



Eggleston Environmental

May 6, 2016

Haverhill Conservation Department
City Hall, Room 201
4 Summer Street
Haverhill, MA 01830
Attn: Robert E. Moore, Jr., Environmental Health Technician

**RE: Stormwater Management Review
174 North Ave – Wingate Assisted Living**

Dear Mr. Moore:

Per your request I have conducted a technical review of the April 2016 NOI application packet for the proposed Wingate Residences Assisted Living Facility at 174 North Avenue in Haverhill, with respect to stormwater management. Included in the materials I received and reviewed were the following:

- Notice of Intent (w/ Stormwater Report) – 174 North Avenue Haverhill, prepared for WHC Haverhill AL, LLC by Weston & Sampson and dated April 2016.
- NOI Submission Site Plan – Wingate Residences Haverhill Proposed Assisted Living Facility, prepared by Weston & Sampson and dated April 27, 2016.

I also conducted a brief site visit to the property to observe existing drainage patterns.

In accordance with your Scope of Work the focus of my review is on the overall stormwater management approach and design concepts used in the project and its compliance with Massachusetts Stormwater Management Standards and accepted engineering practice, particularly as those standards and practices pertain to the protection of the eight interests of the Wetlands Protection Act and the resource area values identified under Chapter 253, Section 1 of Haverhill's Wetlands Protection Ordinance.

The project site is an approximately 8.1-acre parcel adjacent to the Wingate nursing home on North Road in Haverhill. The site is currently undeveloped and vegetated with dense brush. Runoff is overland in a northerly direction to two isolated wetlands and a bordering vegetated wetland on the property and downgradient of that to an existing culvert at Route 495. The proposed project calls for construction of a new assisted living facility with associated paved driveways, parking and utilities. As proposed, runoff from the development would be conveyed through a closed drainage system to a series of infiltrating stilling areas, swales and stormwater basins, with overflow to the BVW and downgradient culvert.

My comments on the proposed plan as presented in the application are outlined below:

1. The hydrologic analysis and drainage design is based on outdated (1961) TP-40 precipitation frequency data that is not representative of current climatology. More recent rainfall data should be used; either from NOAA's Atlas 14, which supersedes TP-40, or that developed by the Northeast Regional Climate Center and available at www.precip.net.
2. The drainage analysis uses a single control point at the downgradient (offsite) culvert. Given that there are several wetland resources on the site, and that some of the runoff flow is to or through those individual wetlands, they should also be included as control points in the analysis so that the potential impacts on the hydrologic regime of the resource areas can be assessed.
3. The hydrologic analysis is based only on the area of the project site and does not take into account the drainage onto the site from properties to the south and west.
4. The post-development drainage area map/routing diagram is difficult to read at the scale it is presented in the Stormwater Report and it does not clearly show the subarea boundaries.
5. In accordance with the MA Stormwater Handbook, exfiltration should be calculated over the bottom area (floor) of the basins only, not the wetted area.
6. The proposed project relies on a series of infiltrating stilling areas and stormwater basins to mitigate runoff rates and to recharge and treat the stormwater runoff. Based on the NRCS soil mapping, the predominant soils on the site are Canton and Sutton fine sandy loams, both designated HSG B and generally suitable for infiltration. However, the seven soil test pits dug on the site all revealed a restrictive layer of dense gray silt and clay not characteristic of these soils roughly two to three feet below grade, and a seasonal high groundwater table perched on top of that layer. Based on this test pit data, I do not believe that the 1.02 in/hr design infiltration rate assumed in the hydrologic analysis and in the sizing of the proposed BMPs is appropriate unless the restrictive layer is fully penetrated and removed.
7. The test pit data also indicate that proposed Stilling Areas 1, 2 and 3 and Stormwater Basin 2 would not provide the 2-ft separation to seasonal high groundwater required by Stormwater Standards 3 and 4.
8. Since the proposed infiltration basins are used to attenuate peak flows during the 10-yr and larger storm events and the separation to seasonal high groundwater is less than four feet, a mounding analysis is also required under Stormwater Standard 3.
9. Portions of the two proposed stormwater infiltration basins are located within the 50-ft buffer to the BVW, and a portion of Stilling Area 3 is within the 50-ft buffer to

Isolated Wetland “D”. The MA Stormwater Handbook prohibits stormwater infiltration within 50 feet of a wetland resource area.

10. The proposed treatment train does not provide adequate pretreatment of the pavement runoff prior to discharge to the infiltration BMPs. The 80% TSS removal credit in the MA Stormwater Handbook is predicated on adequate pretreatment being provided, e.g. in a sediment forebay or equivalent. Lack of adequate pretreatment can also lead to a reduction in the rate of exfiltration and premature failure of the basins.
11. The discharge from Stilling Area 1 would flow to a wetland resource area (Isolated Wetland 1) before it makes it way to the downgradient stormwater basins, hence it must be demonstrated that the basin at Stilling Area 1 provides adequate water quality volume to treat the runoff from its tributary drainage area prior to discharge.
12. It is not clear from the plan how roof runoff from the assisted living building would be being handled. To the extent possible, roof runoff should be discharged to infiltration structures directly and not combined with pavement runoff.
13. The TSS removal calculations assume 5% TSS removal for street sweeping. As you are aware, the credit for street sweeping is discretionary on the part of Conservation Commissions and not something I typically recommend granting as it relies on follow through by future property owners.
14. While the proposed infiltration basins are designed to mitigate runoff rates for up to and including the 100-yr storm, it is not clear that the closed drainage system is designed to convey the flow from storms that large. If is not, alternative drainageways should be provided to convey the excess runoff to the basins.
15. The catchbasin outlet hood should be specified on the plan; I recommend the LeBaron Snout or Eliminator brands.
16. A design detail for the flared end sections should be added to the plan, with the stone aprons sized to prevent scour in accordance with Standard 1.
17. As indicated in the Stormwater Checklist, the proposed project entails the disturbance of more than one acre of land and will therefore be subject to EPA’s NPDES Construction General Permit (CGP). Prior to the initiation of work the selected contractor will need to file a Notice of Intent for coverage under the CGP, and prepare a Stormwater Pollution Prevention Plan (SWPPP) to be implemented during construction. This requirement should be clearly noted on the plans, and the Conservation Commission should have the opportunity to review the SWPPP prior to the start of work.
18. The Long Term Pollution Prevention Plan calls for using sand and salt to treat paved surfaces and for plowing snow towards grassed areas off the pavement. Much of the

grassed area adjacent to the pavement on the site is within the infiltrating stilling areas and stormwater basins - plowing sediment laden snow into these basins is likely to compromise their infiltration capacity. Designated snow storage areas should be identified on the plan at locations that are either upgradient of pretreatment facilities or on pervious surfaces where the accumulated sediments can be raked out and removed in the spring.

19. I have the following comments on the Operation and Maintenance (O&M) Plan submitted with the Application:
- The plan should identify the owners and parties responsible for the ongoing maintenance of the stormwater system.
 - The plan should include a simple figure showing the locations of all stormwater BMPs to be maintained as well as designated snow storage locations.
 - The O&M Plan and the Long Term Pollution Prevention Plan should be combined in a single standalone document to be kept and used onsite.
 - Per DEP requirements, an estimated annual budget for maintenance is required.
20. The Illicit Discharge Statement included with the NOI submittal will need to be signed prior to discharge occurring. In addition, I recommend that in conjunction with the as-built plans and certification the finished project should be inspected by a qualified professional engineer who can certify that there are no illicit connections to the storm drainage system.

I appreciate the opportunity to assist the Haverhill Conservation Commission with the review of this project, and hope that this information is suitable for your needs. Please feel free to contact me if you or the applicants have any questions regarding the issues addressed herein.

Sincerely,
EGGLESTON ENVIRONMENTAL



Lisa D. Eggleston, P.E.