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October 21, 2013

Ms. Margaret Hoffman, Assistant Town Planner
Hanover Zoning Board
Town Hall, Suite #24
550 Hanover Street
Hanover, MA 02339

RE: REVIEW OF STORMWATER MANAGEMENT DOCUMENTATION
KENNEDY BUILDING SITE IMPROVEMENTS
HANOVER, MA

Dear Ms. Hoffman and Members of the Zoning Board:

In response to your request, Comprehensive Environmental, Inc. (CEI) has conducted a review of information for the proposed Kennedy Building Site Improvements at the Cardinal Cushing School in Hanover. Our review has focused on the design of the Stormwater Management System and associated documentation. We have based our review on a reconnaissance of the site on October 9, 2013 and the following information furnished to the Town:

- A. Drawings entitled "Kennedy Building Site Improvements Permitting Plans, Hanover, Massachusetts" dated September 2013, prepared by Horsley Witten Group. The drawings include 9 sheets.
- B. A report entitled "Stormwater Analysis and Drainage Report, Kennedy Building, Cardinal Cushing School, 369 Washington Street, Hanover, Massachusetts" dated September 2013, prepared by Horsley Witten Group.

CEI offers the following comments regarding the documentation of the proposed stormwater management design.

A. Stormwater Management System Supporting Calculations

The following comments apply to the supporting calculations provided in the Stormwater Analysis and Drainage Report:

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1. The routing diagram provided in the calculations for proposed conditions shows the rear roof area of the building discharging to the bioretention area. The drawings do not depict such a connection.
2. The modeling of the outlet from the bioretention area uses a 24 inch orifice/grate. It is not clear from the documentation whether the model correctly accounts for the actual open area of the grate (which would be significantly less than the 24-inch square opening).
3. Calculations should include information confirming the stability of the proposed overflow spillway during the design flow condition.
4. The drainage report describes infiltrometer testing (page 3) and references Appendix A for more information. The appendix does not provide information corresponding to this testing.

B. Stormwater Management System Design

The following comments apply to the design of stormwater management facilities as depicted on the drawings furnished to the Zoning Board:

1. The roof drain downspouts appear to connect into the drainage system underground. Has the designer confirmed where these connections occur?
2. The grading as proposed results in a low spot (contour 57) at the north rear landscaped area adjacent to the building. Under existing conditions, the lawn and pavement slope toward the driveway. The information provided does not document that this area can drain adequately by infiltration. We recommend the designer either provide for a yard drain connected to the drainage system, or revise the grading to provide for positive drainage, to eliminate potential standing water in the landscaped area.
3. The slope of the existing driveway from the existing upper level rear parking to the lower level parking is currently in the range of 6 to 9 % in the vicinity of contour elevations 58 and 59 feet. The proposed grading increases this slope to the range 11 to 12%. We recommend modifying the design to maintain or flatten the existing grade through this area.
4. The drainage report references the provision of pretreatment for the rain garden, and the calculations appear to include sizing information. However, the drawings do not show the rain garden with any pretreatment (e.g., a forebay).



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5. The design detail for the bioretention area (rain garden) on Sheet C-8 of the drawings shows the bioretention soil media 12 inches in depth.
 - a. The MassDEP Massachusetts Stormwater Handbook indicates that the depth of this material should be at least 2 feet, given the herbaceous plantings proposed.
 - b. It is not clear if the specifications for the soil for this layer are consistent with the MassDEP guidelines for bioretention media.
6. The elevation difference between the overflow spillway and top of bank at the rain garden is less than 0.5 feet. This does not appear to provide adequate freeboard above the surface of water discharging over the spillway during an overflow event, such as during the 100-year storm or during a lesser event if the outlet structure is clogged with debris. Given that some embankment erosion or differential settlement may occur over time, additional freeboard should be provided to avoid risk of an inadvertent bypass of the overflow spillway. We recommend increasing the elevation difference from spillway to top of bank to one foot.
7. There appears to be a typographical error in listing the Bottom of Bed Elevation D in the table on Sheet C-8 of the drawings.

C. Compliance with the MassDEP Stormwater Management Standards

The stormwater management system design must comply with the Massachusetts Wetlands Protection Act (WPA) Regulations, and will therefore need to comply with the Stormwater Management Standards. CEI offers the following comments relative to the Stormwater Management Standards:

1. Standard 1. No new untreated stormwater discharges.

The design of the project stormwater management system provides for the treatment of all new stormwater discharges from the site.

2. Standard 2. Control of peak discharge rates.

Minor adjustments to the calculations as noted above should be completed, to confirm compliance with this standard.

3. Standard 3. Annual recharge to approximate existing site conditions.



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The design shows a net reduction in impervious surface on the site, resulting in compliance with this standard as a redevelopment project.

4. Standard 4. Stormwater quality treatment.

The redeveloped lower level parking area behind the existing building will drain to a bioretention area, receiving greater than 80% TSS removal for the contributing flows. Assuming the design is modified to provide for adequate pretreatment of runoff discharged to this facility, this represents a significant improvement over existing conditions, resulting in compliance with this standard as a redevelopment project.

5. Standard 5. Stormwater discharges from areas with higher potential pollutant loads.

The proposed development does not fall under the status of “land use with higher potential pollutant load.” Therefore, this standard does not apply.

6. Standard 6. Stormwater discharges to critical areas.

Portions of the Cardinal Cushing campus are within the mapped Zone II of the Hanover Water Supply, and also within the Town's Aquifer Protection Zone. However, the stormwater bioretention area and the associated stormwater discharge point are outside the limits of these areas. Nevertheless, according to the calculations, the proposed bioretention area is designed to handle 1-inch of runoff from the contributing impervious surface, consistent with the requirements of this standard.

7. Standard 7. Redevelopment sites.

This project constitutes a redevelopment as defined by the Stormwater Management Standards. The project reduces impervious surface, and provides treatment for a portion of the redeveloped parking lot, improving existing conditions and complying with this Standard.

8. Standard 8. Erosion and sediment controls.

The project design provides for a detailed program of erosion and sediment controls, in compliance with this Standard.

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9. Standard 9. Operation and maintenance plan.

Operation and Maintenance is discussed in the drainage report.

- a. We recommend that the permanent O&M measures, Long Term Pollution Prevention Plan, and corresponding checklists should be compiled into a free-standing document to be provided to the facility owner/operator, to serve as an O&M manual for the facility.
- b. The document should provide for the ongoing retention of records of inspections, maintenance, and repairs for at least three years, in accordance with MassDEP guidelines.
- c. As no hydrodynamic separators are proposed, reference to them should be deleted from the O&M checklist.
- d. As the overflow spillway appears to be vegetated, the checklist should be revised to provide for corresponding maintenance of this surface.
- e. CEI believes that the bioretention media infiltration capacity maintenance (item in checklist) requires the upper 6 inches of material to be rototilled, not the bottom 6 inches.

10. Standard 10. Prohibition of illicit discharges.

The Long Term Pollution Prevention Plan (LTPPP) provided in the drainage report prohibits connection of floor drains and sewer pipes to the drainage network. We offer the following comments:

- a. The applicant should file a signed Illicit Discharge Compliance Statement prior to placing any stormwater facilities into service, to comply with this Standard.
- b. The LTPPP should prohibit all non-stormwater discharges to the drainage system (in addition to sewer pipes and floor drains), except for those discharges specifically allowed by the US EPA, the MassDEP, and any local regulations. Allowable discharges should be specifically listed.
- c. CEI recommends that the applicant be required to compile documentation prior to or during construction, that an investigation has been completed to confirm that there are no existing illicit discharges to the storm drainage system serving this site or to the immediately adjacent wetland resources.



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This investigation should be performed by a qualified professional engineer, and include evaluation of the existing on-site drainage structures, as well as internal building plumbing connections that might direct non-allowable discharges to the drainage system or wetland resources.

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If you have any questions or comments regarding this report please contact me.

Sincerely,
COMPREHENSIVE ENVIRONMENTAL INC

David C. Nyman, P.E.
Senior Civil Engineer

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Cc: Amy Walkey, Conservation Agent (via e-mail)
Brian Kuchar, R.L.A., P.E., Horsley Witten Group (via e-mail)

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