



June 13, 2019
Project No. 170367E001

The Estate of Barbara J. Nelson
c/o Buff Nelson
16508 NE 79th Street
Redmond, Washington 98052

Attention: Mr. Buff Nelson

Subject: Correction Notice Response
Gunshy Manor Residential Subdivision

Dear Mr. Nelson:

This letter has been prepared in response to comments from the King County Development Services Department, geotechnical review. The comments were provided to us in an email for input on each of the responses

Landslide/Steep Slope Geologic Hazard Areas

Landslide Hazard Area - The Associated Earth Sciences report dated April 26, 2018 touches on the potential for geologic hazard on alluvial fans. Additional information is necessary to document that there is no hazard associated with these alluvial fans. The geotechnical engineer should address the following:

Comment - Fan #2 subsurface soils are described as topsoil over Vashon recessional deposits. The report text should better explain the source of sediment deposition in this area over time. Some geologically recent deposition from Martin Creek would be expected even if the geotechnical engineer attributes the feature to deposition concurrent with Vashon Recessional deposits. The report concludes that current stream flows do not cause concern. The report should elaborate on the range of measured or anticipated flows, upstream conditions and at what point would increased risk exist. The consultant should also look at the drainage and flooding complaints reported to the county. One report includes a description of "the stream jumping its bank."

Response:

According to the U.S. Geological Survey (USGS) Map MF-2016, *Geologic Map of the Redmond Quadrangle, King County, Washington*, (J.P. Minard and D.B. Booth, 1988), Alluvial Fan deposits (Holocene) are described as, Fan Shaped deposits consisting mostly of stratified sand and pebble to cobble gravel along the base of slopes and at the mouths of stream gullies, fanning out from the gullies onto the valley bottoms. Deposits are late Holocene in age and still receive material, mostly during high water stages.

Sediment observed in the explorations are consistent with the descriptions by the USGS, with the addition of near-surface topsoil or sediment over bank deposits.

Alluvial Fan #2 is located at the northeast corner of the site and in our opinion the geomorphic form is the result of post-glacial stream erosion and deposition as a result of flows from the east of the site. Natural sediment erosion and transport mechanisms have been fundamentally altered by development within the drainage basin and the addition of a bottomless culvert crossing under NE Union Hill Road by King County in 2010. A geomorphic assessment of Martin Creek as related to existing channel conditions of the property was not completed. Areas around the channel within the property have been stabilized to prevent channel migration or to direct flow to the crossings. Based on a review of LiDAR and contour data, the stream channel has incised near the base of the upland/top of the fan, particularly adjacent to and uphill of NE Union Hill Road where the historic fan was steepest. The stream is incised into the upper and middle portion of the fan on the project site. The stream channel in this channel reach can be considered a sediment transport reach. The location of additional headward incision is undetermined at this time. The sediment load is deposited where the stream gradient lessens, causing further stream aggradation and a reduction in channel capacity. The effect is that a new fan appears to be forming at the down edge limits of the primary fan complex, offsite to the west. It is our opinion that the erosion and deposition processes that formed the historic fan deposit would be contained within the incised channel on the project site. The risk of the stream channel aggrading or shifting laterally on the project site is low because the on-site channel reach is considered an incised sediment transport reach. The proposed road crossing is currently conceptual. Mitigation measures to address future channel incision and side slope erosion will include spanning the entire stream channel and could also include engineered bank stabilization measures if necessary.

We contacted King County Surface Water about the noted complaints in the area including the incident referenced in the corrections notice when the stream “jumped its banks.”

Complaint 90-0498

On January 29, 1990, the resident located at 7714 196th Avenue NE issued a complaint that the stream had overflowed the banks and was causing damage during a storm event. Within the complaint there is a statement that the site was visited in 1986 as well. This was considered a private problem.

Complaint 2010-0731

On December 13, 2010 multiple calls were made from residents near the same location regarding the stream that had taken a new route outside the banks on a 90-degree corner.

After review of the report it appears that part of the cause other than an extreme storm event was the replacement of a 36-inch culvert under Union Hill Road to a bottomless arch pipe in 2009 or 2010. Prior to the replacement there apparently was an undersized pipe under the road. The undersized pipe provided detention and a controlled release under the run for the downstream properties. The culvert was replaced with a full arch culvert and resulted in removing the detention. Flow was then allowed unencumbered under the roadway. The source of sediment downstream is believed to be the sand and gravel that was in the bed of the old culvert that was removed. This sediment reduced the capacity of the channel where the gradient changed near the residences.

Both of these incidents appear to have occurred during or following extreme storm events, although there is no stream flow data to indicate flow at the time of the issues. The stream appears to be experiencing channel aggradation downstream of the project site and there is also note of dredging the channel in the reports. The cause of aggradation is a combination of high sediment load from upstream areas and a lessening of the channel gradient in this portion of the stream, causing the sediment to drop out of the water column. There have been no further complaints recorded on the King County iMap reference page since 2010.

Stream flow data is available for selected sites through the King County Surface Water web page, and there is data available for the last four water years at a station where the creek crosses NE Union Hill Road. The data indicates typical average daily stream flows in the range of 1 to 3 cubic feet per second (cfs), with some higher flows during the wet winter months. They also indicate instantaneous bursts with high flows in the range of 20 cfs. No complaints have been posted on the publicly available King County drainage complaint database available through King County iMAP since the 2010 complaints.

As discussed above, a geomorphic assessment of Martin Creek as related to existing channel conditions in the vicinity of the proposed project was not completed. It is possible that remediation to the channel after the NE Union Hill Road culvert replacement and 2010 flood/sediment deposition events has provided capacity in the stream since that time. Some deposition at the new downgradient fan location can be expected as the upper reaches of the channel naturally erode.

An increased risk would exist if the proposed project directed more stormwater runoff directly to Martin Creek. The project has been designed to collect, treat and infiltrate its stormwater runoff from new impervious surfaces; the proposed project is also restoring the stream buffer by removing impervious surfaces and replacing them with native plant materials, thereby reducing the risk of contributing to stream flow and a potential increase in risk to downstream properties from the current development.

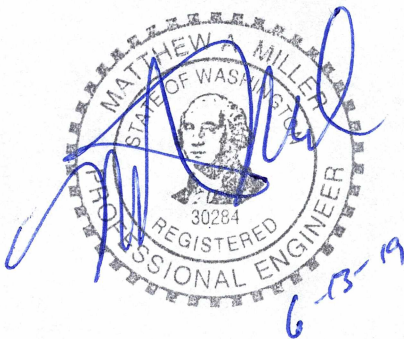
Comment - Clarify if Alluvial Fan #1 should be included in the above condition summary. It is my understanding that there is no observed flow or source of current alluvial fan deposition.

Response

The drainage basin for Alluvial Fan #1 is smaller than Alluvial Fan #2, and the potential for upland surface water discharge is less. A ditched conveyance is present north of Alluvial Fan #1 and conveys groundwater discharge from the slope. Groundwater discharge is present along much of the slope and is considered the primary source of flow. It is our understanding that the current property owner has not experienced sediment deposition or aggradation in the area of Alluvial Fan #1. We do not anticipate any significant addition to the area of Alluvial Fan #1.

We hope this information meets your present requirements. Please contact the undersigned at (425) 827-7701 should you have any questions.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



Matthew A. Miller, P.E.
Principal Engineer