

Memorandum

To: Chelsea Benner, Kittitas County CDS

From: Paul Tappel, Fisheries Engineers, Inc.

Cc: Mitch & Julie Williams

Date: February 15, 2019

Re: Addendum to Grading Permit No. GP-18-00018 (Williams)

This memo, and two drawings (Drawings 10 and 11) provide additional information for the subject grading permit. Below, I address each of your requests, with technical narrative and description for the listed topics (in order from your 2/6/2019 memo to Williams):

a. Type of Fill

All materials used to construct the proposed driveway and bridge approaches (except rock subgrade and final driving surface) will be native soils obtained from an upland borrow site on Williams' property. These soils will be a granular mix of gravel, sand, silt and clay with maximum gravel 6"-size and less than 10% clay, so compaction will not be sensitive to water content (within limits). Soils will be placed in 1'-thick (maximum) lifts and compacted to at least 90% of maximum density with vibratory compaction equipment. Soil materials will meet requirements of WSDOT Standard Specification 9-03.14(2) (Select Borrow), and compaction will generally comply with WSDOT 2-03.3(14)C, Method B (Compacting Earth Embankments).

A 4"-thick rock subgrade (broken rock, 4"-minus) will be placed over compacted native embankment materials for solid driveway support between compacted soil embankment and surface crushed rock. Over the rock subgrade, a 4"-thick layer crushed surfacing base course (WSDOT 9-03.9(3)) (1¼"-minus crushed rock) will be placed and compacted. Driveway surface will be 16'-wide, except over the 60'-span bridge with deck width 14' (see Drawings 10 and 11).

b. Grading Information

Your request for additional information for this topic also referenced a memo from Mark Cook (PE) dated 10/19/2018. The type, quantity, source, and composition of proposed materials for driveway construction are as follows:

- ✓ Embankment materials for driveway and bridge approaches will be native soils as previously described. I estimate that 140 cubic yards (CY) of native soils will

be needed for the approach on north side of bridge (Drawing 11); all fill north of the bridge will be above floodplain elevation (Drawings 10 and 11).

- ✓ Bridge approach construction on the south side of bridge will require 470 CY of native soil materials, with an estimated 130 CY (included in total 470 CY) to be placed on the existing floodplain and lower than the estimated 100-year flood.
- ✓ The proposed loss of 130 CY floodplain water storage volume will be off-set by excavating a 220'-long driveway section to be about 1' lower than existing floodplain elevation (Drawings 10 and 11). The counter-sunk driveway (Drawing 11) will balance with proposed bridge approach fill for net zero change in floodplain water storage capacity.
- ✓ It is recognized that the counter-sunk driveway section will be submerged during peak flow events of Manastash Creek. There is an existing alternate route for vehicle access to the Williams residence, e.g. for Emergency Vehicle Access during floods.
- ✓ The top 8"-thick of the proposed driveway will be fractured rock (4"-minus) with compacted crushed rock driving surface as described above. An estimated 130 tons of 4"-minus broken rock for subgrade will be required, with 190 tons of crushed rock supplied, spread, and compacted for the driveway surface (crushed rock also over bridge deck).

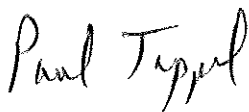
c. **Composition of Proposed Driveway**

The proposed composition and amounts of driveway construction materials are described above.

d. **Disturbed Area Measurement**

I assumed that clearing and soil disturbance would occur to 4' outside the plan view area shown on Drawing 10 for the driveway, bridge approaches, and bridge. Total disturbed area for the project would be 12,900 ft² (0.30 acre). Disturbance of existing areas within the floodplain will be 9,700 ft² (0.22 acre) included within the total disturbed area. As noted on Drawing 11, all disturbed soils and new road slopes would be seeded, then straw mulch spread, after completion of the driveway construction project.

Please give me a call (or e-mail) if you have any questions about the supplemental information and drawings included herein, for Grading Permit No. GP-18-00018. Thank you !



Paul Tappel, PE
Civil Engineer & Fisheries Biologist

