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MEMORANDUM

**TO:** Brett Kelper, AICP, City of Milwaukie  
**FROM:** Scott Emmens, PE Senior Project Manager  
**DATE:** January 23, 2017  
**SUBJECT:** Kellogg Creek Subdivision – Floodplain Analysis

This memorandum summarizes the Kellogg Creek Subdivision floodplain impacts. The proposed project will construct an approximately 14 acre subdivision and will include the construction of 92 new lots intended for single-family attached homes (rowhouses). In order to construct the homes, fill is required to be placed on the site to bring the building elevation above the floodplain elevation.

The proposed design follows City of Milwaukie Municipal Code, Chapter 18.04 Flood Hazard Areas. Provided below is a summary of our responses to the relevant code sections.

**18.04.150 General Standards**

*D. Subdivision Proposals*

*1. All subdivision proposals shall be consistent with the need to minimize flood damage.*

**Response:** The proposed project was designed to minimize flood damage by elevating the site at least one foot above the floodplain. Fill is placed outside the bankfull channel and away from an existing lower elevation area on the western side of the site.

*2. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize or eliminate flood damage.*

**Response:** All public utilities are located outside the floodplain with the exception of the sanitary sewer connection to the existing sanitary sewer located within the existing floodplain, as well as public utilities to be located in the existing Kellogg Creek Drive, a portion of which lies within the existing floodplain.

*3. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage.*

**Response:** The site is graded to provide positive drainage to reduce exposure to flood damage. Proposed street grades meet or exceed the minimum grade allowed by the City of Milwaukie Public Works Standards, and street cross sections match typical sections provided by the City of Milwaukie to ensure proper drainage.

*4. Base flood elevation data shall be provided for subdivision proposals and other proposed development which contain at least fifty (50) lots or five (5) acres (whichever is less).*

**Response:** The project proposes more than 50 lots. The existing floodplain is shown on Sheet C100 and the proposed grading is shown on Sheet C400 of the land-use application (attached). The base flood

elevation is 69.9 located at cross section C on FEMA map number FM41005C0036D (NAVD 1988 datum).

*F. Balanced Cut and Fill*

*The displacement of flood storage area by the placement of fill or structures (including building foundations) shall conform to the following standards for balanced cut and fill:*

*1. The placement of fill or structures that displaces ten (10) cubic yards or less of flood storage area is exempt from the requirements of subsection 2 below.*

**Response:** More than 10 cu-yds of fill will be displaced. See response below.

*2. The placement of fill or structures that displaces more than ten (10) cubic yards of flood storage area shall comply with the following standards:*

*a. No net fill in any floodplain is allowed.*

**Response:** All fill added to the floodplain will be balanced with an equal amount of soil removed from the floodplain meeting the “no net fill” requirement. Supporting earthwork exhibits are attached.

*b. All fill placed in a floodplain shall be balanced with at least an equal amount of soil material removal.*

**Response:** See response above.

*c. Any excavation below bankfull stage shall not count toward compensating for fill.*

**Response:** Excavation will not occur below the bankfull stage.

*d. Excavation to balance a fill shall be located on the same parcel as the fill unless it is not reasonable or practicable to do so. In such cases, the excavation may be located in the same drainage basin and as close as possible to the fill site subject to the following:*

*(1) The proposed excavation and fill will not increase flood impacts for surrounding properties as determined through hydrologic and hydraulic analysis;*

*(2) The proposed excavation is authorized under applicable municipal code provisions including Section 19.402 Natural Resources; and*

*(3) Measures to ensure the continued protection and preservation of the excavated area for providing balanced cut and fill shall be approved by the City.*

**Response:** Excavation will occur within the same parcel as the project.

*e. Temporary fills permitted during construction shall be removed at the end of construction.*

**Response:** Temporary fill permits will be removed at the end of construction.

*f. New culverts, stream crossings, and transportation projects shall be designed as balanced cut and fill projects or designed not to significantly raise the design flood elevation. Such projects shall be designed to minimize the area of fill in flood management areas and to minimize erosive velocities. Stream crossings shall be as close to perpendicular to the stream as practicable. Bridges shall be used instead of culverts wherever practicable.*

**Response:** The project does not include a creek crossing.

*g. Excavation and fill required for the construction of detention facilities or structures, and other facilities, shall be designed to reduce or mitigate flood impacts and improve water quality. Levees shall not be used to create vacant buildable lands.*

**Response:** The proposed stormwater ponds are designed to improve water quality and reduce hydromodification of the Mt. Scott Creek. The bottom elevations of the ponds are set above the 25-year creek stage to provide detention and the top of the ponds are set above the floodplain so as to not trap fish when floodwaters recede. The project does not create levees to create buildable land.

#### ***18.04.160 SPECIFIC STANDARDS***

*In all special flood hazard and flood management areas where base flood elevation data has been provided as set forth in Section 18.04.050 and Subsection 18.04.120.B, the following provisions are required:*

##### *A. Residential Construction*

*New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated one (1) foot above base flood elevation.*

**Response:** The proposed residential structure will be located at least one foot above the base flood elevation.

#### **Conclusion**

The Kellogg Creek Subdivision is required to balance the cut and fill impacts from the proposed development. In order to offset the volume of fill being placed at the site, area surrounding the wetland will be excavated. Additionally, the site was designed to minimize impacts to the surrounding area and protect proposed property and public utilities.

## **Floodplain Capacity Analysis**

The following summarizes the floodplain capacity analysis. In order to determine the net change in floodplain storage, two calculations were made. One calculation determined the existing floodplain storage within a boundary that encompasses the subject property as well as all other disturbed area. The second calculation determined the floodplain storage of the developed site within the same boundary. This data was calculated by comparing the existing/future ground surface within the project limits to the floodplain elevation of 69.9. Volumes registered as a “fill” are floodplain storage, while volumes registered as a “cut” are soil amounts above the floodplain elevation (does not affect floodplain storage). The existing ground surface was determined from a site topographic survey in 2016, while the proposed grades were created in AutoCAD Civil 3D. A final comparison was completed between the two sets of data. A comparison using the proposed grade showing more “fill” volume than the existing grade comparison means an increase in the floodplain volume.

The following capacity analysis data was calculated using AutoCADs Volume analyze tool. The tool completes the comparison at each tin point within the surface.

### Volume Comparisons

The Existing Grade Comparison = 24,492 CY Fill

The Proposed Grade Comparison = 25,113 CY Fill

Net Comparison = Net +621 CY Floodplain Storage

Since the net comparison is positive, the project will generate a slight increase in the floodplain storage at the site.