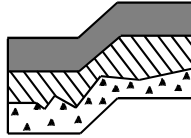


# MEMORANDUM



## TERRA ASSOCIATES, Inc.

Consultants in Geotechnical Engineering, Geology  
and  
Environmental Earth Sciences

To: Alex Garcia Mendoza Date: 12-4-23  
Trammell Crow Company Project No.: T-8829  
From: Ted Schepper, P.E. Project Name: PSE Operation Training Center  
Subject: Response to City Comments Puyallup, Washington  
Ref: Terra Associates Geotechnical Report, PSE Operational Training Center, revised dated 8-28-23

Alex,

As requested by the project civil engineer, Freeland and Associates, we have reviewed two comments from the City of Puyallup regarding the stormwater drainage design. The first relates to the bioretention swale located above and adjacent to a fill embankment at the northwest perimeter of the site. The city requested confirmation from us that the infiltrated stormwater would not impact the stability of the fill embankment. In their second comment the city requested an expanded narrative regarding infiltration rates used in design of the permeable pavement. The following summarizes our responses:

Review of the section through the bioretention swale shows the fill embankment will be slightly less than five feet high and sloped at a gradient of 3:1 (horizontal: vertical). The swale design includes an underdrain that will collect stormwater treated by infiltration through the bioretention soil mix and convey the treated stormwater to discharge into the developments stormwater detention pond located in the eastern portion of the site. Provided the embankment fill is compacted structurally as recommended in the referenced report and the underdrain is installed, stormwater collected by and infiltrated below the swale would have no adverse impact on the stability of the fill embankment.

As discussed in our referenced report, soil conditions at the site are alluvial sediments. These soils were deposited by the Puyallup River following retreat of the glaciers and are unconsolidated deposits. Infiltration rates discussed in the referenced report for design of low impact development (LID) features such as permeable pavement and bioretention cells are based on our experience and as allowed by Ecology's Stormwater Management Manual for Western Washington (Manual), results of grain size analysis. We would note that the rates recommended represent saturated permeability values ( $K_{sat}$ ) of less than .3 inches per hour which in the Manual, is a threshold below which permeable pavement and bioretention for managing stormwater runoff is considered infeasible.

If you have any questions or require additional information, please call.

  
*Theodore J. Schepper*  
12-4-23

Cc: Miles McEathron, P.E., Freeland and Associates, Inc.