



RANGER ENGINEERING GROUP, INC.

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July 11, 2022

Ms. Jacki Byerley,
Planner Andover Planning
Board Town Office
36 Bartlett Street
Andover, MA 01810

Re: Stormwater Peer Review
Sellers Farm Estates – Modified Definitive
Subdivision 171 Rear Highland Road, Andover, MA

Dear Ms. Byerley and Board Members:

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 proposed development has two design points.

1) Design Point 1 (DP1) is Highland Road. Under existing conditions, the stormwater from a portion of the site between #167 and #171 Highland Road (EX1) flows north towards Highland Road. Under proposed conditions the drainage within the proposed roadway is collected in catch basins and piped south towards the BVW. A portion of the site (P2) which has been reduced under proposed conditions continues to flow towards Highland Road. HW concurs with the Applicant's assessment of DP1, no further action needed.

No Response Required

2) DP2 is the A-series wetland located along the southern property boundary. Most of the parcel slopes towards the south. It appears that there may be additional offsite areas that also flow through the project site to the southern wetland. HW recommends that the Applicant review the boundaries of EX2 specifically along the northern property boundary and the western property boundary and justify the limits of the catchment area. The proposed catchment area may need to be adjusted to match the limits of the existing watershed.

Additional topography has been added to the plans. The drainage plans have been revised to incorporate offsite areas which flow into the project site. The majority of the new catchment area is located northwest of the property boundary and a very small area is located east of the property boundary.

3) HW further recommends that the Applicant delineate the catchment area that flows towards the central B-series wetland. HW recommends that the Applicant include a



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third design point to evaluate the stormwater flowing into the B-series wetland under existing and proposed conditions.

The project site drainage area was split into three catchments. EX3 describes stormwater flowing to wetland series ‘B’ and ultimately into wetland series ‘A’. In the post development condition catchment P6 flows to the wetland. A breakdown of the volume of flow entering the wetlands is as follows.

	Pre Development Flow Volume (CF)	Post Development Flow Volume (CF)
2 year	4,690	6,222
10 year	11,186	13,358
25 year	15,753	18,177
100 year	23,239	25,906

The numbers indicate that the wetland does not loose flow and therefore its function as a wetland will remain.

- b. The Applicant has proposed three infiltration basins. Two of the basins discharge to the A-series wetland with 12-inch reinforced concrete pipes (RCP). The Flared End Section detail is provided on Sheet 11 (CS6021). The detail indicates that the stone apron should be 36” wide by 36” long. HW recommends that the Applicant provide riprap apron sizing calculations to verify that the stormwater discharge will not cause erosion within the wetland.

The rip rap apron calculations have been included and the details have been revised.

- c. Infiltration Pond 2 is located on Lot 1. The basin exfiltrates and has an overflow weir located approximately 35 feet from the B-series wetland. HW recommends that the Applicant document that the discharge rate will not cause erosion in the central BVW. **The berm releases 0.61 cfs of stormwater during the 25 year storm. Over the 5’ wide weir, this equates to 0.12 cfs per foot of weir which is handled by the riprap on the downslope of the overflow weir. The flow velocity is much lower than the allowable 2 feet per second to avoid scour.**

- d. HW recommends that the Applicant confirm that the proposed culvert located under the driveway to Lot 2 will not cause erosion to the BVW. The layout shown on Sheet 6 (CS1501) appears to place the culvert within the wetlands causing an impact that will require approval from the Conservation Commission. Furthermore, the invert and outlet for the two 12-inch culverts are not consistent between the HydroCAD model and the plan view.

The two culverts have been moved east to an area with more room to discharge flow from Wetland series ‘B’ to Wetland series ‘A’. Preformed riprap scour holes



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are to be installed on both ends of the culvert in order to prevent erosion in the wetlands. The scour hole is shown on detail 6 sheet cs6021.

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

a. The Applicant has provided a HydroCAD model to verify that post-development conditions do not exceed pre-development conditions to DP1 (Highland Road) or DP2 (the BVW on the south side of the parcel). The pre-development HydroCAD model describes DP1 as pond SP2 (Sum Pond Street) and DP2 as pond SP1 (new Pond). The post-development HydroCAD model describes DP1 as pond SP2 (Sum Pond Street) and DP2 as pond SP1 (Sum Pond Woods). The labeling and descriptions are confusing and HW recommends that the Applicant consider clarifying the HydroCAD model.

SP1 has been labelled Sum Pond Woods and SP2 has been labelled Sum Pond Road in both the pre and post HydroCAD models.

b. The Applicant has indicated gravel road and fallow soil in the Post Development HydroCAD. HW was not able to locate the gravel road or the fallow soil in the proposed plans. HW recommends that the Applicant verify where in the plans the gravel road and fallow soil are proposed.

Gravel road was used to describe walkways to the dwellings; The walkway surface type has been changed to impervious area. Fallow soil was used to describe the wetland surface type. The surface type of Wetland series 'A' and 'B' has been changed to woods/grass good HSG 'D' in both the pre and the post development HydroCAD.

c. The Applicant has indicated a surface condition of "poor" for the Woods in the Post Development HydroCAD model. HW recommends that the Applicant justify the use of "poor" Woods. Furthermore, HW recommends that the Applicant confirm that the curve numbers used in the HydroCAD model are consistent with Table 1 in Section IX.E. of the Andover Stormwater Bylaw.

The woods poor is used for the portion of trees located on the western portion of the lot. The definition for poor woods is "heavily mowed and have no litter or new young growth. The curve numbers have been updated to match table 1 in section IX.R of the Andover Stormwater Bylaw.

d. HW recommends that the Applicant confirm it has calculated the times of concentration (Tc) for the existing (EX2) and the proposed (P6) catchment areas that flow through the B-series wetland accurately.

The Time of concentration (Tc) for EX2 and P6 has been revised to incorporate the new catchment area to the North East. The flow path can be seen for both catchments on sheets CS9201 and CS9301 respectively.

e. Infiltration Pond 3 is located on Lot 2. The HydroCAD model indicates that the 12" primary outlet is set at elevation 263.00, the detail on Sheet 12 (CS6021) notes that the 12-inch invert is at 262.00. The detail further indicates that the 12" outlet is set at 259.00. The plan view on Sheet 6 (CS1501) calls out the flared end section (FES 2) at 261.50. HW recommends that the Applicant confirm that



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the plan view, detail, and HydroCAD model are consistent.

Elevations associated with OCS 3 and FES 2 details, plan view, and HydroCAD have been revised are consistent throughout the plan set and hydrocad.

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

- a. In Section X. of the Stormwater Management Report, the Applicant has listed the recharge volumes provided by each of the infiltration basins. HW recommends that the Applicant provide the HydroCAD stage storage print out for each basin to confirm the volume provided below the outlets.

Calculations for the required recharge volume for each pond in the Drainage report under section X Standard 3. These volumes are less than the provided which are shown in the hydrocad as the volume below the lowest outlet.

- b. The two closest test pits for Basin 2 are TP4 and TP9. Neither test pit falls within the footprint of the basin. The estimated seasonal high groundwater (ESHW) at TP 9 indicates groundwater at approximately elevation 263 which is higher than the bottom of the basin, the required 2 feet of separation has not been satisfied. HW recommends that the Applicant conduct additional soil testing to demonstrate adequate separation to the ESHGW per MSH Volume 2 Chapter 2 Page 88. HW further recommends that the Applicant verify if a mounding analysis is required and provide if applicable.

Additional test pits have been performed and the locations are shown on sheets CS0201 and CS1501. TP14 is shown in Pond 1. TP 15 is shown in pond 2 and TP 16, 17, and 18 are shown in pond 3. The ESHGW in basin 2 was found to be 30" below existing grade at approximately elevation 261. The pond has been raised to maintain the required 2' depth between groundwater and pond bottom.

- c. Similarly, HW recommends that the Applicant conduct additional test pits within the footprint of Basin 3 to demonstrate adequate separation to the ESHGW per MSH Volume 2 Chapter 2 Page 88. HW further recommends that the Applicant verify if a mounding analysis is required and provide if applicable.

More Testpits have been performed the locations are shown on sheets CS0201 and CS1501. TP 16, 17, and 18 are shown in pond 3. The ESHGW in basin 3 was found to be 40" below existing grade at approximately elevation 258.66, 260.66, 262.66 respectively. These elevations have been shown on the pond details sheet CS6022. The pond has been raised to maintain the required 2' depth between groundwater and pond bottom.

- d. It appears that Basin 1 has greater than 2 feet of separation to ESHGW but less than 4 feet. HW recommends that the Applicant provide a mounding analysis per the MSH Volume 3, Chapter 1, Page 28.

Groundwater mounding calculations have been performed and included in the drainage report.

4. *Standard 4 requires that the stormwater system be designed to remove 80% Total*



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Suspended Solids (TSS) and to treat 1.0-inch of volume from the impervious area for water quality.

- a. The Applicant has chosen to size the infiltration basins to provide water quality treatment as well as recharge volume. HW recommends that the Applicant provide the HydroCAD stage storage print out for each basin to confirm the water quality volume provided below the outlets.

The required water quality treatment volume is the same as the required recharge volume for each pond. These volumes were calculated in section X, Standard 3 of the drainage report and shown in the HydroCAD report for each pond.

- b. The Applicant has proposed catch basins, sediment forebays and infiltration basins to provide adequate TSS removal. **No further action required.**
- c. Basin 2 appears to capture runoff from a driveway curb scupper which leads to the forebay (Sheet 12 of 14). HW recommends that the Applicant confirm that the curb scupper is properly sized and that flow will not cause erosion between the driveway and the basin.

A drain scupper detail has been added to sheet CS6021. A riprap spill way has been added which will extend to the bottom of the pond 2 forebay and prevent erosion between the driveway and the basin.

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

- a. The site is not considered a LUHPPL, therefore **Standard 5 is not applicable.**

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 is not within a critical area, therefore **Standard 6 is not applicable.**

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 new development. **Standard 7 does not apply.**

8. *Standard 8 requires a plan to control construction related impacts including erosion, sedimentation or other pollutant sources.*

- a. The Applicant has included an Erosion and Sediment Control Plan, Sheet 13 (CS8001). The legend lists check dams. HW recommends that the Applicant include a check dam detail.

A check dam detail has been added to sheet CS8501

- b. HW recommends that the Applicant include proposed stockpile locations with appropriate erosion controls on the Erosion & Sediment Control Plan.
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Stockpile locations have been added to sheet CS8501. The stockpile detail on sheet CS8001 and the plan view show the required erosion control devices.

- c. HW recommends that the Applicant add fencing around the infiltration basins to prevent heavy vehicles from compacting the soil.

Temporary snow fences have been shown around basins. These fences consist of orange mesh and shall be removed after the roadway is finished. This specification is shown in construction sequence 9 sheet CS8501.

- d. The Applicant provided a Fiber Log Detail on Sheet 14 (CS8501). HW recommends that the Applicant show where this practice is being used and clarify that the practice shall not use straw or hay.

The Detail has been updated to specify that no straw or hay shall be used. The Plan view has specified where to install the compost wattles.

- e. HW recommends that the Applicant clarify the number of large trees (greater than 12" diameter) that will be removed as part of the proposed layout. Per Section IX.H.14. of the Andover Stormwater Regulations, tree removal shall be minimized.

The survey and existing conditions plan has been updated to show the trees greater than 12" diameter. The Trees that will need to be removed are specified on sheet CS1001.

- f. HW further recommends that the Applicant verify it has reviewed and complies with Section IX.H. of the Andover Stormwater Regulations.

The specifications in section IX.H – Design Criteria, Erosion Control - have been added to the notes on sheet cs8501.

- g. The proposed project requires land disturbance of greater than 1 acre. Therefore, a Stormwater Pollution Prevention Plan (SWPPP) per the EPA NPDES Construction General Permit will be required. HW recommends that the Applicant provide a copy of the SWPPP to the Town a minimum of 14 days prior to land disturbance.

A SWPPP plan will be provided

9. Standard 9 requires a Long-Term Operation and Maintenance (O & M) Plan be provided.

- a. The Applicant has provided a Long-Term Pollution Prevention Plan in the Stormwater Management Report as required. HW recommends that the document become a standalone document to be signed by the property owners prior to occupancy.

A long term Pollution Prevention Plan will be provided.

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

- a. HW recommends that a signed Illicit Discharge Compliance Statement be provided to the Conservation Commission prior to the discharge of any stormwater to post-construction best management practices (BMPs).

A signed Illicit Discharge Compliance Statement will be provided.

11. Additional comments per Andover Stormwater Bylaw.



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- a. Per Section IX. A. HW recommends that the Applicant document the low impact development practices that were considered for this project.
- b. Per Section IX.D.2. HW recommends that the Applicant verify if the project site discharges to a water body or tributary subject to a Total Maximum Daily Load (TMDL).

The site does not discharge into a body of water listed as category 4b or 5 in the current Massachusetts list of impaired water bodies and their tributaries.

- c. HW recommends that the Applicant clearly document the limit of work. It appears that the erosion control barrier is being placed on the property of #171 Highland Road. Furthermore, it appears that there are some trees and some proposed grading that is outside of the erosion control barrier. HW recommends that the Applicant revisit the erosion controls and adjust as applicable.

The limit of work has been updated to encompass the entire limit of work

April 05, 2022 – The following revisions have been made to address comments made by various town representatives during the Interdepartmental review meetings.

1. Need easements around all stormwater ponds and drainage features

Easements have been added around all stormwater ponds

2. Bob Douglas – Wetland and Stormwater Review

Wetland review is ongoing and stormwater review comments have been addressed.

3. Tom Carbone – Pump station Special permit and written noise attenuation plan for ledge removal.

Special permits for the pump stations have been granted by the Board of Health subject to approval of the HOA documents

A noise attenuation plan will be provided prior to ledge removal.

4. Fire department – hydrant location and distance to lot 2 for sprinkler

An additional hydrant has been added at approximately station 1+75'.

A Hydrant Flow test has been performed.

Lot 2 is 220 feet from the proposed roadway. If the house is more than 150' from fire apparatus access but less than 300 feet, a residential fire sprinkler system shall be installed. This should be a condition of approval.



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5. Water Department – utilities owned by homeowners

HOA documents have been submitted and are under review. The looped water main has been replaced with a single 8" line.

6. Town Engineer – HOA document

HOA documents have been submitted and are under review

7. Planner – street trees to be removed from plan except for quantity

Quantity of street trees added to sheet CS1001. Tree locations of plan removed.

Thank you,

Benjamin C. Osgood Jr.
President
