

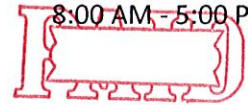


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MAY 25 2023

BY:

TOWN OF NORTH YARMOUTH
10 VILLAGE SQUARE ROAD
NORTH YARMOUTH, MAINE 04097
PHONE: (207) 829-3705 X204
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CODE OFFICE HOURS
MONDAY - THURSDAY
8:00 AM - 5:00 PM



ADMINISTRATIVE, VARIANCE OR MISCELLANEOUS APPEAL APPLICATION

APPLICANT: Sol and Alicia Dostilio APPLICANT PHONE #: 2-7-232-5598
APPLICANT MAILING ADDRESS: 15 Parsonage Rd North Yarmouth ME 04097
APPLICANT OWNER EMAIL: awellsdostilio@gmail.com

PROPERTY OWNER: Laurie Bachelder/527 LLC PROPERTY OWNER #: _____
PROPERTY OWNER ADDRESS: 865 Oak Hill Drive
PROPERTY OWNER EMAIL: lbach@me.rr.com

TAX MAP & LOT NUMBER: 62

PROPERTY USE: Residential

LOCATION/PROPERTY ADDRESS: 521 Walnut Hill Rd, North Yarmouth ME 04097

ZONING DISTRICTS:
 VILLAGE CENTER VILLAGE RESIDENTIAL FARM AND FOREST FLOODPLAN

OVERLAY ZONING DISTRICTS:
 RESIDENTIAL SHORELAND (100') RESOURCE PROTECTION (150') RESOURCE PROTECTION (250')
 ROYAL RIVER CORRIDOR OVERLAY GROUND WATER PROTECTION OVERLAY

CASE DESCRIPTION – PROVIDE A CONCISE WRITTEN STATEMENT INDICATING WHAT RELIEF IS REQUESTED, A SKETCH AND WHY THE APPEAL OR VARIANCE SHOULD BE GRANTED:

See all enclosures

IF A VARIANCE IS GRANTED, IT IS THE APPLICANT'S RESPONSIBILITY TO OBTAIN A VARIANCE CERTIFICATE FROM THE CODE ENFORCEMENT OFFICER AND TO RECORD THIS CERTIFICATE AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS. THE VARIANCE SHALL EXPIRE IF THE WORK INVOLVED IS NOT SUBSTANTIALLY COMPLETED WITHIN ONE YEAR.

I HEREBY CERTIFY THAT THE INFORMATION PROVIDED IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATE: 5/22/2023

APPLICANT SIGNATURE

DATE OF PUBLIC HEARING: _____ DATE PAID: _____ TOTAL FEE AMOUNT: \$250.00

Attachments:

https://docs.google.com/document/d/1AeQcjnaWGbd5XKfsG0Gj5WhA_kOtzWksKQtfh-w3EmA/edit?usp=sharing

Sol and Alicia Dostilio (immediate abutters to the Deacon Hayes Commons Project), request relief from the April 26, 2023 decision to approve the final application of the Deacon Hayes Commons Major Subdivision in North Yarmouth, Maine. The request for relief is based on several factors including the fact that the project record lacked the site-specific groundwater level and elevation data necessary to support the Planning Board's decision. Ultimately, the decision to approve the Deacon Hayes Commons Project is inconsistent with the North Yarmouth Land Use Ordinance.

The request for relief from the decision to approve the final application for the Deacon Hayes Commons Major Subdivision should be granted because the project does not meet all required land use ordinances and will have an adverse effect on the abutters and community in its current state.

This appeal refers to information and evidence that became available after last September's conditional approval of the project by the Planning Board and therefore was not part of the scope of our previous appeal with the Zoning Board of Appeals. The ZBA should review and enforce the following specific land use ordinances or remand the following items to the Planning Board:

LUO 5.12 B (12)

Review Criteria: The Planning Board shall consider the following criteria and, before granting approval, must determine that:

12. Groundwater: The proposed subdivision will not, alone or in conjunction with existing activities, adversely affect the quality or quantity of ground water on site or on adjacent properties, and in particular the quality and quantity of ground water within the Groundwater Protection Overlay District;

The Planning Board's decision, made without site-specific groundwater level and elevation data measured during natural seasonal high groundwater, failed to meet this land use ordinance. Site-specific groundwater level and elevation data determined from installed piezometers should have been required to support the design of the project. Lacking that data, the project application did not provide sufficient evidence that the septic design will meet the health and safety guidelines for the project in the groundwater overlay.

Ultimately, the data provided to address the LUO compliance of the septic system was incomplete and inconsistent. The Planning Board did not have the data/evidence that it needed to rule on the sufficiency of the system in general. More specifically, the reports provided were not sufficient to make a determination as to whether or not the system will meet town setback requirements for nitrate levels. The data was also not sufficient to determine whether or not the separation distance (i.e. 2 feet) shown on the project design plans between the groundwater

table and the bottom of the constructed engineered subsurface wastewater disposal system will be met.

Of particular concern is a 11/29/22 report that the applicant provided to the state (**Attachment A**). The report was prepared by Mark Cenci and ultimately represented the final conclusions presented to the Planning Board about the impact of the system. We have specific concerns with the conclusions presented in the report.

As background, the information in the report was requested by the state after the initial report presented to the state (in their 11/18 application) did not factor in the newly identified 2% hydraulic gradient (last spring the hydraulic gradient used in the calculations was .5% but in the fall that number was found to be 2%...thus the state's request for updated analysis on the impact of that change).

In the 11/29 report Mr. Cenci found that the change in the hydraulic gradient increased the length of the 5mg/liter NO₃-N plume from 40' to 67'. To that point the distance between the system and the property line had been determined by a flow direction informed by Yarmouth Water District regional modeling (**Attachment B** shows this water flow direction). A plume length of 67' along that direction would not have met town LUO standards.

But in the 11/29 report Mr. Cenci also concluded that the direction of the water flow should be updated to be more southerly than previously assumed. This created a new angle between the system and the property line and a longer separation distance between the two. Mr. Cenci found that this increased distance between the system and property line would allow for the increased plume length and allow the system to meet LUO standards.

The November 2022 reporting from Mr. Cenci (and subsequent Planning Board testimony in April 2023) failed to provide site-specific groundwater level and elevation data to support the reports' conclusions. The depth to water level readings (numbers) and water table elevations (numbers) based on these readings that Mr. Cenci used to reach his new conclusion about the direction of the water flow were not provided. There was no data provided to support the conclusion.

Mr. Cenci reported installing 2-inch diameter well screen piezometers, 5 feet in length, at four locations on the site and using a water level indicator to measure the depth to the water table. Mr. Cenci also reported using the data to determine groundwater flow direction and water table gradient at 2%. But, again, to our knowledge, these site-specific groundwater level and elevation data determined from these piezometers were not provided to the Planning Board or State.

The absence of this site-specific groundwater level and elevation data in the 11/29 report was confirmed by the state in a letter from Alex Pugh (the state regulator) to town residents that had expressed concern. This letter from Mr. Pugh was introduced by Mr. Cenci to the Planning Board in the 4/26 meeting. Mr. Pugh's comments read that: "I understand that he used measured groundwater elevations to revise his Nitrate study and groundwater direction. I don't believe that he submitted these elevations to us, only the results of the study. That was a last-minute oversight on my part." (**Attachment C**).

The Planning Board's approval of this project ultimately compounded the state's error by not requesting that the site-specific groundwater levels and elevations determined from the piezometers be entered into the record for review. The report offers conclusions without showing the supporting data for its work; there is ultimately no data to support its conclusion that the direction of the waterflow should change. And to reiterate our key point, the project would not have met the town LUO limit on nitrate levels at the property line without that change in water flow direction.

Another concern with the 11/29/22 report is that as far as we can tell the calculations in this analysis are based on a static gradient (current groundwater levels) and not a mounded gradient (what the water levels will be once the system is up and running). We believe that the calculations should be representative of the impact of the system while it is in use and that the Planning Board could not have made an informed decision on septic compliance with the LUO without this information.

If a mounded gradient was used here then it seems quite possible that the hydraulic gradient would push past 2%. If that was the case then how would that impact the nitrate levels at the property line considering that a mounded gradient would mean that effluent would travel downgradient faster?

The other potential impact of a mounded gradient would involve the spacing between the water table and the septic system. It looks like right now the applicant is showing a two-foot separation between the chambers and the water table (*page 11 of the applicants 8/30/22 submission*). Per a 9/19/22 study by Marcotte Environmental (**Attachment D**) the maximum groundwater mound was found to be 1 foot. Mounding could then reduce the separation between the chamber and the water table to one foot which is not consistent with the 2 feet of separation shown on the project disposal system plans. The plans show a depth to groundwater at 6 feet (per TP-5) which does not appear to reflect any mounding determined by Mr. Marcotte.

Also of note, the Marcotte report is dated 9/19/22 which predates the revised November 2022 analysis by Mr. Cenci with respect to groundwater conditions at the site. Mr. Marcotte's report states his analysis relied on the test pit information provided by Mr. Cenci which indicated a water table found at a depth of 6 feet below ground. There is no description in the Marcotte report regarding his knowledge or use of the piezometer water level and elevation data collected by Mr. Cenci in November.

Therefore, it raises the question as to whether the new piezometer water level and elevation data were available to Mr. Marcotte. It appears these data points were collected on a future date after Mr. Marcotte finished the mounding analysis report. The Planning Board and State should have required an updated mounding evaluation and report from Mr. Marcotte based on the new water level and elevation data collected by Mr. Cenci in November.

Finally, we have additional concerns with the septic system data and analysis that we believe demonstrate that the town does not have enough information to determine that LUO 5.12 (B) (12) has been met:

- As part of a last minute switch to the engineered septic plans in the planning board meeting on 9/13, the applicant flipped the system and placed the CEN21 tanks down-gradient from the disposal bed and closer to our property line (and house).

To place those tanks the applicant will need to remove a large chunk of the natural soil (which is what was conceptually part of the soil studies). Our concern is that the placement of the tanks down-gradient from the disposal system and the removal of the natural soil will essentially create a situation where the effluent seeks to fill in around the newly placed tanks thus making the tanks part of the septic area.

Because of this we contend that the tank area should be considered part of the septic area. And as a result the end of the tanks should be used as the starting point for all town setback calculations, particularly as it relates to nitrate levels. We believe the nitrate analysis should be reevaluated to reflect this new disposal system design and a third party review is necessary to assist the Planning Board.

- Going back to the fall we've also been concerned that most of the analysis in the various reports from Mr. Cenci seems to assume that water will go deep into the ground. Yet, both Mr. Cenci and Mr. Marcotte reference a silt/clay layer on the property (and specifically mention its existence south of the disposal field). We have concern that the existence of this soil layer was not completely represented in the analysis around the impact of the septic system. This spring there has been evidence on the property that water will perch if even a shallow pit is dug (**Attachment E**). Is this perching a result of the silt/clay layer? Will this layer prevent water from reaching the predicted estimated depths and lead to higher water levels than currently predicted?

Either way, if the water is perched like that, won't the septic effluent also be perched?

- In addition, based on our understanding of the information on record with the State and Planning Board, the only site-specific subsurface water data provided by Mr. Cenci is on the log of test pit #5 (TP-5) stated as "free water at 72 inches' or 6 feet. The test pit log is dated 9/16/22, which was done during low, seasonal water table conditions that often occur in August-September. The depth of 6 feet to groundwater below existing ground surface is shown on the project's wastewater disposal system drawing Sheet #5, dated 9/22/22, with a revision dated 11/18/22.

The photo in Attachment E of the foundation excavation shows water pooled onsite that appears to be 3 feet or less below ground surface. Clearly, this high water condition is inconsistent with the September "free water" data presented for TP-5. This recent photo is evidence that the water level can rise much higher in the ground than was represented in the TP-5 log. As reported by Mr. Marcotte and Mr. Cenci, a "thick layer of silty/clay at 6 feet below the ground surface" is present at the site. It's apparent that water became pooled in the excavation due to the presence of this poorly drained layer.

- The recent high water condition resulted from natural rainfall infiltration on the site. The proposed wastewater disposal system design flow of up to 3,240 gpd will significantly add

to the natural infiltration. In addition, the project proposes to infiltrate stormwater water runoff from the building roofs and extensive pavement that will be placed on the site. Collectively given these factors, we are concerned with the total water infiltration into the site, and possible effects to our property and whether the quantity concerns in LUO 5.12B (12) will be met.

- As we understand it, no test pits were dug directly over the final septic area. If that's the case then the Planning Board had no test pit information to review that was specific to the location of the final septic area.
- The Planning Board never publicly commented or deliberated on the impact of the UV shed or the control alarm and air pump on the concrete slab. The PB should have inquired about the noise level and placement of the alarm and air pump in particular to ensure it met LUO set back and noise level ordinances.

In summary, the information provided by the applicant in regards to the impact of the septic system was inconsistent and incomplete. We ask the ZBA to enforce the ordinance and/or remand the issue of compliance with the LUO back to the Planning Board and, at a minimum, the Cenci and Marcotte evaluations should be updated to include the site-specific groundwater level and elevation data collected by Mr. Cenci at the piezometers. The updated reports should include the nitrate, mounding, and flow direction analysis needed to demonstrate that the town's LUO has been met.

We argue that the ZBA or Planning Board should issue a request for a peer review of the final septic plans and submission of updated evaluations to be completed by Mr. Cenci and Mr. Marcotte. As it currently stands we believe that our property would be used to meet disposal requirements.

If the ZBA or the Planning Board does not grant relief on the decision of approval, this request will serve to go on the record to document that piezometer groundwater level and elevation data were not provided for approval to install the advanced wastewater disposal and thus failed to meet LUO 5.12B(12) Groundwater:

"The proposed subdivision will not, alone or in conjunction with existing activities, adversely affect the quality or quantity of ground water on site or on adjacent properties, and in particular the quality and quantity of ground water within the Groundwater Protection Overlay District."

LUO 10.34 C 2 4

All plans for parking areas shall include a landscaping plan which adequately screens parking lots, and that provides interruptions of parking spaces.

LUO 10.14 B 2 b

b. Buffering must be designed to provide a year-round visual screen in order to minimize adverse impacts. It may consist of fencing, evergreens, berms, rocks, boulders, mounds, or a combination thereof.

The initial conditionally approved findings of fact from last fall indicated that tree clearing would be minimal and limited to trees along Parsonage Rd. After that conditional approval the applicant went ahead and removed seven trees of significant size (8" - 12" inches in diameter) along our shared property line. This violated the findings of fact and significantly altered the screening in place to the proposed development.

Because these trees were removed after the Planning Board's conditional approval in September, their removal was not able to be part of our initial appeal to the ZBA (though there was discussion in the appeal meetings about whether or not this topic could be discussed, the ultimate determination was that it was not part of the Planning Board record and therefore not within the scope of that appeal).

Ultimately, the Planning Board decided to alter the findings of fact in their 4/26/23 meeting (to remove the qualification that the clearing would be limited to trees along Parsonage Rd.) but they failed to discuss the impact this change would have on their original ruling that screening was "adequate" and minimized "adverse impacts." The Planning Board also made this change to the findings of fact after previously shutting down public comment in the public hearing about the issue under the premise that it was not part of the scope of the meeting. This was inappropriate as was the removal of the trees by the applicant before seeking clarification on the issue from the Planning Board.

We believe that the original findings of fact and references to the trees by the applicant at various Planning Board meetings throughout the process would have led the Board to believe that the trees would remain in place and therefore were part of their initial determination that the screening met the LUO.

Without these seven trees along the property line we do not believe that the screening to the project is adequate and their plan without the trees does not provide a sufficient "visual screen in order to minimize visual impacts."

To get a sense for the change in the visual impact with the trees the ZBA can refer to Attachment F (the view from our front porch towards the applicant's property before the trees were cut down) and Attachment G. Attachment H shows the impact without the trees.

At the very least, the Planning Board needs to go on the record and say whether the conditionally approved findings of fact in the fall (that tree clearing would be limited to trees along Parsonage Rd.) influenced their determination that screening was sufficient. If they did lean on that finding of fact then there has to be a new review and public discussion of the screening plan to determine if it still meets the LUO without the trees along the property line.

We ask the ZBA to enforce the screening ordinances laid out in the LUO or to remand the issue of screening back to the Planning Board.

Mark Cenci
Geologic, Inc.

93 Mill Road • North Yarmouth, Maine 04097
Cell: 207.329.3524 • mark@markcenci.com
www.markcenci.com

CERTIFIED GEOLOGIST/LICENSED SITE EVALUATOR



**Memo regarding additional hydrogeologic and location
data from the Deacon Hayes Site, North Yarmouth**

Date: November 29, 2022

Summary:

More accurate location data and an updated, more accurate NO₃-N plume analysis reveals the proposed Engineered System meets the requirements of the Subsurface Wastewater Disposal Rules and the Minimum Lot Size Law.

Background:

A question about the implications of the measured hydraulic gradient from four shallow piezometers on the fate and transport of NO₃-N from a proposed Engineered wastewater disposal system was raised by Alex Pugh. To answer this question a return to the site was made on November 29, 2022, and additional location data of known points shown on the site plan was taken with the same Trimble GEO XH that previously located the piezometers. These additional location data points allowed for a refinement of the groundwater flow direction.

Additionally, the newly determined hydraulic gradient was entered into the SOLUTRANS computer program to determine if the change of that variable from an assumed gradient of 0.5% to a measured 2% would have an effect on the shape and size of the NO₃-N plume.

Results of the Investigation:


The groundwater flow direction is now accurately known and is depicted on the enclosed sketch map. The flow direction is slightly more southerly than assumed. This increases the distance between the disposal chambers and the property line regarding groundwater flow. The length of the 5 mg/liter NO₃-N plume is increased from 40 feet in length to 67 feet in length.

The curve of the NO₃-N concentration and the depiction of the plume is attached. Also attached is a site plan at a scale of 1" = 50' with piezometers, equipotential lines, the groundwater flow direction and the 5 mg/liter plume depicted.

Conclusions:

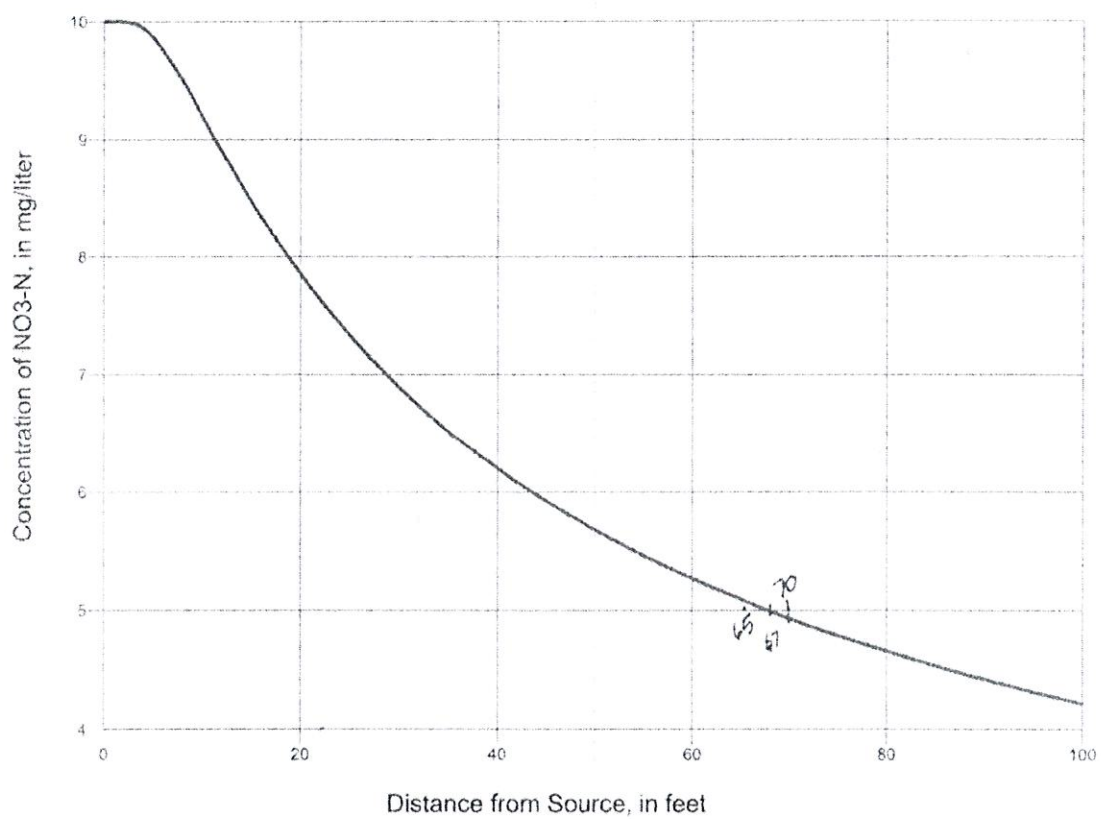
Improved piezometer location information allows for a more accurate depiction and analysis of the groundwater flow direction beneath the property. Entering the measured hydraulic gradient into the SOLUTRANS computer analysis allows for a more accurate depiction of the NO₃-N plume size and shape.

When plotted on the site plan, this increased accuracy reveals the proposed Engineered System meets the requirements of both the Subsurface Wastewater Disposal Rules and the Minimum Lot Size Law regarding groundwater meeting the Primary Drinking Water Standards at the property boundary.



Mark Cenci, I.G #467, LSE # 262

NO3-N vs Distance from Source

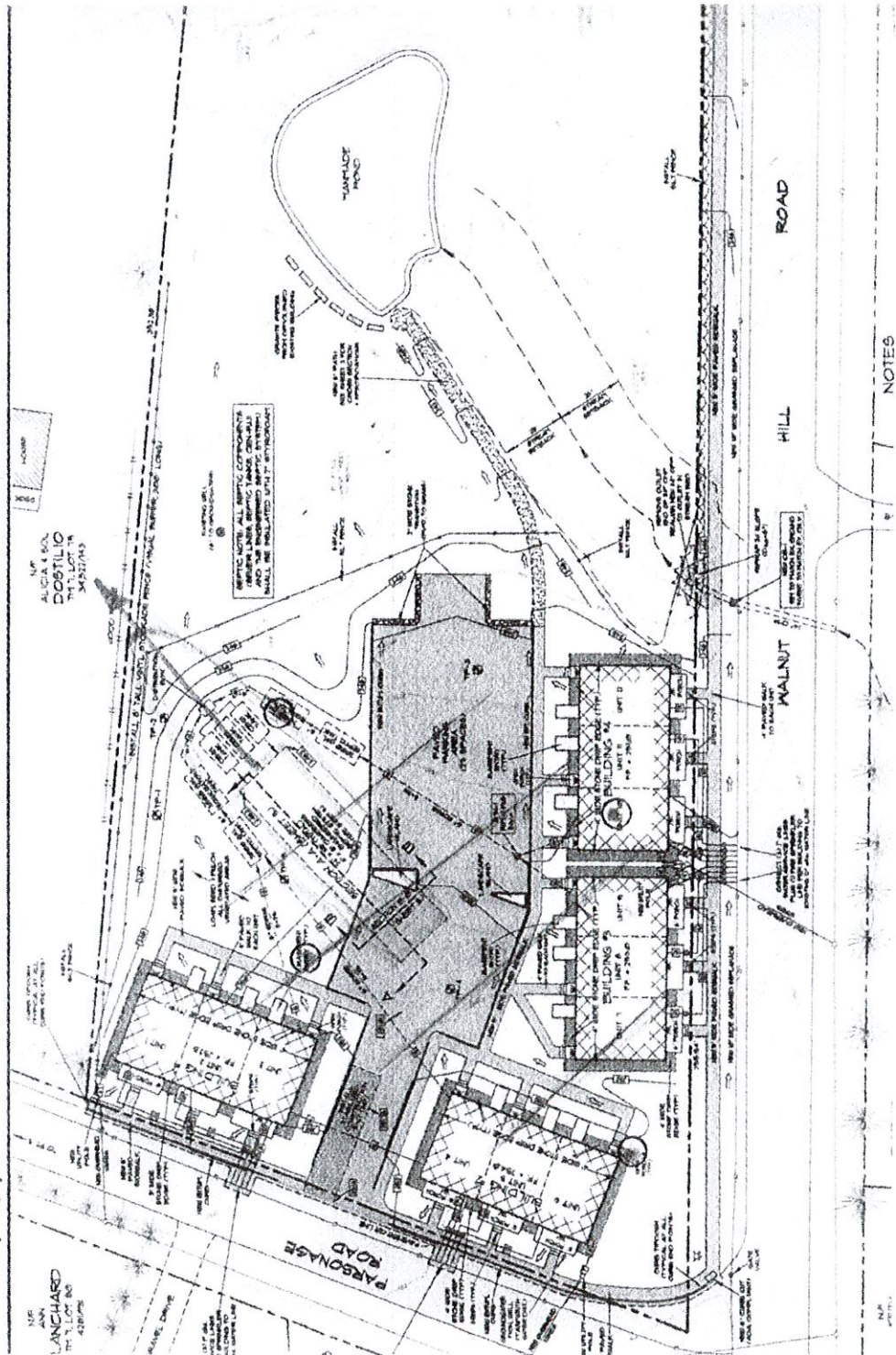


1" = 50'

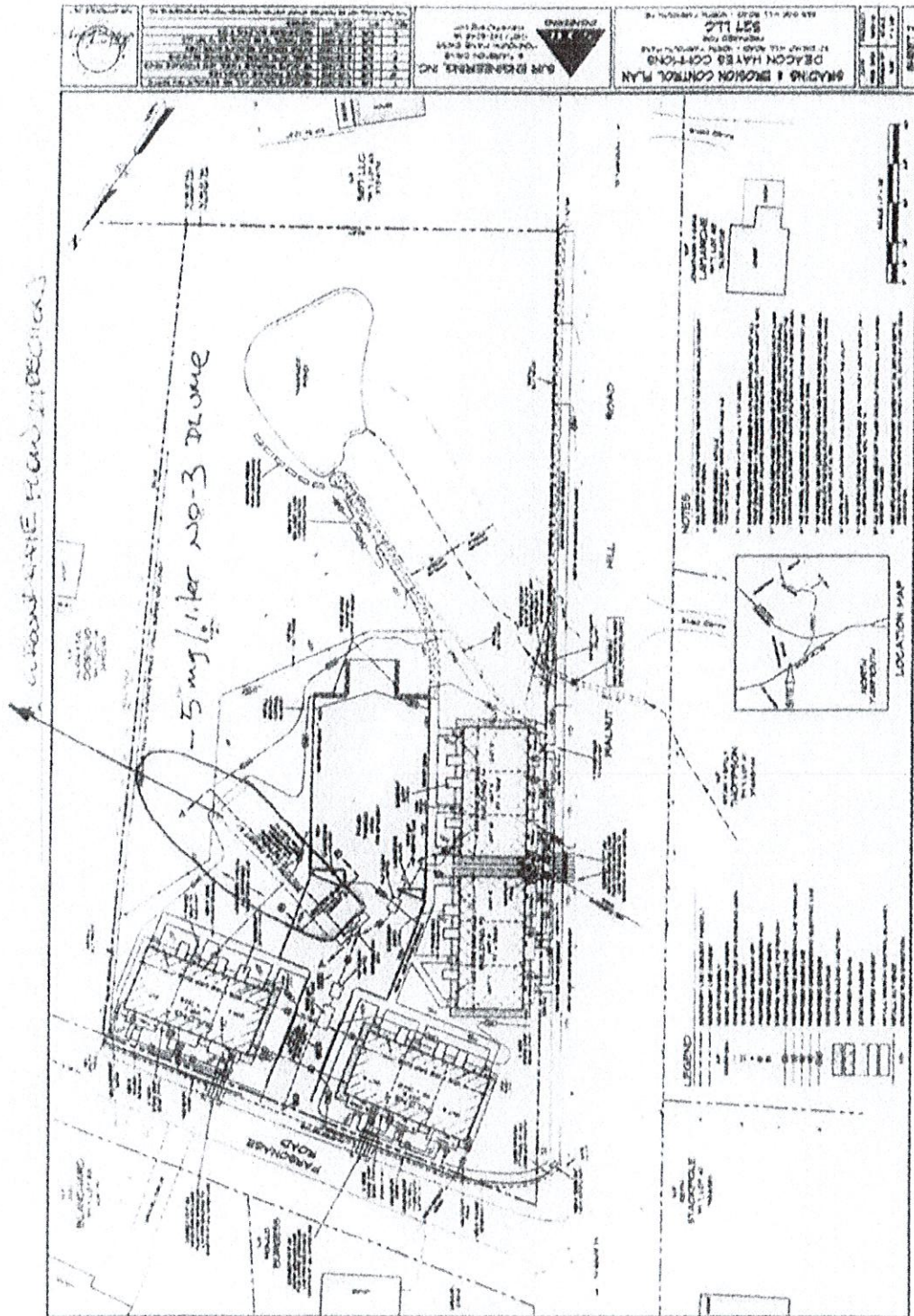
11-29-22
Karl DeWitt
LA #467

GROUND WATER
FLOW DIRECTION
5 mg/l for
NO3-N PLUME

PIEZOMETER
EQUIP. POTENTIAL
LINE



NOTES



Attachment C

From: "Pugh, Alex L." <Alex.L.Pugh@maine.gov>
Subject: RE: Deacon Hayes Project
Date: April 25, 2023 at 3:41:17 PM EDT
To: Judy <mmallory@maine.rr.com>
Cc: Sol Dostilio <sdostilio@vontweb.com>, Phd0006 <phd0006@aol.com>, "Collins, Kristin M." <kcollins@preti.com>

Ms. Potter:

I am CC'ing Sol Dostilio and Paul Hodgetts as they had similar questions, and Kristen Collins from PrettiFlaherty who wants to know what the community concerns are, so that the 572 LLC team can answer questions if asked.

Test Pits:

As I understand the history, the test pits were done in an earlier design phase when there were going to be multiple disposal fields. The team redesigned the disposal fields into the current design in response to their reinterpretation of the groundwater direction. Bill Noble and I asked them about the location of the test pits not being in the disposal field area, and we remember that Mark Cenci convinced us that the soils were very similar in that area. They may have offered to do some additional ones, we can't remember and my notes don't mention it.

Setbacks

As the plans were presented to us the design met the setbacks. A couple of folks have recently mentioned a bedrock well as well as the dug well. I just walked along Parsonage and Walnut Hill Roads and did not see a steel-cased bedrock well. I recall that the dug well was going to be properly abandoned as part of the construction, and I had thought that this had been done, but the well is still there. Proper abandonment of a dug well would involve filling it with a low-permeability soil. Perhaps this has been done. I did not go on site to look inside. Proper abandonment of any well on site would remove it from any setback restrictions. It seems from your e-mail that the property lines were presented differently to the town. The town will need to make its own decisions.

Groundwater Direction

Mark Cenci's groundwater directions are iterative. His initial direction was based on his interpreted geology and the topography. His understanding was changed after he saw reports from the Yarmouth Water District. Both of these directions were based on fairly regional data. Questions from Bill Noble and I prompted him to install a number of piezometers. I understand that he used measured groundwater elevations to revise his Nitrate study and groundwater direction. I don't believe that he submitted these elevations to us, only the results of the study. That was a last-minute oversight on my part. There are situations where a regulator must rely on the professional certification of the geologist or engineer.

You ask about a nitrate plume going in a different direction than groundwater flow. It is generally assumed that nitrate is sufficiently soluble that it will follow the direction of groundwater.

I hope that this helps answer your questions

Alex Pugh, Sr. Environmental Hydrogeologist
Subsurface Wastewater Unit
Drinking Water Program

MARCOTTE ENVIRONMENTAL

Wastewater ♦ Groundwater ♦ Permitting ♦ Environmental Compliance

September 19, 2022

PN: #22032

Mark Cenci Geologic, Inc.
93 Mill Road
North Yarmouth, ME 04097
Attn: Mark Cenci

REFERENCE: Groundwater Mounding and Site Transmission Analysis
Engineered Subsurface Wastewater Disposal Field
Deacon Hayes Commons – 521 Walnut Hill Road, North Yarmouth, Maine

Dear Mark:

Marcotte Environmental (Marcotte) completed a groundwater mounding and transmission analysis for an engineered subsurface wastewater disposal field to serve the above referenced development. The site and vicinity are served by water supply wells and/or public water, and subsurface wastewater disposal fields (leachfields). The site will be served by public water.

Information used to complete the analysis includes test pits provided by Mark Cenci Geologic, Inc. (Cenci), development plans prepared by SGR Engineering, Inc., and published geologic maps and literature.

PROPOSED DISPOSAL FIELD

The proposed engineered septic system will have a design flow of 3,240 gallons per day (GPD). Wastewater will be treated by septic tanks and conveyed to a Fujiclean CEN treatment system. Treated effluent will discharge to a concrete chamber disposal field measuring 24 feet by 88 feet. The concrete chambers area footprint is 2,112 square feet (ft²). The average loading rate is 1.53 GPD/ft² or 0.205 feet per day (ft/day).

SITE SETTING

Topographic and geologic maps showing the site and vicinity are provide as Attachment 1. The proposed disposal field location is located on the gently sloping area southeast of Walnut Hill, and east of Bruce Hill.

The Maine Geological Survey has mapped the surficial geology at the site and vicinity as marine regressive deposits over the Presumpscot Formation. Marine regressive / or fan sand deposited in shallow marine waters during regression of the sea from the coastal area of Maine. The sands are commonly interbedded with upper layers of the Presumpscot Formation. The Presumpscot Formation consists of fine-grained silt and clay deposited in deep marine waters.

The Maine Geological Survey has mapped the surficial deposits at the site as a significant sand and gravel aquifer with moderate to good groundwater yields generally greater than 10 gallons per minute for a properly constructed overburden well.

Subsurface Conditions at Engineered Disposal Field Area

Soils test pit observations by Cenci show native soils near the disposal field consist of stratified loamy sand, loamy gravelly sand, and medium sands. A water table was encountered at 6 feet below the ground surface at the disposal field. Personal communications with Cenci indicate a thick layer of silt/clay layer was encountered at 6 feet below the ground surface in the boring for the Yarmouth Water District monitoring wells located to the south of the disposal field.

A sample of saturated sands was submitted by Cenci to SW Cole of Gray Maine for a soil gradation and permeability / hydraulic conductivity determination. The estimated bulk hydraulic conductivity of the sample is estimated to range from 50 to 70 feet per day; refer to calculations provided in Attachment 2.

GROUNDWATER MOUNDING AND TRANSMISSION ANALYSIS

Groundwater mounding will occur below and in the vicinity of the disposal field in response to wastewater infiltration. The height and lateral extent of the groundwater mound associated with the disposal field is dependent on the rate of wastewater infiltration, hydraulic properties of native soil and/or fill materials, and proximity to boundary conditions or areas where water leaves or enters the groundwater system (e.g., wetlands, streams, other disposal field areas).

A three-dimensional groundwater model was prepared to estimate the rise of the groundwater table beneath the proposed disposal field under design flow loading conditions. The model was constructed and solved using United States Geological Survey (USGS) ModelMuse¹ graphical user interface and MOOFLOW². A three-dimensional grid representing the model top and top/bottom of model layers was generated based upon LIDAR data from the Maine Office of GIS and information presented on the enclosed topographic and geologic maps.

Model layer thickness and hydrology properties are summarized below.

Model Layer/Material	Layer Thickness (feet)	Horizontal Hydraulic Conductivity (Kh) (feet/day)	Vertical Hydraulic Conductivity (Kz) (based on Kh)	Specific Yield / Effective Porosity
Sediments	3	30	Kh	0.3
Upper Sand	Varies	65	Kh/3	0.15
Silt/Clay	10	0.008 to 0.08	Kh/10	0.05
Lower Sand	50	50	Kh/3	0.15

The wetlands and ponds were simulated in the sediments layer. Wetland areas were simulated with drain cells with a drain elevation 0.1 feet below model top. The pond south of the disposal field was simulated with constant head cells. The perched water table in the upper sands was simulated with constant head cells on the upgradient/northwest side of the model. The water table in the lower sands was simulated with constant head cells on the upgradient/northwest and downgradient/southeast sides of the model.

Recharge is estimated to be 0.005 feet per day, or 50% of an estimated average annual precipitation of 48 inches. The model was solved with 20-foot grid size and 22-layer discretizations. Figures showing the model construction and results are provided as Attachment 3.

¹ ModelMuse 5.0.0.0 (3/18/2022), <https://www.usgs.gov/software/modelmuse-graphical-user-interface-groundwater-models>
² MOOFLOW 6.3.0. (3/4/2022), <https://www.usgs.gov/software/mooflow-6-usgs-national-hydrologic-model>

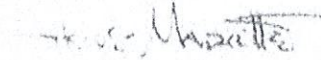
CLOSURE

Results of the mounding and site transmission analysis are as follows:

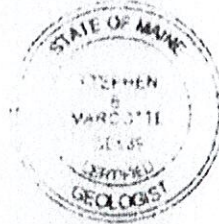
- The model predicts a maximum groundwater mound of 1.0 foot.
- The native soil and fill material have sufficient capacity to prevent wastewater from surfacing down gradient within fifty feet of the disposal field.

The findings discussed herein are based on an interpretation of site conditions and information provided by others. If there are changes to the disposal field design flow, or significant changes in layout, I request the opportunity to review the changes and conduct further analysis as necessary to confirm the changes do not alter the conclusions and recommendations provided herein.

Sincerely yours,
Marcotte Environmental

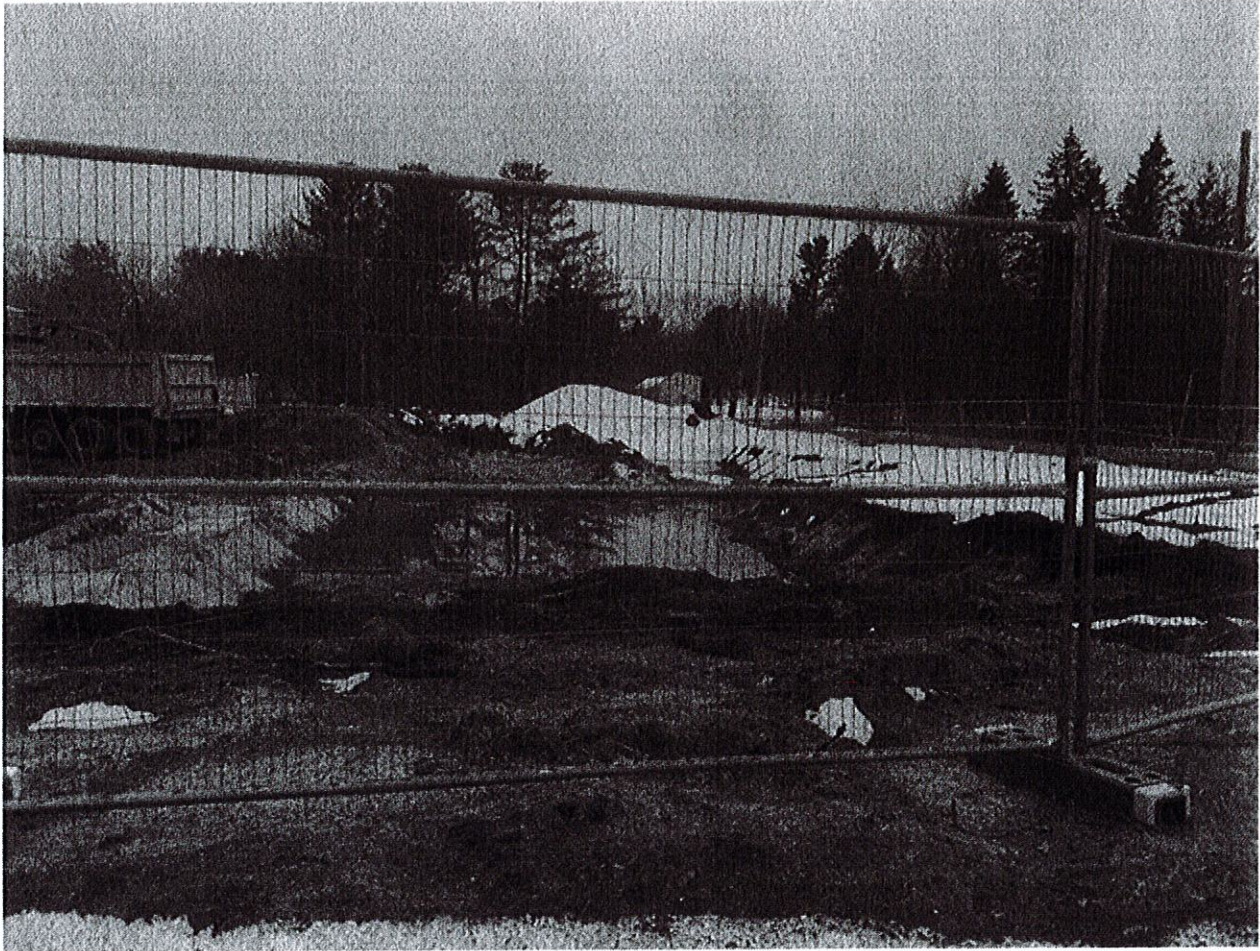


Stephen B. Marcotte, LG, LSE
Principal Geologist



Enclosures

Attachment E (photo from March 13th)



Attachment F



Attachment G



Attachment H

