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Date: August 1, 2018

To: Linda Hansen, Conservation Administrator
Wayland Conservation Commission

From: Henry T. Nover, P.E.

Subject: **24 School Street – Stormwater Review Follow-Up**
Nover-Armstrong File No. P4434

DOCUMENTS REVIEWED

- *Letter to Nover-Armstrong Associates, Inc.*, prepared by MetroWest Engineering, Inc.; dated July 18, 2018.
- Site Plans (5 Sheets), prepared by MetroWest Engineering, Inc.; dated September 6, 2017, revised through July 5, 2018; not endorsed.
- *Stormwater Report Proposed Site Redevelopment, 24 School Street, Wayland MA*; prepared by MetroWest Engineering, Inc.; revised through July 2018.

1.0 PROJECT UPDATE

MetroWest Engineering, Inc. (MetroWest) has provided revised Site Plans, an updated Stormwater Report and a letter addressed to Nover-Armstrong Associates, Inc. (Nover-Armstrong) in response to our stormwater management comments (Sections 5 & 6) found in our letter to the Commission dated June 6, 2016.

2.0 GENERAL COMMENT

Overall, it is our opinion that MetroWest's responses adequately address our June 6, 2018 comments. They have revised the plans and calculations to provide additional construction details and documentation of compliance with the Massachusetts Stormwater Standards for their proposed stormwater management systems.

We still have a difference of opinion with MetroWest regarding the need to fully comply with the specifications of the Stormwater Handbook and whether the Handbook is a design or guidance document. First of all, the Standards are no longer a DEP Policy as they have been incorporated into the Massachusetts Wetland Regulations, 310 CMR 10.00 (the Regulations). The Regulations state that "...discharges from said projects...shall be provided with stormwater management practices...in accordance with the...Stormwater Management Standards as further defined and specified in the Stormwater Handbook".

The Stormwater Handbook states that stormwater BMPs must be designed, constructed, operated and maintained in accordance with the specifications and procedures set forth in Volumes 2 and 3 of the Massachusetts Stormwater Handbook. It is Nover-Armstrong's opinion that this should be the only engineering practice acceptable to be used to meet the performance standards found in the Regulations.

Nover-Armstrong has provided further comment on previous comments presented in our June 8, 2018 comment letter in ***bold italics*** below.

3.0 SAS MOUNDING CALCULATION COMMENTS

Nover-Armstrong has no further comment.

4.0 STORMWATER MOUNDING CALCULATION COMMENTS

Nover-Armstrong has no further comment.

5.0 STORMWATER MANAGEMENT COMMENTS

It is Nover-Armstrong's opinion that MetroWest's responses adequately address the comments in Section 5.0 presented below.

- 5.1 The September 2017 Stormwater Report narrative and O & M Plan should be updated to reflect the revisions to the proposed stormwater management system provided in the May 2018 Revised Hydrologic Analysis.
- 5.2 Under the Stormwater Standards, this project is classified as a mix of new and redevelopment as there is an increase in impervious surface of 11,283 square feet (MWE -Revised Hydrologic Analysis).
- 5.3 Due to the fact that there is an increase in the amount of impervious surface, the project is classified as a mix of "New" and "Redevelopment". The Wetland Regulations Stormwater Standards require that the runoff from the new impervious surface fully meet the Standards and the existing or redeveloped impervious surface meet the Standards to the maximum extent practicable but must at the very least improve existing conditions.
- 5.4 It appears that the proposed stormwater infiltration system could meet full compliance with the Standards for the 11,283 square feet increase in impervious surface reported in MWE's Revised Hydrologic Analysis. This system is designed to treat a total of 14,145 square feet of impervious surface. The capacity of the system to treat more impervious than the new impervious surface be considered as improvement of the existing conditions.
- 5.5 There is little difference between the pre-development and post-development runoff Time of Concentration. Nover-Armstrong recommends that the Velocity Method found in TR-55 versus the Lag Method be used to estimate the times of concentrations and that the overland flow paths cross perpendicular to the topographic contour lines.
- 5.6 Part 630 Hydrology, National Engineering Handbook states that the velocity method (TR-55 overland flow) is "the best method for calculating time of concentration for an urbanizing watershed or if hydraulic changes to the watercourse are being considered." Our experience has found using the Lag Method versus the Velocity Method estimates smaller peak rates of runoff.
- 5.7 The CN value used for the existing block driveway and walk should be adjusted to reflect some level of perviousness instead of considering it as a complete impervious paved surface.

6.0 STORMWATER SYSTEM COMMENTS

6.1 Subsurface Infiltration BMP

- 6.1.1 The subsurface infiltration system BMP does not have the required 2 feet of separation from seasonal high groundwater. The March 12, 2018 groundwater level in MW 3 was 160.14 feet. On the plans and calculations by MWE, the bottom of the 3.0' high subsurface infiltration precast structure is 162.25. The bottom of crushed stone under the BMP is 161.25

feet. The bottom of the stone needs to be 2 feet above groundwater. The mounding calculations by CREATIVE used 162.25 as the bottom of the stone.

Nover-Armstrong does not accept any liability for the design of the subsurface infiltration system. Use of filter fabric at the bottom of the galleys was discussed only as one solution to the bottom stone foundation not having two of separation from seasonal high groundwater. The bottom of the stone foundation was the elevation where infiltration would occur into the native soils and needs to be two from groundwater. Nover-Armstrong suggests that if MetroWest feels the current design will be prone to differential settlement, then they should look at an alternative design.

- 6.1.2 The manifold inlet fittings to the infiltration BMP should be detailed. The fitting layout is conceptual. Nover-Armstrong does not recommend 12" diameter connections to an 8" diameter manifold.

The inlet manifold to the subsurface infiltration system is still labeled as 6" diameter on Sheet 2 of 5.

- 6.1.3 The two 6" diameter outlets from the infiltration BMP are labelled as 8" diameter on the plans and should be corrected.

Nover-Armstrong has no further comment.

- 6.1.4 Design information should be provided to support the diversion manhole outlet invert elevations to the Stormceptor units and the infiltration BMP.

Nover-Armstrong has no further comment.

- 6.1.5 The pipe run from CB 2 to DMH 3 should not be located within the SAS reserve area.

Nover-Armstrong defers the review of the new layout to the Board of Health.

- 6.1.6 Design information to support the Level Spreader manifold sizing needs to be provided. The Detail and plan view of its layout are inconsistent. Additional detail of the inspection cover should be provided as it is conceptual in nature. A second inspection point on the manifold inside of the wall should be provided. Future access for maintenance and/or repair of the manifolds and the outlet pipe on the south side of Unit 1B will be difficult.

The design information has been provided and the outlet velocity from each orifice is calculated to be less than 1.0 foot per second. Ease of access for future maintenance is still an issue.

- 6.1.7 The location of the gutter downspouts and pipe connections to the subsurface infiltration BMP should be added to the plans. Nover-Armstrong is of the opinion that the roof runoff collection system would not be able to capture and convey the roof runoff from large storm events. Depending on the roof configuration, overflow from the gutters may by-pass the infiltration BMP, particularly from Units 1A and 1B.

Nover-Armstrong recommends that the downspouts from the end Units 1A and 1B be piped underground to the subsurface infiltration to eliminate potential for by-pass.

- 6.1.8 The grading at the top of the driveway from East Plain Street will allow runoff to by-pass CB 3 and discharge out to East Plain Street.

It is Nover-Armstrong's opinion that the proposed berm is not a good solution to eliminate the potential bypass. We recommend that the top of the driveway be re-graded. The proposed berm will be susceptible to damage and/or removal from snow plowing operations.

- 6.1.9 Subsurface Infiltration System BMPs have an expected TSS removal rate of 80% versus the 99% reported. Requisite pretreatment BMPs receive no additional TSS removal credit per the Handbook

Nover-Armstrong has no further comment.

6.2 Rain Garden BMP

It is Nover-Armstrong's opinion that MetroWest's responses adequately address the comments in Section 6.2 paragraphs below with the recommendation that the size of the bottom of the "Rain Garden" be added to the plans.

- 6.2.4 The design of the Rain Garden BMP is not consistent with the Stormwater Handbook. The planting soil and stone specifications and thicknesses do not match the Handbook detail.
- 6.2.5 Rain Garden BMPs have an expected TSS removal rate of 90% if designed in accordance with the Handbook. The BMP better resembles a landscaped infiltration basin that has an expected TSS removal rate of 80%.
- 6.2.6 Separation of the bottom of the Rain Garden BMP and seasonal high groundwater appears to be about 2.5 feet.
- 6.2.7 The limits of the bottom of the Rain Garden (elevation 103.5) should be shown on the plans.
- 6.2.8 The two specification notes for seeding the bottom of the Rain Garden are inconsistent. We don't think "New England Wet Mix" is appropriate considering the amount of groundwater separation.
- 6.2.9 There are a lot of plants proposed for the Rain Garden. The planting schedule should be reviewed for spacing guidelines.

6.3 Stormceptor Proprietary BMP

It is Nover-Armstrong's opinion that MetroWest's responses adequately address the comments in Section 6.3 paragraphs below. Our comments were made for informational purposes. DEP has indicated that BMPs are not achieving the TSS removal rates credited in the Stormwater Handbook and cautioned that the TSS removal rates for proprietary BMPs may not be based on testing using the same size particle size distribution that was used to develop the TSS removal ratings in the Handbook.

- 6.3.1 The Stormceptor 450i was originally designed by the manufacturer to be used as a stand-alone inlet. The manufacturer claims it will remove 93% of the annual TSS loading on this Project. It is Nover-Armstrong's opinion that the removal efficiency of proprietary BMPs claimed by the manufactures exceed actual rates found in the field.
- 6.3.2 As the unit is provided here in an "off-line" configuration and captures a relatively small amount of impervious area, it is our opinion however that the units combined with the Deep-Sump Catch Basin BMPs will remove at a minimum the 44% TSS required for discharges near or to critical areas or within an area of soils with rapid infiltration.

7.0 SUMMARY

Based on our technical review of the revised plans and calculations and additional information provided, the Applicant has provided sufficient information for the Commission to issue an Order of Conditions.

Sincerely

Nover-Armstrong Associates, Inc.

A handwritten signature in black ink, appearing to read 'H. Nover', with a stylized flourish at the end.

Henry T. Nover, MA Civil P.E. 30339
Senior Engineer