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Wingate Residences Haverhill
Haverhill, MA
WSE Job No. 2140079

June 6, 2016

Robert E. Moore, Jr.
Haverhill Conservation Department
4 Summer Street
Haverhill, MA 01830

Re: Wingate Residences Haverhill
Stormwater Management Review – Response to Comments

Dear Mr. Moore,

The following is Weston & Sampson's response to the peer review comments from Lisa Eggleston dated May 6, 2016.

1. *Question: The hydrologic analysis and drainage design is based on outdated (1961) TP-40 precipitation frequency data that is not representative of current climatology.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.*

   Response: The rainfall has been updated using Northeast Regional Climate Center data in both the existing and proposed stormwater model.

2. *Question: 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.*

   Response: The individual wetlands have been added as control points in both the existing and proposed stormwater models.

3. *Question: 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.*

   Response: The HydroCAD model has been updated to include additional watershed areas from the south and west.

4. *Question: 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.*

Response: A new diagram has been provided.

5. *Question: In accordance with the MA Stormwater Handbook, exfiltration should be calculated over the bottom area (floor) of the basins only, not the wetted area.*

   Response: The model has been changed to only allow exfiltration on the basin floors.

6. *Question: 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.*

   Response: The Stilling Areas that have been modified to be bioretention areas are not accounting for any exfiltration. The stormwater basins have been adjusted to provide more than four feet of separation to seasonal high groundwater. The favorable material above the restrictive layer has been increased; therefore, the 1.02 in/hr infiltration rate has been maintained.

7. *Question: 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.*

   Response: Stilling Area 3 has been removed and Stilling Areas 1 and 2 have been modified to be bioretention areas. These areas and both stormwater basins have been adjusted to provide adequate distance to seasonal high groundwater.

8. *Question: 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.*

   Response: The proposed stormwater basins have been adjusted to provide four feet or more of separation to seasonal high groundwater.

9. *Question: 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.*

   Response: The stormwater basins have been moved outside of the 50-ft buffer area. Stilling Area 3 has been removed from the project.

10. *Question: 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.*

    Response: A sediment forebay has been added upstream of Stormwater Basin 1 for pretreatment. Stormwater Basin 2 does not have one, as it is only receiving runoff from the roof and from western, unaltered portions of the property. Stilling Area 3 has been removed and Stilling Areas 1 and 2 have been modified to be bioretention areas and are sized to handle more than the required water quality volume.

11. *Question: 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.*

    Response: Stilling Area 1 has been modified to be a bioretention area to achieve adequate water quality prior to discharge to Isolated Wetland C. The area has been sized to treat more than the required water quality volume. A calculation has been provided showing the required and provided water quality volumes.

12. *Question: 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.*

    Response: Piping for the roof runoff has been added to the plans. Runoff from the western side of the building flows directly into Stormwater Basin 2; however, runoff from the east is connected into the driveway drainage system.

13. *Question: 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.*

    Response: Updated TSS removal calculations will be provided.

14. *Question: 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.*

Response: During certain storm events, paved areas may overtop the curb. These areas are graded into BMPs. The continued maintenance of these grass areas through mature root growth will be included in a revised O&M Plan.

15. *Question: The catch basin outlet hood should be specified on the plan; I recommend the LeBaron Snout or Eliminator brands.*

Response: A note has been added to the Standard Catch Basin detail (Detail 3, Sheet C8.02).

16. *Question: 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.*

Response: The Flared End Pipe detail (Detail 1, Sheet C8.02) has been updated.

17. *Question: 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.*

Response: A note has been added to Sheets C0.01 and C2.01 indicating that the Contractor is responsible for filing with the EPA.

18. *Question: 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.*

Response: A figured will be provided for inclusion into the compiled LTPPP and O&M Plan, as described below.

19. *Question: 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.*

Response: A figure will be added to the O&M Plan, as requested. The written plan previously submitted identifies the Owner as WHC Haverhill AL, LLC and a budget of $10,000 per year for maintenance of the BMPs. Upon approval of the O&M Plan and LTPPP, a compiled document will be provided to the Owner for implementation.

20. *Question: 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.*

Response: This will be signed by the Owner. If the Commission sees fit, we would suggest that a condition be applied to the approval of the project indicating that a professional engineer certify that no illicit connections exist into the City's storm drainage system.

If you should have any questions or require additional information, please contact me.

Very truly yours,

WESTON & SAMPSON

S. Roger Alcott, PE
Team Leader