

March 1, 2018

Earth Removal and Stormwater Advisory Committee  
c/o Ms. Michelle Collete, AICP  
Stormwater Inspector/ADA Coordinator  
173 Main Street  
Groton, MA 01450

RE: Nitsch Project #12743  
Groton Senior Center  
Stormwater Review  
Groton, MA

Dear Committee Members:

Nitsch Engineering received and reviewed the Site Plan (the Plan) entitled, "Groton Senior Center, 163 West Main Street Map 106, Parcel 38, Groton, Massachusetts" (10 sheets), dated February 9, 2018, and prepared by Ducharme & Dillis, Civil Design Group, Inc. (D&D). In addition to the Plan, Nitsch Engineering has also received the following documents:

1. Copy of an application entitled "Application for Stormwater Management Permit for Groton Senior Center, 163 West Main Street in Groton, Massachusetts," dated February 12, 2018 and prepared by Ducharme & Dillis, Civil Design Group, Inc.; and
2. Copy of a report entitled "Stormwater Report, Groton Senior Center, 163 Main Street, Groton, Massachusetts," prepared for the Town of Groton, 173 Main Street, Groton, MA 01450, by Ducharme & Dillis Civil Design Group, Inc, 1092 Main Street, Bolton, MA 01740, dated February 9, 2018.

Nitsch Engineering has reviewed the Plan to determine conformance to the following:

1. "Earth Removal Stormwater Advisory Committee" Regulations, Chapter 352 from the Code of the Town of Groton, adopted April 14, 2015; and
2. The Massachusetts Stormwater Management Standards.

This letter review is limited to stormwater.

#### **WAIVERS REQUESTED**

1. *Section 352-11 C(5) – To qualify as a treatment BMP, a recharge system must discharge to soils with infiltration rates less than or equal to 2.4 inches per hour when used as a treatment BMP.*

(D&D response) In order to accommodate the larger building and parking area, underground infiltration chambers were used under the proposed pavement. These chambers must discharge to soils with infiltration rates less than 2.4 inches per hour.

2. *Section 352-11 C(10) – Underground recharge systems may only be used to recharge runoff directly from the rooftops. They may not be used to recharge stormwater runoff from other surfaces due to sediments in the runoff that may cause clogging of the recharge system and difficulty to rehabilitate these systems once they have failed.*

(D&D response) In order to accommodate the larger building and parking area, underground infiltration chambers were used to collect runoff from both the roof and pavement areas. Runoff will receive pre-treatment from both dump-sump hood catch basins and a sediment forebay before entering the chambers for infiltration. An inspection port will be installed on each infiltration area to easily monitor

sediment build up and drainage manhole on both ends of the chambers will allow for easy cleaning once the buildup is too high,

3. *Section 352-11G – Use curve number (CN) values as provided in Table 2 to calculate stormwater runoff rates for pre-/post-construction ground surface conditions.*

(D&D response) Standard CN values were used for the HydroCAD modeling. Since the proposed project is generally within the existing limit of disturbance, it is expected that there will be no significant difference in surface conditions post construction. It is expected that good landscaping practices will be used for all proposed lawn and landscaped areas.

### **GROTON STORMWATER DESIGN CRITERIA AND THE MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS**

1. Section 352-2.F(1)(d) states that the full stormwater management permit application shall contain, at a minimum: delineation of the total land area to be disturbed.

The Plan should be revised to indicate the limit of work and total land area to be disturbed.

2. Section 352-2.F(1)(r)[2] states that the full stormwater management permit application shall contain, at a minimum: A survey of existing vegetation, including the following information: location of all trees with a caliper 12 inches or larger, noting specimen trees and forest communities.

The Plan indicates several trees with a caliper 12 inches or larger within the limit of work that appear will need to be removed. The Committee should determine if this is acceptable.

3. Section 352-2.F(1)(r)[3] states that the full stormwater management permit application shall contain, at a minimum: A survey of existing vegetation, including the following information: line clearly showing the limit of vegetation clearing and specimen trees to be saved.

The Plan should be revised to indicate the limits of vegetation clearing and specimen trees to be saved.

4. Section 352-2.F(2)(b) states that the full stormwater management permit application shall contain, at a minimum, if permanent or temporary structural soil erosion control, sediment control, or stormwater BMPs are required, the detailed engineering plans shall include information on these measures, including but not limited to: spillway or outlet control designs showing calculated stage elevations.

The two Infiltrations Areas depicted on Sheet C-402 Grading & Drainage Details do not include spillway or outlet control designs showing calculated stage elevations. Nitsch Engineering understands the systems are designed to hold and infiltrate the entire runoff volume from the 100-year storm. The Plan should be revised to indicate the calculated stage elevations on the details.

5. Section 352-2.F(2)(c) states that the full stormwater management permit application shall contain, at a minimum, if permanent or temporary structural soil erosion control, sediment control, or stormwater BMPs are required, the detailed engineering plans shall include information on these measures, including but not limited to: emergency spillway designs showing a sections with one-hundred-year storm stage elevation.

The Plan does not include emergency spillway designs for the stormwater BMPs. The Plan should be revised to include emergency spillway designs showing a section with one-hundred-year storm stage

elevation, or at a minimum the Applicant shall indicate how the stormwater BMPs will handle overflow from a larger than 100-year storm event.

- 6. Section 352-2.F(2)(f) states that the full stormwater management permit application shall contain, at a minimum, if permanent or temporary structural soil erosion control, sediment control, or stormwater BMPs are required, the detailed engineering plans shall include information on these measures, including but not limited to: volume of storage required.

The Plan does not indicate the volume of storage required. The Plan should be revised to indicate the volume of storage required.

- 7. Section 352-9.A(1) states that low-impact development (LID)/green infrastructure techniques must be incorporated into development and redevelopment projects in the Town unless it can be shown per §352-9A(1) that the use of LID techniques is not feasible. Applicants must use decentralized systems that involve the placement of a number of small treatment and infiltration devices located close to the various impervious surfaces that generate stormwater runoff in place of a centralized system comprised of closed pipes that direct all drainage from the entire site into one large detention basin. The applicant must demonstrate to the Committee that the use of LID techniques is not feasible given existing site constraints. The Committee or its designated agent will determine if the documents submitted are adequate to demonstrate the use of LID techniques is not feasible.

The Plan includes two centralized systems in the form of Cultec manufactured Infiltration Areas for stormwater management. The Applicant should provide evidence that decentralized LID techniques were evaluated and why they are not feasible.

I agree, they should address this requirement. No need to include the other reference.

- 8. Section 352-10 states that no stormwater runoff generated from land development and redevelopment shall be discharged directly to a wetland, local water body, municipal drainage system, or abutting property, without treatment in compliance with these criteria.

Infiltration Area 2 appears to collect the majority of the stormwater runoff from the proposed paved impervious parking lot and adjacent driveway. In the case that this system is clogged or backed up, stormwater runoff would surcharge from the connecting structures and overflow without receiving the required stormwater runoff treatment. The Plan should be revised to identify a solution for a surcharge condition.

- 9. Section 352-11.B states The volume of water to be recharged shall be based on the site soils. The volume of water to be retained from the developed site shall be calculated using the following equation:

$$\text{Rev} = [(S)(TIA)]/12$$

Where:

- Rev = Recharge volume (cubic feet).
- TIA = Total impervious area (square feet).
- S = Soil-specific recharge factor (inches).

Hydrologic Group	Soil-Specific Recharge Factor
A	0.60
B	0.35
C	0.25
D	0.10

Nitsch Engineering understands the NRCS Soils Map appears to indicate the presence of "A" type soils across the site. Sheet C-401 indicates that a minimum of eight test pits were performed on site, however, these test pit results were not included as part of the Drainage Report and were not performed within the footprint of the proposed systems. The Applicant should provide evidence and documentation consistent with Massachusetts Stormwater Standards to ensure that the soil types located within the location and depth of the infiltration areas are consistent with that of "A" type soils as calculated in the Drainage Report. The Applicant shall also confirm the current seasonal high groundwater elevations at each infiltration system.

10. Section 352-11.C(2) states the following criteria shall also apply, the applicant must submit all recharge calculations. The capture area adjustment calculations described in the Massachusetts Stormwater Management Standards must be applied if runoff from all impervious surfaces if not directed to the treatment BMPs. In no case shall runoff from less than 65% of the site's impervious cover be directed to the BMPs intended to infiltrate the required volume.

Capture area recharge calculations are included in the Drainage Report, the Applicant should confirm if all values used in the calculations are correct.

11. Section 352-11.C(3) states the following criteria shall also apply, compaction of soils in designated recharge areas must be minimized during and after construction.

The Plan does not indicate to protect infiltration areas from compaction during and after construction. The Plan should be revised to note to protect infiltrations from compaction during and after construction.

12. Section 352-11.C(5) states the following criteria shall also apply, to qualify as a treatment BMP, a recharge system must discharge to soil with infiltration rates less than or equal to 2.4 inches per hour when used as a treatment BMP.

Nitsch Engineering understands a waiver was requested for Section 352-11.C(5). The Drainage Report appears to indicate an expected infiltration rate of 8.27 in/hr which is greater than 2.4 in/hr. As per Comment #9, Nitsch recommends the Applicant provides additional documentation before the Committee reviews this waiver request.

13. Section 352-11.C(9) states the following criteria shall also apply, system should be designed based on the infiltration rates in Table 1, using the soil evaluation process outlined in Volume 3 of the Massachusetts Stormwater Handbook.

See response to Comment #9.

14. Section 352-11.C(10) states the following criteria shall also apply, underground recharge systems may only be used to recharge stormwater runoff directly from rooftops. They may not be used to recharge stormwater runoff from other surfaces due to sediments in the runoff that may cause clogging of the recharge system and difficulty to rehabilitate these systems once they have failed.

Nitsch Engineering understands a waiver was requested for Section 352-11.C(10). Nitsch agrees the layout of the manholes on both ends of the respective Isolator Rows will allow for easily accessible maintenance of the proposed systems. However, in case of blockage, Nitsch recommends the Applicant evaluate emergency spillway designs.

15. Section 352-11.C(13) states the following criteria shall also apply, all units/devices shall be designed to drain within 72 hours from the end of the storm.

See response to Comment #9.

16. Section 352-11.C(14) states the following criteria shall also apply, a mounding analysis must be performed when the vertical separation from the bottom of an exfiltration system to seasonal high groundwater is less than four feet and the recharge system is proposed to attenuate peak discharge from a ten-year or higher twenty-four-hour storm. The mounding analysis must demonstrate that the recharge volume is fully dewatered within 72 hours and that the groundwater mound that forms under the recharge system will not break out above the land or water surface of a wetland. The Hantush or other equivalent method may be used to conduct the mounding analysis.

See response to Comment #9.

17. Section 352-12.B(6) states pretreatment structures shall be sized to hold an annual sediment loading. An annual sediment load shall be calculated using a sand application rate of 500 pounds/acre for sanding of roadways, parking areas and access drives within the subcatchment area, a sand density of 90 pounds per cubic foot and assuming a minimum frequency of 10 sandings per year. To obtain an annual sediment volume, perform the following calculation:

Area to be sanded (acres) x 500 pounds/Acre-Storm ÷ 90 pounds/ft<sup>3</sup> x 10 storms/year = cubic feet of sediment/year

The Drainage Report did not include sediment loading calculations. The Report should be revised to include sediment loading calculations.

18. Section 352-13.E states the following criteria shall be followed to control peak discharge rates and improve the overall effectiveness of the stormwater treatment systems. These are minimum design criteria. Emergency spillways shall be designed for the full range of design storms assuming the primary outlet is not functioning.

The Infiltration Areas do not indicate design for emergency spillways. The Plan should be revised to include design for emergency spillways in case the primary inlets and outlets to the systems are not functioning.

19. Section 352-13.G states the following criteria shall be followed to control peak discharge rates and improve the overall effectiveness of the stormwater treatment systems. Use curve number (CN) values as provided in Table 2 to calculate stormwater runoff rates for pre-/post-construction ground surface conditions.

Nitsch Engineering understands a waiver was requested for Section 352-13.G. Nitsch recommends the values stated in the regulation be used as well as the Hydraulic Soil Group to be confirmed per Comment #9.

### General Comments

20. As previously mentioned, the Plan appears to indicate that test pits and percolation tests were performed on site. Nitsch recommends the Applicant provides these test results for review.

21. Nitsch recommends the Plan include a construction gate and fencing as deemed necessary by the Committee.
22. The Plan appears to indicate the majority of the snow storage will be located on top of the primary sanitary sewer leaching bed. Nitsch recommends the Board of Health confirm if this is appropriate for long term effectiveness of the system.
23. Nitsch recommends the Plan be revised to indicate potential soil stockpile areas and proper erosion control to protect nearby surrounding wetlands and waterways.

### RECOMMENDATIONS

The Plan appears to conform to the Code, except as noted. The applicant should revise and resubmit the documents.

If the Committee has any questions, please call.

Very truly yours,

**Nitsch Engineering, Inc.**



Zulfikar Mahmudjin, EIT, LEED Green Associate  
Senior Project Designer

Approved by:



Jared E. Gentilucci, PE, LEED AP BD+C  
Project Manager

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