

Horsley Witten Group

Sustainable Environmental Solutions

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January 3, 2017

Ms. Beth Suedmeyer
Environmental Planner
Planning and Community Development
Town of Sudbury
278 Old Sudbury Road
Sudbury, Massachusetts 01776

Re: Peer Review of The Coolidge at Sudbury Phase 2
187 – 189 Boston Post Road
Sudbury, Massachusetts

Dear Ms. Suedmeyer and Board Members:

The Horsley Witten Group (HW) is pleased to provide the Sudbury Zoning Board of Appeals (ZBA) with this letter report summarizing our initial engineering peer review of The Coolidge at Sudbury Phase 2 project located at 187 – 189 Boston Post Road, Sudbury, Massachusetts (Property). The plans and calculations were prepared for B'nai B'rith Housing New England, Inc. (Applicant) by Hancock Associates. The project at 187 – 189 Boston Post Road involves the development of a 56 unit senior housing building with parking beneath the units, expansion of an existing parking lot, utilities, landscaping and stormwater management.

The proposed stormwater management design for the Property includes the elimination of an existing raingarden and grassed swale and the installation of a closed drainage system which conveys flows to a Stormtech subsurface structure and ultimately to an infiltration basin. The Project also features two areas where porous grass pavers are proposed on fire/emergency access lanes. The proposed development is within the 100-foot Buffer Zone of jurisdictional wetland resource areas and therefore will require the filing of a Notice of Intent (NOI) with the Sudbury Conservation Commission.

The following documents and plans, prepared by Hancock Associates, received at the Sudbury Town Hall on November 28, 2016, were reviewed by HW:

- Stormwater Report for The Coolidge at Sudbury Phase 2; and
- Comprehensive Permit Site Plan, The Coolidge at Sudbury 2, which includes:
 - Title Sheet C1
 - Notes C2
 - Existing Conditions C3
 - Preliminary Subdivision C4
 - Preliminary Layout Plan C5
 - Preliminary Grading and Utility Plan C6
 - Preliminary Landscape Plan C7

Stormwater Review

HW has reviewed the proposed stormwater management designs as per the standards of the Massachusetts Stormwater Handbook (MSH) dated February 2008, the Town of Sudbury Stormwater Management Bylaw Regulations (Stormwater Bylaws), revised January 23, 2013, the MassDEP Wetlands Protection Regulations (310 CMR 10.00) and the Town of Sudbury 2015 Article IX Zoning Bylaw (Zoning Bylaws), dated May 6, 2015.

In accordance with Section 8.0 of the Stormwater Bylaws, this project is required to comply with the performance standards of the MSH. Therefore, we have used the MSH as the basis for organizing our comments. However, in instances where the additional criteria established in Section 8.A.3 of the Stormwater Bylaws requires further recommendations; we have referenced these as well.

1. *Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

The proposed stormwater management design for the Property contains no new proposed stormwater conveyance outfalls. The new proposed stormwater management system includes a series of catch basins and storm drain pipes which discharge to a subsurface Stormtech Isolation Chamber for water quality pretreatment prior to discharging into an infiltration basin located along the southeast corner of the property. Stormwater conveyed to the infiltration basins that does not infiltrate, discharges to the wetlands via a proposed stone weir overflow structure.

Based on calculations provided for Standard 2 below, it appears that the infiltration basin weir overflow, located greater than 50 feet from the on-site bordering vegetated wetlands (BVW) will not overtop (i.e., discharge) during the 100-year, 24-hour storm event and therefore it is expected that stormwater will not cause erosion in the wetlands on the Property.

The Applicant appears to be in compliance with Standard 1.

2. *Standard 2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.*

The Applicant has described the Pre-Development and the Post-Development watershed areas, drainage conditions, and discharge values as documented in the Stormwater Management Report for the Property. HydroCAD output was included in Appendix I of the Stormwater Report. To verify compliance with Standard 2, HW has the following recommendations:

- a. The calculations provided for the peak discharge rates do not include the 25-year design storm event (equal to 6.0 inches). In accordance with Section 8.A.3.f of the Sudbury Stormwater Regulations, analyses shall be analyzed for the 1-inch and the 2, 10, 25, and 100-year design storms under Pre-Development and Post-Development. HW

recommends the Applicant provide calculations for the 25-year 24-hour design storm event.

- b. The HydroCAD output does not provide calculations for the 1-inch storm event in accordance with Section 8.A.3.f of the Sudbury Stormwater Regulations. Furthermore, the HydroCAD output does not provide detailed calculations for the 10-year storm event, to assist in verifying pond inflows, outflows and elevations. HW recommends that the Applicant provide HydroCAD output for the 1-inch and 10-year storm events.
- c. The Post Subcatchment Plan and the HydroCAD model do not appear to be consistent. The Post Subcatchment Plan identifies subcatchments 10A, 10B and 25; however, these are not identified in the HydroCAD model. The Post Subcatchment Plan identifies "Sub 19"; however, the model has two subcatchments labeled as 19 (i.e., "19S A" and "19S B"). Further, the HydroCAD model has a subcatchment 48S, which drains to the street and is not delineated on the Post Subcatchment Plan. HW recommends that the Applicant revise the Post Subcatchment Plan and/or the HydroCAD model for consistency.
- d. A time of concentration (T_c) value for Subcatchments 20f and 48S has not been included in the HydroCAD model. HW recommends that the Applicant provide a T_c value for these subcatchments.
- e. Details for the proposed best management practices (BMPs) including the isolator chambers and Stormtech MC-3500, grass pavers and infiltration basin have not been provided. To function as designed the BMPs must be constructed with the storage included in the modeling calculations. HW recommends that the Applicant provide details and cross sections for the BMPs and a condition be included in any approval that requires an as-built of the BMPs to ensure that the systems have the required capacity.
- f. In accordance with the MSH, an infiltration basin should maintain one foot of freeboard. HW recommends that the Applicant verify that the required freeboard has been provided.
- g. In accordance with the MSH, HW recommends that the Applicant verify and/or provide additional details on the following design elements for the infiltration basin:
 - Location of one (1) monitoring well, which shall be installed in the basin floor for every 5,000 square feet of basin floor.
 - A minimum of three borings for each infiltration basin are required. The Site Plans indicate only two test pits (TP-106 and TP-107) within the infiltration basin.
 - Inlets shall be stabilized (i.e., with riprap) to prevent incoming flow velocities from scouring the basin floor.
 - Infiltration basins must include an overflow outlet in addition to an emergency spillway.

- A drawdown device shall be designed to draw down the basin for maintenance purposes.
- h. In accordance with the MSH, a minimum of two (2) test pits shall be provided in the location of proposed subsurface infiltration structures. HW recommends that the Applicant provide the location and test results for a minimum of two (2) test pits in the location of the proposed Isolator Row and Stormtech subsurface structures.
- i. The Preliminary Landscape Plan identifies the proposed infiltration basin, as identified on the Preliminary Grading and Utility Plan, as a detention basin. HW recommends that the Applicant revise the discrepancy.
3. *Standard 3 requires that the annual recharge from post-development shall approximate annual recharge from pre-development conditions.*
- a. There appears to be a discrepancy between the available storage calculations provided for the Isolator Row and Stormtech Chamber in the Stormwater Report when compared to the HydroCAD values. HW recommends that the Applicant provide clarification on the available storage provided by these BMPs.
- b. HW recommends that the Applicant provide drawdown analysis and calculations for the proposed Grass Pavers and Stormtech subsurface structures.
- c. Based on information provided for Test Pit TP-107, the depth to estimated seasonal high groundwater from the bottom of the proposed infiltration basin is 2.5 feet. In accordance with MSH Volume 3, Chapter 1, page 28 a mounding analysis is required when the vertical separation from the bottom of an exfiltration system to seasonal high groundwater is less than four (4) feet *and* the recharge system is proposed to attenuate the peak discharge from the 10-year or higher 24-hour storm. Based on the HydroCAD summary output provided for the 10-year storm, the infiltration basin infiltrates the entire peak and associated storm volume without discharging to the wetland. HW recommends that the Applicant provide a mounding analysis to demonstrate that the groundwater mound that forms under the recharge system will not break out above the land or water surface of the adjacent wetland.
4. *Standard 4 requires that the stormwater system be designed to remove 80% Total Suspended Solids (TSS) and to treat 1.0-inch of volume from the impervious area for water quality.*
- a. The tributary impervious area associated with calculations provided for the water quality volume required to the infiltration chamber, does not match the inflow impervious area in the HydroCAD model. HW recommends that the Applicant verify the tributary impervious drainage area and revise the water quality calculations or the HydroCAD model as appropriate.
- b. Calculations for the Stormtech Isolator Row refer to “Appendix V”, which were not

provided in the Stormwater Report. HW recommends that the Applicant provide any and all necessary design calculations used to size and design the Stormtech subsurface structures.

- c. Based on the provided Site Plans, it does not appear that the extended detention basin, built as part of Phase I, discharges to a grass channel, as indicated in the Treatment Chain 1 table. HW recommends that the Applicant verify that 80% TSS removal is achieved for the Project.

5. *Standard 5 is related to projects with a Land Use of Higher Potential Pollutant Loads (LUHPPL).*

The proposed project is not considered a LUHPPL; therefore Standard 5 is not applicable.

6. *Standard 6 is related to projects with stormwater discharging into a critical area, a Zone II or an Interim Wellhead Protection Area of a public water supply.*

The proposed development does not appear to be within a critical area; therefore Standard 6 is not applicable.

7. *Standard 7 is related to projects considered Redevelopment.*

The proposed project is not considered a redevelopment; therefore Standard 7 is not applicable.

8. *Standard 8 requires a plan to control construction related impacts including erosion, sedimentation or other pollutant sources.*

The Applicant has indicated that "construction period controls will be provided in the stormwater pollution prevention plan in the final submittal". HW recommends that any approvals granted for this project require that the Application provide an erosion control plan illustrating controls to mitigate erosion, sedimentation and other pollutant sources. HW also recommends that this plan include specific details and locations of erosion and sedimentation control practices and be in compliance with Section 8.B of the Sudbury Stormwater Regulations. Prior to construction this plan should be approved by the Sudbury Conservation Commission.

9. *Standard 9 requires a Long Term Operation and Maintenance (O & M) Plan to be provided.*

The Applicant provided a Stormwater Operation and Maintenance Plan for the Property. HW recommends the following:

- a. The Applicant has not specified the frequency of construction inspections. To ensure compliance with the Town of Sudbury Stormwater Regulations, HW recommends that the wording in the Applicant's O&M plan state that site inspections, including those for erosion/sedimentation control purposes, will be conducted within 24 hours after the end of a storm event of 0.5 inches of precipitation or greater. These frequencies of

inspections should occur from the start of construction until the site is permanently stabilized.

- b. In compliance with MSH Volume 2, Chapter 2, page 92, HW recommends that the Applicant add the following O&M requirements to the infiltration basin area:
 - Items to check during inspections include: signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, condition of riprap, sediment accumulation and the health of vegetation.
 - At least twice per year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces, and revegetate immediately.
 - Remove sediment from the basin as necessary, only when the floor of the basin is thoroughly dry.
- c. HW recommends that the owners of the Property be made fully aware that snow should not be stockpiled within the stormwater BMPs including the sediment forebays, water quality swales, detention basins and infiltration basins.

10. *Standard 10 requires an Illicit Discharge Compliance Statement to be provided.*

The Applicant has stated that an Illicit Discharge Compliance Statement is not applicable. However, in accordance with the MSH, an Illicit Discharge Compliance Statement must be submitted. HW recommends that the Applicant provide the Illicit Discharge Compliance Statement to the Town of Sudbury Conservation Commission prior to the start of construction.

11. It does not appear that the Applicant provided calculations for design of the proposed closed storm drain network. HW recommends that the closed drainage system design be submitted for review and approval.
12. The Applicant is proposing a private well for irrigation for the proposed Project. In accordance with Section 8.A.4 of the Sudbury Stormwater Regulations to conserve water supplies and maximize recharge it may be appropriate for some sites to store and reuse clean runoff (i.e., from roofs) for reuse on the site for irrigation. HW recommends that the Applicant demonstrate why a private well was chosen for irrigation as opposed to a reuse system.

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Conclusions

HW recommends that the Sudbury Zoning Board of Appeals require that the Applicant address these comments as part of the permitting process. The Applicant is advised that provision of these comments does not relieve him/her of the responsibility to comply with all Town of Sudbury Codes and Bylaws, Commonwealth of Massachusetts laws, and federal regulations as applicable to this project. Please contact Janet Bernardo at jbernarado@horsleywitten.com or at 857-263-8193 if you have any questions regarding these comments.

Sincerely,

HORSLEY WITTEN GROUP, INC.



Janet Carter Bernardo, P.E.
Senior Project Manager