

February 16, 2022

Jacki Byerley, Planner  
Andover Planning Board  
Town Office  
36 Bartlett Street  
Andover, MA 01810

**Re: Andover West Elementary and Shawsheen Preschool, DEP #090-1387**

*Stormwater Second Peer Review Comments*

*SMMA No. 19146*

Dear Ms. Byerley:

We appreciated the opportunity to present the Andover West Elementary School and Shawsheen Preschool project to the Board at their January 11, 2022 public hearing. As you know, a Notice of Intent was also filed with the Conservation Commission and the project was before the Commission at the December 21, 2021 public meeting. It was requested that the project be peer reviewed, and Horsley Witten Group (HW) was retained to review the stormwater design.

We have received HW's second comment letter dated February 14, 2022 and would like to take the opportunity to respond. Only the outstanding comments have been responded to below; resolved comments have not been included in this response letter. Following each comment is our response in italics.

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

b. The proposed development has several outfalls to wetland areas onsite. Some of these wetland areas are intermittent design points of analysis. Riprap has been proposed at each outlet, but it does not appear that riprap sizing calculations have been provided based on the outlets. For example, it is unclear the sizing of FES 1-1, FES 1-4, and FES 1-5. HW recommends that the Applicant provide riprap sizing calculations and include either a schedule of dimensions for each outfall on the flared end section detail in the plans set or dimension each on the Grading and Drainage Plan.

February 14, 2022: The Applicant has provided calculations for riprap sizing as well as a schedule on the drawings in the Details. It is unclear on the drawings or calculations what size D50 is specified for each FES. HW recommends that the Applicant add a column to the schedule to include the D50 sizing on the plans and on the calculation sheet for each FES for consistency.

*Riprap sizing calculations have been attached and are based on formulae provided in the Connecticut Guidelines for Soil Erosion and Sediment Control. The calculation for median stone size (D50) is partially based on the 25-year peak flow*

*being conveyed to each riprap apron. Riprap aprons on-site are proposed to experience relatively low peak flows in the larger design context of the D50 sizing formula, and therefore very small D50 sizes were calculated for some riprap aprons on-site. Accordingly, a D50 of 6-inches has been specified for each riprap apron, which is between the customary 5-inch "moderate" D50 and 8-inch "intermediate" D50 categories specified in the Connecticut guidelines. Please refer to the revised detail on sheet C-501.*

2. Standard 2 required that post-development runoff does not exceed pre-development runoff off-site.

b. The Applicant has mentioned the construction of a turf field on the project site. It is unclear how or if the subsurface area of the turf field will be connected to the proposed drainage system or if it will have any underdrains. The proposed grading on the proposed turf field is unclear. HW recommends that the Applicant include the proposed turf field design infrastructure as part of the Grading and Drainage Plan.

February 14, 2022: The Applicant has added a Turf field drainage grading sheet to the plan. It appears that the connection out for the Turf field drainage does not line up with the Pipe out from the field on the Grading and Drainage Plan I. The Turf field also indicates 2 pipes leaving the system, a 6-inch and a 15-inch, for high flow and low flow events. The low flow pipe is not shown as a connection on the Grading and Drainage Plan I. The Grading and Drainage Plan I also references an enlargement area H4 on sheet C143. This enlargement area does not appear on that sheet. HW recommends that the Applicant review and revise these items and callouts as needed.

*The athletic field consultant, JJA Sports LLC, has revised the outlet pipe from the field on the enclosed sheet C-803 such that its location is consistent with that which is shown on sheet C-141. The pipe callouts on sheet C-141 have been revised to reflect both the 6-inch and 15-inch pipes leaving the turf field drainage system as requested. The enlargement H4 appears on sheet C-143 as requested.*

h. The pipe connecting OCS 1-1 and FES 1-1 lists the slope as .006 or 0.6%. Based on the outlet invert of OCS 1-1 and FES invert out this appears incorrect as there is a 5.74 foot drop over 200 feet (0.029 or 2.9%). Furthermore, the 24-inch outlet pipe appears to have an outlet invert elevation of 151.00. The surrounding grading indicates that this outfall is between contour elevations 154 and 153. It is unclear if there is any additional grading around the outfall. HW recommends that the Applicant review and revise this outfall as needed.

February 14, 2022: The Applicant has revised the outfall invert and the slope of the pipe to reflect a 0.8% slope with an outfall of 154.50. It appears that based on the slope and the grading associated with the cover, approximate 35 feet of the pipe will have no cover. HW recommends that the Applicant review and revise the grading such that there is adequate cover over the outfall pipe.

*In addition to minor grading revisions proximate to FES 1-1, the drainage conveyance from OCS 1-1 to FES 1-1 has been revised to address cover concerns.*

*Additional changes have been made to the conveyance train from OCS 1-1 to support changes to the OCS and associated subsurface system 3 (per comments j. and k. below). Please refer to sheets C-141 and C-142.*

i. The grading around OCS 1-1 appears to be missing a 167 contour. The rim elevation is 167.5 with the nearest contour being 166. HW recommends that the Applicant review the grading in this area.

February 14, 2022: The Applicant has revised the grading in the area of the OCS. However, due to the shading of the subsurface basin, it is unclear how the 167 contour ties back on the south side. HW recommends that the Applicant review the contours and revise as needed.

*The shading of the subsurface basin has been made translucent to improve visibility of the proposed grading within the footprint of the basin. Please refer to sheet C-142.*

j. The Applicant has proposed three subsurface systems that are fully wrapped in impermeable liner. These subsurface systems have been wrapped due to high groundwater and are being used for detention and water quality. It appears none of these systems have underdrains in them and would therefore constantly hold water below the inlet and outlet elevations. For Example, Subsurface System 3 has an inlet of 156.00 and an outlet of 156.74. The bottom of the system is set at 156.00 and the bottom of the chambers is set at 156.75. System 3 is designed to have water sit to an elevation of 156.75 (outlet pipe) which means the inlet pipe at 156.00 would constantly stay submerged. HW recommends reviewing and revising these inlets and outlets as needed. HW also recommends installing a four-inch underdrain to ensure that the full storage can be drained and used. Furthermore, HW recommends that the Applicant review each outlet control structure (OCS) that has a two-inch orifice at the base of the outlet control weir to ensure proper drainage.

February 14, 2022: The Applicant has revised Subsurface System 3 to have an outlet of 156.00. The proposed system no longer has a condition where chambers would be submerged. However, it appears that the bottom 9 inches of stone will still be submerged as the system is lined with an impermeable liner. HW recommends that the Applicant add a 4-inch underdrain at the bottom of the stone along one side of the system to allow drainage of the stone. The underdrain would be within the system and within the permeable liner, such that it would only drain the system and not the adjacent groundwater. HW recommends that the Applicant tie this underdrain directly into the outlet structure.

*A 4-inch underdrain pipe, placed at the bottom of the Subsurface System 3 stone layer and directly connected to the associated outlet control structure, has been added to the HydroCAD model, the relevant subsurface system and outlet control structure (OCS) details, and the grading and drainage plans. The low-flow orifice elevation and the OCS outlet pipe have been lowered to the same bottom-of-stone elevation. Please refer to sheets C-141 and C-142 for the underdrain layout and spacing, and sheet C-502 for the revised details.*

k. The Applicant has proposed three OCS for the three subsurface systems. Currently,

the detail on the plan set calls out a two-inch orifice at the base of each weir that should be unplugged after every storm event to be operated as a manual drain. This appears to be labor intensive and is not listed in the O&M plan as something that is required after every storm event. HW recommends removing the plug from the orifice weir design and revising the HydroCAD to reflect an open low flow orifice. Furthermore, HW suggests reviewing the size of the orifice and revising to a larger size if flows allow to prevent clogging.

February 14, 2022: The Applicant has revised its orifice outlets for each system. Currently, the amount of storage in each of these systems is reduced after the initial storms fill up the void spaces in the stone below the bottom of the chamber elevation. HW recommends that the Applicant revise the hydrocad model and plans to reflect the reduction in storage in each system or as noted above provide a 4 inch underdrain pipe in each system tied to the applicable orifice to drain the stone beneath the chambers.

*A 4-inch underdrain pipe, placed at the bottom of each subsurface system's stone layer and directly connected to the associated outlet control structure, has been added to the HydroCAD model, the relevant subsurface system and outlet control structure (OCS) details, and the grading and drainage plans. The low flow orifice elevation and the OCS outlet pipe have been lowered to the same bottom-of-stone elevation. Please refer to sheets C-141 and C-142 for the underdrain layout and spacing, and sheet C-502 for the revised details.*

l. HW recommends adding the limit of disturbance to the Grading and Drainage Plans, the Utilities Plans, and the Layout and Materials Plans for reference.

February 14, 2022: The Applicant has added a Limit of Work/Disturbance to the Grading and Drainage Plans. The Applicant did not submit revised Utility or Layout and Materials Plans showing this addition. HW suggests adding the same Limit of Work/Disturbance to the entire plan set.

*The limit of work line added to the Grading and Drainage Plans (C-141 and C-142), the Utility Plans (C-151 and C-152), and Layout and Materials Plans (L-121 and L-122). We would be pleased to issue the entire plan set showing this limit of work line upon final Planning Board approval.*

q. The Applicant has provided a HydroCAD analysis to demonstrate that post-development runoff rates and volumes do not exceed those of pre-development conditions. HW has the following comments regarding the HydroCAD analysis:

i. The Applicant is showing a 25-foot length of 12-inch pipe from DMH 1-29. The proposed HydroCAD models the proposed turf field with a 15-inch pipe having a primary outfall at 146.77. (Node - Pond P-1.3) HW recommends that the Applicant clarify the intent of this pipe and whether it is the outfall for the turf field. If so, HW recommends that the Applicant review and revise the size, slope, and elevation of the turf field outfall so that it is consistent with the Grading and Drainage Plans.

February 14, 2022: The Applicant has revised its HydroCAD to reflect the 15-inch

pipe shown on the Turf Field plans. However, it appears that there is an additional 6-inch pipe shown on the plans for low flow conditions that is not accounted for. HW recommends that the Applicant review and revise the plans and HydroCAD to include this pipe.

*The proposed conditions HydroCAD model and sheet C-141 have been revised to account for the additional 6-inch outlet pipe connected to the turf field drainage.*

iii. The Applicant has proposed three bioretention areas onsite for water quality and storage. These areas are depicted in the proposed HydroCAD as Ponds B-1.10, B-1.6, and B-3.0. The detail on the plans shows each of these bioretention areas are lined with an impermeable liner and have an underdrain. However, these underdrains area not modeled as part of the HydroCAD. HW recommends revising the HydroCAD to include the modeling of these underdrains as outlet flow from the bioretention areas to present a more accurate representation of capacity.

February 14, 2022: The Applicant has added underdrains Nodes to the Bioretention Area treatment train within the HydroCAD model. The Applicant has also revised the Bioretention nodes to clarify the intent of the underdrains. HW recommends that the Applicant revise the Bioretention exfiltration rate to reflect an HSG 'A' soil with an infiltration rate of 2.41 inches/hour. HW also recommends clarifying the intent of Pond B-1.10 and Pond B-1.6 is to have a horizontal grate opening of 2-inch x 2-inch for low head flow or if the orifice should be a 2-foot x 2-foot catch basin grate.

*The bioretention media exfiltration rate has been revised to 2.41 inches/hour as requested for each bioretention area. The horizontal grate openings specified in ponds B-1.10 and B-1.6 have been revised to model a 2-foot by 2-foot catch basin grate. Please refer to the updated proposed conditions HydroCAD model enclosed with this document.*

iv. The Applicant has provided peak flow attenuation and analysis for the entire site. This analysis shows the existing condition of the site and the final post construction condition of the site. However, based on the phasing plan, it appears there is an intermittent time where the impervious runoff onsite is considerably more than the existing or the proposed condition and the proposed drainage system will not be installed to detain or provide water quality. HW recommends that the Applicant provide an analysis of the interim condition and confirm that the increased runoff does not create an adverse interim condition that the downstream design points cannot manage.

February 14, 2022: The Applicant has provided the peak discharge HydroCAD analysis for the 2-year event. The Applicant has also provided the revised site preparation plans to route the drainage onsite as necessary during the interim conditions. HW recommends that the Applicant include this data as a section within the Stormwater Drainage Report narrative for the project.

HW further recommends that any HydroCAD adjustments that would reflect a change in the peak runoff rates in the existing or proposed condition be updated in the Stormwater Report narrative for consistency.

*As discussed with Horsley Witten on 2/14/2022, SMMA has prepared a section in the enclosed and revised Stormwater Report narrative to discuss the temporary peak impervious hydrology analysis. Additionally, all updated peak rates from hydrology-related revisions have been included in the Stormwater Report narrative for consistency.*

9. Standard 9 required a Long-Term Operation and Maintenance (O&M) Plan be provided. The Applicant has provided a Stormwater Operation and Maintenance (O&M) Plan, which includes instructions for maintenance of stormwater control measures, an O&M budget, and an O&M checklist. HW has the following comments regarding the O&M Plan:

d. Andover Stormwater Regulations Section VI.C.1.b.7, HW recommends that the Applicant include a simple sketch as part of the O&M Plan that clearly labels the various stormwater practices to be inspected.

February 14, 2022: The Applicant has provided a sketch for various stormwater practices. HW recommends included locations of catch basins that need to be inspected or maintained as part of this plan.

*The stormwater BMP sketch at the end of the Operation & Maintenance Plan has been revised as requested; see the revised Operation & Maintenance Plan enclosed with this document.*

e. February 14, 2022: HW recommends that the Applicant provide a snow removal/storage plan as part of the O&M Plan. The Applicant may consider incorporating the snow storage locations into the BMP maintenance plan with notes or highlighted areas.

*SMMA has incorporated permanent signage prohibiting snow storage near wetland resource areas and bioretention basins. As discussed with Horsley Witten on 2/14/2022, this meets the concern relative to snow storage areas near BMPs and wetlands, and satisfies the comment. Please see the attached Signage Plan (C-131).*

f. February 14, 2022: HW recommends that the Applicant include the manufacturer maintenance guidance or information for the water quality units and turf field as part of the O&M Plan.

*As discussed with Horsley Witten on 2/14/2022, SMMA will include a final O&M Plan that will contain specific manufacturer requirements including water quality units and field drainage BMPs. Because specific manufacturers will be reviewed and approved during construction, the final O&M plan will be submitted prior to occupancy.*

12. Other comments:

d. February 14, 2022: HW recommends adding a scale to Sheet C803 in addition to the listing as noted.

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*A scale bar has been added to the enclosed C-803 sheet.*

We believe this response letter addresses all remaining comments. Please call (617) 833-1483 if there is a need for future correspondence.

Very truly yours,

**SMMA**



Erin Prestileo, PE  
Senior Associate

cc: Janet Bernardo, PE, Horsley Witten Group  
Bob Douglas, Andover Conservation Commission  
MA DEP Northeast Regional Office  
Janet Nicosia, Town of Andover, Director of Facilities  
Jacki Byerley, Planner, Town of Andover  
Joel Blumstein, Chairman, Andover WESP School Building Committee

Enclosures:

Plans:

C-131 Signage Plan, dated 02/15/2022  
C-141 Grading & Drainage Plan, dated 02/15/2022  
C-142 Grading & Drainage Plan, dated 02/15/2022  
C-143 Grading & Drainage Enlargement, dated 02/15/2022  
C-501 Details I, dated 02/15/2022  
C-502 Details II, dated 02/15/2022  
C-803 Athletic Field Grading and Drainage Plan, dated 02/14/2022

Calculations:

Riprap Sizing Calculations, dated 02/15/2022  
Proposed Conditions HydroCAD model, dated 02/15/2022  
Peak Impervious Cover HydroCAD model, dated 02/15/2022

Attachments:

Operation & Maintenance Plan, dated 02/15/2022  
Revised Stormwater Report Narrative, dated 02/15/2022