Freeland and Associates, Inc.

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February 3, 2020

City of Sumas
C/O Sehome Planning
103 E Holly Street Suite 206
Bellingham, WA 98225

Attention: Mr. Rollin Harper

Subject: **3867 Kneuman Rd Sumas Concrete Products - Culvert Analysis**
Third-Party Review for City of Sumas

Dear Mr. Harper:

Per your request, we have reviewed the Sumas Concrete Products Existing Culvert Evaluation Report prepared by Reichhardt & Ebe Engineering, Inc (R&E) and dated January 14, 2020. We reviewed this document to evaluate modeling procedure and assess general report conclusions.

From our review, we offer the comments below. We believe that our comments on this analysis will provide an additional factor of safety; however, it is not expected that the overarching conclusion in R&E's evaluation will change. It was apparent from the R&E evaluation that the existing 10-inch culvert needs to be removed.

1. Table III-2.3.2 - Runoff Curve Numbers for Selected Agricultural, Suburban, and Urban Areas within the 2014 Department of Ecology Stormwater Management Manual for Western Washington identifies curve number for a 24-hour duration storm and typical antecedent soil moisture condition (AMC II) preceding 24-hour storms. Antecedent soil moisture condition III (AMC III) represents a scenario that has heavy or light rainfall and low temperatures having occurred during the previous five days, such as the site photos presented. Modeling with an AMC III may be more appropriate.

2. Does the BNSF Railroad line intercept flows from areas south of Halverstick Road and convey them northeast to the project site?

3. It would be helpful to locate the photos on a map so they can be referenced.

4. Please show time of concentrations for each basin on a map.

5. Time of concentration calculations for Basin 2 and Basin 3 use 300 feet of sheet flow. Per USDA/NRCS Urban Hydrology for Small Watersheds TR55, the maximum sheet flow allowable is 300 feet.

   https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf (TR55 Link)

   However, more recent studies presented in USDA/NRCS Part 630 Hydrology National Engineering Handbook identify that sheet flow falls far below the maximum 300 feet. See Table 15-2 for recommended lengths. The link is below for convenience.

   https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=27002.wba (Part 630 Link)

Please feel free to contact me if you have any questions about these comments. To expedite and minimize additional reviews, it is requested that the applicant provide a response letter with responses to each comment above and references to where the comments are addressed with the drainage analysis.

Sincerely,
Freeland and Associates, Inc.

Jean-Paul (J.P.) Slagle, PE
Principle Engineer