

**Job No.:** MSC-221  
**Date:** July 23, 2019  
**To:** Vera Kolas, AICP  
**City of Milwaukie**  
**From:** Ken Valentine, PE



**Project/Subject: Elk Rock Estates – Staff Report Response**

Vera,

Thank you for reviewing the application and materials and providing thoughtful comments. I would like to present the following responses to the Summary of issues identified on page 11 of the NR-2018-005 Staff Report.

1. *Analysis of cut and fill based on area of inundation for the 1996 flood was not addressed.*

*Per Title 18.04.030 States the “Design flood height” means the higher elevation for the following:*

- a. *The elevation of the one hundred (100)-year storm as defined in FEMA Flood Insurance Studies and as shown as Zone A on Flood Insurance Rate maps; or*
- b. *Water surface elevation 34.5, the elevation of the February 1996 flood event measured for the Willamette River.*

The Base Flood Elevation for the project area is identified as being 36.4 in the FEMA Insurance Study which is higher the 34.5 elevation of the 1996 flood, therefore the default design is the BFE from the Insurance Study. The developer would rather design to the 34.5 contour if that would be allowable.

2. *Consideration of bankfull stage when making cut and fill calculations was not included.*

The bankfull stage is generally defined as the height of water in a natural channel at its maximum height before flooding. In the case of the proposal that could be the ordinary high water mark. The top of bank elevation varies from 29’ to 32’ with an average of 30.5’. The cut/fill analysis for the proposed development has approximately 90 cyds of cut. The area below the bankfull area will not be included in the final earthwork balance analysis.

3. *Documentation to justify crawlspace design was not included.*

The foundations are intended to be designed in accordance with all code requirements.

4. *Drainage impacts on neighboring properties was not addressed.*

Per the grading plan no drainage from the site is being directed toward neighboring properties. All the site improvements and impervious surfaces will drain to the proposed swale. The swale was designed using the City of Portland PAC which indicated zero discharge through the 25-year event.

*5. Design of detention area to avoid fish being trapped during high flow events was not addressed.*

There is no code requirement stating that the swale must be designed for fish passage. There are numerous natural features in the area that will trap fish. The swale, which should not be labeled as a detention facility, has an emergency overflow outlet that would allow fish to escape if they were in the swale.

#### **Other issues identified in the staff report and conditions of approval.**

**The roadway elevation** at centerline is one foot above the BFE. The City is concerned that the gutter at the lowest section of the road would only be 9 inches above the BFE. This is easily modified by raising the centerline by 0.24'.

**HECRAS Model.** The project does not propose to rely on the Tillicum Bridge model as the sole analysis for floodplain modeling. The Tillicum Bridge model was chosen for preliminary analysis because it is the best and most recent data available for this section of the Willamette River and it was accepted by FEMA for LOMR 15-10-0392P-410183. The FEMA requirements for a “no rise” analysis is to use the same model that was used for the Flood Insurance Report unless it is not available. If the model is not available then an alternative hydraulic model can be used and must be calibrated to reproduce the FIS profiles within 0.5 feet. The original model used for the Milwaukie area was performed by the US Army Corp of Engineers in 1978 prior to the development of the HEC-RAS model program. The old models are no longer available, so new models have to be developed and calibrated. The Tillicum Bridge model was chosen as a starting point because it was developed using the HEC-RAS modeling program and the most recent river bathymetric data available and has been accepted by FEMA as a viable river model. FEMA requires that the most recent data should be used when developing flood plain models. Models like these take hundreds of man hours to create. It is considered the starting point for the proposed project, not the end point. The project will likely require a Letter of Map Amendment (LOMA) or Letter of Map Revision (LOMR) that will be processed and approved by FEMA meaning that the final model will be sent to FEMA for analysis and approval.

**Channel Velocities.** The staff report indicates that the applicant is proposing to deviate from FEMA guidance for determining the velocities around the buildings and that we intend to use a model from a different project.

The FIS report provides a generalization of the channel velocities and assumes the velocities are the same throughout the channel cross section. The friction factors or manning’s “n” values vary greatly from the center of the channel to the edges of the channel. They are significantly different. This can be easily demonstrated by tossing a piece of wood in any channel. The center of the channel moves much quicker than the edges because the banks tend to have plants and protruding stones, etc. which slows the water velocity at the edges. This is basic hydraulic engineering. The staff report states that using the floodway’s mean velocity is NOT a good measure of actual flood velocity and we agree. That is exactly why you model the channel to get accurate, defensible data. The applicant intends to use the most recent and best available data to prepare a model exclusive to this project by building on the existing model to determine



the velocities and water surface elevations. As stated above the applicant intends to use the most recent and best data available to calculate real numbers rather than simple division of the total flow divided by the cross sectional area. Sound engineering principles will be utilized in accordance with FEMA guidelines.

**Stormwater Management.** The staff report lists the Public Works code section relating to stormwater detention. The code states that detention is required unless it can be demonstrated by hydraulic analysis that the proposed development will not increase stormwater runoff volumes or peak discharge and meets all requirements of the City's MS4 permit.

The City has adopted the City of Portland Stormwater Management Manual. The COP PAC calculator was used to design the stormwater facility. The peak discharge for the 10-year event is 0.607 cfs which would be discharged to the Willamette River. The flow rates for the Willamette River in Milwaukie are as follows:

10-Year Event – 251,000 cfs – The site runoff is 0.000002% of the total flow. (Immeasurable)  
50-Year Event – 329,000 cfs  
100-Year Event – 375,000 cfs

By observation you can see that the runoff from the site is minuscule compared to the river flows indicating the site will not increase measurable flows in the river. The City of Portland does not require detention for sites that discharge directly to the Willamette River and it would not make sense to do so. This is documented in the COP Stormwater Management Manual.

**Stormwater Basin.** The City of Milwaukie has adopted the City of Portland Stormwater Management Manual. The storm water facility was designed using the COP PAC program and will blend in well with the natural landscape. The vegetated facility meets all of the stormwater manual criteria and the desired use of vegetated water quality treatment. The planting plan utilizes native plants that will thrive and be aesthetically appealing. The proposed plantings come directly from the COP Stormwater manual plantings list. The staff report provides no code criteria for disallowing the facility as designed. The facility meets the code requirements. An operations and maintenance plan will be provided during the permit stage of the project.

In summary, there are no issues within the staff report that cannot be met with minor revisions and/or clarifications. The project should be approved with conditions.

Sincerely,

*Ken K Valentine*  
Ken Valentine, PE