SMMA

February 4, 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 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 initial comment letter dated January 31, 2022 and would like to take the opportunity to respond. 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.

a. The existing site discharges stormwater via overland flow to four separate design points of analysis (DP). Under proposed conditions the Applicant has provided stormwater practices to collect, manage, treat, and recharge the stormwater within the developed areas of the site. The watershed areas and flow rates that continue to discharge towards the DPs have been reduced under proposed conditions. The project discharges stormwater runoff to adjacent bordering wetlands from proposed outfalls. The Applicant has demonstrated that there are no new untreated discharges to the wetlands as a result of the project.

No response required.

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.

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Riprap sizing calculations have been completed and enclosed with this document. Dimensions for each rip rap outfall have been provided in a schedule on the Flared End detail (C3 on sheet C-501).

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

a. The Applicant has provided a HydroCAD model using the most recent Atlas-14 Rainfall data from NOAA's online database as noted in its stormwater report. HW recommends that the Applicant provide a printout of the rainfall data to include as part of the report to confirm the precipitation depths used.

A printout of the NOAA rainfall data incorporated into the HydroCAD model is enclosed with this document.

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.

The Athletic Field Grading and Drainage Plan (C-803) prepared by JJA Sports, Inc., has been enclosed with this document.

c. The Applicant has proposed a turf field but has not included any details of the subsurface system. HW recommends that the Applicant include any pertinent details for the turf field on the Detail Sheets of the plan set.

The drainage detail sheet (C-807) of the Athletic Field plans prepared by JJA Sports, Inc. has been enclosed with this document.

d. The Grading and Drainage Plans list inverts for drain manholes and catch basins either to the nearest tenth or nearest hundredth. Some drainage structures list all inverts and outlets and some list only one. HW recommends that the Applicant verify it has included all inverts and outlets of each structure. Furthermore, HW suggests that the Applicant consider adding a structure table to the Grading and Drainage Plan.

All invert elevations have been added to drainage structure callouts and are rounded to the nearest hundredth. To improve plan readability, several areas have been designated for plan enlargements; please refer to Sheet C-143 for the grading and drainage enlargement plan.

e. The Grading and Drainage Plans lists area drains surrounding the proposed school area. Some of these area drains do not have rim or invert elevations or callouts identifying them. HW recommends that the Applicant review the Grading and Drainage Plans and revise as needed.

The plans been revised as requested; please refer to Sheet C-141 and the Grading and Drainage enlargements on sheet C-143.

f. The Grading and Drainage Plans lists length, size, and direction of flow on some pipes on the plan set but not all. HW recommends that the Applicant verify that all of the pipe sizes and slopes have been labeled on the plan set.

All pipe sizes and slopes have been added on the plan set. Flow arrows have been included for all labels anchored to each pipe; AutoCAD Civil 3D does not have the functionality to support flow arrows when Civil 3D callouts are placed in a "dragged" state. To improve plan readability, several areas have been designated for plan enlargements; please refer to sheet C-143 for the grading and drainage enlargement plan.

g. The pipe connecting FES 1-3 and FES 1-2 does not appear to have adequate cover based on the contouring in the area. Furthermore, an adjacent spot grade of 160.25 is shown by a sidewalk crossing with no corresponding 160 contour before the grade slopes to 159 into the adjacent Bioretention Area 1. HW recommends that the Applicant review the grading in this area.

The pipe connecting FES 1-3 and FES 1-2 has been specified with a 6" diameter and the contouring above the pipe has been updated such that up to approximately 18" of cover is achieved over the pipe. No vehicular traffic is anticipated over the pipe. The grading proximate to the sidewalk crossing has been revised as requested; please refer to sheets C-141 and C-142 of the enclosed drawings.

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.

The outlet invert elevation of FES 1-1 has been changed to 154.40 to reflect the proposed grading design. The outlet invert of OCS 1-1 has been changed to 156.00. The pipe length callout has been revised to 195 LF resulting in a 0.01 ft/ft slope.

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.

The rim elevation of OCS 1-1 has been revised to reflect the proposed grades proximate to the structure.

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.

The bottom-of-chamber elevation for Subsurface System 3 has been revised to be 156.00. To remove conditions of constant chamber submergence, the invert-in and invert-out elevations of structure OCS 1-1 have been revised both to be consistent with the bottom-of-chamber elevation. Additionally, the 2" plugs originally proposed for all three subsurface systems' respective outlet control structures have been removed, enabling all three systems to continuously drain and remove a possible standing water condition. We believe these changes to address drainage concerns in the structures, and we view a potential underdrain below each system as a measure that would periodically intercept groundwater and may not serve to drain the systems as intended. Please refer to the response below for additional information relative to the size increase of proposed low-flow orifices.

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.

The 2" plugs originally proposed for all three (3) subsurface systems' respective outlet control structures have been removed, enabling all three subsurface systems to continuously drain and remove a possible standing water condition. The HydroCAD model has been revised accordingly. SMMA has reviewed the size of each orifice and has increased the orifice diameters in OCS 2-1 and OCS 2-2 from 2” to 4”, as allowed by the applicable peak flow regulations.

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.

The limit of disturbance has been added to the Grading and Drainage Plans and the Utilities Plans. SMMA has coordinated with CBA Landscape Architects, LLC, to add the limit of work line to their Layout and Materials plan.

m. The Applicant has provided a permeable pavement detail with a six-inch underdrain in an eight-inch reservoir stone layer. It is unclear based on the detail where the underdrain sits in the layer. HW recommends adding a dimension or elevation for reference.

Dimensions have been added to the permeable pavement details on sheet C-504 to illustrate 1” of crushed stone above and below the underdrain.

n. The Applicant has proposed replacing a twelve-inch reinforced concrete pipe (RCP) wetland outfall pipe that connects to DMH 1-6. It is unclear if this is a back pitched pipe on purpose or if the inverts of DMH 1-6 are incorrect. HW recommends that the Applicant review and revise as needed or clarify the intent.

The outlet of the wetland outfall pipe has been revised such that the pipe flows west to east at a slope of 1%. The inlet elevation of the existing wetland outfall is proposed to match existing conditions. See sheet C-141.

o. There are a few areas onsite where it appears the drainage pipe linework has multiple pipes shown on the Grading and Drainage Plans. HW recommends that the Applicant review the drainage linework and revise as needed.

The drainage pipe linework has been revised as requested.

p. The Applicant shows a detail for OCS 2-1. It appears that the invert in and the invert out are not consistent with the inverts called out on the Grading and Drainage Plan. HW recommends that the Applicant review and revise as needed.

The inverts for OCS 2-1 have been reconciled. See sheets C-502 and C-141 for the proposed inverts.

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.

SMMA can confirm the pipe in question is the outfall for the athletic turf field. The athletic field consultant, JJA Sports, Inc., has designed and sized the outfall pipe to be 15 inches in diameter, and SMMA's HydroCAD model and C-141 drawing have been revised such that the outfall pipe's size, slope, and invert elevations are consistent with the athletic field drawings.

ii. The Applicant shows two large areas of porous pavement on the plans. These areas are depicted in the proposed HydroCAD as Ponds P-1.11 and P-2.1. Both of these nodes have primary outlets included as 12-inch culverts. However, the detail for porous pavement and the routing on the plans depict a 6-inch pipe. HW recommends that the Applicant revise the plans or HydroCAD for consistency. Furthermore, HW recommends coordinating the outlet invert height for the primary outlet in HydroCAD with the detail on the plans. (In reference to comment 2.m.).

The HydroCAD model has been revised such that the underdrains modeled as culverts in nodes P-1.11 and P-2.1 reflect the 6" diameter shown in the relevant detail. The outlet invert height in the HydroCAD model for these underdrains has been revised to reflect the updated detail A7 on Sheet C-504.

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.

The HydroCAD model has been revised to include underdrain modeling for each of the three (3) bioretention areas. Please refer to the 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.

Construction phase stormwater analysis was not provided in the initial permit submission package because it is not required. It is difficult to develop a construction phase hydrology model because land cover and BMPs change over the course of construction.

SMMA understands HW's concern that there may be a period during construction between Phase 1 and 2A in which the impervious cover is greater than the existing conditions, when the new school and western driveway are complete before the existing school is demolished. It should be noted that this condition may occur for a period of a few months.

SMMA has developed a HydroCAD model to estimate what the peak rates of runoff may be during this time when the impervious area is the greatest. The model accounts for the new school, western loop driveway, and associated stormwater systems along with all of the existing roof, construction area, and temporary parking lots still being used by the school. The Phase 2A Site Preparation Plan (C-113) includes two temporary basins, which are also represented in the HydroCAD model, and will handle runoff from portions of the construction zone.

SMMA also found that the temporary parking lot created during Phase 1 adjacent to Beacon Street was contributing to an increase in peak flow to Design Point 2. In order to mitigate runoff from this temporary parking lot, the enclosed drawings and new HydroCAD model now include it as pervious pavement. It is represented as such in HydroCAD.

The table below summarizes the existing condition and peak impervious cover condition for the 2-year storm. Three of the four Design Points in the peak impervious condition either remain unchanged or reduce peak rates of runoff relative to the existing condition. A minor peak flow increase in Design Point 3 is indicated. In reality, Wetland G (Design Point 3) discharges to the drainage in Beacon Street (Design Point 2) before ultimately discharging across the street.

When these two design points are summed, the existing is 0.68 cfs and peak impervious cover is 0.61 cfs, therefore not increasing peak discharge rates downstream or both design points.

Design Point	2-Year Peak (cfs)	
	Existing	Peak Impervious Cover
DP-1	16.09	14.08
DP-2	0.60	0.16
DP-3	0.08	0.45
DP-4	0	0

r. It appears there is a foundation drain called out around the building, but it does not have a symbol on the plan set. HW recommends including this line type symbol in the legend.

The foundation drain line type symbol appears in the legend on Sheet C-142.

3. Standard 3 requires that recharge from post-development shall approximate annual recharge from pre-development conditions.

a. The Applicant has conducted multiple test pits onsite. A geotechnical report that includes soil borings has been provided as part of the Stormwater Report by Nobis Engineering. Based on the geotechnical report and test pit data, the depth to groundwater onsite ranges from zero feet (at surface) to greater than 10 feet with several areas under 3 feet depth to groundwater. Due to the conditions onsite, it appears impracticable to recharge groundwater, so the Applicant has lined stormwater systems and focused on water quality and a reduction in impervious. The proposed site design has an overall reduction in impervious area. The required recharge volume is 0 cf. No further action required.

No response required.

4. Standard 4 required 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 Applicant has stated that the project achieves at least 80% TSS removal via deep sump catch basins and a hydrodynamic separator located just before the stormwater system discharges into the wetland. HW has the following comments on this calculation.

i. The Applicant has provided two details for water quality units (WQU). It is unclear based on the plans where each of these are used. HW recommends that the Applicant provides a schedule in the details that lists which WQU is to be used where or detail callout on the Grading and Drainage Plans.

Each water quality unit (WQU) on sheet C-141 is provided with a callout referring to its associated detail on sheet C-503.

ii. The Applicant has provided water quality calculations for the water quality flow rate required of each WQU. However, it does not appear that the Applicant has provided

manufacturer information confirming the credit listed for the TSS removal. HW recommends that the Applicant provide additional manufacturer information to confirm the TSS removal rate of the WQU.

As a public project, the applicant is obligated to provide three (3) alternative WQU products. As such, SMMA has proposed the following three (3) products, which have all been documented to achieve 70% TSS removal per testing completed by each manufacture, such that 80% TSS removal is achieved when used in concert with a deep-sump hooded catch basin: (1) Stormceptor ® STC, by Imbrium Systems Inc. (2) CDS ® by Contech Engineered Solutions (3) ADS ® by Barracuda Max. Please see table below, which will be included in our project specifications prior to bidding.

	WQU 1-1	*WQU 1-2*	*WQU 1-3*	*WQU 2-1*	*WQU 2-2*	*WQU 2-3*	*WQU 2-4*
Stormceptor ® STC by Imbriums System Inc.	*STC 2400*	*STC 450*	*STC 450*	*STC 2400*	*STC 450*	*STC 450*	*STC 450*
ADS ® Barracuda Max.	*S4*	*S3*	*S3*	*S4*	*S3*	*S3*	*S3*
CDS ® Stormwater Treatment by Contech Solutions	*CDS 2015-4*	*CDS 2015-4*	*CDS 2015-4*	*CDS 2015-4*	*CDS 2015-4*	*CDS 2015-4*	*CDS 2015-4*

iii. The Applicant has provided TSS removal calculations. However, it does not appear that all treatment trains have been included. For example, there are no subsurface systems shown in any of the treatment trains provided. HW recommends that the Applicant review the stormwater management system to confirm that all treatment trains for TSS removal are provided.

The previously submitted treatment trains were understood to have met relevant TSS removal standards. The lined subsurface detention systems were originally excluded from the TSS removal treatment trains, as SMMA did not believe any notable TSS removal would be achieved by the lined systems. Per Horsley Witten's request, we have revised the treatment trains to include the lined subsurface detention systems, but have claimed the systems to only remove 10% TSS due to the impervious liners with which they are equipped. Please refer to the calculations enclosed with this document for the revised treatment trains.

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

a. The Applicant has noted that the proposed project is not considered a LUHPPL. However, based on the additional trips calculated in the traffic impact assessment it appears this project would be considered a LUHPPL as it exceeds 1000 vehicle trips per day. The existing condition generates 418 and 207 trips in the AM and PM peak hours, respectively. Based on the extrapolation of additional students, an additional 315 AM peak hour and 156 PM peak hour trips will be made. Together, these trips exceed 1000 vehicle trips per day. Therefore, Standard 5 is applicable. The Applicant has provided 80% TSS removal onsite including 44% pretreatment based on the treatment trains provided and water quality separators. The Applicant appears to comply with Standard 5.

No response required.

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.

a. The site does not discharge to a critical area, therefore Standard 6 is not applicable.

No response required.

7. Standard 7 is related to projects considered Redevelopment. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

a. The proposed project is considered a redevelopment, therefore Standard 7 is applicable. It is HW's opinion that once the Applicant adequately addresses the comments in this letter and raised by the Town, the proposed stormwater management design is improving existing conditions and complies with the MSH to the maximum extent practicable.

No response required.

8. Standard 8 requires a plan to control construction related impacts including erosion, sedimentation, or other pollutant sources. The Applicant has provided multiple Site Preparation Plans which include multiple phases. These plans include the Sediment and Erosion controls for each phase.

a. The Applicant has proposed straw wattles and sediment sacks at catch basins throughout each phase. HW recommends that the Applicant include installation of sediment sacks or catch basin inserts in all the existing onsite and all of the proposed catch basins as they are constructed within the limit of work during the construction phase and within 100 feet of the construction entrance on both sides of the road.

A hatch was added to all existing catch basins both onsite and within 100 feet of the construction fence depicting sediment bags for the full duration of construction. A note was added to the C-112 Site Preparations Plan Phase I which reads "All catch basins, including existing, proposed, and catch basins receiving flow from the site are to have sediment bags for the entire duration of the project or until the catch basin is removed."

b. The Applicant has proposed the use of straw wattles as an erosion control measure. It appears that the straw wattles could be extended in certain areas to contain potential exposed disturbed soil. For example, on the northwest side of the existing building, the straw wattles can be extended to border the entire shaded area that is called out for pipe and pavement removal. HW recommends that the Applicant revisit the straw wattle line and adjust accordingly.

SMMA has reviewed the extent of proposed straw wattles and have proposed additional areas for protection where work occurs up-gradient of abutters and wetland resources.

c. Site Preparation Phase I calls for temporary pavement to be installed at the southeastern portion of the site. It appears that some riprap hatching has been included in this area. It is unclear its purpose and is not shown as an erosion control measure on the plans as it is not located in a position as a viable construction entrance area. HW recommends that the Applicant provide erosion control measures around these parking areas to limit any sediment runoff to the adjacent wetland.

The riprap hatch represents a drainage feature detailed in A9 C-501. The feature is designed to slow runoff and provide treatment.

d. Phase I of Site Plan preparation calls for construction of the new school as well as grading, drainage, outfall stabilization, and pipe removal at the north and west portions of the site. It appears that some of the areas that call for riprap stabilization of new outfalls or pipe removal are either outside the limits of work or not included within the limits of erosion and sediment control based on the location of the straw wattles. HW recommends revising the plans to show erosion and sedimentation control at all areas within the wetland buffer onsite.

The limit of work and erosion controls have been adjusted to encompass all proposed work during construction, including areas of riprap stabilization of new outfalls as well as areas of pipe removal.

e. There are several drainage structures proposed as part of the phase 1 portion of development around the proposed school. These drainage structures are upgradient of structures proposed to be built as part of the second phase of construction. HW recommends that the Applicant include a note stating that it is the responsibility of the contractor to maintain drainage onsite during all phases of construction. HW also recommends that the Applicant clarify how drainage will be managed and conveyed during the interim phase between phase 1 and phase 2. A separate plan may be useful to clearly illustrate this.

SMMA has reviewed the continuity of drainage infrastructure between phases, and the revised plans reflect changes made to illustrate that the drainage will be accommodated throughout all phases of construction (either through construction of permanent drainage or temporary drainage connections).

f. The proposed development requires disturbance of greater than one acre of land and therefore is required to obtain coverage under the NPDES Construction General Permit

issued by EPA and prepare a Stormwater Pollution Prevention Plan (SWPPP). The Applicant has provided a draft SWPPP. HW recommends that a copy of the final SWPPP be provided to the Town at least 14 days prior to commencing land disturbance activities.

Comment acknowledged.

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:

a. Per MSH Volume 2, Chapter 2, HW recommends that the O&M Plan be revised to require catch basin inspection and maintenance four times per year.

The enclosed O&M plan has been revised as requested.

b. Per Andover Stormwater Regulations Section VI.C.1.b.1, HW recommends that the Applicant include the name and address (contact information) of the persons responsible for the maintenance and emergency repairs.

The enclosed O&M plan has been revised as requested. The Andover Director of Facilities, Janet Nicosia, has been included as the responsible party for maintenance and emergency repairs.

c. Per Andover Stormwater Regulations Section VI.C.1.b.6, HW recommends including an estimated operation and maintenance budget.

The enclosed O&M plan has been revised as requested.

d. Per 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.

A figure identifying the various stormwater practices to be inspected and maintained has been prepared and placed within the revised O&M Plan document.

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

a. The Applicant has stated that there are no known or suspected illicit discharges. The Applicant has provided a signed Illicit Discharge Compliance Statement. HW has no further comment. The Applicant complies with Standard 10.

No response required.

11. Section IX (Andover Stormwater Regulations – Design Criteria)

a. C – Pretreatment: The Applicant must size all pretreatment practices (deep sump catch basins) to accommodate one-years' worth of sediment and debris using the calculation provided in Andover's regulations. HW recommends that the Applicant provide the required calculation.

All proposed deep sump catch basins on site were sized to accommodate one-years' worth of sediment and debris build up. Please refer to the enclosed catch basin sump sizing calculations.

b. D – Pollutant Removal: As a redevelopment project, the design is required to remove 80% of TSS and 50% of Total Phosphorus (TP). The Applicant has not provided phosphorus loading and removal calculations. HW recommends that the Applicant provide the required phosphorus removal calculations.

Phosphorus removal calculations have been enclosed with this document. Due to the extremely high seasonal groundwater conditions observed throughout the site, porous pavement has been selected as the only proposed BMP minimally invasive enough to support infiltration. Other BMPs are proposed to be lined with impermeable liners due to seasonal high groundwater conditions. As phosphorus removal is primarily achieved through infiltration practices, reaching 50% phosphorus removal with the proposed site design poses an unachievable goal. The enclosed phosphorus removal calculations simulate a circumstance in which the three (3) proposed subsurface systems are unlined to demonstrate that 50% phosphorus removal is achievable in this condition. Should Horsley Witten recommend SMMA to remove the proposed liners from each of the subsurface systems to prioritize phosphorus removal concerns, SMMA would entertain this recommendation.

12. Other comments:

a. Pipe calculations – The Applicant has provided the pipe sizing calculations for a 25-year storm event. It appears based on the plans that there are some elevation discrepancies listed based on inverts on the plans and inverts in the table. This could be due to the inconsistency of significant digits used for invert elevations. Some of these inconsistencies include but are not limited to: 1. DMH 1-12 (rim), 2. DMH 1-6 (rim), 3. DMH 1-15 (rim or inverts), 4. DMH 2-11 (invert out), 5. OCS 2-1 (invert out). HW recommends that the Applicant review the pipes on the plans and the table to confirm consistency with rims and inverts.

The above listed inconsistencies have been addressed in the enclosed pipe sizing spreadsheet.

b. HW recommends that the Applicant address any additional comments provided by the Planning Board or Department of Public works in relation to the stormwater or wetland review of this project.

There are no outstanding comments to address from the Planning Board. SMMA met with the Department of Public works on January 19, 2022 (Art Martineau, Town Engineer and Jeffery Crane, Water and Sewer Superintendent) to review the project. The enclosed plans reflect minor revisions to the water distribution piping, as requested by the town.

c. There are multiple areas onsite where the Applicant is working within the 25-foot wetland buffer area. Per the Town of Andover's Wetland's Protection By-Law, a 25-foot undisturbed vegetated buffer shall be maintained. This is further described in Section 4.2 of the Conservation Commissions Wetland Protection Regulations. HW defers to the Conservation Commission for approval for working within this area.

The project is currently being peer reviewed by LEC Environmental Consultants, who will review the project's compliance with Andover's Wetland Protection Regulations.

We look forward to your review of this response package. Please feel free to call with any further questions or concerns, (617) 833-1483.

Very truly yours,

SMMA

Erin Prestileo, PE
Senior Associate

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

Enclosures:

Plans:	C-111 Site Preparations Phase I, dated 02/04/2022
	C-112 Site Preparations Phase I, dated 02/04/2022
	C-141 Grading & Drainage Plan, dated 02/04/2022
	C-142 Grading & Drainage Plan, dated 02/04/2022
	C-143 Grading & Drainage Enlargement, dated 02/04/2022
	C-501 Details I, dated 02/04/2022
	C-502 Details II, dated 02/04/2022
	C-503 Details III, dated 02/04/2022
	C-504 Details IV, dated 02/04/2022
	C-803 Athletic Field Grading and Drainage Plan, dated 01/14/2022
	C-807 Details, dated 01/14/2022
Calculations:	Riprap Sizing Calculations, dated 02/04/2022
	Proposed Conditions HydroCAD model, dated 02/04/2022
	Peak Impervious Cover HydroCAD model, dated 02/04/2022
	Phosphorus Removal Calculations, dated 02/04/2022
	Catch Basin Sump Sizing Calculations, dated 02/02/2022
	TSS Treatment Trains, dated 02/04/2022
	Pipe Sizing Calculations, dated 02/04/2022
Attachments:	Operation & Maintenance Plan, dated 02/04/2022

Jacki Byerley, Planner
February 4, 202

NOAA Rainfall Data
STC Stormceptor Water Quality Unit Technical Sheet
CDS Contech Solutions Water Quality Unit Technical Sheet
ADS Barracuda Water Quality Unit Technical Sheet