



MIDDLETOWN
Rhode Island

PLANNING DEPARTMENT

TOWN OF MIDDLETOWN

350 East Main Road, Middletown, RI 02842
(401) 849-4027 | MiddletownRI.com

To: Paul A. Croce, Chairman
Planning Board members

From: Ron Wolanski, Town Planner

Date: February 2, 2022

Re: **Public Hearing** – Application of Juan Campos for Preliminary Plan approval of a 5-lot subdivision including extension of an existing town road. The property is located at the end of Serenity Drive, with frontage also on Maidford River Road, and is identified as Tax Assessor's Plat 120, Lots 68-A & 68-B.

This item was continued to the February 9, 2022 Planning Board meeting at the request of the applicant to allow for review and response to Crossman Engineering's review comments dated January 11th (attached). Responses to these comments by the applicant's engineer, dated January 18 & January 27, 2022 are attached. Also attached is a letter from the applicant's attorney requesting a variance from the applicable provisions of Town Code Chapter 153 if deemed necessary. These correspondences have been provided to the Town's consulting engineer, Crossman Engineering, and the Town Engineer. If it is determined that a variance is necessary, the Town Engineer has the authority to consider the request.

The applicant is requesting Preliminary Plan approval for the 5-lot conventional subdivision of approximately 318,972 sq.ft. of developable land. The property is in the R-40 zoning district. In March of 2020 the Planning Board granted Master Plan approval of the 5-lot conventional subdivision including a waiver to construct a 350-foot extension of Serenity Drive which will be 22-feet wide where 26-feet is required by Town regulations. This configuration would provide the required street frontage for all five lots of the conventional design. The proposed road would terminate in a 90-foot cul-de-sac partially on private property. No connection to Maidford River Road is proposed.

It appears that the proposed lots would meet the dimensional requirements of the Middletown Zoning Ordinance, including the minimum lot area of 40,000 sq.ft., and minimum frontage of 150 feet, or 50 feet on a cul-de-sac turnaround. The lots would be served by and public water and sewer. There are wetlands located on proposed lots 1 and 3.

The application was referred to the appropriate departments and committees for final comments. The Middletown Tree Commission responded with no concerns. The Newport Water Department sent a letter dated June 28, 2021, indicating that the proposed water main as presented is not acceptable, however a preliminary water availability letter was issued.

TRC Review:

The TRC reviewed the application on September 1st and November 5th, 2021. Following its review, the TRC voted to provide a positive recommendation to the Planning Board. Following are conditions of approval recommended by the TRC and Planning Dept. staff:

Recommended conditions of approval:

1. Prior to Final Plan approval, calculations relative to the stability of the stormwater detention pond berm design shall be provided, subject to approval by the Town Engineer.
2. Prior to Final Plan approval the applicant shall submit a redesign of the detention basin to demonstrate the ability for groundwater recharge or request a waiver of the recharge requirement from the Planning Board.
3. Prior to Final Plan approval, the applicant shall secure approval from the Town Council to abandon portions of the Serenity Drive right-of-way, unless a revised plan is submitted demonstrating that abandonment is not necessary.
4. Prior to Final Plan approval, the plan shall be revised to show the relocation of the proposed new fire hydrant to a location near the lot line between proposed lots 1 and 2.
5. Prior to final plan approval the maintenance and sewer easements must be reviewed and approved by the Town Solicitor.
6. Prior final plan approval payment of development plan review fees must be submitted.
7. Prior to final plan approval a landscape maintenance plan including a schedule of initial and ongoing activities to be undertaken by the property owner, homeowners association or other appropriate party if a landscape plan is proposed, as required by §523.

Required findings (Subdivision rules and regulations section 403):

The following is a list of the required findings the Board must make in approving a subdivision. The Board should make its own conclusions as to the consistency of the plan with these findings.

1. The proposed development is consistent with the comprehensive community plan and/or has satisfactorily addressed the issues where there may be inconsistencies;
2. The proposed development is in compliance with the standards and provisions of the Town Zoning Ordinance
3. There will be no significant negative environmental impacts from the proposed development as shown on the final plan, with all required conditions of approval;
4. The subdivision, as proposed, will not result in the creation of individual lots with such physical constraints to development that building on those lots according to pertinent regulations and building standards would be impracticable. (See definition of Buildable lot). Lots with such physical constraints to development may be created only if identified as permanent open space or permanently reserved for a public purpose on the approved, recorded plans;
5. All proposed land developments and all subdivision lots shall have adequate and permanent physical access to a public street. Lot frontage on a public street without physical access shall not be considered compliance with this requirement.

The Preliminary Plan application was certified complete on June 16, 2021. The Planning Board must complete its review and render a decision within 90 days of certificate of completeness: September 14, 2021. With the applicant's agreement to continue the matter until the February Planning Board meeting, the deadline was extended to February 9 2022. Unless a further continuance is agreed to by the applicant, action must be taken by that date.

Please contact me with any questions regarding this matter.

Cc: Applicant
Town Solicitor

MILLER SCOTT HOLBROOK & JACKSON

Attorneys and Counselors at Law

MICHAEL W. MILLER
TURNER C. SCOTT
FRANCIS S. HOLBROOK II*
J. RUSSELL JACKSON

**also admitted in Connecticut*

February 1, 2022

Ron Wolanski
Town Planner
Warren Hall
Town Engineer
Town of Middletown
350 East Main Rd.
Middletown, RI 02842

SENT VIA EMAIL ONLY
rwolanski@middletownri.com
whall@middletownri.com

RE: Application of Juan Campos for Preliminary Plan Approval of a 5-lot subdivision including extension of an existing town road. The property is located at the end of Serenity Drive, with frontage also on Maidford River Road and is identified as Tax Assessor's Plat 120, Lots 68-A & 68-B.

Dear Ron & Warren:

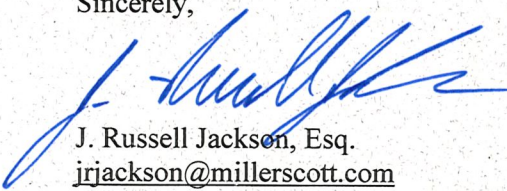
I am writing as a follow up to our discussions regarding the need for a waiver of the design criteria, methodologies and construction specifications set forth in the Design Manual, relative to the proposed detention basin on the above referenced plan. Northeast Engineers has reviewed the most recent comments of Crossman Engineering and in response, has provided a Memorandum addressing the issue, which is attached hereto. It is the opinion of Lyn Small, that the recharge calculations demonstrate that the basin will infiltrate the volume for the recharge and a waiver is not required.

In the event that the Town Engineer Warren Hall does not agree with the conclusions of Northeast Engineers, then please accept this correspondence as our request for a waiver or variance pursuant to Section 153.04, from the requirements of Section 153.23 of the Ordinance.

Our primary objective is to stay on track for the completion of this hearing on Preliminary Plan approval at the next Planning Board meeting on February 9, 2022. Accordingly, please advise if there is any further information required to proceed.

Thank you for your attention to this matter.

Sincerely,


J. Russell Jackson, Esq.
jrjackson@millerscott.com
enclosure

cc: Client
Lyn Small, PE
Peter B. Regan, Esq.
David P. Martland, Esq.



Memorandum

Date: January 27, 2022

To: Ron Wolanski, AICP, Town Planner, Town of Middletown

From: Jeremy Rosa, PE

Subject: Serenity Drive Subdivision, Detention Basin Groundwater Mounding

Pursuant to the continued concerns raised by the town third party reviewer regarding the separation between the bottom of the proposed infiltrating detention basin to the estimated seasonal high groundwater table, Northeast Engineers & Consultants, Inc. (NE&C) has prepared the following groundwater mounding analysis.

The codified Rhode Island Stormwater Manual (250-RICR-150-10-8) does not indicate a preferred method for analyzing the potential for groundwater mounding under stormwater infiltration basins. Section 5.3.1. of the non-codified manual; however, indicates that the Hantush Method, or any other equivalent method, may be used to demonstrate that the groundwater mound that forms under an infiltration will not break out above the land or jurisdictional water.

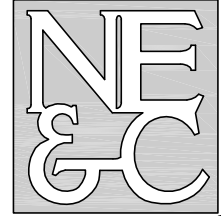
As part of a scientific investigation report prepared in 2010 entitled "Simulation of Groundwater Mounding Beneath Hypothetical Stormwater Infiltration Basins", the USGS prepared and made available to the general public, a spreadsheet solving the Hantush (1967) equation to calculate the groundwater mounding under infiltration basins based on user-specified conditions. This spreadsheet was used in the analysis of the Serenity Drive detention basin. The inputs for this calculation method were taken from the proposed site conditions shown in the most recent town submission and from established sources of data for soil properties. For the purposes of the analysis, a minimum depth to groundwater from the bottom of the basin of 0 feet was used. As the soil evaluations did not reveal a depth to a limiting impervious layer, an assumption of 15 feet was used. This assumption has been previously accepted by RIDEM when this information is not available.

As is shown in the results from this analysis, the highest points in the resulting mound are within 20 feet of the center of the basin. As this is still within the extents of the basin, groundwater break out is not possible. The following table shows the height of the resulting mound, the maximum groundwater elevation, and the proposed grades for distances outside of the proposed detention basin.

Table 1. Groundwater Mounding Results

Distance from Basin Center (ft)	Minimum Existing Grade (ft)	Depth to SHGWT (ft)	Height of GW Mound (ft)	Final GW Elevation	Minimum Proposed Grade
40	97.0	1.5	0.459	95.96	99.0
50	96.5	1.5	0.053	95.06	96.5
60	96.0	1.5	0.007	94.51	96.0

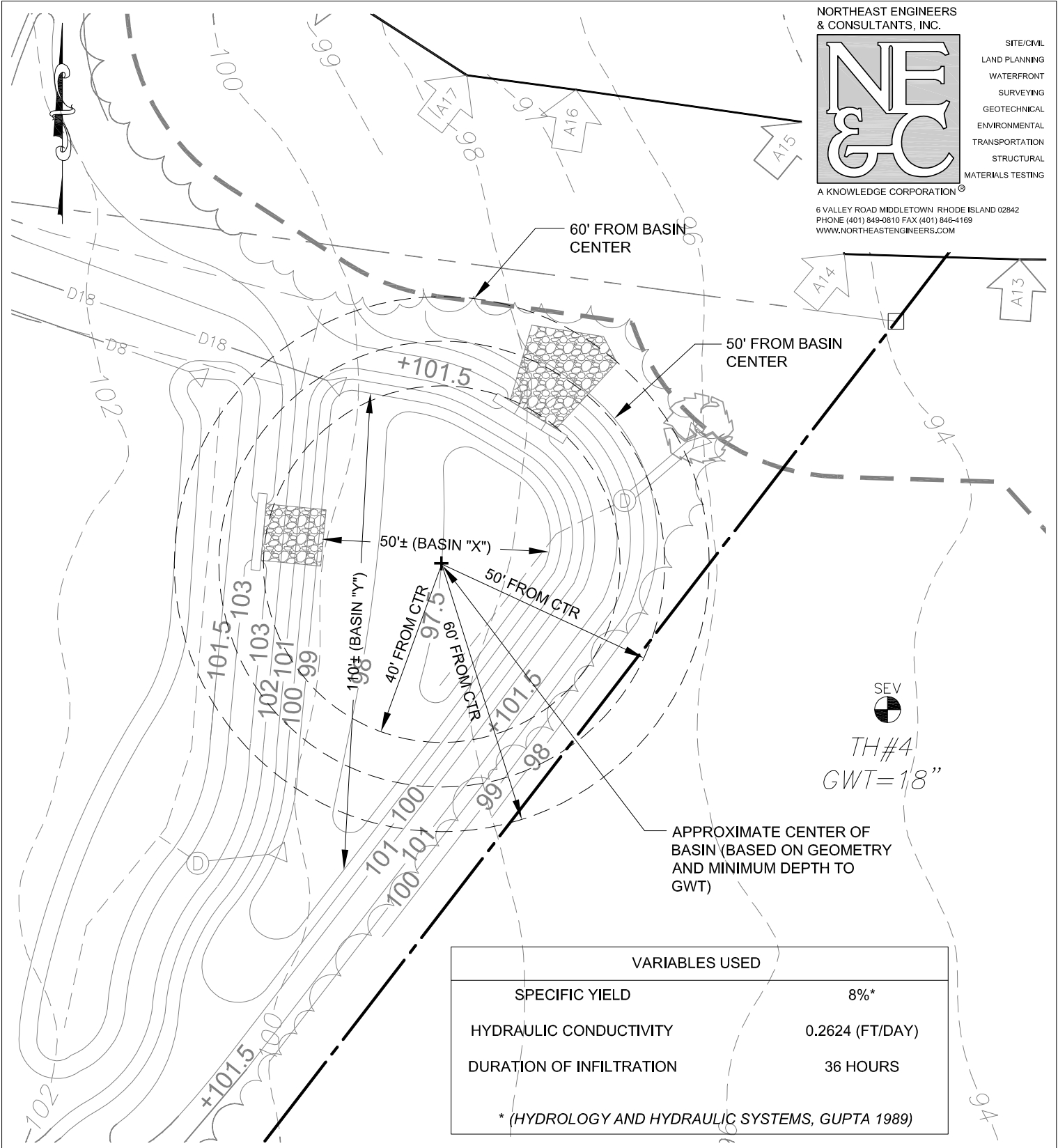
As evidenced by these results, the potential for groundwater breakout as a result of mounding groundwater is extremely low. This can be attributed to the relative size of the proposed basin, and the limited infiltration capacity.



A KNOWLEDGE CORPORATION®

6 VALLEY ROAD MIDDLETOWN RHODE ISLAND 02842
 PHONE (401) 849-0810 FAX (401) 846-4169
 WWW.NORTHEASTENGINEERS.COM

- SITE/CIVIL
- LAND PLANNING
- WATERFRONT
- SURVEYING
- GEOTECHNICAL
- ENVIRONMENTAL
- TRANSPORTATION
- STRUCTURAL
- MATERIALS TESTING



VARIABLES USED	
SPECIFIC YIELD	8%*
HYDRAULIC CONDUCTIVITY	0.2624 (FT/DAY)
DURATION OF INFILTRATION	36 HOURS
* (HYDROLOGY AND HYDRAULIC SYSTEMS, GUPTA 1989)	

Scale: 1"=30'	Date: 27JAN22	Designed By: JJR	Drawn By: JJR	Checked By: GES
Project Title: CAMPOS SUBDIVISION SERENITY DRIVE, MIDDLETOWN RI		Drawing Title: DETENTION BASIN GROUNDWATER MOUNDING		
Issued for: PERMITTING		Drawing Number: C-1	Project Number: 19187.0	

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.

Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. **The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed** otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

Input Values

0.5400	R	Recharge (infiltration) rate (feet/day)
0.080	Sy	Specific yield, Sy (dimensionless, between 0 and 1)
0.26	K	Horizontal hydraulic conductivity, Kh (feet/day)*
25.000	x	1/2 length of basin (x direction, in feet)
55.000	y	1/2 width of basin (y direction, in feet)
1.500	t	duration of infiltration period (days)
15.000	hi(0)	initial thickness of saturated zone (feet)

24.908	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
9.908	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)

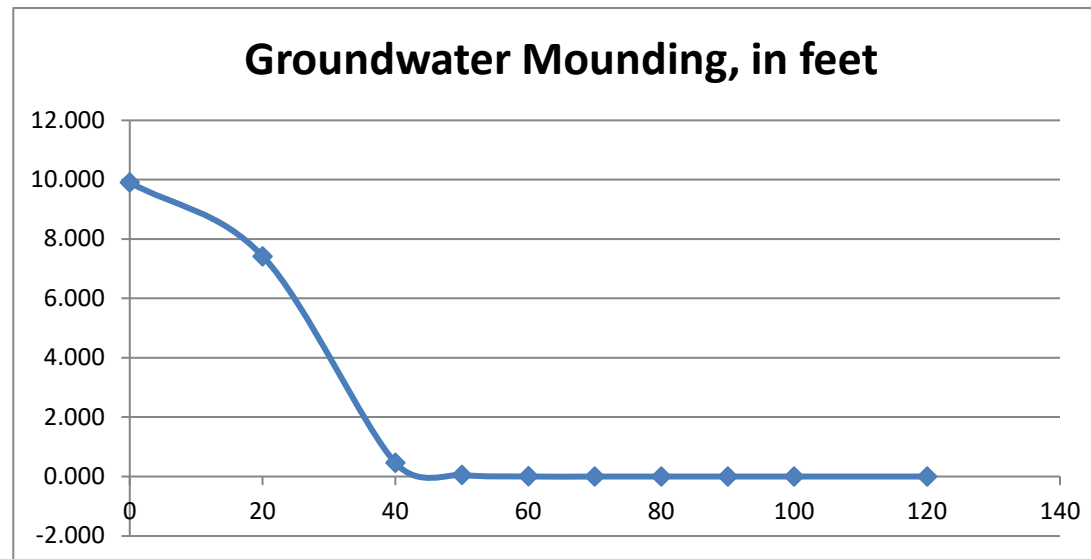
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

9.908	0
7.418	20
0.459	40
0.053	50
0.007	60
0.003	70
0.003	80
0.003	90
0.003	100
0.003	120



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program



Site Evaluation Form
Part A - Soil Profile Description

Application Number NA

Property Owner: J&M Mello Nominee Trust

Property Location: Paradise Avenue (AP 120 Lot 168) Middletown, RI

Date of Test Hole: May 5, 2015

Soil Evaluator: Chris Sutter

License Number: D-4077

Weather: Clear, 60's

Shaded: Yes [] No [x] Time: 8:00 am

Table with 11 columns: TH Horizon, Depth, Horizon Boundaries (Dist, Topo), Soil Colors (Matrix, Re-Dox Features), Re-Dox (Ab., S., Contr.), Texture, Structure, Consistence, Soil Category. Contains data for TH 3 and TH 4 horizons.

TH 3 Soil Class Basal Till Total Depth 80" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 24" (og)

TH 4 Soil Class Basal Till Total Depth 78" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 16" (og)

Comments:



**NORTHEAST ENGINEERS
& CONSULTANTS, INC.**

"A Knowledge Corporation"®
6 VALLEY ROAD MIDDLETOWN RHODE ISLAND 02842 401.849.0810 PHONE 401.846.4169 FAX

January 18, 2022

Ronald M. Wolanski, AICP
Director of Planning & Economic Development
350 East Main Road
Middletown, RI 02842

RE: Response to Continuous Technical Review Comments
Campos Residential Subdivision
Plat 120, Lots 68A & 68B

Dear Mr. Wolanski:

The following responses are in reference to the Preliminary Plan application review comments issued by Crossman Engineering dated January 11, 2022. Comments that have been resolved have not been reiterated.

1. *(Comment 3): Proposed Layout and Utility, Sheet C-5: The plans call for all driveways to be crushed stone and the stormwater system is based on non-paved driveways. Therefore, a deed restriction is recommended.*

This comment shall be resolved between the solicitor and project counsel.

2. *(Comment 5): Proposed Grading and Drainage Plan, Sheet C-6: With seasonal high-water tables of 17 – 24 inches, we recommended that the lowest basement elevation be provided for each home to avoid the need for sump pumps. The applicant responds that sump pumps are allowed under current Town regulations. For future consideration, we note that the use of sump pumps for new construction conflicts with the stormwater recharge standard which promotes maintaining groundwater resources. Status: The discharge of sump pumps should not enter the stormwater management system, to prevent premature clogging. The system is designed for surface runoff only. A note was added to Sheet C-6 that states that "Discharge from any Residence sumps shall be to the rear of individual lots" but since the rear of lots 4 and 5 drain into the stormwater system, the note will need to be expanded to ensure that flow does not enter the sand filter or infiltration system.*

Regardless of any potential conflicts between the use of sump pumps for new construction and stormwater recharge standards, the town does not prohibit them at this time. The notation that was added to direct sump flow towards the rear of the lots was agreed upon at a previous meeting to address the original comment; however, the reviewer appears to be resurrecting the issue with the claim that sump pump flow can cause "premature clogging" of a stormwater system. NE&C finds this assertion to be unfounded, and invites the reviewer to provide any evidence that a seasonal sump pump clean groundwater discharge of less than 0.01 cfs overland flow across stabilized lawns will cause any measurable amount of clogging to a stormwater system that manages runoff from several acres of land. NE&C reminds the town that state and local standards do not prohibit or even dissuade the discharge of sump pump flow upstream of stormwater systems.

3. *(Comment 8): Proposed Road Profile, Sheet C-8: On the Road Section Detail, the proposed sidewalk is now shown but the removal and replacement of unsuitable soils below the base course should be shown, in addition to the sewer and gas lines. Status: A reference to "Earthworks Notes" was added to sheet C-8 but they were not readily found in the plan set. We recommend that the recommended note be added to Sheet C-8.*

The notes in question can be "readily found" in section 2 under the "Soil Erosion and Sediment Control" section. NE&C will rename this section "Earthwork Notes" if that will finally resolve this comment.

4. *(Comment 9): NE&C provided a certified stability analysis of the sand filter berm which indicated that the berm is stable. During construction, we recommend that NE&C inspect the soils to confirm that they conform to the cohesion, friction angle and other assumptions used in the analysis. In regards to the detention pond berm with the impervious clay core, we recommend that the detail on Sheet C-10 show the impervious core being keyed into the existing subsoils. A note is provided but a clearer depiction is recommended.*

The assumptions made in the stability analysis are generally accepted as standard. Given that the berm shall be entirely comprised of fill materials, they must conform to the standards provided in the earthwork notes. It is the site contractor's responsibility to ensure that the materials used in construction are suitable. The contractor may elect to retain NE&C or another qualified professional to provide this quality assurance.

With respect to the clay core, the note provided on the plan indicates that the clay core is to "extend to original in-organic material". It is unclear how this could be misinterpreted or misunderstood by a site contractor and why continued clarification is necessary. The clay core was added to the plans in the September 2021 revision and appeared to address the reviewer concern at that time. It is unclear why this design aspect is receiving renewed scrutiny.

5. *(Comment 10) Stormwater Analysis: The detention basin bottom is at or below the seasonal high groundwater table and would not qualify for recharge credit. We recognize that RIDEM issued a permit but none of the infiltration basin design standards are met, especially with the underdrain outlets. Therefore, as designed, a waiver from the Town is required. Status: The bottom of the infiltration pond (referred to as detention pond on Sheet C-10) was raised by 6 inches from elevation 97.0 to 97.5. The newest calculations demonstrate that the required recharge volume is provided but a waiver is needed from design standards for not providing a minimum 2 feet from the pond bottom to the seasonal highwater table. Two (2) reasons for the vertical separation requirement are to prevent mounding of the groundwater during recharge which will reduce the actual infiltration volume, and to minimize the potential for groundwater contamination. Based on the Grading Plan and soil data, the water table is only 18 inches below grade and the pond will be excavated 18 inches to 12 inches below grade. Therefore, the revised design does not provide 2 ft of separation and will require a waiver to the design standards.*

Despite the assertions by the reviewer, the state stormwater standards do not have a requirement of 2-feet of separation between the bottom of extended detention basins and the seasonal high groundwater table. Section 8.33.A of 250-RICR-150-10-8 states that "dry basins do not need a permanent pool and may be designed such that the groundwater table is at or below the bottom of the basin". With respect to the two specific reasons provided by the reviewer:

1. The claimed infiltration volume to meet the state standard is based on a 1.2" water quality storm. It is unlikely that groundwater mounding would be a significant concern during such small storms.
2. It is unclear what the potential source of groundwater contamination would be in the scenario, as the basin is preceded by several pre-treatment devices and a primary water quality device. Generally speaking, it is not accepted practice to design stormwater devices as if all preceding devices in a treatment train have failed.

The reviewer claims that a waiver is required from the design standards. NE&C requests that the reviewer indicate the specific codified standard pertaining to dry extended detention basins (not water quality basins) that applies to this design. It is the opinion of NE&C that there is no actual standard that would require a town waiver.

6. *(Comment 11) Stormwater Analysis: The 100-year freeboard for the Sand Filter's embankment is only 0.37 feet, therefore we are concerned with its stability. Status: NE&C provided a certified stability analysis with soil assumptions which indicated that the berm is stable. During construction, we recommend that NE&C inspect the soils to confirm that they satisfy the cohesion, friction angle and other assumptions used.*

Given that the sand filter embankment shall be entirely comprised of fill materials, they must conform to the standards provided in the earthwork notes. It is the site contractor's responsibility to ensure that the materials used in construction are suitable. The contractor may elect to retain NE&C or another qualified professional to provide this quality assurance.

Should you have any additional questions or concerns, please contact our offices. Thank you.

Best regards,
NORTHEAST ENGINEERS & CONSULTANTS, INC.



Jeremy Rosa, PE
Senior Civil Engineer



PELIMINARY PLAN REVIEW MEMORANDUM

To: Ronald M. Wolanski, AICP
Director of Planning & Economic Development

From: Steven Cabral
Crossman Engineering

Date: January 10, 2022

Re: Campos Residential Subdivision
Plat 120, Lots 68A & 68B
Middletown, RI

Following the December Planning Board Hearing, our office received the following documents:

- Sand Filter Berm Stability Analysis, dated December 29, 2021, by Northeast Engineers and Consultants (NE&C)
- Preliminary Plan Set, dated November 15, 2021, by NE&C
- Stormwater Runoff Analysis, dated November 15, 2021, by NE&C
- Letter to Middletown Planning Board from Attorney Martland, dated December 8, 2021

Below are the comments within our October 5, 2021 Memorandum followed by their status in red:

Remaining Engineering Comments:

1. (Original Comment 3): Subdivision Plan, Sheet C-4: The existing Cul-de-Sac land which is part of the Town Right-of-Way is shown to be removed and to become part of Proposed Lots 1 & 5. Since existing Serenity Drive is shown as a Public Right of Way, is Town Council action necessary to convey this land? **Status: The design no longer seeks approval to abandon the existing cul-de-sac, therefore the comment no longer applies.**
2. (Original Comment 4): Subdivision Sheet C-4 now shows an easement to the Town around the stormwater ponds. If the Association is the responsible party, the easements should also identify the Association. In regards to the Easement delineation, the easement space at the top of the ponds is limited. We recommend a minimum width of 10 ft at the top of each pond. DPW may require more space. **Status: The easement has been expanded, therefore the concern is resolved.**
3. (Original Comment 11): Proposed Layout and Utility Plan, Sheet C-5: The Plans call for all driveways to be crushed stone and the stormwater system is based on non-paved driveways. Therefore, a deed restriction is recommended. **Status: This recommended condition remains.**
4. (Original Comment 12): Proposed Layout and Utility Plan, Sheet C-5: Since new water and gas lines will require trenching of the existing segment of Serenity Drive to Compton View Drive, the Plans

October 5, 2021
Revised January 10, 2022
Campos Residential Subdivision
Middletown, RI
Page 2 of 3

- should clearly identify the proposed repair work to the Serenity Drive. Following permanent trench patching, a full-width overlay is recommended. A Note was added to Sheet C-5 stating that road repairs will be coordinated with DPW but we recommend that the extent of repairs be documented during permitting. **Status: We understand that DPW is satisfied with the notation.**
5. (Original Comment 14): Proposed Grading and Drainage Plan, Sheet C-6: With seasonal high-water tables of 17 – 24 inches, we recommended that the lowest basement elevation be provided for each home to avoid the need for sump pumps. The applicant responds that sump pumps are allowed under current Town regulations. For future consideration, we note that the use of sump pumps for new construction conflicts with the stormwater recharge standard which promotes maintaining groundwater resources. **Status: The discharge of sump pumps should not enter the stormwater management system, to prevent premature clogging. The system is designed for surface runoff only. A note was added to Sheet C-6 that states that “Discharge from any Residence sumps shall be to the rear of individual lots” but since the rear of lots 4 and 5 drain into the stormwater system, the note will need to be expanded to ensure that flow does not enter the sand filter or infiltration system.**
 6. (Original Comment 15): We recommended that the site’s grading be refined to ensure that homes are protected from surface runoff. The applicant responds that final grading will be handled at the building permit stage. **If this is the Town policy, we have no objection.**
 7. (Original Comment 18): The proposed Road Profile, Sheet C-8, was raised, as recommended, but at Station 0+00, the revised slope begins flat (0%). To avoid ponding, we recommend a minimum slope of 1% minimum, 2% preferred. **Status: The profile was updated, as requested.**
 8. (Original Comment 21): Proposed Road Profile, Sheet C-8: On the Road Section Detail, the proposed sidewalk is now shown but the removal and replacement of unsuitable soils below the base course should be shown, in addition to the sewer and gas lines. **Status: A reference to “Earthworks Notes” was added to sheet C-8 but they were not readily found in the plan set. We recommend that the recommended note be added to Sheet C-8.**
 9. (Original Comment 23) Site Details, Sheet 10. The original comment was that 3 ft top width of the basins is less than standard (8 ft) and that the engineer needs to ensure that the embankment is suitable for the water pressures expected. The revised Plans include a clay barrier for the detention pond but none appears shown for the sand filter embankment. Also, the sand filter berm only provides (102 top of berm – 101.63 water level) 0.37 feet of freeboard. One (1) ft is recommended. On the Detention Pond Detail, it appears that the sand filter is only elevation 100.5. (The detail appears reversed). A 2 ft wide clay dam is now shown in the detention pond embankment. With a water depth of 2.62 ft, we recommend that the designer provide calculations to demonstrate stability of the narrow berm. **Status: NE&C provided a certified stability analysis of the sand filter berm which indicated that the berm is stable. During construction, we recommend that NE&C inspect the soils to confirm that they conform to the cohesion, friction angle and other assumptions used in the analysis. In regards to the detention pond berm with the impervious clay core, we recommend that the detail on Sheet C-10 show the impervious core being keyed into the existing subsoils. A note is provided but a clearer depiction is recommended.**
 10. (Original Comment 30) Stormwater Analysis: The detention basin bottom is at or below the seasonal high groundwater table and would not qualify for recharge credit. We recognize that RIDEM issued a permit but none of the infiltration basin design standards are met, especially with the underdrain outlets. Therefore, as designed, a waiver from the Town is required. **Status: The bottom of the**

October 5, 2021
Revised January 10, 2022
Campos Residential Subdivision
Middletown, RI
Page 3 of 3

infiltration pond (referred to as detention pond on Sheet C-10) was raised by 6 inches from elevation 97.0 to 97.5. The newest calculations demonstrate that the required recharge volume is provided but a waiver is needed from design standards for not providing a minimum 2 feet from the pond bottom to the seasonal highwater table. Two (2) reasons for the vertical separation requirement are to prevent mounding of the groundwater during recharge which will reduce the actual infiltration volume, and to minimize the potential for groundwater contamination. Based on the Grading Plan and soil data, the water table is only 18 inches below grade and the pond will be excavated 18 inches to 12 inches below grade. Therefore, the revised design does not provide 2 ft of separation and will require a waiver to the design standards.

11. (Original Comment 32) Stormwater Analysis: The 100-year freeboard for the Sand Filter's embankment is only 0.37 feet, therefore we are concerned with its stability. **Status: NE&C provided a certified stability analysis with soil assumptions which indicated that the berm is stable. During construction, we recommend that NE&C inspect the soils to confirm that they satisfy the cohesion, friction angle and other assumptions used.**
12. (Original Comment 35) Stormwater Operations & Maintenance Manual: We recognize that maintenance measures are provided in the Stormwater Analysis Report but we recommend a separate O&M Manual be provided for the future owners. **Status: Resolved**
13. (Original Comment 36) Utilities and Drain Lines: For utilities and drain lines that are below the seasonal high-water table, the recommend trench dams at 100-foot intervals along all pipelines is provided in a new detail on Sheet C-10. We recommend a note stating that it is to be installed along all drains, sewer and water lines below the seasonal highwater elevation. **Status: The detail on Sheet C-10 is acceptable.**