

To: Alison C. Steinfeld, Planning Director
Department of Planning and Community Development
333 Washington Street
Brookline, MA 02445

From: Adam S. Kran, P.E.

Cc: James. D. Fitzgerald, P.E., LEED AP
Ryan J. Trahan, P.E.

Date: May 2, 2018

Subject: Puddingstone at Chestnut Hill, Brookline (40B)
Stormwater Peer Review #2

This is to advise that we have completed a stormwater peer review of the proposed Puddingstone at Chestnut Hill (Puddingstone) Project located on Gerry Road in Brookline, MA near the border with Boston, MA. The Applicant, Chestnut Hill Realty, is represented by an engineering consultant, Stantec Planning and Landscape Architecture P.C. (Stantec). Since our previous letter dated September 16, 2016, Stantec prepared a response letter with 12 attachments dated April 10, 2018. The latest documents were reviewed for conformance with the 2008 Massachusetts Stormwater Handbook (Handbook), the 2013 MassDEP Standard Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices, and MassDEP's Guidelines for Public Water Systems (Guidelines) as well as good engineering practice.

Background

The Puddingstone Project was submitted as a Chapter 40B application to the Town of Brookline's Zoning Board of Appeals on April 11, 2016. The Applicant is proposing to construct four residential buildings and associated site features within the existing Hancock Village property along the Brookline-Boston border. The site under consideration for development is located primarily in Brookline on an undeveloped space situated among existing residential buildings between Gerry Road, Sherman Road, and Independence Drive. Currently, the site includes areas of trees and grass with numerous ledge outcroppings and some steep terrain.

The proposed stormwater system includes a network of roof drains, subsurface pipes, proprietary water quality devices, trench drains, manholes, perforated pipe systems, and a watertight underground detention system. The Applicant is proposing to extend water, fire protection, sewer, electric, and gas services to the proposed buildings and provide new fire hydrants along the proposed driveway. The Applicant is proposing to re-route some utilities that conflict with proposed structures.

Memorandum

May 2, 2018

Page 2

Our comments below note missing items and noncompliance with various standards. *Comments which have been addressed by the Applicant are included as an attachment to this letter.*

Comprehensive Permit Plans

1. The plans do not include a comprehensive legend. The Applicant should clearly define all symbols, abbreviations, hatches, etc.

The Applicant has provided a legend. The Applicant should identify the Grasspave referenced in the latest document on the plans and provide a detail. The Applicant should clarify if the “Glass Ring Fire Lane” on L-1001 is the same as the Grasspave referenced elsewhere.

2. L-0700 – The proposed water main servicing N2-N4 terminates in a dead end at the proposed cul-de-sac. Guidelines Chapter 9, Section 3 includes requirements for dead ends, looping water mains, and flushing. The Applicant should coordinate with the local public water supplier to determine appropriate blow-off locations and water main looping opportunities.

There is an opportunity to avoid installing a dead end water main along the proposed roadway by connecting to the water main that is being relocated to construct Building N4. The Applicant should review the proposed water main layout with the public water supplier. Refer to Suggested Condition #2.

3. L-0700 – The Applicant proposes a new route for a water main to the south of proposed building N4. The Applicant should provide a detail of the proposed “C.T.E. with coupling”, and the Applicant should coordinate other water main details with the public water supplier.

The Applicant has proposed a Smith-Blair coupling; however, these typically do not provide lateral restraint. Refer to Suggested Condition #2.

4. L-0700 – There is an existing 4 inch sewer line that crosses the proposed watertight chambers. The Applicant should resolve this conflict.

In the response letter, the Applicant has proposed to field verify the location of the sewer line and modify the detention system layout as needed. This modification could require a substantial change to the preliminary stormwater design and calculations. Therefore, the Applicant should conduct the field verification or submit a revised design and supporting calculations that avoids the 4 inch sewer line shown on the Applicant’s plans.

On revised Sheet L-0700, the Applicant appears to show a relocation of this 4 inch sewer line to avoid the conflict with the proposed chambers. The Applicant should provide legible rim and invert elevations and clarify what is proposed.

5. L-0701 – Most of Subsurface Basin D-1B is shown above the existing ground surface. The Handbook typically prohibits the construction of infiltration BMPs on top of fill materials (e.g. Volume 2, Chapter 2, Page 88 for infiltration basins and Volume 2, Chapter 2, Page 97 for infiltration trenches). If fill materials are present, the Handbook



Memorandum

May 2, 2018

Page 3

stipulates that the hydrologic soil group of the most restrictive layer must be used in design (Volume 3, Chapter 1, Page 12). The Applicant should justify the proposed design or revise to be more consistent with the requirements of the Handbook.

The Applicant has indicated that the fill material will exceed the assumed infiltration capacity of the native soil. The Applicant should ensure that any fill materials are carefully installed to preserve the infiltration capacity of the fill.

In addition, as the Applicant notes, Basin D-1B is within four feet of estimated seasonal high groundwater. According to the Applicant's 100-year storm calculations, there is less than 1 inch of extra capacity in this 30 inch pipe system; therefore, if groundwater infiltrates this BMP, capacity can be lost and this condition could result in upstream surcharging or minor flooding. D-1B is proposed to meet the required recharge volume requirements of Standard 3 and to attenuate peak discharges for Standard 2 compliance. Consequently, the Applicant should provide a mounding analysis as required by the Handbook Volume 3, Chapter 1, page 28.

6. L-0701 – Subsurface Basins D-1B and D-2B are located near existing and proposed structures, respectively, and Subsurface Basin D-1B is located near steep slopes and a proposed wall. The Handbook typically provides required setback distances for infiltration BMPs (e.g. Volume 1, Chapter 1, Page 8), and Title V provides similar setbacks for leaching fields (310 CMR 15.211). The Applicant should justify the proposed design or revise to be more consistent with the requirements of the Handbook and Title V regulations.

The Handbook requires a setback of 10 to 100 feet from building foundations depending on the BMP (Volume 2, Chapter 1, Page 32). The Applicant has proposed perforated pipe systems, which are classified under the generic catch-all "subsurface structures" section of the Handbook. There is no specific building setback requirement for subsurface structures, so the Applicant claims that only a 10 foot setback is required.

We remained concerned about the proximity of Basins D-1B and D-2B to existing and proposed structures and downslope areas and suggest larger setback requirements should apply. For example, infiltration basins require a 100 foot setback from existing structures which are downslope of the BMP (Volume 2, Chapter 2, Page 88). D-1B and D-2B are each within 100 feet upslope of structures, and Basin D-1B is immediately upslope of a retaining wall. Given the proximity of structures and bedrock to the proposed infiltration areas, it is suggested that the Applicant revise the design or conduct a groundwater mounding analysis to review the effects of the proposed infiltration facilities on the nearby facilities.

Stormwater Report

1. Section 2.2.1 – The Applicant notes proposed porous asphalt pavement as part of this project. The Applicant should provide a detail on the plans, indicate the location on the plans, provide operations and maintenance information in the Stormwater Report, and address the potential for porous pavement to fail over long periods of time. Porous pavement has rigorous operation and maintenance protocols.



Memorandum

May 2, 2018

Page 4

The Handbook includes “grass pavers” under the porous pavement section of Volume 2, Chapter 2 (Page 118-122). It appears that the proposed Grasspave should be subject to the Handbook’s requirements, including the required setbacks and the operation and maintenance requirements. The Applicant should clarify what is proposed.

2. Section 2.3.5 & Appendix E – The Applicant based the 24-hour rainfall rates on publications from the 1960s and 1970s. Some engineers now rely on data from Cornell University’s Extreme Precipitation Website (<http://precip.eas.cornell.edu/>) for more updated estimates of design storms. In this location, for example, the 100-year, 24-hour storm on this website is approximately 8.9 inches, which is significantly more than the 6.7-inch storm listed by the Applicant in the Stormwater Report. It is recommended that the Applicant revise the stormwater calculations to include the more recent available data.

The Applicant continues to use the older, TP-40 rainfall rates in the calculations. It is recommended that the Applicant provide the pre- and post-development 8.9-inch storm HydroCAD calculations for the record.

3. Subcatchment PR-2A – The outline of the subcatchment on Figure 5 appears to exclude a portion of the proposed work to the south of Building N1.

The Applicant has updated the watershed plans and the HydroCAD calculations. The Applicant should update the Standard 3 recharge volume calculations and demonstrate compliance with the Standard 4 de minimus requirements for water quality.

4. Standard 2 – Runoff from the existing site enters a series of catch basins and yard drains, and then this runoff flows through closed drainage systems to the existing analysis points. In the proposed configuration, runoff flows to two distinct points in each existing closed drainage system. The Applicant should confirm that the existing drainage systems can handle this change.

The Applicant wrote that the proposed flow from the 10-year storm into the existing network is typically a relatively small percentage of the receiving conduit’s full flow capacity; however, the Applicant did not provide information about existing flow in these pipelines. During the April 12, 2018 meeting, the Applicant noted that they have completed an extensive study of the existing drainage network. The Applicant should provide available information about any known tailwater conditions in the existing system which may limit the ability to transmit the full proposed flow to the existing conduits.

In addition, the Applicant should base the analysis on the 25-year storm, matching the design storm of the Applicant’s 3/23/2016 pipe design calculations.

5. Seasonal high groundwater – Groundwater levels vary over the course of a year, so the Handbook requires project proponents to report the seasonal high groundwater level beneath proposed recharge areas to help ensure that these areas will drain. The Applicant only reports a single observed water level as the seasonal high groundwater level. If the Applicant proposes to use monitoring wells to determine seasonal high groundwater



Memorandum

May 2, 2018

Page 5

levels, the Applicant must follow the procedures outlined in the Handbook, including a comparison with nearby USGS monitoring wells. We note that there was below average snowfall this year when the Applicant conducted the field investigation.

Basin D-1B – The Applicant states that the majority of nearby USGS monitoring wells were at normal levels around the time of the March 2016 reading. The Applicant should provide data and relevant calculations, such as the Frimpter Method calculations, to support this statement. In addition, the Applicant should provide any additional available monitoring well information since the 3/1/2016 reading.

Basin D-2B – Refer to the following comment.

6. Standard 3 – The Applicant has not provided complete soil and water table information for Subsurface Basin D-2B. The detail on L-0701 shows boring B-A7 crossing through the proposed basin; however, this boring is located closer to Building N2 than the proposed recharge area. The detail does not show information from B-A8, another nearby boring. Based on the plans and the boring log for B-A8, bedrock may be around elevation 166 feet, which is above the top of the proposed recharge basin. In addition, the groundwater level reported in B-A7 is from the month of September and is not adjusted to the seasonal high groundwater elevation. The boring logs also do not contain any information about the presence or absence of redoximorphic features/soil mottling. The Applicant should conduct additional soil exploration within the boundary of this proposed recharge area if the Applicant intends to receive Standard 3 credit for this basin.

In accordance with the requirements of Standard 3, the Applicant should conduct additional soil exploration within the footprint of the proposed basin to help resolve questions about soil and water table information. In addition, the Applicant should provide the results of any additional groundwater monitoring in the area.

7. Standard 3 – The Applicant has proposed perforated pipe systems to meet the recharge requirements of Standard 3. The Handbook indicates that perforated pipes may not receive credit for Standard 3 (Volume 2, Chapter 2, Page 104). The Applicant should clarify how the proposed system meets the requirements of Standard 3 or revise the design to comply with the Handbook.

The Applicant has clarified that D-1B and D-2B are perforated pipe systems, which may receive credit for Standard 3. Because these systems attenuate peak discharges, the Applicant must provide mounding calculations if the groundwater elevation is determined to be within 4 feet of the bottom of the basin. Given the proximity of bedrock, there is significant potential for the groundwater mound to affect the performance of these systems.

8. Standard 9 – The plans indicate that an existing catch basin near proposed DMH 13 was full of debris at the time of the survey, suggesting the existing drainage system may not be well maintained. The Applicant has proposed to discharge stormwater to the existing system. Consequently, the Applicant should provide information on the operation and maintenance of the existing stormwater system and certify that the existing system provides adequate drainage for the existing development.



Memorandum

May 2, 2018

Page 6

The Applicant reported that the majority of the existing drainage network was cleaned and CCTV-inspected. The Operation and Maintenance Plan should include cleaning of downstream drainage facilities.

9. Appendix B – The Applicant should provide all available groundwater elevation data. It is not clear that the highest observed groundwater elevation is provided the report. The report should clearly state the *seasonal* high groundwater elevation at each proposed recharge facility and should comment on the presence or absence of redoximorphic features/soil mottling.

The Applicant has not commented on the presence or absence of redoximorphic features/soil mottling.

The Applicant should report any additional groundwater readings collected at the site since the report was first issued approximately two years ago.

10. Appendix D – The Applicant should justify the use of a CN of 69 for “Grasspave” in the proposed HydroCAD calculations.

The Applicant has provided documentation justifying the use of a CN of 69. The Applicant should update the Operation and Maintenance Plan to include any requirements necessary to ensure the long-term suitability of the CN value.

11. Appendix L – Contech recommends regular inspections of the subsurface structures. The Applicant should clearly indicate how this will occur. No inspection ports are indicated on the plans.

The Applicant has added inspection ports for the subsurface chambers (D-1C); however, similar ports have not been added for the perforated pipe systems (D-1B and D-2B). The CMP Detention and Infiltration Inspection and Maintenance Guide provided in the original Stormwater Report also includes quarterly inspection requirements.

Additional Comments

1. Basin D-1C is proposed below the existing water table. The Applicant should perform buoyancy calculations for the proposed watertight chambers and confirm that there is a factor of safety against uplift.

The Applicant has indicated that buoyancy calculations will be provided later in design. Refer to Suggested Condition #4.

2. Basin D-1C is described as “watertight”. The Applicant should provide additional information to justify this claim. Typically, concrete chambers within the groundwater table are not completely in the dry. If groundwater infiltrates this storage BMP, capacity can be lost and could result in upstream surcharging or minor flooding.

The Applicant has indicated this will be addressed later in the design. At this stage in the design, the Applicant should provide sufficient information to demonstrate that it is feasible to make Basin D-1C a watertight system.



Memorandum

May 2, 2018

Page 7

The Applicant also referenced that the system will be tested after installation to confirm it is watertight. The Applicant should provide additional information about how this test will be conducted and reference the requirements on the plans.

3. The borings indicate shallow bedrock around the entire site, and the plans show large areas of exposed ledge. The Applicant should verify the constructability of proposed structures, including deep utility trenches for water, sewer, and drainage. Protection of existing structures and utilities is a concern if the Applicant uses blasting techniques.

The Applicant has stated that rock removal means and methods will be determined by the contractor; however, it is recommended that some standard conditions be adhered to. Refer to Suggested Conditions #5 and 6.

4. For each building, the Applicant should provide the required fire sprinkler system flow rate and the required ISO fire flow rate to the public water supplier.

Refer to Suggested Condition #2.

5. The closed drainage system associated with WQD15, DMH14, and DHM13 appears to connect to an existing manhole in Gerry Road; however, this manhole is not visible in the street. The Applicant also does not show where water goes after entering this existing manhole. The Applicant should provide more information about this manhole, its connectivity, and the capacity of the existing drainage system before proposing to discharge to it.

The Applicant has updated the plan to show a wye connection to an existing sewer line. Stormwater discharges to the sewer system are classified as inflow under 314 CMR 7.00 and are not allowed. The Applicant must revise the design.

New Comments

1. The Applicant should provide the latest version of all updated detail sheets referenced in the response letter. L-1004 appears to be missing.
2. Basin D-1C has an outlet control structure which prevents the watertight structures from fully draining, limiting their capacity for future storm events. The Applicant should provide calculations which accurately reflect this condition or revise the design to ensure that the chambers drain within 72 hours.
3. The Applicant should report the capacity of each proposed inlet and ensure that the inlets can pass the runoff listed in the pipe design calculation in the original Stormwater Report.
4. HydroCAD calculations should include hydrographs, matching what was provided in the original Stormwater Report.

Suggested Conditions of Approval

1. Provide a Stormwater Pollution Prevention Plan (SWPPP), including a plan showing the specified sediment traps, for review and approval prior to construction.



Memorandum

May 2, 2018

Page 8

2. Prior to receiving a building permit, provide letters of approval from the Town of Brookline Fire Department and Public Works Department (including the Water & Sewer Divisions). The design shall conform to Town of Brookline standards. The Applicant will coordinate the following, at a minimum, with Town of Brookline departments:
 - a. Water main sizing and layout, including the possibility of looping the proposed dead end water main, as well as valve and curb stop locations.
 - b. Water & sewer details, including couplings, joint restraint, service connections, etc.
 - c. Fire department access routes and hydrant locations.
3. Future property owners and property managers shall be notified of the stormwater management system and the requirement for proper operation and maintenance through a Regulatory Agreement, which will be recorded at the Registry and reference the final Stormwater Report, including the Operations and Maintenance Plan.
4. Prior to receiving a building permit, provide buoyancy calculations demonstrating a factor of safety against uplift for Subsurface Basin D-1C. The calculations shall be certified by a registered Professional Engineer in the Commonwealth of Massachusetts.
5. All blasting shall be in strict accordance with 527 CMR 13.00. Since nearby buildings include multi-family housing units, notifications shall also be provided to the actual residents in addition to building owners.
6. The time during which explosives, jack hammers, or similar rock excavation equipment may be used is restricted to Monday through Thursday between the hours of 9:00 AM and 2:00 PM.

