

June 13, 2019

Our File: 2211-46871-12

Mr. Sundance Topham, CAO
Village of Cumberland
2673 Dunsmuir Avenue
Box 340, Cumberland, BC V0R 1S0

Dear Mr. Topham,

**COAL VALLEY ESTATES PHASE 9 - DEVELOPMENT PERMIT APPLICATION
ECOFISH PEER REVIEW OF STORMWATER MANAGEMENT PLAN**

Per your issuance of Ecofish's "Peer Review of the Stormwater Management Plan of Subdivision for Residential Development of Phase 9 of Coal Valley Estates, Remainder DL 24, Nelson District as it pertains to DPA#1 – Draft V1" dated June 10, 2019, we provide the following requested clarifications to McElhanney's Stormwater Management Plan (SWMP) dated May 22, 2019. We have kept consistent numbering with Ecofish's peer review letter for ease of reading.

2. We disagree with the statement "... as most parameters and assumptions were not provided,...". Section 4.0 of the SWMP outlines the design storms used in the simulation and Table 4 provides the model input parameters.

3.1) No clarification required.

3.2) We disagree with the statement "However, the plan still indicates that flows >10-year storm event will flow along municipal roads with an unknown routing path." The SWMP states "Flows in excess of the 10-year peak will be conveyed via existing and proposed overland flood routing (municipal roads and paths) and will follow similar routes as the piped storm conveyance network." To further clarify this point, Phase 9 overland flood routing will follow Kendal Avenue and discharge to the adjacent property, to the north, at the existing Village outfall location just west of Egremont Road. The exception is Lindale Avenue which will discharge to the northern property at a low point along Lindale Avenue approximately 100 m west of Kendal Avenue.

3.3) To our knowledge, Village Bylaws do not require the inclusion of climate change in stormwater modeling. However, as it is good practice, and was previously requested, climate change was included in the revised SWMP. The science of climate change is not complete; long-term monitoring of evolving weather patterns required to verify model accuracy is limited. The Pacific Climate Impacts Consortium (PCIC) provides a range of climate change models which provide very different predictions. The Median (PCIC) increase in precipitation for the winter months (typically the rainiest months in BC), out to year 2050 is an average increase in rainfall of 8% (models range from -2 to +15%). A 10% increase in rainfall was used in our SWMP to represent an above average increase in precipitation.

3.4) The reduction to only a 25% increase in post-development runoff is due to the following two factors:

- An increase in the initial abstractions in the post-development model provided by amended topsoil. (Note that 20mm of abstractions is a conservative estimate for 300mm of topsoil).



- An increase over previous modeling in percent impervious and curve number for the pre-development model (these numbers were increased based on our current knowledge of the site, i.e. little to no overburden overlying bedrock).

For the pre-development model, an SCS curve number of 77 was used based on a soil type C ("Soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water,..." i.e. bedrock) and a forest land with thin stand, poor cover and no mulch. For the post-development model, an SCS curve number of 85 was used based on a soil type B (based on 300 mm of amended topsoil) and residential lots 1/8 acre or less (505 metres square). Note that the SCS curve numbers account for % impervious (area of hard surface compared to area of vegetation), therefore no justification of the amount of vegetation retention is required other than the post-development assumption of 60% impervious. Additionally, the initial abstractions, which model the amended topsoil and vegetation area, are only applied to the pervious area, i.e. the vegetated area (this is a default parameter of the model and cannot be changed). Therefore, by definition of the model parameters, the post-development site is assumed to be 60% hard surface and 40% vegetation.

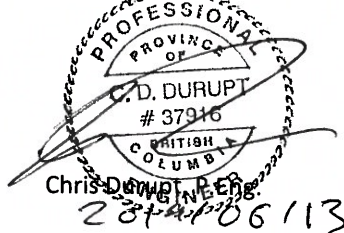
3.5) The effect of runoff between the discharge locations and the downstream wetlands has not been assessed at this time. The average slope between the north-westerly discharge location and Bevan Road is 4%. At a 4% slope, an increase of 25% runoff in a 10-year storm event is not expected to significantly increase scour and/or erosion.

3.6) Expected water pollutants, after subdivision build out, will predominantly be from the driveways and Village roadways which will enter the system downstream of any implemented lot-based controls. Catch basin sumps for control of post-development water quality is consistent with the Village's subdivision servicing bylaw. The location and number of catch basins will be based on low points, grades and collection areas per the Village's subdivision servicing bylaw. Regular cleaning of Village roadways and catch basins will be key to maintaining good water quality post full build out.

We trust the information provided is as required. Please do not hesitate to contact us should you wish to discuss further.

Yours truly,

MCELHANNEY LTD.



CD/njg

Reviewed by:

Bob Hudson, P.Eng.

Cc: CVE
Village of Cumberland, Ken Rogers, Joanne Rees, Rob Crisfield