May 12, 2016

Corey Layman, AICP
Zoning Administrator
Department of City Planning
Division of Zoning & Development Review
200 Ross Street, Suite 309
Pittsburgh, PA 15219

Subject: Response to Comments
Geotechnical and Development Documents
Proposed Villas at Winter Park
City of Pittsburgh, Allegheny County, Pennsylvania

Dear Mr. Layman:

We are in receipt of the review letter dated April 27, 2016 of Garvin Boward Beitko Engineering, Inc. regarding the proposed Villas at Winter Park development. We offer the following responses to the concerns raised on a point-by-point basis:

Comment 1: The site slopes are mapped as susceptible to landsliding and the borings encountered redbed materials, which are landslide prone.

Response: While this is a true statement and is offered as a general acknowledgement of the site conditions, it is not a true representation of the magnitude of the issue. The red claystones encountered are associated with the Casselman Formation below the Pittsburgh Coal Seam, and present as thin isolated seams in the formation. They are not as significant and pervasive as the Pittsburgh Red Beds, a thick strata found in other parts of the City of Pittsburgh and the region that are associated with major landslide events. The borings did encounter the reddish-hued layers of bedrock in the surface, and these layers were only several feet thick and along a limited band across the site.

Comment 2: Cuts into landslide-prone slopes/materials remove toe resistance, potentially triggering slope movements and failures, as well as landslides.

Response: The Geotechnical Investigation indicates that the reddish-hued bedrock generally correlates with the natural bench across the site that is being redeveloped. The flatter slope of this section is the result of the presence of soils derived from this rock strata. Excavation into this area will mitigate any instability issues in the soils present.

Comment 3: Landslides at this site possess the potential for propagating upslope, leading to slope failures on neighboring, as well as possibly well-removed, properties.

Response: There is no evidence that an earth movement event would propagate upslope and impact neighboring properties. First, the soil types present on the upper slope are not associated with reddish-hued bedrock and, therefore, are inherently more stable. Second, the soil mantle is of limited thickness overlying the weathered bedrock, which itself is only of limited thickness. Any slip plane development, if it were even to occur, will not result in a major movement event.

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Comment 4: Such ground disturbances encroaching onto properties beyond the development site can cause structural distresses, damaging homes and businesses.

Response: As previously stated, land movement of the type indicated is highly improbable. Impacts to homes and businesses are of low risk due to the projected development.

Comment 5: No slope stability analyses appear to have been performed to substantiate the cut and fill slope recommendations in the KUR report. In my opinion as a professional geotechnical engineer, such analyses are critical for verifying the limitations and requirements for developing the site. Development should not be approved without such analyses. Further, to protect the City residents and businesses in the neighborhood, as well as responsible City officials, the analyses should be reviewed by an independent professional geotechnical engineer, such as the City of Pittsburgh geotechnical engineer, to verify that they meet the generally-accepted local standard of care for geotechnical engineering, as well as that the soil and rock parameters and properties selected for the analyses are properly substantiated and reasonable for subgrade strata (i.e., redbeds) encountered in the test borings.

Response: Analysis of two cross-sections of the site, reflecting the greatest degree to potential disturbance, have been analyzed to address this concern. As indicated on the attached results, no stability issues exist with the proposed development areas. The cross-sections show that soils of concern associated with the reddish-hued bedrock will be removed during the earthwork activities, and that the resulting exposures that will be addressed by the engineered retention structures is actually weathered and competent bedrock. Review of any documentation is at the purview of the City of Pittsburgh, and does not necessarily require the services of an outside consulting engineer.

Comment 6: The retaining wall design/drawings/specifications and related documents should be submitted to an independent professional geotechnical engineer for the same reasons indicated in Item 5.

Response: Review of any documentation is at the purview of the City of Pittsburgh, and does not necessarily require the services of an outside consulting engineer.

Comment 7: No global stability analysis for the proposed retaining walls was submitted. Such an analysis should be performed to verify that, with respect to global subsurface conditions, the proposed walls and surrounding slopes are stable. These analyses should also be reviewed and evaluated by the professional geotechnical engineer mentioned in Item 5.

Response: As indicated in the response to Comment 5, global stability analysis of two cross-sections was performed to address this concern. Global stability is also part of the design of each wall segment, which was previously conducted.

Comment 8: The proposed MSE retaining walls will undoubtedly require extensive cuts into existing slopes. The cuts will be substantial, as required to provide the area behind the walls to facilitate the geogrid and compacted reinforced earth. This will cause the vertical cuts to be greater than shown on the plans. Hence, the combined (terraced walls and building excavations) cuts into the slope will be greater than 30 vertical feet in depth. Although, if properly designed, the walls should replace the loss in resistant stabilizing forces to the hillsides, the temporary cuts will likely be unstable. Hence, temporary cut conditions

should be subjected to slope stability analyses, as generally outlined in Item 5. Of course, these analyses should also be reviewed and evaluated by the aforementioned independent professional geotechnical engineer. Without such analyses, the risk to City property owners is unrealized and potentially substantial.

Response: **As indicated in the Geotechnical Assessment, the soil mantle is relatively thin across the slope, and the weathered bedrock strata is only slightly thicker. The majority of the cut into the slopes will have a shallow soil cross-section (3 to 6 feet thick) with the remainder of the exposure being weathered bedrock and competent bedrock. These strata are commonly stable for the duration of wall construction. If necessary, localized temporary shoring may be installed, or an alternate wall system that mitigates the need for any temporary construction may be utilized.**

Comment 9: All temporary shoring and bracing for the temporary cuts discussed in Item 8 should be designed by a professional engineer. The design/drawings/specifications and related documents for such shoring and bracing should be reviewed and evaluated by the aforementioned independent professional geotechnical engineer.

Response: **Review of any documentation is at the purview of the City of Pittsburgh, and does not necessarily require the services of an outside consulting engineer.**

Comment 10: Based on my review of the aforementioned KUR Sheet No. P-114, the proposed MSE retaining walls are either within a few feet or essentially immediately adjacent to the "limit of disturbance" line shown on that drawing. This is also illustrated on KUR Sheet No. C-405, appended to their Report. A review of the aforementioned KUR retaining wall calculations reveals that the geogrid reinforced soil zone behind, or south of, the southern-most walls – which cut well into the existing hillside – extends between about 4 ft and 13 ft behind the wall faces. This wall width, alone, extends beyond the limit of disturbance in most cases. However, if the temporary cut slope, required to facilitate the construction of those walls, is also taken into account at a liberal 1:1 grade – likely not stable – then the excavated zone behind the walls, or into the problematic existing hillside, extends to as much as at least 26 feet. Should that liberally estimated 1:1 temporary cut slope prove unstable via the temporary cut slope stability analysis that should be performed for this site, but does not appear to have been undertaken, then a temporary cut slope of even gentler grade will be required, which would extend even more beyond the limit of disturbance line. Hence, the excavations for the proposed southern-most walls will extend well beyond the limit of disturbance. Further, in many cases, the reinforced zone for the proposed walls, a permanent construction element of the walls, will extend beyond that limit.

Response: **The use of MSE walls provides a demonstration that engineered wall systems are feasible for the project. The wall sections that are the subject of this comment about possibly extending beyond the limit of disturbance are actually low walls at the top of terraced sections. These commonly only have a grid length of 4 feet from the front face of the wall, so the depicted limit of disturbance may only be slightly out of position. Any disturbance above the upper walls will only be temporary in duration, and will not involve the extensive over-excavation envisioned by the commenter.**

If the temporary limit of disturbance for the project is an issue that cannot be resolved with the City of Pittsburgh, other engineered wall systems can be installed

within the designated limits or other accommodations made to facilitate proper construction.

If you have any questions regarding the contents of this response, please contact our office at your earliest convenience.

Respectfully submitted,

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TOM/HPM:cak