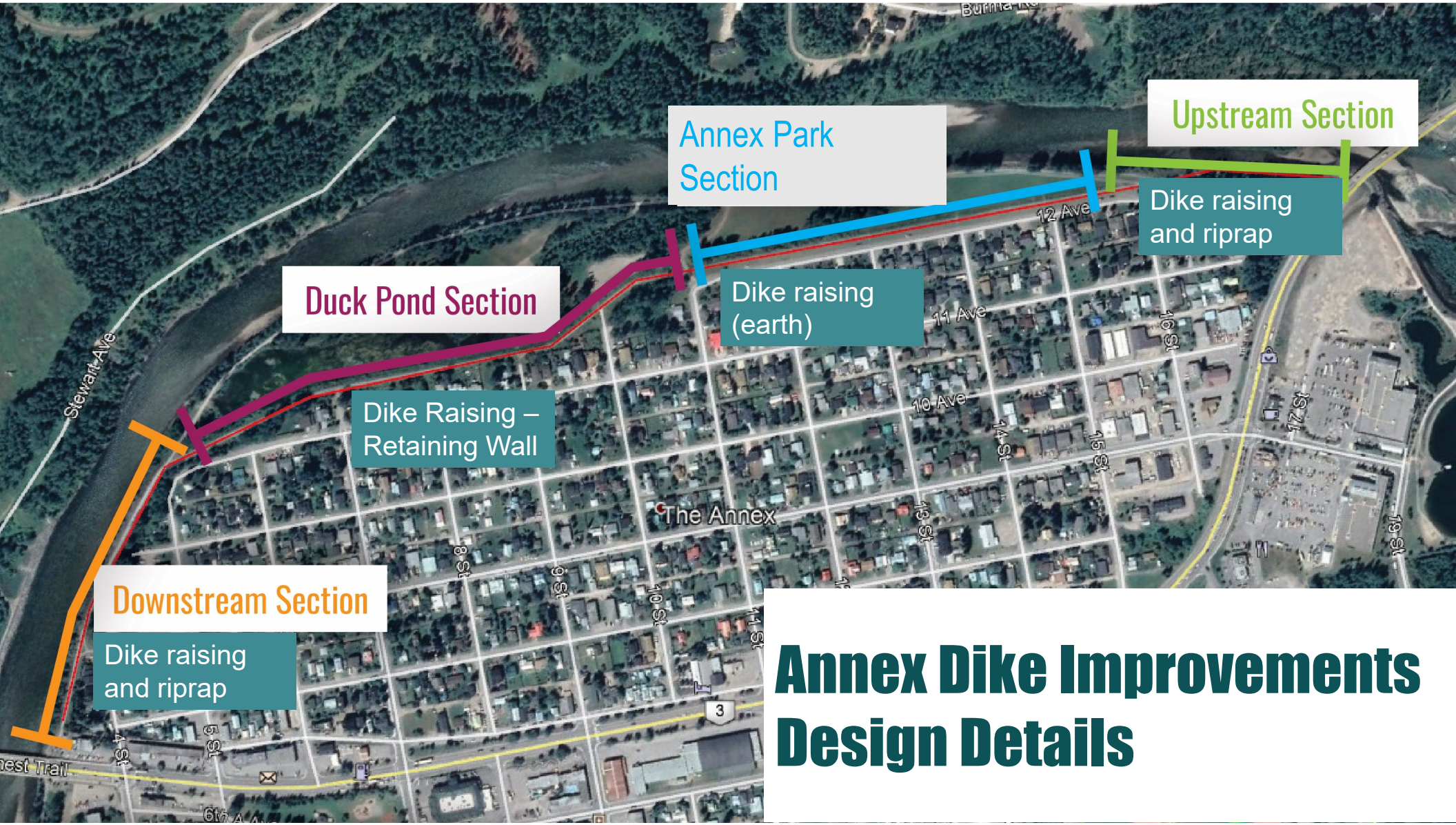
- Completely avoid private property
  - Avoiding property purchases or right-of-way negotiations
- Avoid (if possible) any in-stream construction
  - Federal fisheries regulations for in-stream work require a longer regulatory review and costly habitat reconstruction
- Pursue additional grants for park enhancements
  - Discussed later in this presentation

Impacts During Construction

- Key Points
  - The pathway will need to be closed during active construction
  - Work can be staged
  - The attack dike provides a great detour while working in the Duck Pond and Annex Park sections
  - Other detours will be required while working in Downstream and Upstream sections
  - Constraints can be placed on the contractor that require them to stage the work and provide detours as desired
  - Special events such as Wapiti can be accommodated
  - Caution, placing too many constraints on a contractor adds cost



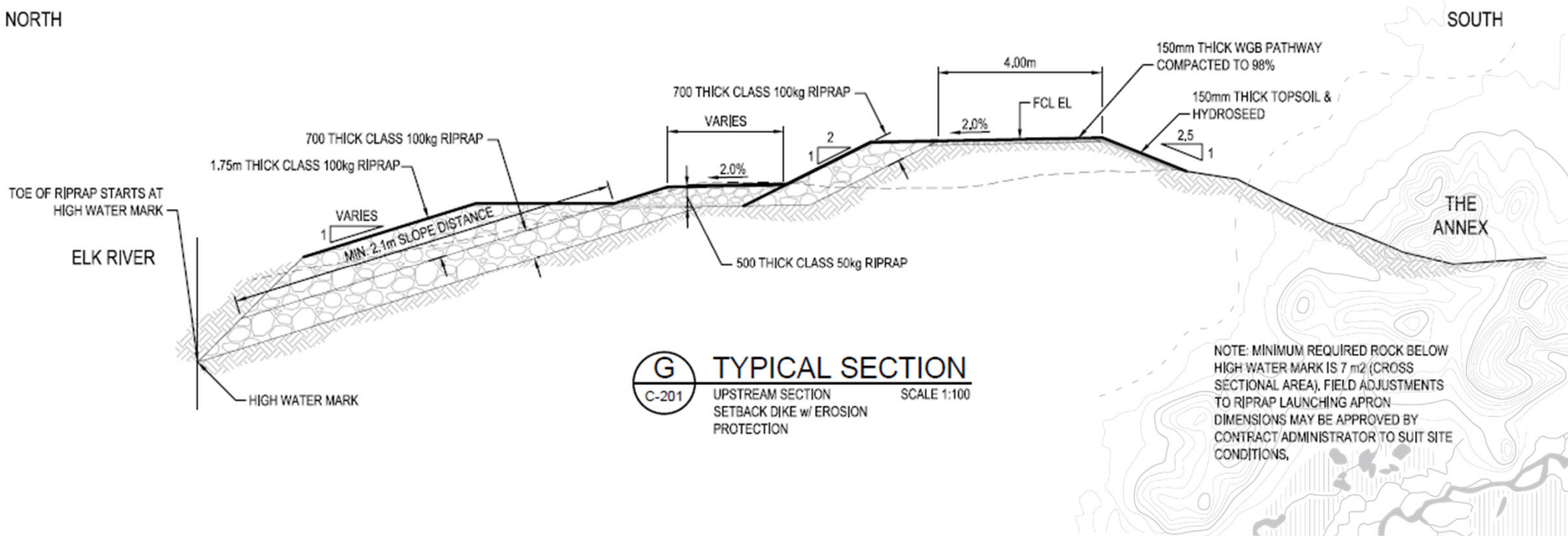
Annex Dike Improvements

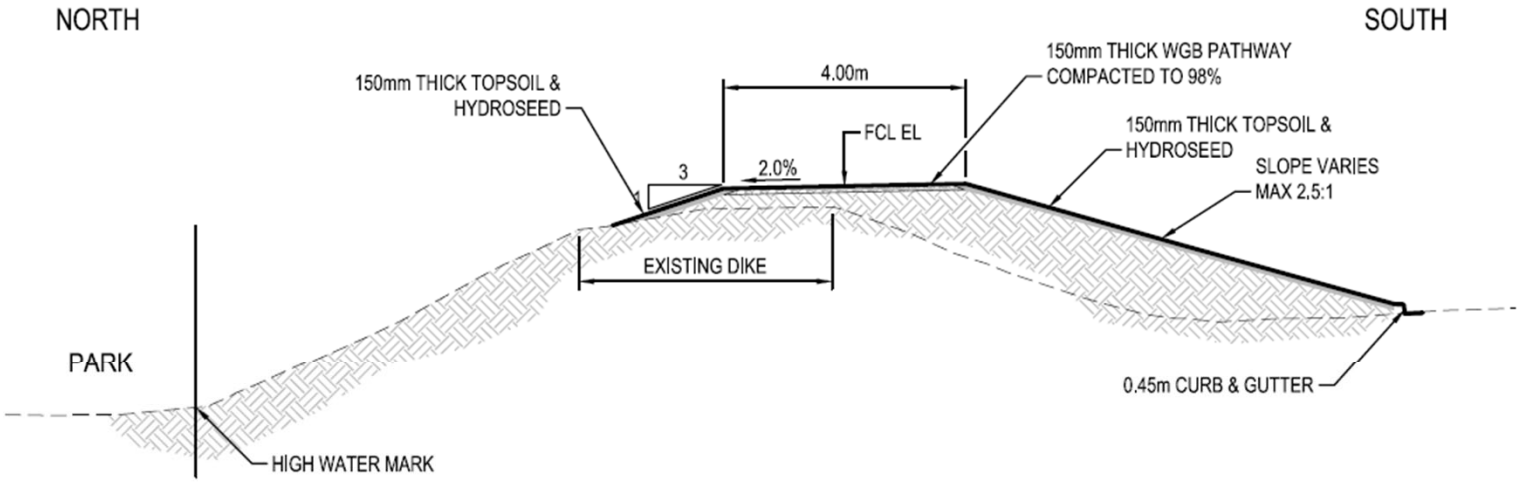


Annex Dike Improvements Design Details

Annex Dike

Upstream Section





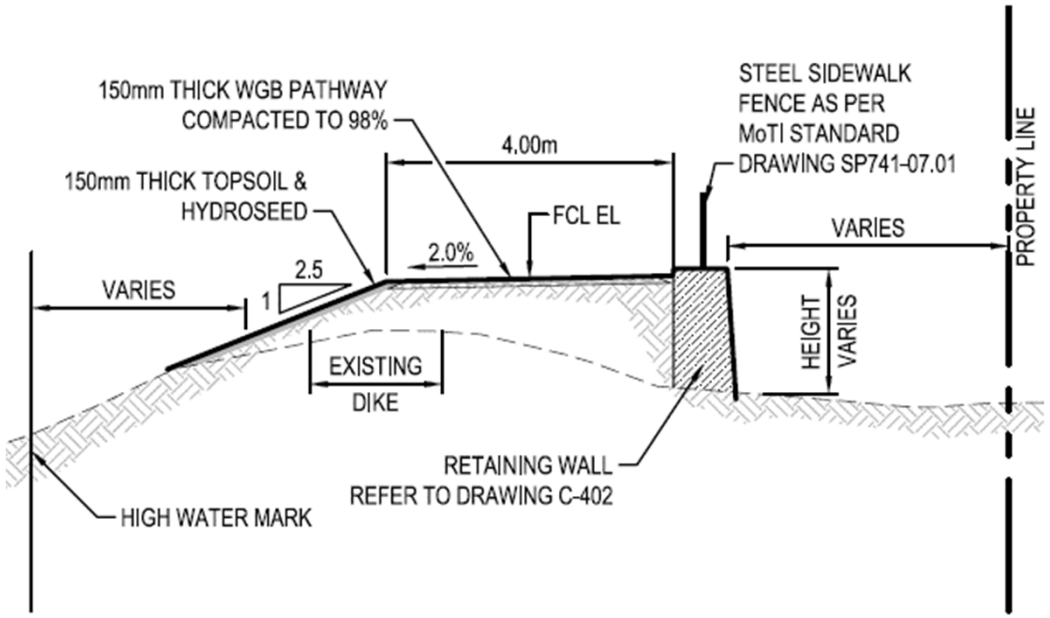
E C-201 TYPICAL SECTION
DOG PARK DIKE RAISE w/ RETAINING WALL
SCALE 1:100

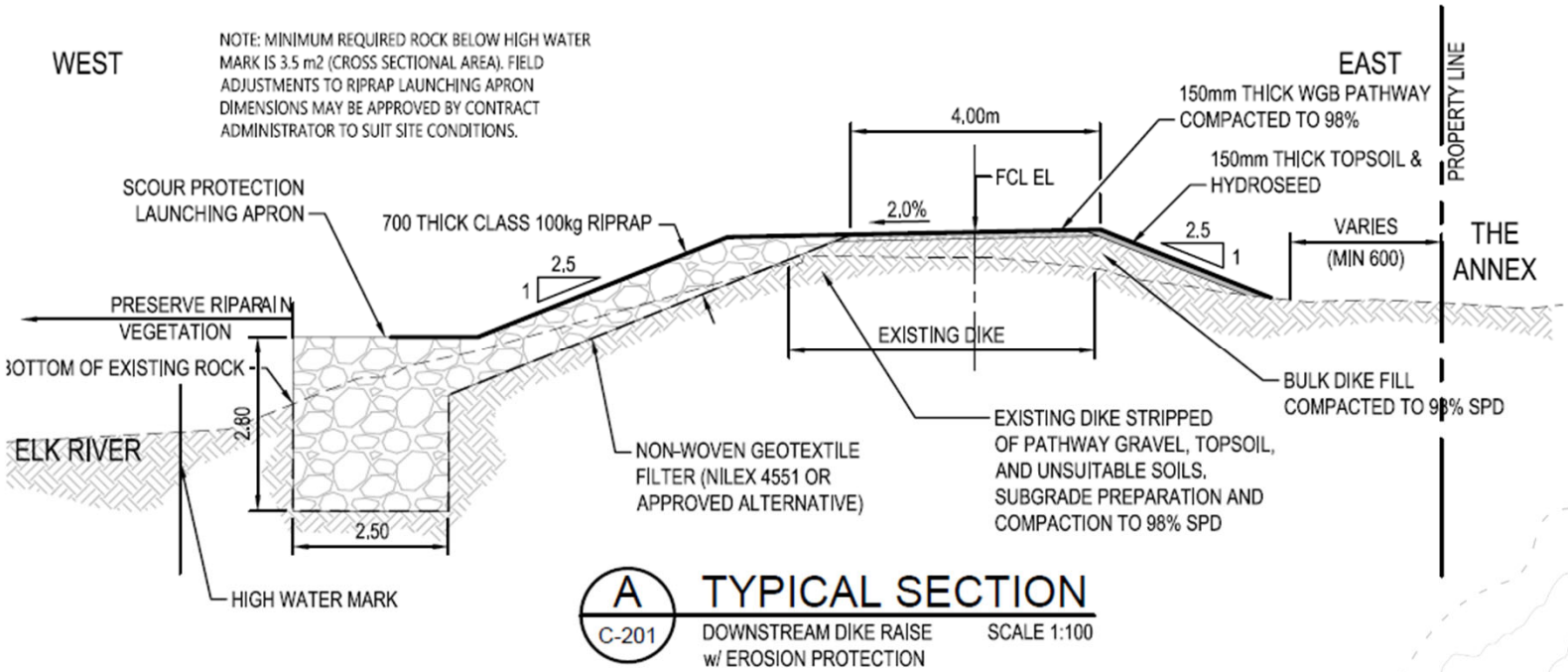
Annex Dike

Annex Park Section

Annex Dike

Duck Pond Section





Annex Dike

Downstream Section

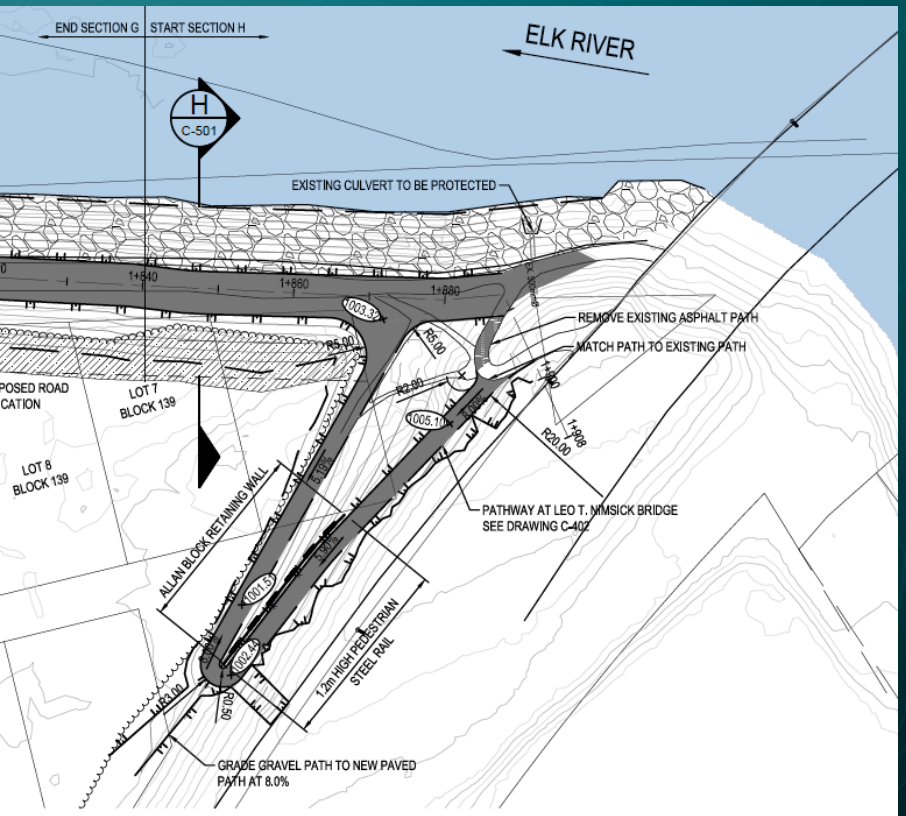


Annex Park Improvements

- The City of Fernie applied for a grant for active transportation improvements in Annex Park.
- There are also improvements to the Park that are funded by the City.
- Note: The dike improvements (ARDM) grant only provides budget for flood protection improvements – pathway or amenity improvements are not eligible under this grant.

Annex Park Improvements

Active Transportation Grant Application Components



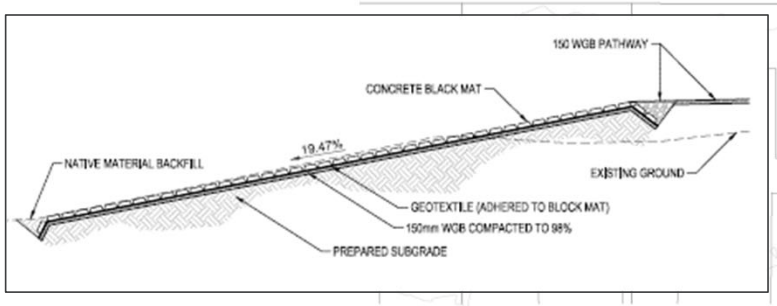
- Pathway access improvements (on/off the dike trail)
- Paving of the Annex Dike, the attack dike, and accesses
- An automatic counter of pathway users
- Outdoor wellness stations
- Connection to the FVP (Bridge Bistro)



Annex Park Improvements

City-funded components

- Hand boat launch
- Duck pond outfall replacement



Hand Boat Launch

(City-funded)

- Concrete mat ramp suitable for hand-launching small boats
- Asphalt parking area north of 16 Street on City-owned lots.



Duck Pond Outfall Replacement

(City-funded)

- Replace aging outfall structure with an improved version that is:
  - Better able to control pond water levels
  - Able to block backflow from the river during a flood
  - Less easily blocked by beavers

Questions

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McElhanney

CANADA BEST MANAGED COMPANIES