

Third party review of the amended site plan at LandCare, Knox Marsh Road, Madbury, NH

Tom Ballestero

20 July 2022

The purpose of the review will be to confirm that the proposed plan conforms with applicable Site Plan Review Regulations, specifically, Article XII Sections 5 and 6.

Reviewed Documents:

- Plot Plan 2022-04-26
- 20-083 LandCare Associates Drainage Binder 4-26-22
- 20-083 LandCare Associates Plan Set 5-24-22
- HydroCAD files
 - 20-083 Existing Analysis
 - 20-083 Proposed Analysis

Site visit: 18 July 2022 in presence of Daniel Gordon and Chris Berry.

Reviewers' introduction

This site has been in existence for decades and has slowly expanded its operations. There was very little stormwater or sediment management in the past. As a redevelopment project, it is recognized that stormwater and sediment management strategies are already constrained, and that implementation of strategies will be a marked improvement over existing practices.

Section 5. Erosion and Sediment Control

An Erosion and Sediment Control Plan (E&S Plan) was submitted in the 20-083 LandCare Associates Drainage Binder 4-26-22. This plan was stamped by a currently licensed in New Hampshire Professional Engineer.

Site redevelopment aside, in its normal operation mode, more than 40,000 square feet is continuously disturbed soil. Accordingly, the erosion and sediment control aspects are just as important post-construction as during construction.

Prior to construction disturbance, the majority of the E&S Plan discussion about installation of appropriate erosion and sediment control measures is silt fence. Silt fence is identified in the drainage report and erosion and sediment control plan as well as on the plan sheets, however the plans do not show where silt fence is to be used. During the site inspection it was represented that silt fence would not be used for the project. Therefore, mention of silt fence should be removed from the reports and plans,

as well as silt fence details. Filtrexx Silt Soxx, or equivalent, is identified as a perimeter control. Erosion Control Mix Berm or coir logs are suitable alternatives. Unsuitable alternatives would be those with plastic netting. A construction entrance of 3-inch stone will address sediment tracking by vehicles. In addition, existing perimeter berms will control site runoff and runoff. There is no strategy for site runoff management and sediment control during construction, for example sediment ponds, traps, or ditches.

There is no protection of the existing infiltration (leaching) catch basin during construction.

Dust control during construction is planned to be adaptive: should it be necessary, strategies are suggested. Given the typical operations at the site, dust control should be one of the long-term aspects of site environmental management.

The E&S Plan does describe temporary and permanent stabilization of disturbed soils, including stockpiled construction soils.

One aspect missing in the E&S Plan is irrigation in order to assure the success of seeded areas. The E&S Plan does indicate that newly seeded areas will be mulched or covered with a rolled erosion control blanket (RECB). Irrigation may not be necessary if all new seed is properly mulched. If any areas are not mulched, irrigation will need to be considered.

Section 6. Stormwater Runoff

A Stormwater Management Plan (SMP) was submitted in the 20-083 LandCare Associates Drainage Binder 4-26-22. This plan was stamped by a currently licensed in New Hampshire Professional Engineer. The entire site is over 8 acres and therefore the SMP is required.

The general concept for stormwater management is to employ existing site features and augment them with a subsurface gravel wetland (SGW). This is considered a dramatic improvement over existing site stormwater management. The SGW is appropriately sized for the water quality volume. Post-redevelopment runoff and runoff volume are modeled to be reduced compared to pre-redevelopment volume. However a better metric of comparison is the site in a more natural state. It is not being suggested that stormwater management return the site runoff characteristics to that of a forested, undeveloped site, however the comparison of post-redevelopment site hydrology to that of a natural site underscores how far the site deviates from a natural state.

Given that a large part of the site is on highly permeable soils, where possible, additional stormwater infiltration should be considered.

An inspection and maintenance manual is provided in the 20-083 LandCare Associates Drainage Binder 4-26-22. The items in Section 6.C of the Town's Site Plan Review

Regulations are met. There are some minor items that should be added/amended to the stormwater feature inspection and maintenance procedures:

- Animal burrowing in stormwater systems (berms, layers, etc.) – monthly during April through October months. Repair as necessary
- De-icing: salt is suitable for paved surfaces. For unpaved surfaces, sand or fine gravel is recommended and is consistent with existing site characteristics.
- Maintenance guidelines and checklist for the SGW should use those specified by the UNHSC - <https://www.unh.edu/unhsc/maintenance>

Subsurface Gravel Wetland (SGW) Design comments

1. The design plans (20-083 LandCare Associates Plan Set 5-24-22, sheet 11 of 23) and the SGW design (20-083 LandCare Associates Drainage Binder 4-26-22, PDF page 86 of 149) do not agree on important design elevations. On the plans, it is shown that ESHWT from TP103 is 88.83 ft and in the Drainage Binder on the NHDES worksheet SHWT is identified as 87.00 feet. ESHWT from TP 104 should be used as that is in SGW cell #1 whereas TP103 is located in the SGW forebay.
2. The SGW primary outlet orifice invert seems to be set at 86.67 ft (HydroCAD). Given the ESHWT from TP 103, the system should be lined. The design plans indicate a low permeability material is to be used as a liner however no details/specifications are provided.

Recommended Stormwater and E&S Practices

1. The existing wetland in the central portion of the site today receives runoff and sediment resulting from existing site characteristics. This runoff enters the wetland from the southeast and sediment deposition is evident. As part of the long term sediment management plan, at this location and outside of the wetland, there should be a sediment trap designed and constructed to minimize sediment runoff into the wetland.
2. The existing infiltrating (leaching) catch basin is a good practice. No details are available on its design, but it was reported to be a concrete vault with a pipe to a larger area of stone. Preferably the catch basin is a deep sump (greater than three feet to the outlet pipe invert), but the existing sump does not appear to be very deep or it is filled with sediment. The site owner reported to routinely vacuum sweep the lot that drains to this catch basin, which is also a good practice. The sediment deposition in the catch basin sump should be monitored at least twice per year and the sump vacuumed out at least once per year. Owner should strongly consider a trap/modification in the catch basin for floatables in order to extend the life of the stone.
3. The RECB should be staked down with biodegradable stakes of length at least 6 inches.

4. There is mention of a rain garden in the plans and the report, yet no rain garden is proposed for the site. It is assumed that this reference is rather to the SGW. If correct, all mention of the rain garden should be corrected.
5. Outlet berm protection was in part proposed to be North American Green turf reinforcement. This is a plastic net product and not recommended. Instead, REBC of natural materials that biodegrade are preferred.

Optional Stormwater Management Practices

1. The excavation and replacement of the 12-inch HDPE pipe could include the pipe set in stone bedding and perforations drilled along the lower half of the pipe in order to accommodate infiltration.

Other Considerations

1. The site operations fragment existing wetlands. The ditch line along Knox Marsh Road connects these two wetlands and therefore can serve as an important connection between the wetlands for terrestrial species. This ditch line should remain free from obstructions and maintained.
- 2.

Comments on Plans that need to be addressed

1. Site plan (existing and proposed) makes an island of the interior wetland. It is recommended to connect it to wetland to the west with a corridor, possibly along Knox Marsh Road (make this route more terrestrially passable while at same time minimizing terrestrial access to the site operations from the interior wetland).
2. Sheet 9 of 23, test pits in the SGW are mislabeled.
3. The SGW low permeability liner needs specifications.
4. Sheet 12 of 23, NOTE 7 references City of Dover Engineering Department. This should be replaced with Town of Madbury Department of Public Works. Search entire plan set for similar issues and correct.
5. Sheet 12 of 23, Remove note 8. No silt fence to be used on site.
6. Sheet 12 of 23, Note 13 "IT" should be "IS".
7. Sheet 12 of 23, as the driveway is to have modifications, the infiltration (leaching) catch basin needs to be protected against sediment during construction (Sheet 18 of 23 shows practice E11, Sheet 19 of 23 shows practice E15). This sediment protection system, inspection, and maintenance should be identified and included in the plans and the Drainage Binder.
8. Sheet 17 of 23, Planting Note 8 needs to be significantly revised.
9. Snow storage and maintenance

Comments on plans that would be nice to be addressed

1. Instead of rip rap energy dissipators/level spreaders, consider a planted geogrid or concrete grid pavers (easier to maintain than rip rap). The less plastic used, the better all around.
2. Silt fence is identified in the drainage report and erosion and sediment control plan as well as on the plan sheets, however the plans do not show where silt fence is to be used. During the site inspection it was represented that silt fence would not be used for the project. Therefore mention of silt fence should be removed from the reports and plans, as well as silt fence details.
3. Seed mix for permanent stabilization of open areas (Sheet 19 of 23, practice E16) should consider 15% native wildflower seeds.
4. Outlet structure 101B is situated in SGW Cell #1. This makes the system "inline". Better water quality performance occurs in offline systems. To that end, might consider moving this outlet structure to the SGW forebay.

Notes on HydroCAD models

Existing

- What physically is the 6P 12-ft length overflow weir?
- 6R is a paved surface yet is coded as earth. n in model is 0.022, but should be in 0.012-0.015 range.

Proposed

- There is inconsistency between the SGW orifice invert on the plans (87.67 ft) and the HydroCAD model (86.67 ft).

Conclusions

The proposed stormwater management concepts are a dramatic improvement over existing site stormwater management. The Erosion and sediment control measure for construction and post-construction are appropriate. If at a minimum the Plan Comments That Need to Be Addressed and made (red text in this memorandum), the stormwater and erosion control project aspects meet the Town of Madbury Site Plan Review Regulations, Article XII Sections 5 and 6.