



VIA EMAIL: ethanp@ipswichma.gov

April 14, 2021

Ethan Parsons, Planning Director
Ipswich Planning Board
25 Green Street
Ipswich, MA 01938

**Re: Site Plan Review Application for Child Care Facility
New England Biolabs - 240 County Road
Ipswich, Massachusetts**

Dear Mr. Parsons and Members of the Board:

Meridian Associates, Inc. (MAI) has received the drainage and stormwater management review from Robert E. Puff, Jr., PE dated March 24, 2021 and offer the following responses:

Stormwater Management

1. Pre Development Calculations – Several existing depressions on the site have been omitted from the hydrologic model. As a result, existing peak runoff rates from the associated catchment areas is likely to be overestimated. Recalculation is warranted and specific locations of concern are:
 - a. Existing depressions located in the southerly section of Subcatchment 2. The depressed areas account for approximately 15 percent of the catchment area.

MAI Response: This area has been added to the pre-development analysis as subcatchment #2a and #2b.

- b. An existing depression in the northerly section of Subcatchment 3. The depressed area accounts for approximately 10 percent of the catchment area.

MAI Response: This area has been added to the pre-development analysis as subcatchment #3a.

2. Pre Development Calculations – Based on the topography provided, the westerly boundary of Subcatchment 1 appears to be inaccurately delineated. Hence, the area of the subcatchment and the resulting runoff to 'Pond 1' is underestimated. Re-delineation of the boundary and recalculation of the subcatchment runoff rate and volume should be conducted.

MAI Response: Subcatchment #1 has been re-delineated to the west to include more area.

3. Post Development Calculations – The following items should be addressed by the design engineer.



- a. The westerly boundary of Subcatchment 11 appears inaccurately delineated (similar to item 2 above) and should be revised and recalculated.

MAI Response: Subcatchment #11 has been re-delineated to the west to include more area.

- b. A modelling or calculation error appears to exist in the hydraulic connection between the Bioretention Basin and Infiltration Basin 1. For the 10 and 100 year design storms, the peak elevation in Infiltration Basin 1 is higher than that in the Bioretention Basin (this would imply a reverse in flow direction, which is improbable for the design scenario). This issue should be re-examined by the design engineer. i. Related to the above, the dynamic tailwater elevations for 'Pond 1' and the Bioretention Basin should also be rechecked. The elevations generated are less than what would be anticipated for the 10 and 100 year storms.

MAI Response: The layout and connection of proposed bioretention basin #3 and proposed infiltration basin #1 have been redesigned. The bioretention basin bypasses the infiltration basin and will not be impacted by the previous tailwater conditions.

- c. The 100 year peak stage of Infiltration Basin 1 will exceed the rim elevation of the proposed drain manhole in the driveway, thereby causing a surcharge of runoff that will 'short circuit' flow back into the Bioretention Basin. This condition is not considered by the model. Revision or recalculation is warranted.

MAI Response: The drainage layout has been revised, and this issue has been resolved.

- d. Proposed grading of the Sediment Forebay and Infiltration Basin 2 should be specified on the plans.

MAI Response: Grading of the sediment forebay and bioretention basin #2 have been further detailed on the revised site plans.

- e. The geometry of the spillway grading for 'Pond 1P' (westerly of the bioretention basin) should be more specifically defined on the plans to reflect design intent.

MAI Response: The proposed drainage layout and grading has been revised to reflect the changes to the proposed design.

- f. The design engineer should recheck the ability to construct the outlet control devices specified for the Bioretention Basin. Specifically, the outlet pipe is modelled to be a 12 inch pipe with an invert elevation of 35.50, but the three outlet control rims are specified to be at an elevation lower than the crown of the 12 inch outlet pipe.

MAI Response: The proposed bioretention basin has been revised, including the outlet control devices. A detail of the basin has been provided on the revised plans.

- i. A construction detail of the outlet control structure of the Bioretention Basin should be provided on the plans.



MAI Response: A detail of the outlet control device has been provided on the revised plans.

- ii. A cross section of the Bioretention Basin should be provided in conformance with the requirements of the MA DEP Stormwater Handbook, including specification of soil depth and soil composition within the basin.

MAI Response: A cross section detail of the bioretention basin has been provided on the revised plans.

- g. A construction detail of the outlet control structure of Infiltration Basin 1 should be provided on the plans.

MAI Response: The outlet control structure has been eliminated from infiltration basin #1.

- h. All new roof runoff is designed to be conveyed directly to Infiltration Basin 1. This design intent should be specifically noted on the plans.

MAI Response: Proposed roof drains are identified on the plans, as well as in the drainage calculations.

- i. The size, invert, and slope of the roof drain pipe conveying runoff to the Infiltration Basin 1 should be specified on the plans and analyzed by hydraulic calculation (consideration should be given to tailwater impacts related to operation of Infiltration Basin 1).

MAI Response: The proposed roof drains are included in the drainage calculations.

- j. Planting specifications for the bioretention basin should be coordinated between the permit site plans and the landscaping plans.

MAI Response: The landscaping specifications have been removed from the Meridian Associates Permit Site Plans, and are included within the Planting Plans as prepared by Offshoots, Inc.

- 4. To be consistent with the post development design assumptions, the existing depression (analyzed as 'Pond 1') should be labelled as an area to remain undisturbed (i.e., a no fill area) to ensure that the assumed stormwater detention/infiltration properties of the area will be maintained.

MAI Response: A note to not fill this area has been added to the revised site plans.

- 5. No soil testing data was received in support of the assumptions made in the stormwater management design. The following is noted:
 - a. Soil testing should be conducted at each Infiltration Basin and Bioretention Basin, in conformance with MA DEP Stormwater Handbook requirements, to confirm soil composition, infiltration rate, and seasonal high groundwater levels.



MAI Response: Soil testing has been performed onsite with locations and test pit data located on the Record Conditions Plan.

- b. The Rawls Rate used for soil infiltration rates within Infiltration Basin 1 and the Bioretention Basin is not consistent with the underlying hydraulic soils groups shown on the watershed maps (and identified by the Natural Resources Conservation Service (NRCS) at the site). The design engineer should elaborate on how the contrary information was established and provide technical documentation supporting the conclusion.
 - i. Runoff curve numbers (CN) used in the hydrologic model should be consistent with the soil properties utilized in the design of the Infiltration Basins and Bioretention Basin (i.e., if the Rawls Rate used in Infiltration Basin 1 corresponds to a hydrologic soil group B, then the CN used for the associated subcatchment area should correspond to the same hydrologic soil group; similar consideration should be given to the subcatchment containing the Bioretention Basin).

MAI Response: As discussed, runoff curve numbers used within the hydrologic model have been adjusted to be consistent with the soil properties utilized in the design based on soil testing.

6. It is suggested that the design engineer consider shifting the Sediment Forebay and Infiltration Basin 2 further away from the existing main driveway to avoid destabilization of the driveway foundation due to infiltration of stormwater directly adjacent to the pavement.

MAI Response: The sediment forebay has been shifted away from the road as far as possible. A impermeable membrane has been added to the sediment forebay to prohibit infiltration.

Drainage & Grading

1. Drainage information should be provided on the plans to reflect the full intent of the stormwater management design. Currently, the following information has been omitted from the plans and should be added to the plans in a comprehensive revision:
 - a. All pipe sizes and invert elevations.

MAI Response: The site plans have been updated to include proposed pipe sizes and invert elevations.

- b. Spillway locations, crest elevations, and geometry.

MAI Response: The site plans have been updated to include additional spillway information as requested.

- c. Drainage structure and outlet control structure details.



MAI Response: The site plans have been updated to include details of drainage structures, including outlet control structures.

- d. Construction details for drainage and stormwater related items.

MAI Response: The site plan details have been updated to include relative drainage and stormwater items.

- e. Revise the specified drain manhole detail to enable construction of the 'shallow manhole' indicated on the plans.

MAI Response: The shallow manhole has been eliminated from the project.

- f. Outlet protection and rip rap apron details should be provided, and locations indicated.

MAI Response: The site plan details have been updated to include rip-rap apron details.

- g. Construction detail, cross section, and specification for the fill embankment needed at Infiltration Basin 1.

MAI Response: The site plans have been updated to include details, cross sections, and information about Infiltration basin #1, as requested.

DEP Stormwater Management Standards

1. Standard 3 Items:

- a. Infiltration Basin 2 is designed with an infiltration rate of 8.27 in/hr. Soils with an infiltration rate greater than 2.4 in/hr are considered to have 'rapid infiltration' per the MA DEP Stormwater Handbook (refer to Volume 2, Chapter 2). As such, the associated infiltration basin is required to have pretreatment capable of removing 44 percent of total suspended solids (TSS) prior to infiltration of runoff. The proposed design does not satisfy this requirement. Revision and redesign are suggested.

MAI Response: Pursuant to our discussions, infiltration basin 2 has been modified and designed as a bioretention basin. As such, a modified soil will be introduced with loamy sand properties rather than sand. The introduction of the modified soil will slow the rate from 8.27 in/hour, removing the "rapid infiltration" designation and 44% pretreatment requirement.

- b. The finished surface of Infiltration Basin 2 should be designed to ensure that it is capable of infiltrating stormwater at a rate comparable to the underlying soil (i.e., at least 8.27 in/hr).

MAI Response: This comment is no longer applicable due to the design revisions.



- c. Recharge calculations indicate that 2,885 sf of impervious area will not be directed to a recharge best management practice (BMP). This condition is not apparent or implied on the proposed grading plans. The design engineer should clarify this inconsistency.

MAI Response: The stormwater management report has been revised to include additional language to clarify what impervious area is not being directed towards an infiltration system. The site plans have been updated to provide more detail. For clarity here; a portion of the roof is being discharged to the south to one of the natural depressions, and the deck as well as adjacent sheds to the north east of the site are not being directed to an infiltration system.

- d. The Applicant should elaborate on how Rawls rate was established for the three infiltration areas. No soils testing data was received.

MAI Response: Infiltration rates are based on soil testing performed on January 27, 2021. The results of the soil tests are included in the revised site plan submission. The rate of infiltration for basin #2 is in accordance with our previous discussions.

2. Standard 4 – Calculations for Sediment Forebay sizing should be provided to document adequate water quality volume is available at this BMP.

MAI Response: Sediment forebay sizing calculations are included in the revised stormwater management report.

3. Standard 8 - Address and coordinate the following items as presented on the plans and in the Construction Period Pollution Prevention Plan (CPPPP):

- a. Plans should be revised to indicate areas intended to receive erosion control measures.

MAI Response: Proposed erosion control devices have been added to the plans.

- b. Specific notes and graphics should be outlined to prevent compaction of, and erosion and sedimentation transport into, the Infiltration Basins and the Bioretention Basin during construction.

MAI Response: Notes have been added to the Site Plans detailing the use of temporary sedimentation devices. The CPPPP has been revised to include additional language regarding these devices.

- c. A construction detail should be provided for 'Storm Drain Inlet Protection' as described in the CPPPP.

MAI Response: Storm drain inlet protection is not required for this project. The CPPPP has been updated to reflect this change.

- d. Include provisions in the CPPPP for dust control, diversion swales, and sediment basins during construction.



MAI Response: Information regarding dust control, diversion swales, and sediment basins have been added to the CPPPP.

e. Provide construction sequencing in the CPPPP.

MAI Response: A general construction sequence has been added to the CPPPP.

f. Include a note in the CPPPP referencing the requirements of the project SWPPP.

MAI Response: A note has been added to the CPPPP referencing the requirement of a SWPPP.

g. Include a note on the plans referencing the requirements of the CPPPP and the SWPPP.

MAI Response: A note has been added to the plan referencing the requirement to review the CPPPP and for a SWPPP to be prepared prior to construction.

4. Standard 9 – Address and coordinate the following items as presented in the Long Term Operation and Maintenance Plan (O&M Plan):

a. The O&M Plan should refer to the design plan of record and any ‘as-built’ plans that may be generated after construction.

MAI Response: A note in the O&M has been added to refer parties to future as-built plan prepared.

b. A construction detail should be provided for the ‘Stone & Turf Filter Strip’ as described in the O&M Plan.

MAI Response: A detail of the stone and turf filter strip has been added to the bioretention area schematic detail.

c. The O&M Plan section entitled ‘Snow disposal and plowing plans...’ should be expanded to address how stone storage will be addressed within and/or adjacent to the Infiltration Basins and Bioretention Basin.

MAI Response: Additional information has been added to the snow disposal section of the O&M.

d. Provide estimated annual costs for maintenance of the stormwater management system.

MAI Response: New England Biolabs has full time staff on site to maintain the stormwater management system. An annual estimated cost has been provided in the revised operation and long-term maintenance plan.



- e. Training and Emergency Contact information is listed as 'to be determined by the owner'. Given that this is a relocation of an ongoing operation, these items should already be established, and should be identified in the O&M Plan.

MAI Response: Additional information has been provided in the O&M as requested.

- f. The description of the Bioretention Basin, Infiltration Basins, Sediment Forebay, outlet protection areas, and stone and turf filter strips should all be revised to include the locations where the elements are provided on the project site.

MAI Response: The location of each of these features has been identified the narrative in the O&M, as well as a sketch.

- g. The 'Inspection Schedule and Evaluation Checklist' should be revised to address the following items:
 - i. Indicate inspection for two Infiltration Basins, not one.

MAI Response: The site plans have been revised to only provide one infiltration basin. However, the infiltration basin in the checklist has been numbered to correlate with the site plan.

- ii. Coordinate Bioretention Basin inspection frequency with that specified in the narrative description.

MAI Response: The inspection schedule and evaluation checklist has been updated to agree with the narrative.

- iii. The quantity of outlet and rip rap locations should be indicated.

MAI Response: Each outlet location has been identified in the inspection schedule and evaluation checklist.

- iv. Inspection of the proposed drain manhole should be added to the checklist.

MAI Response: Each yard drain location has been identified in the inspection schedule and evaluation checklist.

- v. Inspection of the Stone & Turf Filter Strip should be added to the checklist.

MAI Response: The stone and turf filter strip has been identified in the inspection schedule and evaluation checklist.

- vi. Inspection of outlet control structures should be added to the checklist.

MAI Response: Each outlet control structure has been identified in the inspection schedule and evaluation checklist.



5. Standard 10 - A fully executed Illicit Discharge Compliance Statement should be submitted.

MAI Response: An illicit discharge compliance statement has been provided in the O&M.

Thank you for your time and coordination throughout the process. Please feel free to contact me at aferraro@meridianassoc.com with questions or comments.

Sincerely,

MERIDIAN ASSOCIATES, INC.

A handwritten signature in blue ink, appearing to read 'April C. Ferraro', is written over a faint, larger version of the signature.

April C. Ferraro, PE, LEED AP
Senior Project Manager

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