ALP Engineering
& Landscape Architecture, PLLC

October 11, 2021

Nick Lee, Chair and Members of the Inland Wetlands Commission
Town of Wilton / Town Hall
238 Danbury Road
Wilton, CT 06897

Re: 141 Danbury Road
Wilton, CT

Third Party Review of Stormwater Management Plan

Dear Mr. Lee and Members of the Commission:

At the request of Michael Conklin, we have reviewed the amended site plans and supporting documentation in conjunction with the above noted application. The response letter from Tighe and Bond is repeated below (the original comment and the response from the applicant's engineer) which is then followed by our comments on the response.

1. "The Engineering Report provides information on the results of soil borings, which were conducted in 1992. With regards to the testing, we recommend that the developer provide the IWC with a map showing the location of borings. Furthermore, we recommend that there be at least two percolation tests performed in the footprint of each of the four stormwater management practices being proposed. This information is needed at this time, rather than prior to the completion of construction documents, in order to assess how well the proposed stormwater management practices will function, and whether site design changes will be needed. We recommend that the percolation test hole be dug so that the bottom of the percolation test hole is at least one (1) foot below the elevation of the bottom of the practice."

Response: Deep test holes and percolation testing were performed on site on September 20, 2021. Per our phone discussion, six (6) test holes were dug in total, two (2) were performed in the location of each of the two porous pavement systems, and one (1) in each of the infiltration systems. Material on-site was coarse sandy material, which provided for good percolation test results in all but one area (TP-4). Based on your concerns with the suitability of the testing performed at TP-4, we have proposed eliminating the porous pavement in this area and replacing it with standard bituminous pavement. In order to satisfy the water quality requirements for the site, the adjacent CB has been revised to an inlet water quality structure to treat the surface runoff. Section 7.2 of the CT DEEP Stormwater Quality Manual notes that infiltration practices shall be used where practical and that high groundwater, ledge, and poor soil conditions are acceptable constraints to limit the use of infiltration on subject sites. Reducing the amount of infiltration did slightly modify the peak rates of runoff discharging to

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the Norwalk River, but they are still considerably lower than the existing runoff currently being experienced on site. The revised plans and calculations associated with these revisions have been provided for your review. The table below summarizes our findings:

We concur that the applicant has provided an updated stormwater management plan, which provides stormwater quality controls and attenuation of the post-development, 100-year storm events to pre-development levels. The proposed design, however, needs to address whether the proposed water quality structures will provide remove 80% of TSS from the site on an average annual basis, which is a required threshold in the Connecticut Stormwater Quality Manual as a standard and criteria for decision.

2. "The Soil Survey of the State of Connecticut notes two soil types on the property, Rippowam fine sandy loam and Urban Land. Rippowam soils are nearly level and occur in flood plains. Urban Land soils are 'so variable that on-site investigation is required to determine the suitability of the proposed use'. Hence, the need for on-site soils testing. The Rippowam soils in the USDA mapping extend from the Norwalk River to about two-thirds of the distance along the northern property line. The prior development of the subject property has resulted in modification of the soil profile of what likely was Rippowam soils into what is now classified as Urban Land. The Soils Survey notes the Rippowam fine sandy loam features a depth to a seasonal water table 0 to 18", and this shallow dept to the water table can occur in all parts of the year. It can also be greater than 6-feet during all months of the year. The concern here is the proposed stormwater management practices will function as intended only if the groundwater table is at least 3-feet below the bottom of the practice per the Connecticut Stormwater Quality Manual. If precipitation events during a season result in a high seasonal water table, then the proposed stormwater management practices will not function as intended since they or the soils below the practices would be saturated with water. Given the Rippowam fine sandy loam soils are subject to this high seasonal water table and it can occur throughout the year, it calls into question the ability of these practices to provide the peak rate attenuation and the water quality improvement, and contribute to additional flooding in the Norwalk River."

Response: Deep test holes were performed on site as noted in the response to Comment #1. All test holes were dug approximately 7 to 7.5- feet deep and had no observance of groundwater or redoximorphic soil features (mottling). This is consistent with the historic monitoring well data and the more current readings provided by GZA, which observed groundwater surface elevations down approximately 8.5 to 9-feet. Since our infiltration practices are all set at elevation 141.0, the groundwater surface elevation will be at least 2-feet below, and in some cases over 3- feet below the bottom of our system. The additional field deep tests confirm that there is adequate separation distance from ground water for the proposed infiltration practices and that they will function as designed.

Based on our observation of the deep test pits, we concur that the there was no groundwater to a depth of about 7 feet to 7.5 feet below the existing grade, and that there will be a separation of about 2.5 feet to 3 feet from the bottom of the stormwater practice and the

groundwater. We also recommend that the location of the deep test holes that were recently performed be shown on Sheet C-301.

3. "We question the Tc flow path in the Existing Condition Watershed Map. Flow paths do not run perpendicular to the contour EX-WS-01. For EX-WS-02, the sheet flow segment of flow, which is calculated to be 130 feet, appears to be much shorter before its conversion to shallow concentrated flow. Furthermore, using a sheet flow length of over 100-ft in the modeling methodology is not permitted unless the flow is across a planar segment of pavement. The effect of modeling of excessive or incorrect sheet flow lengths will be to increase the time of concentration with the resultant decrease in the peak rates of runoff. Using the shorter lengths of sheet flow will result in more accurate time of concentration calculation, and a higher existing condition peak rate of runoff.".

4. "We also question the Tc flow path in Figure WM-01, Proposed Watershed Map. Please provide a full-size sheet of the Existing and Proposed Watershed Maps showing the existing and future condition site grading, respectively, for review."

Response: The modifications being requested would only serve to raise the calculated flow for the existing condition thereby reducing the need for more extensive proposed stormwater management measures. The Tc paths and assumptions used were intended to be more conservative and therefore our proposed system has been designed to further reduce runoff below the more conservative estimates for the existing condition.

Comments addressed.

5. "Given that the Northern Porous Pavement facility will be placed where the grade drops over 2-feet, and for the southern porous pavement facility the grade drop is proposed to be about 3.7 feet, show on the plans the locations where the compacted clay and silt berms will be placed in the plans, or indicate that the porous pavement sections will be benched and a berm placed at each drop in the bench to promote infiltration. The water quality volume calculations and the porous pavement section detail need to take into account the grade change across the porous pavement facilities."

Response: The porous pavement is being constructed on a slight variable slope that ranges between 1.8% and 2.5%. Industry standards consider porous pavement a suitable BMP measure on slopes ranging from 0% to 5%. Since the porous pavement is located within the floodplain, we are limited on how much we can alter existing grades, but the proposed slope falls well within the typical application ranges. The bottom of the system is designed to mirror the surface slope condition to reduce the amount of disturbance to native soils and the subsequent volume of earthwork being generated on site. A series of 12-inch berms are being proposed within the reservoir course of the porous pavement section that will be placed at 20 to 25-foot increments perpendicular

to the slope in order to check water and promote infiltration. These locations have not been shown on the plans as they will be determined based on field conditions to maximize their effectiveness. Benching the system will operate in a similar fashion and still require these berms; however, it will require additional excavation at each tier as the bench extends into the native grade. We can modify the system to show the bench if desired; however, we ask the third-party review engineer to reconsider this recommended revision and support the current design to limit the disturbance of native soils on site while still promoting infiltration of the proposed water quality volume.

It is recommended that the benching be done so that the area between the berms is level in order to maximize the infiltration into the soils in the porous pavement. Given that the berms are proposed at a 20-foot to 25-foot interval, the additional excavation to accomplish this will be minimal, on the order of less than 6".

6. "Show the locations of the proposed 6" underdrains with the ASTM No. 2 stone reservoir course on the Stormwater Management Plan. Where will the runoff from these underdrains be conveyed. Show he location of the discharge of these underdrain pipes on the Stormwater Management Plan."

Response: Sheet C-301 currently shows the locations of the perimeter underdrains for the porous pavement system and their routing. Additional drain lines that 'T' off these main drains will likely be added during construction based on field conditions and the final locations of the proposed berms noted in the response to Comment #5.

Comment addressed.

7. "Provide a section through the northern and southern porous pavement facilities which show the location of the drainage pipes from infiltration system No.1 and No. 2 through the systems. Will these drainage pipes from the infiltration systems impact the perforated underdrain pipes?"

Response: As seen on sheet C-301, the underdrains have been located to avoid conflicts with the stormwater management system. Any additional drains added would also be placed to avoid these crossings.

Comment addressed.

8. "The western ends of the Northern and Southern porous pavement facilities are very close to the mapped Rippowam fine sandy loam soils. Provide information that will demonstrate that the porous pavement facilities will not be impacted by a high seasonal groundwater table, which would reduce the volume available for peak rate attenuation and prevent the treatment of the water quality volume since treatment of runoff

pollutants is dependent on providing 3 feet of unsaturated soil below the bottom of the No.2 stone reservoir course.

Response: Please see response to Comment #2.

Comment addressed.

9. "The flow path for CB-01 and CB-01A do not appear to correctly represent the actual sheet flow and shallow concentrated flow segments and need to be revised. Flow paths do not run perpendicular to the contour for EX-WS-01. For EX-WS-02, the sheet flow segment of flow, which is calculated to be 130-feet, appears to be much shorter before its converted to shallow concentrated flow. Furthermore, using a sheet flow length of over 100-ft in the modeling methodology is not permitted unless the flow is across a planar segment of pavement."

Response: See the provided responses to Comments #3 and #4.

Comment addressed.

10. "The Engineering Report Stage/Storage Table for the North and South Infiltration Systems provide storage of runoff commencing at elevation 141.0 feet yet the details on sheet C-606 show a stone base elevation of 142.0 feet. This needs to be rectified to be consistent. Show on the section through the infiltration system the inflow pipes into the chambers."

Response: We do not see this conflict on the drawings; however, the initial submission from June 7 did have a typo that was corrected on the revised July 15 resubmission. The bottom of the two systems is currently proposed to be at elevation 141.0 and all details and calculations should reflect this.

Comment addressed.

11. "Provide pipe flow calculations to demonstrate that the proposed storm drainage system will be able to convey the anticipated flows. For one example, the rip rap apron discharge in Appendix I is designed to convey a flow rate of 9.14 CFS. However, the hydrograph return period recap for the total site combined flows shows a peak rate of flow of 10.69 CFS for the 25-year storm and 17.35 CFS for the 100-year storm, in excess of the design flow."

Response: The revised Storm Sewer Tabulation for verifying the pipe flow sizing has been provided with these responses for your review. The riprap apron sizing has also been revised with these responses based on the updated flow information from the Hydrograph Return Period Recap summary report. The current design flow for the 25-year peak storm event is calculated to be 10.14 CFS and the detail on sheet C-605 was updated to reflect the revised flow information. The storm drainage system was also sized to convey the 25-

year storm per the Town of Wilton requirements. It is important to note the discharge line out to the river will have a check valve to prevent the Norwalk River from flowing back into our system. The tailwater elevation in the Norwalk River during flooding events will result in a similar hydraulic grade line building up within the proposed piped drainage system. In the event the system is submerged and the river elevation rises to the parking area (which didn't happen during the most recent significant storm event on 9/1/21 through 9/2/21, Hurricane Ida), the site has been designed to still maintain sheet flow runoff out from the proposed parking areas and towards the river.

Comment addressed. It should be noted by the Commission that in the event the outlet is submerged, that there will be a back up of runoff from the site within the building and the parking area. Access to the check valve for regular maintenance is also critically important since these mechanical devices are prone to jamming in a closed or even open position. A shut check valve which fails to open due to mechanical failure also could lead to ponding in the parking areas of the property and the potential for sheet flow of largely untreated runoff from the property into the Norwalk River.

If you should have any questions or comments regarding our assessment of the revisions to the submitted plans and supporting documentation, please feel free to contact us at (475) 215-5343.

Sincerely,

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