

November 19, 2018

Ms. Amanda Lessard, AICP, Assistant Town Planner
Town of Windham
Planning Department
8 School Road
Windham, ME 04062

Preliminary Subdivision & Site Plan Application: Cook Road Retirement Community

On behalf of Mr. James Cummings, we are pleased to submit the Preliminary Subdivision & Site Plan Applications for the Cook Road Retirement Community, a 46 unit 55+ development. The property is shown as lot #5 on the Town of Windham Tax Map #9. The 12.88 acre property is located within the Farm Zone (F) as well as the Retirement Community and Care Facility Overlay District (RCCFO). The standard net residential density for the RCCFO Overlay Zone is 1 unit per 5,000 SF. The net residential area calculation shows that the lot can support approximately 88 units.

Mr. Cummings proposes to create a 46 unit retirement community that will feature a mixture of duplexes and multi-unit buildings. Half of the units will feature a 1-car garage while the other half will have a 2 car garage. The development will feature a centrally located club house & recreation area. Likely recreational amenities include a bocce ball court & fire pit area. All forty six units will be accessed from the proposed internal roadway system. The roads will contain a 4' wide paved shoulder that will serve as a pedestrian access-way. Additionally, a sidewalk will be constructed between the units and Gray Road. The project roadway system will connect to both Gray Road & Cook Road since more than 30 units are proposed. The units along Gray Road will be designed so that the front of each unit faces the existing street.

The Planning Board reviewed the Sketch Plan application at the October 11, 2018 and held a sitewalk on November 10, 2018. The schematic plan of the internal development is very similar to the sketch plan. The 46 units & clubhouse will be accessed by approximately 1,680' of access roads. The roads will be designed to meet the town private road standards. The Town of Windham subdivision ordinance stipulates that all developments that exceed 30 units must provide two connections to external roads. We are proposing separate connections to Cook Road & Gray Road.

The site is served by public water. A new water main will be constructed beneath the proposed access road that will serve the entire development. Several shared septic systems will be constructed within the project green space. Electrical service will be provided via an underground power system. A new hydrant will be constructed adjacent to the internal intersection per request of the fire chief. We've sent our plans to the Portland Water District and they are reviewing our water design. Upon completion of their review, they will provide us with an ability to serve letter.

Steve Marcotte of Summit Geoengineering evaluated the site for wastewater potential and has provided a wastewater investigation (see attached). The septic flow from the 21 buildings will

flow to one of eleven new septic systems. Test pits for each location can be seen in the wastewater investigation. Steve also prepared a Nitrate Assessment for the project. Specialized treatment tanks will be used to reduce nitrates to allowable levels. Detailed information on the treatment systems are included within the assessment.

Detailed stormwater calculations have been provided that show that the Town's water quantity and quality stormwater regulations are being met by the combination of two gravel wetlands, a filtration basin & a series of roof drain filters. The project is located within the Pleasant River Watershed. We prepared water quality treatment calculations as required by MDEP regulations. The development features approximately 2.8 acres of new impervious area. The project will require a MDEP Stormwater Permit.

The attached preliminary plan set is based upon a boundary and topographic survey that was prepared by Wayne T. Wood of Wayne T. Wood & Company. A wetland delineation was completed by Steve Marcotte of Summit Geoengineering Services.

The record owner of the property is: Mr. Jim Cummings
 P.O. Box 957
 Windham, ME 04062

The ITE Trip Generation Manual for attached senior adult housing indicates that this development will result in approximately 3 trips during the AM peak hour and approximately 5 trips during the PM peak hour.

Street lights are proposed at all entrances & dead ends per ordinance requirements. Proposed landscaping is shown on the Site & Landscaping Plan.

Mr. Jim Cummings is an experienced developer and has been involved in several residential developments in recent years. The applicant has hired the following project consultants:

Engineer:
Jeff Amos, P.E. #10167
Terradyn Consultants, LLC
41 Campus Road, Suite 101
New Gloucester, ME 04260
(207) 926-5111

Site Evaluator & Wetland Delineation:
Steve Marcotte
Summit Geoengineering Services
145 Lisbon Street, Ste. 701
Lewiston, ME 04240
(207) 939-2600

Surveyor:
Wayne T. Wood & Associates
30 Wood Drive
Gray, ME 04039
(207) 657-3330

Both Wayne Wood & Jeff Amos have been involved with many similar projects across the State of Maine. Terradyn Consultants, LLC was established in 2005 and has completed hundreds of projects in that time ranging from residential & commercial subdivisions, site plans, watershed



studies, and environmental permitting. We have worked & secured permits within the Town of Windham several times and have professional references available from MDEP, CCSWCD, Contractors & Private Developers.

We are requesting two waivers: High Intensity Soil Survey & Hydrogeologic Assessment.

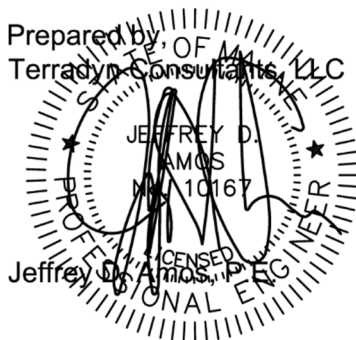
High Intensity Soil Survey: This item is a requirement of the Preliminary Subdivision Application. High Intensity Soil Surveys provide information related to the septic suitability of the soils. They can also be used to identify the runoff characteristics of the existing watershed soils. The available Medium Intensity Soil Survey will be used for the basis of the existing soil conditions for the stormwater calculations. Additionally, we will have a test pit in any stormwater area. A licensed site evaluator will provide test pits in the proposed septic disposal areas that will be used to design the systems. A High Intensity Soil Survey would not add any valuable information to the design of the project. Therefore, we ask the board to grant a waiver.

A cost estimate and proof of financial capacity will be submitted under separate cover.

The following items are attached as required by the Preliminary Subdivision & Site Plan Application procedures:

- Preliminary Subdivision Application Fee— submitted by applicant
- Review Escrow Fee— submitted by applicant
- Attachment 1: Preliminary Major Subdivision Application
- Attachment 2: Site Plan Application
- Attachment 3 : Waiver Request Form
- Attachment 4: Property Deed
- Attachment 5: Septic Report
- Attachment 6: Nitrate Assessment
- Attachment 7: Stormwater Narrative

We are hopeful that this application can be placed on the agenda for the December 10, 2018 Planning Board Meeting. Thank you for your consideration, and please call me if you have any questions as you review the enclosed plans and information.



TOWN OF WINDHAM MAJOR SUBDIVISION APPLICATION

Preliminary Plan

(Section 910 – Subdivision Review, Submission Requirements)

The original signed copy of this application must be accompanied by:

- The required application and review escrow fees,
- Five (5) collated submission packets, which must include
 - Full size paper copies of each plan, map, or drawing, and
 - A bound copy of the required information found in Section 910 of the Land Use Ordinance.
 - The checklist below offers a brief description of these requirements for the purpose of determining the completeness of a submission. Please use the Ordinance for assembling the submission packets.
 - Only two (2) full copies of Stormwater Management Plan and Traffic Impact Study are required. Summaries and conclusions of the Stormwater Management Plan and Traffic Impact Study are adequate for the remaining three (3) submission packets.
- Electronic submission in PDF format of:
 - All plans, maps, and drawings.
 - These may be submitted as a single PDF file or a PDF for each sheet in the plan set.
 - A PDF of the required information found in Section 910 of the Land Use Ordinance

The submission deadline for Preliminary plans is three (3) weeks before the Planning Board meeting for which it will be scheduled.

Applicants are strongly encouraged to schedule a brief submission meeting with Planning Staff, to walk through the application checklist at the time a Planning Board submission is made. This will allow applicants to receive a determination of completeness, or a punch list of outstanding items, at the time a submission is made.

If you have questions about the submission requirements, please contact:

Windham Planning Department	(207) 894-5960, ext. 2
Amanda Lessard, Planner	allessard@windhammaine.us
Ben Smith, Planning Director	bwsmith@windhammaine.us

Preliminary Plan - Major Subdivision

Project Name: Cook Road Retirement Community

Tax Map: 9 **Lot:** 5

Number of lots/dwelling units: 46 **Estimated road length:** _____

Is the total disturbance proposed > 1 acre? ☒ Yes ☐ No

Contact Information

1. Applicant

Name: Mr. Jim Cummings

Mailing Address: P.O. Box 957, Windham, ME 04062

Telephone: 207-310-8818 Fax: _____ E-mail: jimcummings111@gmail.com

2. Record owner of property

X (Check here if same as applicant)

Name: _____

Mailing Address: _____

Telephone: _____ Fax: _____ Email: _____

3. Contact Person/Agent (if completed and signed by applicant's agent, provide written documentation of authority to act on behalf of applicant)

Name: Larry Bastian, P.E.

Company Name: Terradyn Consultants, LLC

Mailing Address: 41 Campus Drive, Suite 101, New Gloucester, ME 04260

Telephone: 207-926-5111 Fax: 207-221-1317 E-mail: larry@terradyconsultants.com

I certify all the information in this application form and accompanying materials is true and accurate to the best of my knowledge.

Signature 

9/12/2018
Date

A. Mandatory Written Information		Applicant	Staff
1	A fully executed and signed application form	X	
2	Evidence of payment of the application and escrow fees	X	
3	Proposed name of the subdivision	X	
4	Verification of right, title, or interest in the property, and any abutting property, by deed, purchase and sales agreement, option to purchase, or some other proof of interest.	X	
5	Copy of the most recently recorded deed for the parcel, along with a copy of all existing deed restrictions, easements, rights-of-way, or some other proof of interest	X	
6	Copy of any existing or proposed covenants or deed restrictions intended to cover all or part of the lots or dwellings in the subdivision	X	
7	Copy of any existing or proposed easements on the property	X	
8	Name, registration number and seal of the Maine Licensed Professional Land Surveyor who conducted the survey	X	
9	Name, registration number and seal of any other licensed professional of the state who prepared the plan (if applicable)	X	
10	An indication of the type of sewage disposal to be used in the subdivision	X	
	i. If connecting to public sewer, provide a letter from Portland Water District stating the District has the capacity to collect and treat the waste water	NA	
	ii. If using subsurface waste water disposal systems (septic), submit test pit analyses prepared by a Maine Licensed Site Evaluator or Certified Soil Scientist. Test pit locations must be shown on a map.	X	
11	Indicate type of water supply system(s) to be used in the subdivision.	X	
12	If connecting to public water, submit a written statement from the Portland Water District indicating there is adequate supply and pressure for the subdivision.	X	
13	Names and addresses of the record owner, applicant, and adjoining property owners	X	
14	An acceptable title opinion proving right of access to the proposed subdivision or site for any property proposed for development on or off of a private way or private road.	NA	
15	The name and contact information for the road association who's private way or road is used to access the subdivision.	NA	

Applicant Staff

16	Financial Capacity.	X	
	i. Estimated costs of development, and itemization of major costs	X	
	ii. Financing - provide one of the following:	X	
	a. Letter of commitment to fund from financial institution, governmental agency, or other funding agency	X	
	b. Annual corporate report with explanatory material showing availability of liquid assets to finance development	X	
	c. Bank statement showing availability of funds if personally financing development		
	d. Cash equity commitment		
	e. Financial plan for remaining financing		
	f. Letter from financial institution indicating an intention to finance		
	iii. If a corporation, Certificate of Good Standing from the Secretary of State	NA	
17	Technical Capacity		
	i. A statement of the applicant's experience and training related to the nature of the development, including developments receiving permits from the Town.	X	
	ii. Resumes or similar documents showing experience and qualifications of full-time, permanent or temporary staff contracted with or employed by the applicant who will design the development.	X	

B. Mandatory Plan Information			
1	Name of subdivision, date and scale	X	
2	Stamp of the Maine License Professional Land Surveyor that conducted the survey, including at least one copy of original stamped seal that is embossed and signed	X	
3	Stamp with date and signature of the Maine Licensed Professional Engineer that prepared the plans.	X	
4	North arrow identifying all of the following: Grid North, Magnetic North, declination between Grid and Magnetic, and whether Magnetic or Grid bearings were used in the plan design	X	
5	Location map showing the subdivision within the municipality	X	
6	Vicinity plan showing the area within 250 feet, to include:	X	
	i. approximate location of all property lines and acreage of parcels	X	
	ii. locations, widths, and names of existing, filed, or proposed streets, easements or building footprints	X	
	iii. location and designations of any public spaces	X	
	iv. outline of proposed subdivision, together with its street system and indication of future probably street system, if the proposed subdivision encompasses only part of the applicants entire property.	X	
7	Standard boundary survey of parcel, including all contiguous land in common ownership within the last 5 years	X	
8	Proposed lot lines with approximate dimensions and area of each lot.	X	
9	Contour lines at 2-foot intervals, or at intervals required by the Board, showing elevations in relation to the required datum.	X	

		Applicant	Staff
10	Typical cross sections of the proposed grading for roadways, sidewalks, etc., including width, type of pavement, elevations, and grades.	X	
11	Wetland areas shall be delineated on the survey. If none, please note.	X	
12	Number of acres within the proposed subdivision, location of property lines, existing buildings, vegetative cover type, specimen trees, if present, and other essential existing physical features.	X	
13	Rivers, streams, and brooks within or adjacent to the proposed subdivision. If any portion of the proposed subdivision is located in the direct watershed of a great pond, note which great pond.	X	
14	Zoning district in which the proposed subdivision is located, and the location of any zoning boundaries affecting the subdivision.	X	
15	Location & size of existing and proposed sewers, water mains, culverts, bridges, and drainage ways on or adjacent to the property to be subdivided. The Board may require this information to be depicted via cross-section, plan or profile views.	X	
16	Location, names, and present width of existing streets, highways, easements, building lines, parks, and other open spaces on or adjacent to the subdivision	X	
17	Location and widths of any streets, public improvements, or open space within the subdivision (if any) shown on the official map and the comprehensive plan	X	
18	All parcels of land proposed to be dedicated to public use and the conditions of such dedication.	X	
19	Location of any open space to be preserved or common areas to be created, and general description of proposed ownership, improvement, and management	X	
20	Approximate location of treeline after development	X	
21	Delineate boundaries of any flood hazard areas and the 100-year flood elevation as depicted on the Town's Flood Insurance Rate Map	NA	
22	Show any areas within or adjacent to the proposed subdivision which have been identified by the Maine Department of Inland Fisheries and Wildlife "Beginning with Habitat project maps or within the Comprehensive Plan..	NA	
23	Show areas within or adjacent to the proposed subdivision which are either listed on or eligible for the National Register of Historic Places, or have been identified in the comprehensive plan or by the Maine Historic Preservation Commission as sensitive or likely to contain such sites	NA	
24	Erosion & Sedimentation control plan, prepared in accordance with MDEP Stormwater Law Chapter 500 Basic Standards, and the MDEP Maine Erosion and Sediment Control Best Management Practices, published March 2003.	X	
25	Stormwater management plan, prepared by a Maine Licensed Professional Engineer in accordance with the most recent edition of Stormwater Management for Maine: BMPS Technical Design Manual, published by the MDEP 2006.	X	

C. Submission information for which a waiver may be granted.		Applicant	Staff
1	High-intensity soil survey by a Certified Soil Scientist	NA	
2	Landscape Plan	X	
3	Hydrogeologic assessment - required if i) subdivision is not served by public sewer and either any part of the subdivision is over a sand and gravel aquifer or has an average density of more than one dwelling unit per 100,000 square feet, or ii) where site considerations or development design indicate greater potential of adverse impacts on groundwater quality.	NA	
	a) map showing basic soil types		
	b) depth to the water table at representative points		
	c) Drainage conditions throughout the subdivision		
	d) data on existing ground water quality		
	e) analysis and evaluation of the effect of the subdivision on groundwater		
	f) map showing location of any subsurface wastewater disposal systems and drinking water wells within the subdivision & within 200 feet of the subdivision boundaries.		
4	Estimate of the amount and type of vehicular traffic to be generated on a daily basis and at peak hours	X	
5	Traffic Impact Analysis for subdivisions involving 28 or more parking spaces or projected to generate more than 140 vehicle trips per day.		
6	If any portion of the subdivision is in the direct watershed of a great pond,	NA	
	i) phosphorous impact analysis and control plan		
	ii) long term maintenance plan for all phosphorous control measures		
	iii) contour lines at an interval of 2 feet		
	iv) delineate areas with sustained slopes greater than 25% covering more than one acre		
Electronic Submission			

TOWN OF WINDHAM MAJOR SITE PLAN APPLICATION

Final Plan

(Section 811 – Site Plan Review, Submission Requirements)

The original signed copy of this application must be accompanied by:

- The required application and review escrow fees,
- Five (5) collated submission packets, which must include
 - Full size paper copies of each plan, map, or drawing, and
 - A bound copy of the required information found in Section 811 of the Land Use Ordinance.
 - The checklist below offers a brief description of these requirements for the purpose of determining the completeness of a submission. Please use the Ordinance for assembling the submission packets.
 - Only two (2) full copies of Stormwater Management Plan and Traffic Impact Study are required. Summaries and conclusions of the Stormwater Management Plan and Traffic Impact Study are adequate for the remaining three (3) submission packets.
- Electronic submission in PDF format of:
 - All plans, maps, and drawings.
 - These may be submitted as a single PDF file or a PDF for each sheet in the plan set.
 - A PDF of the required information found in Section 811 of the Land Use Ordinance

The submission deadline for Final plans is three (3) weeks before the Planning Board meeting for which it will be scheduled.

Applicants are strongly encouraged to schedule a brief submission meeting with Planning Staff, to walk through the application checklist at the time a Planning Board submission is made. This will allow applicants to receive a determination of completeness, or a punch list of outstanding items, at the time a submission is made.

If you have questions about the submission requirements, please contact:

Windham Planning Department	(207) 894-5960, ext. 2
Amanda Lessard, Planner	allessard@windhammaine.us
Ben Smith, Planning Director	bwsmith@windhammaine.us

Final Plan - Major Site Plan

Project Name: Cook Road Retirement Community

Tax Map: 9 **Lot:** 5

Estimated square footage of building(s): 64,000 SF

If no buildings proposed, estimated square footage of total development: _____

Is the total disturbance proposed > 1 acre? ☒ **Yes** ☐ **No**

Contact Information

1. Applicant

Name: Mr. Jim Cummings

Mailing Address: P.O. Box 957, Windham, ME 04062

Telephone: 207-310-8818 **Fax:** _____ **E-mail:** jimcummings111@gmail.com

2. Record owner of property

x (Check here if same as applicant)

Name: _____

Mailing Address: _____

Telephone: _____ **Fax:** _____ **E-mail:** _____

3. Contact Person/Agent (if completed and signed by applicant's agent, provide written documentation of authority to act on behalf of applicant)

Name: Larry Bastian, P.E.

Company Name: Terradyn Consultants, LLC

Mailing Address: 41 Campus Dr. Suite 101, New Gloucester, ME 04260

Telephone: 207-926-5111 **Fax:** 207-221-1317 **E-mail:** larry@terradyconsultants.com

I certify all the information in this application form and accompanying materials is true and accurate to the best of my knowledge.

 11/19/2018
Signature Date

Final Plan - Major Site Plan: Submission Requirements		Applicant	Staff
a.	Complete Sketch Plan Application form	X	
b.	Evidence of payment of application and escrow fees	X	
c.	Written information - submitted in bound report		
1	A narrative describing the proposed use or activity	X	
2	Name, address, & phone number of record owner, and applicant if different	X	
3	Names and addresses of all abutting property owners	X	
4	Documentation demonstrating right, title, or interest in property	X	
5	Copies of existing proposed covenants or deed restrictions		
6	Copies of existing or proposed easements on the property	X	
7	Name, registration number, and seal of the licensed professional who prepared the plan, if applicable	X	
8	Evidence of applicant's technical capability to carry out the project	X	
9	Assessment of the adequacy of any existing sewer and water mains, culverts and drains, on-site sewage disposal systems, wells, underground tanks or installations, and power and telephone lines and poles on the property	X	
10	Estimated demand for water supply and sewage disposal	X	
11	Provisions for handling all solid wastes, including hazardous and special wastes	X	
12	Detail sheets of proposed light fixtures		
13	Listing of proposed trees or shrubs to be used for landscaping	X	
14	Estimate weekday AM and PM and Saturday peak hour and daily traffic to be generated by the project	X	
15	Description of important or unique natural areas and site features, including floodplains, deer wintering areas, significant wildlife habitats, fisheries, scenic areas, habitat for rare and endangered plants and animals, unique natural communities and natural areas, sand and gravel aquifers, and historic and/or archeological resources	X	
16	If the project requires a stormwater permit from MaineDEP or if the Planning Board or if the Staff Review Committee determines that such information is required, submit the following:	X	
	stormwater calculations	X	
	erosion and sedimentation control measures	X	
	water quality and/or phosphorous export management provisions	X	
17	If public water or sewerage will be utilized, provide statement from utility district regarding the adequacy of water supply in terms of quantity and pressure for both domestic and fire flows, and the capacity of the sewer system to accommodate additional wastewater.	n/a	
18	Financial Capacity	X	
	i. Estimated costs of development and itemize estimated major expenses	X	
	ii. Financing (submit one of the following)		
	a. Letter of commitment to fund	X	

	b. Self-financing		
	1. Annual corporate report		
	2. Bank Statement		
	c. Other		
	1. Cash equity commitment of 20% of total cost of development		
	2. Financial plan for remaining financing		
	3. Letter from institution indicating intent to finance		
	iii. If a registered corporation a Certificate of Good Standing from:		
	Secretary of State, or		
	statement signed by corporate officer		
19	Technical Capacity (address both)	X	
	i. Prior experience	X	
	ii. Personnel	X	
d.	Plan Requirements - Existing Conditions		
i.	Location Map adequate to locate project within the municipality	X	
ii.	Vicinity Plan. Drawn to scale of not over 400 feet to the inch, and showing area within 250 feet of the property line, and shall show the following:	X	
	a. Approximate location of all property lines and acreage of parcels	X	
	b. Locations, widths and names of existing, filed or proposed streets, easements or building footprints	X	
	c. Location and designations of any public spaces	X	
	d. Outline of proposed subdivision, together with its street system and an indication of the future probable street system of the remaining portion of the tract	X	
iii.	North Arrow identifying Grid North; Magnetic North with the declination between Grid and Magnetic; and whether Magnetic or Grid bearings were used	X	
iv.	Location of all required building setbacks, yards, and buffers	X	
v.	Boundaries of all contiguous property under the total or partial control of the owner or applicant	X	
vi.	Tax map and lot number of the parcel or parcels on which the project is located	X	
vii.	Zoning classification(s), including overlay and/or subdistricts, of the property and the location of zoning district boundaries if the property is located in 2 or more districts or abuts a different district.	X	
viii.	Bearings and lengths of all property lines of the property to be developed, and the stamp of the surveyor that performed the survey.	X	
ix.	Existing topography of the site at 2-foot contour intervals	X	
x.	Location and size of any existing sewer and water mains, culvers and drains, on-site sewage disposal systems, wells, underground tanks or installations, and power and telephone lines and poles on the property and on abutting streets or land that may serve the development.	X	
xi.	Location, names, and present widths of existing public and/or private streets and rights-of way within or adjacent to the proposed development	X	
xii.	Location, dimensions, and ground floor elevation of all existing buildings	X	

xiii.	Location and dimensions of existing driveways, parking and loading areas, walkways, and sidewalks on or adjacent to the site.	X	
xiv.	Location of intersecting roads or driveways within 200 feet of the site.	X	
xv.	Location of the following:	X	
	a. Open drainage courses	X	
	b. Wetlands	X	
	c. Stone walls	X	
	d. Graveyards	X	
	e. Fences	X	
	f. Stands of trees or treeline, and	X	
	g. Other important or unique natural areas and site features, including but not limited to, floodplains, deer wintering areas, significant wildlife habitats, fisheries, scenic areas, habitat for rare and endangered plants and animals, unique natural communities and natural areas, sand and gravel aquifers, and historic and/or archaeological resources	X	
xvi.	Direction of existing surface water drainage across the site	X	
xvii.	Location, front view, dimensions, and lighting of existing signs	X	
xviii.	Location & dimensions of existing easements that encumber or benefit the site	X	
xix.	Location of the nearest fire hydrant, dry hydrant, or other water supply	X	
Plan Requirements - Proposed Development Activity			
i.	Location and dimensions of all provisions for water supply and wastewater disposal, and evidence of their adequacy for the proposed use, including soils test pit data if on-site sewage disposal is proposed	X	
ii.	Grading plan showing the proposed topography of the site at 2-foot contour intervals	X	
iii.	Direction of proposed surface water drainage across the site and from the site, with an assessment of impacts on downstream properties.	X	
iv.	Location and proposed screening of any on-site collection or storage facilities	X	
v.	Location, dimensions, and materials to be used in the construction of proposed driveways, parking and loading areas, and walkways, and any changes in traffic flow onto or off-site	X	
vi.	Proposed landscaping and buffering	X	
vii.	Location, dimensions, and ground floor elevation of all buildings or expansions	X	
viii.	Location, front view, materials and dimensions of proposed signs together with method for securing sign	X	
ix.	Location and type of exterior lighting. Photometric plan to demonstrate coverage area of all lighting may be required by Planning Board.	X	
x.	Location of all utilities, including fire protection systems	X	
xi.	Approval block: Provide space on the plan drawing for the following words, "Approved: Town of Windham Planning Board" along with space for signatures and date	X	

2. Major Final Site Plan Requirements		
a.	Narrative and/or plan describing how the proposed development plan relates to the sketch plan	X
b.	Stormwater drainage and erosion control program showing:	X
	1. Existing and proposed method of handling stormwater runoff	X
	2. Direction of the flow of the runoff, through the use of arrows and a description of the type of flow (e.g. sheet flow, concentrated flow, etc.)	X
	3. Location, elevation, and size of all catch basins, dry wells, drainage ditches, swales, retention basins, and storm sewers	X
	4. Engineering calculations used to determine drainage requirements based on the 25-year, 24-hour storm frequency.	X
	5. Methods of minimizing erosion and controlling sedimentation during and after construction.	X
c.	A groundwater impact analysis prepared by a groundwater hydrologist for projects involving on-site water supply or sewage disposal facilities with a capacity of 2,000 gallons or more per day	n/a
d.	Name, registration number, and seal of the Maine Licensed Professional Architect, Engineer, Surveyor, Landscape Architect and/or similar professional who prepared the plan	X
e.	A utility plan showing, in addition to provisions for water supply and wastewater disposal, the location and nature of electrical, telephone, cable TV, and any other utility services to be installed on the site	X
f.	A planting schedule keyed to the site plan indicating the general varieties and sizes of trees, shrubs, and other vegetation to be planted on the site, as well as information pertaining to provisions that will be made to retain and protect existing trees, shrubs, and other vegetation	X
g.	Digital transfer of any site plan data to the town (GIS format)	X
h.	A traffic impact study if the project expansion will generate 50 or more trips during the AM or PM peak hour, or if required by the Planning Board	n/a
Electronic Submission		

**TOWN OF WINDHAM
SUBDIVISION & SITE PLAN APPLICATION**

Performance and Design Standards Waiver Request Form

(Section 808 – Site Plan Review, Waivers)
(Section 908 – Subdivision Review, Waivers)

For each waiver request from the Performance and Design Standards detailed in Section 811 or Section 911 of the Town of Windham Land Use Ordinance, as applicable, please submit a separate completed copy of this waiver request form.

Subdivision or Project Name: Cook Road Retirement Community

Tax Map: 9 **Lot:** 5

**Waivers are requested from the following Performance and Design Standards
(add rows as necessary):**

Ordinance Section	Standard	Mark which waiver this form is for
910.C.1.(c).(1)	High Intensity Soil Survey	x

- a. Describe how a waiver from the standard indicated above will improve the ability of the project to take the property's pre-development natural features into consideration. Natural features include, but are not limited to, topography, location of water bodies, location of unique or valuable natural resources, relation to abutting properties or land uses. Attach a separate sheet if necessary.

HISS: We will be providing test pits for all septic system areas & will be using the Medium Intensity Soil Survey for stormwater calculations. There's no added value to a high intensity soil survey.

(continued next page)

Ordinance Section: _____

b. Will the waiver have an impact on any of the following criteria?

	Yes	No
Water or air pollution		X
Light pollution or glare		X
Water supply		X
Soil erosion		X
Traffic congestion or safety		X
Pedestrian safety or access		X
Supply of parking		X
Sewage disposal capacity		X
Solid waste disposal capacity		X
Scenic or natural beauty, aesthetics, historic sites, or rare or irreplaceable natural areas		X
Flooding or drainage issues on abutting properties		X
The Town's ability to provide the subdivision with public safety services (if subdivision)		X

If granting the waiver will result in an impact on any of the criteria above, please provide more detail below.

1.84 Acres

**QUITCLAIM DEED
(With Covenant)**

WAYNE J. LIBBY, an individual residing in Gorham, Maine, with a mailing address of 15 Crockett Road, Gorham, ME 04038 and **KATHRYN L. AUSTIN**, also known as **KATHRYN AUSTIN**, an individual residing in Rhinebeck, New York, with a mailing address of 17 Haggerty Hill Road, Rhinebeck, NY 12572, for consideration paid, grant to **CUMMINGS ACQUISITION LLC**, a Maine limited liability company with a mailing address of P.O. Box 957, Windham, ME 04062, with Quitclaim Covenant, the real property located in the Town of Windham, Cumberland County, Maine, more particularly bounded and described on Exhibit A.

Meaning and intending to convey and hereby conveying the property described in the deed from Louise Libby (a/k/a Isabelle) to the Grantors, which deed is dated March 31, 2003, and recorded in the Cumberland County Registry of Deeds in Book 19824, Page 60.

IN WITNESS WHEREOF, the Grantors have executed this deed this 20th day of August, 2018.

Witness

Witness

Wayne J. Libby

Kathryn L. Austin

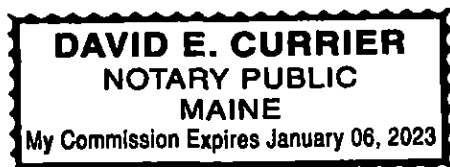
State of Maine
County of Cumberland, ss

Date: August 20, 2018

Then personally appeared before me the above-named Wayne J. Libby and Kathryn L. Austin and each acknowledged the foregoing instrument to be his/her free act and deed.

Before me,

Notary Public
DAVID E. CURRIER
Printed Name



MAINE REAL ESTATE TAX PAID

Wayne J. Libby and Kathryn L. Austin to Cummings Acquisition LLC
(1.84 Acres)
Exhibit A

A certain lot or parcel of land situated on the westerly side of the Gray Road in the Town of Windham, County of Cumberland and State of Maine, bounded and described as follows:

Beginning on the westerly side of the Gray Road at an 8 inch by 8 inch granite monument, being 50 feet right of station 524+19.67, as depicted on Right of Way Map by Maine State Highway Commission, dated April 1952 and recorded in Plan Book 43, Page 24 of the Cumberland County Registry of Deeds;

Thence, along said Gray Road, on a course of South eleven degrees fifty-eight minutes thirty seconds West ($S11^{\circ}58'30''W$) one hundred thirty and sixty-five hundredths (130.65) feet to an iron to be set;

Thence, across the land formerly of I. Louise Libby, on a course of North seventy-seven degrees fifty-nine minutes thirty seconds West ($N77^{\circ}59'30''W$) three hundred seventy-one and ninety-nine hundredths (371.99) feet to an iron to be set;

Thence, across the land formerly of I. Louise Libby, on a course of North twenty-three degrees fifty-six minutes fifteen seconds East ($N23^{\circ}56'15''E$) two hundred thirty-four and ninety-one hundredths (234.91) feet to an iron to be set;

Thence, across the land formerly of I. Louise Libby, on a course of South seventy-eight degrees nine minutes thirty seconds East ($S78^{\circ}09'30''E$) three hundred twenty-four and sixty hundredths (324.60) feet to an iron to be set and to said Gray Road;

Thence, along said Gray Road, a course to the left with a radius three thousand eight hundred sixty-nine and sixty-seven hundredths (3869.67) feet, an arc length of one hundred and fourteen hundredths (100.14) feet and chord South twelve degrees forty-two minutes fifty-eight seconds West ($S12^{\circ}42'58''W$) one hundred and fourteen hundredths (100.14) feet to the point of beginning.

Containing 1.84 acres or 80,100 square feet, subject to easements of record and bearings are based on true meridian by solar observations.

Received
Recorded Register of Deeds
Aug 21, 2018 10:11:29A
Cumberland County
Nancy A. Lane

November 17, 2018
Summit #18218

Jim Cummings
PO Box 957
Windham, ME 04062

Reference: Preliminary Septic System Investigation
Cook Road Retirement Community
306 Gray Road, Windham, Maine (Tax Map 9 / Lot 5)

Dear Mr. Cummings:

Summit Geoengineering Services (SGS) completed a Preliminary Septic System Investigation at the above referenced 13-acre property in November 2018. The purpose of the investigation was to evaluate soils and site conditions for septic system suitability in accordance with the State of Maine Subsurface Wastewater Disposal Rules (August 3, 2015) for first-time systems.

Information used for this investigation includes a preliminary development site plan prepared by Terradyn Consultants, LLC that incorporates a standard boundary survey and topographic survey completed by Wayne Wood & Company.

Proposed Development

The proposed Cook Road Retirement Community consists of forty-six (46) two-bedroom units and a clubhouse. The proposed development will be served by public water via a Portland Water District (PWD) water main from Gray Road, and on-site subsurface wastewater disposal systems.

Water Supply Well Survey

SGS contact the PWD customer services center and verified that all properties within 200 feet of the site along Gray Road are served by public water. It is therefore assumed that no potable drinking water wells are in use at properties on Gray Road within 200 feet of the site property boundary.

The three homes on Cook Road in the vicinity of the site are served by drilled bedrock wells. The drilled wells for 7 Cook Road and 12 Cook Road are located within 200 feet of the property boundary and were approximately located using tape measurements to property pins or utility poles shown on the Terradyn Consultants, LLC site plan. The drilled well serving 17 Cook Road is located more than 200 feet from the property boundary.

Soil Profile and Drainage Conditions

SGS completed a thorough survey of soils on the property with a hand shovel, hand auger and/or tile probe. Soil test locations were located using tape measurements to surveyed site features, and grade stakes laid out by Wayne Wood and Company at select building location corners, and along the proposed road center lines. The twenty-seven (27) soil test pit or boring locations are shown on the site plan included as Attachment 1. Soil test pit / boring logs are provided in Attachment 2.

Soil at the tested locations consisted of fine sandy loam to a gravelly sandy loam soils derived from ablation or lodgment till. Depths to the seasonal high groundwater table ranged from at the ground surface in low lying wetland areas, to greater than 4 feet below the ground surface in the northeast portion of the property along Gray Road.

Areas of shallow depth to bedrock soils occur throughout the property and are most prevalent on the western side of the property (along the woods road) and near the wetland areas in the central and southeastern areas of the property.

Soil at proposed disposal field locations are classified as soil profile 2 and 3. The stone bed square foot equivalent loading rate for soils is medium-large (3.3 square foot per gallon per day).

Proposed Subsurface Wastewater Disposal Fields

SGS selected ten (10) locations on the property for subsurface wastewater disposal fields. The disposal field locations were arranged such that the footprints are on soils meeting first-time system criteria, and applicable setbacks are met for property lines, proposed building foundations, proposed on-site stormwater treatment structures, off-site ditches along Gray Road, and off-site water supply wells on Cook Road. It is assumed that all buildings will have full foundations.

The proposed disposal field locations and system designations (A through J) are shown on the site plan provided in Attachment 1. Disposal field design flows range from 360 gallons per day (GPD) to 1,980 GPD. Where necessary, Fuji Clean CE-series and CEN-series advanced treatment systems are proposed to allow for a reduction in disposal field area size and for treatment of nitrogen to meet nitrate-nitrogen concentration requirements¹ in groundwater at the property boundary. Fuji Clean CE-series and CEN-series models allow for 50% and 75% reduction in disposal field size, respectively (documentation provided in Attachment 3).

At each disposal field location, the limits of fill extensions were estimated using soils information and existing grade topographic contours. Based on our analysis, the fill extensions will be wholly located on the property and minor wetland filling for disposal field fill extension will be required at one proposed disposal field location (Disposal Field I at TB-101/TB-102).

The ten (10) subsurface wastewater disposal systems proposed, dwelling units served and design flows are summarized in the table below.

¹ A groundwater nitrate-nitrogen assessment was prepared by SGS and is presented under separate cover.

Proposed Subsurface Wastewater Disposal Systems

System Designation	Units Served (No. 2-bedroom units served)	Design Flow (GPD)	Proposed Leachfield / Treatment Tanks
A	1 & 2 (2)	360	20 ft x 19 ft – Eljen Geotextile Sand Filter (GSF) 1,000-gallon septic tank
B	3,4,5,6 (4)	720 ¹	21 ft x 38 ft - ADS High Capacity BioDiffuser Plastic Chambers 1,500-gallon septic tank Fuji Clean CE10 (serves 4 units)
C	7,8,9,10 (4)	720 ¹	21 ft x 38 ft - ADS High Capacity BioDiffuser Plastic Chambers 1,500-gallon septic tank Fuji Clean CE10 (serves 4 units)
D	11 & 12 (2)	360	21 ft x 38 ft - ADS High Capacity BioDiffuser Plastic Chambers 1,000-gallon septic tank
E	13 & 14 (2)	360	21 ft x 38 ft - ADS High Capacity BioDiffuser Plastic Chambers 1,000-gallon septic tank
F	15 – 22 (8) 23 – 25 (3)	1,440 540 ²	51 ft x 76 ft - ADS High Capacity BioDiffuser Plastic Chambers (2) – 2,000-gallon septic tanks (1) – 1,500-gallon septic tank (serves units 23, 24 and 25) Fuji Clean CEN7 (serves units 23, 24 and 25)
G	31 – 36 (6) + clubhouse	1,080 ² 100 ³	(19) 4 ft x 8 ft Concrete Chambers w/ 6" stone below and 12" stone around perimeter (non-rectangular) (1) – 1,500-gallon septic tanks (2) – 1,000-gallon septic tank Fuji Clean CEN10 (serves 4 units) Fuji Clean CEN5 (serves 2 units) Clubhouse treated with 1,000-gallon septic tank only
H	26-30 (5)	900 ²	Two (2) 10 ft x 40 ft Stone Beds 1,500-gallon septic tank Fuji Clean CEN14 (serves 5 units)
I	37-40 (4)	720	11 ft x 68 ft – Eljen Geotextile Sand Filter (GSF) 2,000-gallon septic tank
J	41-46 (6)	1,080	19 ft x 60 ft – Eljen Geotextile Sand Filter (GSF) 2,000-gallon septic tank 1,000-gallon septic tank

Note:

1. Fuji Clean CE-series units allow for 50% disposal field size reduction. Effluent total nitrogen equal to 20 mg-N/L.
2. Fuji Clean CEN-series units allow for 75% disposal field size reduction. Effluent total nitrogen is equal to 10 mg-N/L.
3. The clubhouse is assumed to be an assembly area (meeting hall) with 50 persons (patrons) during an average day. The design flow is calculated as follows: 2 GPD/person x 50 persons = 100 GPD.

CONCLUSIONS

The proposed subsurface wastewater disposal systems for the Cook Road Retirement Community meet the State of Maine Subsurface Wastewater Disposal Rules (August 3, 2015) criteria for first-time systems.

Note that a complete HHE-200 application for each proposed subsurface wastewater disposal system must be prepared by a Licensed Site Evaluator and approved by the Local Plumbing Inspector prior to installation.

If you have any questions concerning this letter, please feel free to contact me.

Sincerely yours,
Summit Geoengineering Services



Stephen B. Marcotte, C.G., L.S.E.
Maine Licensed Site Evaluator #387



enclosures

Attachment 1

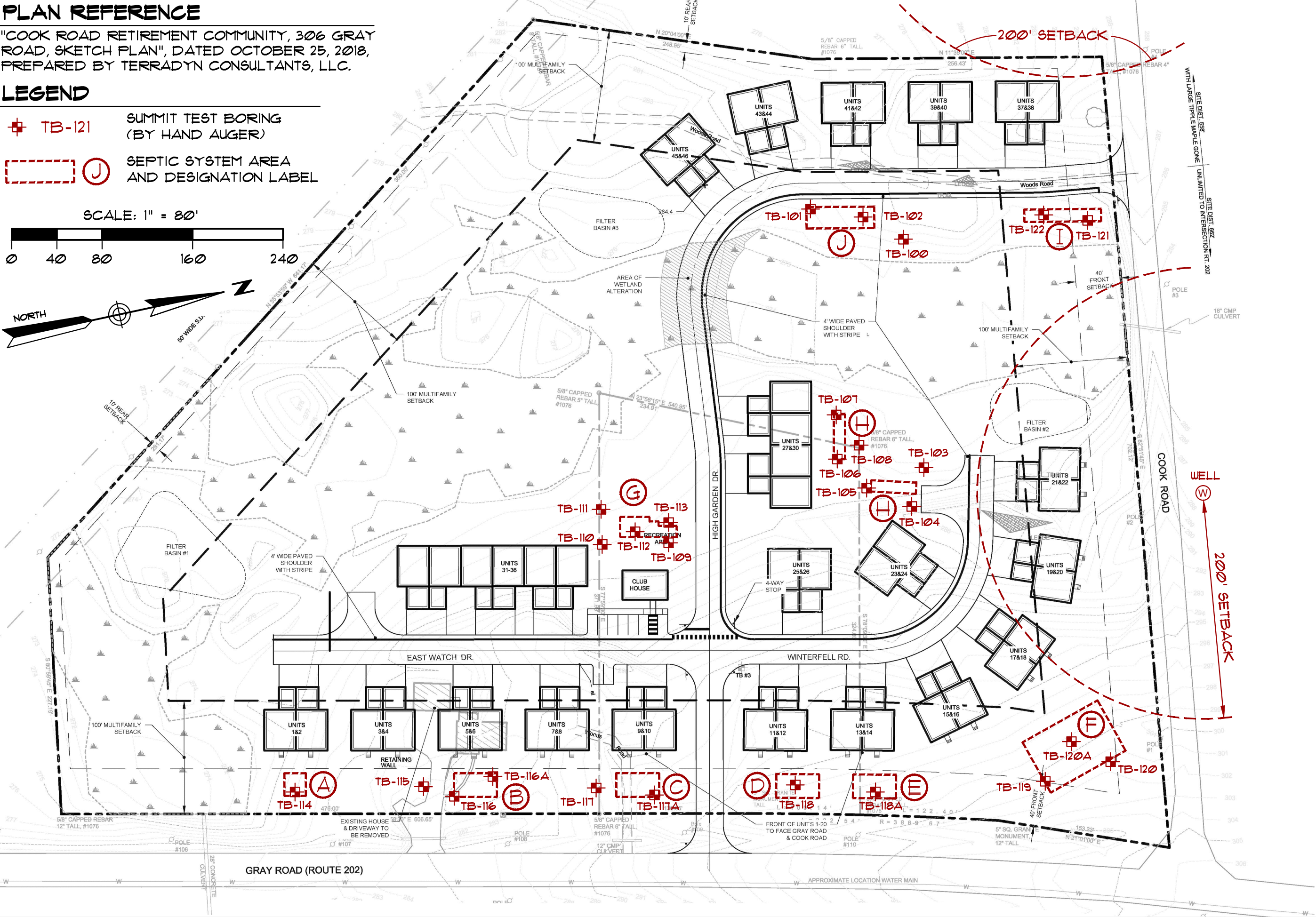
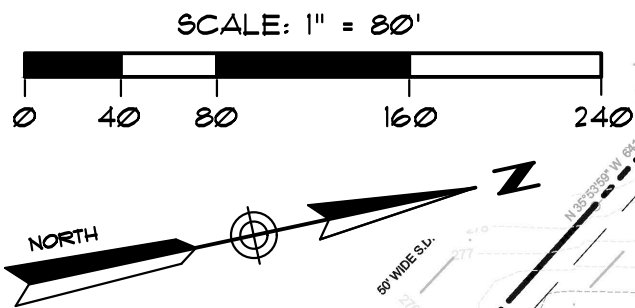
Septic System Location Plan

PLAN REFERENCE

"COOK ROAD RETIREMENT COMMUNITY, 306 GRAY ROAD, SKETCH PLAN", DATED OCTOBER 25, 2018, PREPARED BY TERRADYN CONSULTANTS, LLC.

LEGEND

- TB-121 SUMMIT TEST BORING (BY HAND AUGER)
- SEPTIC SYSTEM AREA AND DESIGNATION LABEL



PROJECT: COOK ROAD RETIREMENT COMMUNITY 306 GRAY ROAD - WINDHAM, ME		CLIENT: JIM CUMMINGS	
TITLE: SEPTIC SYSTEM LOCATION PLAN		DRAWN BY: KRF	APPR BY: SBM
SCALE: 1" = 80'		DATE: NOVEMBER 17, 2018	
<div>145 LISBON ST. - SUITE 101 LEWISTON, ME 04240 Tel: (207) 576-3313</div> <div>SUMMIT GEOENGINEERING SERVICES</div> <div>PROJ.#: 18218 FIGURE: 1</div>			

Attachment 2

Soil Test Pit and Boring Logs

Observation Hole # TB-101 ☐ Test Pit ☒ Boring

3 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
Gravelly Fine Sandy Loam	Friable	Dark Brown	
		Yellowish Brown	None Noted
Bedrock at 18 to 24"			

Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>2</u> Profile	<u>All</u> Condition	<u>5%</u> Percent	<u>18 to 24"</u> Depth	<input type="checkbox"/> Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock

Observation Hole # TP-103 ■ Test Pit □ Boring


1 " Depth of organic horizon above mineral soil

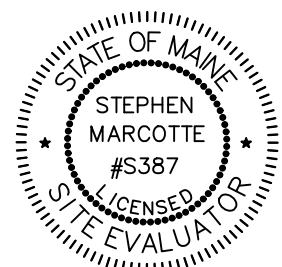
Texture	Consistency	Color	Mottling
Gravelly Fine Sandy Loam	Friable	Dark Brown	
		Yellowish Brown	
	Somewhat Firm	Olive Brown to Olive	Common & Distinct
Bedrock at 28"			

Depth below mineral surface (inches)

Soil	Classification	Slope	Limiting Factor
<u>3</u> Profile	<u>C/AIII</u> Condition	<u>13%</u> Percent	<u>15"</u> Depth

■ Groundwater
 □ Restrictive Layer
 □ Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: 	Date: 11/16/2018
Name Printed/typed: STEPHEN B. MARCOTTE	Cert/Lic/Reg.# <div style="border: 1px solid black; padding: 2px; display: inline-block;">387</div>
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	



SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF
SUBSURFACE CONDITIONS AT PROJECT SITESProject Name:
306 GRAY ROAD PROPERTYApplicant Name:
JIM CUMMINGSProject Location (municipality):
WINDHAM

Observation Hole # TB-104 ☐ Test Pit ☒ Boring

1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive Brown to Olive	Common & Distinct
	Somewhat Firm		
Bedrock at 28"			

Soil Classification Slope Limiting Factor ☒ Groundwater
2/3 C/AIII 12% 15" ☐ Restrictive Layer
 Profile Condition Percent Depth ☐ Bedrock

Observation Hole # TB-105 ☐ Test Pit ☒ Boring

1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive	Common & Distinct
Bedrock at 20"			

Soil Classification Slope Limiting Factor ☐ Groundwater
2 C/AIII 6% 20" ☐ Restrictive Layer
 Profile Condition Percent Depth ☒ Bedrock

Observation Hole # TB-106 ☐ Test Pit ☒ Boring

1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive	Common & Distinct
Bedrock at 24"			

Soil Classification Slope Limiting Factor ☐ Groundwater
2 C/AIII 6% 24" ☐ Restrictive Layer
 Profile Condition Percent Depth ☒ Bedrock


Observation Hole # TB-107 ☐ Test Pit ☒ Boring

1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive	Common & Distinct
Bedrock at 24"			

Soil Classification Slope Limiting Factor ☐ Groundwater
2 C/AIII 6% 24" ☐ Restrictive Layer
 Profile Condition Percent Depth ☒ Bedrock

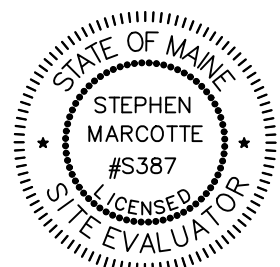
INVESTIGATOR INFORMATION AND SIGNATURE

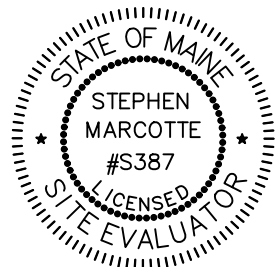
Signature: 

Date: 11/16/2018

Name Printed/typed: STEPHEN B. MARCOTTE


Cert/Lic/Reg.# 387

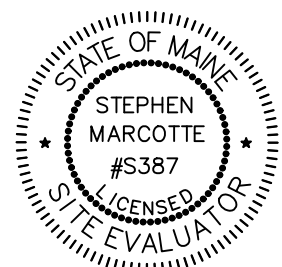
Title: ☒ Licensed Site Evaluator
☐ Certified Geologist☐ Other:



Observation Hole #	<u>TB-113</u>			<input type="checkbox"/> Test Pit	<input checked="" type="checkbox"/> Boring
<u>1</u> "	Depth of organic horizon above mineral soil				
Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	
			Dark Brown		
	Gravelly Fine Sandy Loam	Friable	Yellowish Brown		
			Olive Brown	Common & Distinct	
		Bedrock at 24"			
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input checked="" type="checkbox"/> Bedrock	
<u>2</u> Profile	<u>C/AIII</u> Condition	<u>6%</u> Percent	<u>24"</u> Depth		

Observation Hole #		<u>TB-115</u>		<input type="checkbox"/> Test Pit	<input checked="" type="checkbox"/> Boring
<u>0"</u> (<u>lawn</u>) "		Depth of organic horizon above mineral soil			
Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	
			Brown		
6					
12					
18	Gravelly Fine Sandy Loam	Friable	Yellowish Brown	None Noted	
24					
30					
36					
42	Refusal with auger at 32" Refusal with probe in hardpan or possible bedrock at 38"				
48					
Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input checked="" type="checkbox"/> Bedrock	
<u>2/3</u>	<u>All</u>	<u>7%</u>	<u>>=32"</u>		

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: 	Date: 11/16/2018
Name Printed/typed: STEPHEN B. MARCOTTE	Cert/Lic/Reg.# <div style="border: 1px solid black; padding: 2px; display: inline-block;">387</div>
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	



SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF
SUBSURFACE CONDITIONS AT PROJECT SITESProject Name:
306 GRAY ROAD PROPERTYApplicant Name:
JIM CUMMINGSProject Location (municipality):
WINDHAM

Observation Hole # TB-116 ☐ Test Pit ☒ Boring

0" (lawn) " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0			Brown	
6				
12				
18	Gravelly Fine Sandy Loam	Friable	Yellowish Brown	None Noted
24				
30				
36				
42	Refusal with auger at 30"			
48	Refusal with probe in hardpan or possible bedrock at 41"			
	Soil	Classification	Slope	Limiting Factor
	2/3	AIII	5%	>=30"
	Profile	Condition	Percent	Depth

☐ Groundwater
☒ Restrictive Layer
☒ Bedrock

Observation Hole # TB-116A ☐ Test Pit ☒ Boring

0" (lawn) " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0				
6	Gravelly Fine Sandy Loam (Fill around home)	Friable	Brown to Olive	Relic Mottling Noted
12				
18			Brown	
24	Gravelly Sandy Loam	Friable	Yellow Brown	None Noted
30				
36				
42	Refusal with auger at 32"			
48	No Refusal with probe to 48"			
	Soil	Classification	Slope	Limiting Factor
	2	C/B	5%	>=32"
	Profile	Condition	Percent	Depth

☐ Groundwater
☐ Restrictive Layer
☐ Bedrock

Observation Hole # TB-117 ☐ Test Pit ☒ Boring

0 " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0			Brown	
6				
12	Gravelly Fine Sandy Loam	Friable		None Noted
18			Yellowish Brown	
24				
30				
36				
42	Refusal with auger at 24"			
48	Refusal with probe on assumed bedrock at 36"			
	Soil	Classification	Slope	Limiting Factor
	2	C/AIII	5%	>=24"
	Profile	Condition	Percent	Depth

☐ Groundwater
☒ Restrictive Layer
☒ Bedrock

Observation Hole # TB-117A ☐ Test Pit ☒ Boring

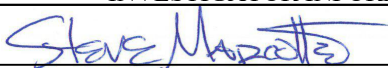
0 " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0			Brown	
6				
12	Gravelly Fine Sandy Loam	Friable	Yellowish Brown	None Noted
18				
24				
30				
36				
42	Refusal with auger at 18"			
48	Refusal in hard pan at 28"			
	Small borrow area into hardpan is downslope			
	Soil	Classification	Slope	Limiting Factor
	3	C	5%	>=18"
	Profile	Condition	Percent	Depth

☐ Groundwater
☒ Restrictive Layer
☒ Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE

Signature:



Date:

11/16/2018

Name Printed/typed:

STEPHEN B. MARCOTTE

Cert/Lic/Reg.#

387

Title:

☒ Licensed Site Evaluator☐ Certified Geologist☐ Other:

SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF
SUBSURFACE CONDITIONS AT PROJECT SITESProject Name:
306 GRAY ROAD PROPERTYApplicant Name:
JIM CUMMINGSProject Location (municipality):
WINDHAM

Observation Hole # TB-118 ☐ Test Pit ☒ Boring
1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Brown	
Fine Sandy Loam		Yellowish Brown	
	Friable		None Noted
Gravelly Fine Sandy Loam			
Refusal with auger at 32"			
Refusal with probe on possible bedrock at 38"			

Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>2/3</u> Profile	<u>C/AIII</u> Condition	<u>5%</u> Percent	<u>38"</u> Depth	<input type="checkbox"/> Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock

Observation Hole # TB-118A ☐ Test Pit ☒ Boring
1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Brown	
Sandy Loam	Friable	Yellowish Brown	None Noted
Refusal with probe on possible bedrock at 18" to 24" in area of proposed disposal field			

Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>2</u> Profile	<u>AIII</u> Condition	<u>5%</u> Percent	<u>18-24"</u> Depth	<input type="checkbox"/> Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock

Observation Hole # TB-119 ☐ Test Pit ☒ Boring
1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Brown	
Fine Sandy Loam	Friable	Yellowish Brown	None Noted
Refusal with auger at 24"			
Refusal with probe on bedrock at 28"			

Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>2</u> Profile	<u>AIII</u> Condition	<u>7%</u> Percent	<u>28"</u> Depth	<input type="checkbox"/> Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock

Observation Hole # TB-120 ☐ Test Pit ☒ Boring
1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Brown	
Fine Sandy Loam	Friable	Yellowish Brown	None Noted
Refusal with auger at 24"			
Refusal with probe on bedrock at 32"			

Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>2</u> Profile	<u>AIII</u> Condition	<u>7%</u> Percent	<u>32"</u> Depth	<input type="checkbox"/> Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE

Signature:

Date:

11/16/2018

Name Printed/typed:

STEPHEN B. MARCOTTE

Cert/Lic/Reg.#

387

Title:

☒ Licensed Site Evaluator☐ Certified Geologist☐ Other:


Observation Hole # <u>TB-121</u>		<input type="checkbox"/> Test Pit	<input checked="" type="checkbox"/> Boring
<u>1</u> "		Depth of organic horizon above mineral soil	
Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive Brown	Common & Distinct
Refusal with auger at 20"			
Refusal with probe on bedrock at 29"			
Soil	Classification	Slope	Limiting Factor
<u>2</u> Profile	<u>D/III</u> Condition	<u>6%</u> Percent	<u>12"</u> Depth
		<input checked="" type="checkbox"/> Groundwater	<input type="checkbox"/> Restrictive Layer
		<input type="checkbox"/> Bedrock	

Observation Hole # _____ ☐ Test Pit ☐ Boring

_____ " Depth of organic horizon above mineral soil

	Texture	Consistency	Color	Mottling
0				
6				
12				
18				
24				
30				
36				
42				
48				

Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>Profile</u>	<u>Condition</u>	<u>Percent</u>	<u>Depth</u>	<input type="checkbox"/> Restrictive Layer
				<input type="checkbox"/> Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE		
Signature:		Date: 11/16/2018
Name Printed/typed:	STEPHEN B. MARCOTTE	Cert/Lic/Reg.# 387
Title:	<input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	

Attachment 3

Fuji Clean Advanced Treatment System Information



Paul R. LePage, Governor
Tel. (207) 287-2070

Mary C. Mayhew, Commissioner

Department of Health and Human Services
Maine Center for Disease Control and Prevention
286 Water Street
11 State House Station
Augusta, Maine 04333-0011
Tel. (207) 287-8016
Fax (207) 287-9058; TTY (800) 606-0215
Fax (207) 287-4172

October 12, 2016

Fuji Clean, LLC
Attn.: Bennette D. Burkes, P.E.
1518 Willow Lawn Drive, Suite 300
Hnerico, VA 23230

Subject: Modified Approval for General Use, Fuji Clean System, CE and CEN Series

Dear Mr. Burkes:

The Division of Environmental and Community Health has reviewed your proposal for reductions in disposal field sizing and reduced separation form limiting factors for systems which incorporate the Fuji Clean System, CE and CEN Series (Fuji Clean) wastewater treatment systems. This request is predicated upon the ability of the Fuji Clean system to produce BOD5 and TSS levels below 10 mg/l, each.

The Division approves the request for reduced disposal field area and reduced separation distances as follows:

1. A minimum separation distance of 12 inches shall be maintained between the seasonal high groundwater table and the lowest elevation of the system's disposal field;
2. A minimum separation distance of 12 inches shall be maintained between bedrock and the lowest elevation of the system's disposal field;
3. Stone beds and trenches are allowed a 75 percent reduction in size, based upon the standard sizing requirements of the Rules;
4. Proprietary devices such as but not limited to plastic chambers and gravel-less pipe trenches are allowed a 50 percent reduction in size based upon the standard sizing requirements of the Rules, absent prohibitions by manufacturers;
5. Eljen GSF units may be used with Fuji Clean systems, but with no reduction in size; and
6. Maintenance agreement contracts must be included with all system installations. Terms and duration of the contracts shall be in accordance with Fuji Clean's company policies.

Because installation and maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of this system. Further, the Division strongly recommends that property owners enter into long term maintenance contracts with Fuji Clean, in accordance with Fuji Clean's company policies.

Should you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in blue ink that reads "James A. Jacobsen". The signature is fluid and cursive, with a long horizontal stroke at the end.

James A. Jacobsen
Project Manager, Webmaster
Division of Environmental Health
Drinking Water Program
Engineering Review Team
e-mail: james.jacobsen@maine.gov

/jaj

xc: File



Department of Health
and Human Services
Maine People Living
Safe, Healthy and Productive Lives

Paul R. LePage, Governor

Ricker Hamilton, Commissioner

Department of Health and Human Services
Maine Center for Disease Control and Prevention
286 Water Street
11 State House Station
Augusta, Maine 04333-0011
Tel.: (207) 287-8016; Fax: (207) 287-9058
TTY Users: Dial 711 (Maine Relay)

Tel. (207) 287-2070

Drinking Water Program

Fax (207) 287-4172

April 9, 2018

Fuji Clean USA, LLC

Attn.: Scott Samuelson, Managing Director

41-2 Greenwood Road

Brunswick, ME 04011

Subject: Disposal Field Size Reduction, Fuji Clean Models CEN5, CEN7, CEN10, and CEN21

Dear Mr. Samuelson:

The Division of Environmental and Community Health has reviewed your proposal for 75 percent reductions in disposal field sizing compared to the standard sizing requirements in the Maine Subsurface Wastewater Disposal Rules for systems which incorporate Fuji Clean Models CEN5, CEN7, CEN10, and CEN21 wastewater treatment systems. This request is predicated upon the ability of the Fuji Clean system to produce BOD5 and TSS levels below 10 mg/l, each as verified in the NSF report dated April 2015.

The Division approves the request for reduced disposal field area and reduced separation distances as follows:

1. A minimum separation distance of 12 inches shall be maintained between the seasonal high groundwater table and the lowest elevation of the system's disposal field;
2. A minimum separation distance of 12 inches shall be maintained between bedrock and the lowest elevation of the system's disposal field;
3. Stone beds and trenches are allowed a 75 percent reduction in size, based upon the standard sizing requirements of the Rules;
4. Proprietary devices such as but not limited to plastic chambers and gravel-less pipe trenches are allowed a 75 percent reduction in size based upon the standard sizing requirements of the Rules, absent prohibitions by manufacturers; and
5. Maintenance agreement contracts must be included with all system installations. Terms and duration of the contracts shall be in accordance with Fuji Clean's company policies.

This letter supersedes the letter dated October 12, 2016.

Because installation and maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of this system.

Should you have any questions, please feel free to contact me at (207) 287-5695, or by fax at (207) 287-4172.

Sincerely,

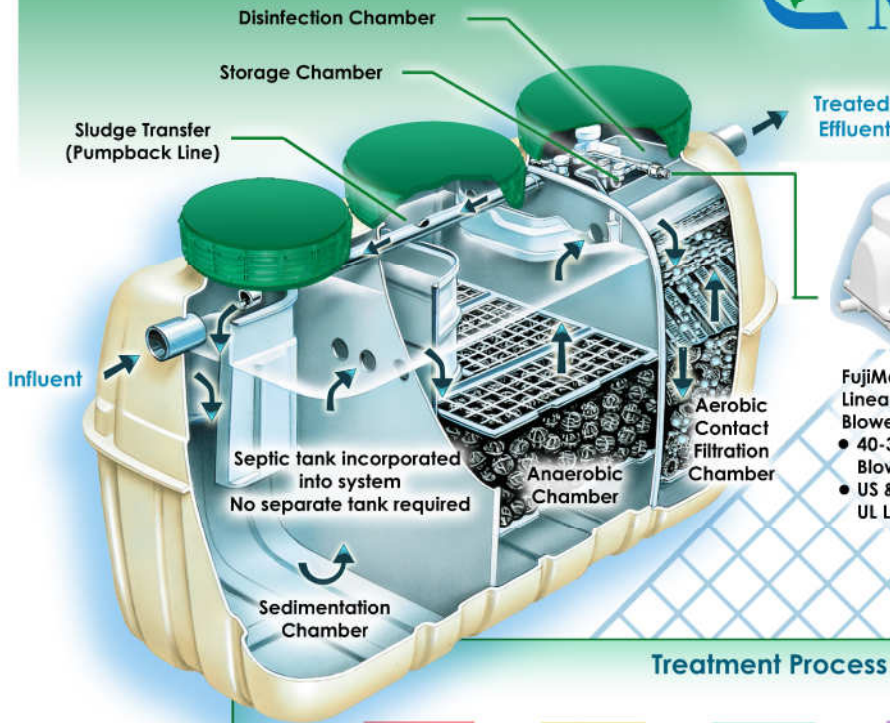


James A. Jacobsen, Environmental Specialist IV
Division of Environmental and Community Health
Drinking Water Program
Engineering Review Team
286 Water Street, Augusta, ME 04333
e-mail: james.jacobsen@maine.gov

xc: File

/jaj

MODEL CE & CEN SERIES *Technical Specification Sheet*



**FujiMac RII
Linear Diaphragm
Blower**

- 40-300L/min Blower Options
- US & CAN UL Listed

Fuji Clean Advantages

- Over 2 million installed systems worldwide
- 1-tank system – no septic tank necessary
- No moving parts in tank
- Built-in equalization - levels variable inflow
- NSF 40 and 40/245 certified
- TN removal to 70+% with CEN models
- Phosphorous reduction technology
- Smallest footprint vs. competitors
- Lowest power use vs. competitors
- Lightweight tank - easy installation
- Quick and easy O&M - no mess
- Rapid startup and restart for seasonal homes

Treatment Process



Design Specification Table	CE Series BOD, TSS, TN							CEN Series BOD, TSS, Enhanced TN			
MODEL:	CE5	CE7	CE10	CE14	CE21	CE30	CE6KG	CEN5	CEN7	CEN10	CEN21
Load Hydraulic (GPD)	360	540	720	1,000	1,900	2,700	6,000	360	540	720	1,900
EFFLUENT (assumes domestic strength influent):											
BOD – Effluent (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
BOD (removal pounds/day)	.52	.73	1.04	1.46	2.08	3.12	6.93	.69	.97	1.38	2.9
TSS (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
TN (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
BLOWER DETAIL:											
Blower Model	MAC80R	MAC80R	MAC100R	MAC100R	MAC150R	MAC200R	MAC200R (3)	MAC80R	MAC100R	MAC100R	MAC200R
Normal Pressure (kPa)	15	15	18	18	20	20	20	15	18	18	20
Airflow Volume (CFM; L/Min.)	2.8 CFM 80 L/MIN	2.8 CFM 80 L/MIN	3.5 CFM 100 L/MIN	3.5 CFM 100 L/MIN	5.3 CFM 150 L/MIN	7.0 CFM 200 L/MIN	21.0 CFM 600 L/MIN	2.8 CFM 80 L/MIN	3.5 CFM 100 L/MIN	3.5 CFM 100 L/MIN	7.0 CFM 200 L/MIN
Power Use (kWh/day)	1.1	1.1	1.6	1.6	2.4	3.4	10.2	1.1	1.6	1.6	3.4
Weight (lbs.)	11	11	11	11	13	13	13 x 3	11	11	11	13
Outlet Diameter (OD, inches)	0.70	0.70	0.70	0.70	1.0	1.0	1.0 x 3	.070	0.70	0.70	1.0
TANK DETAIL:											
Material	Fibre-Reinforced Plastic							Fibre-Reinforced Plastic			
Height (inches)	61.8	65.7	73.6	77.4	81.3	87.2	87.2	65.7	73.6	77.4	87.2
Length (inches)	85	95.7	98.8	118.9	152.8	183.7	434.7	95.7	98.8	118.9	183.7
Width (inches)	43.7	49.2	56.7	68.9	72.4	78.3	115.3	49.2	56.7	68.9	78.3
Weight (lbs.)	397	463	705	926	1,168	1,543	2,900	463	705	926	1,543
Inlet Invert (inches)	49	53	61	62	65	71	67	53	61	62	71
Outlet Invert (inches)	47	51	59	59.5	63	69	64	51	59	59.5	69
Access Ports		2@20"	2@20"	2@20"	2@20"	2@20"	4@24"x24"	2@20"	2@20"	2@20"	2@20"
Quantity & Diameter (inches)	3@20"	1@24"	1@24"	1@24"	1@24"	1@24"	3@24"x48"	1@24"	1@24"	1@24"	1@24"
Tank Volume Total (gallons)	545	749	1,069	1,498	2,252	3,199	7,267	749	1,069	1,498	3,199

Treatment Process Overview

Fuji Clean's "contact filtration" treatment is a simple, well engineered process that consists of a controlled, circuitous flow train through anaerobic and aerobic chambers and in direct contact with assorted proprietary fixed film medias on which biological digestion of organic matter occurs. Media is also designed and positioned to provide mechanical filtration of process wastewater.

The system includes two air lift pumps (see diagram below) The Recirculating Airlift Pump returns process water and sludge from the aerobic zone to the sedimentation chamber, recirculating 2-4 times inflow per day for CE models and 4-6 times inflow for CEN (enhanced denitrification) models. The Effluent Airlift Pump is designed to help equalize flow and discharge treated effluent.



Two Air Lift Pumps. One Recirculating Air Lift pump sending process water and solids back to Chamber 1, and one Effluent Air Lift Pump for measured discharge of treated effluent. (See airlift pump info below).

Chamber 3B. Disinfection Chamber (final zone before discharge – option for chlorination tablet disinfection)

Chamber 3A. Storage Chamber (settling zone)

Sludge Transfer
(Recirculating air lift pumpback) See airlift pump info below.

Outlet

Inlet

Powered by the FujiMAC "R" Series Blowers State-of-the-art linear diaphragm air blowers manufactured by Fuji Clean Co sized to provide about 2.8 cubic feet per minute to most residential systems.

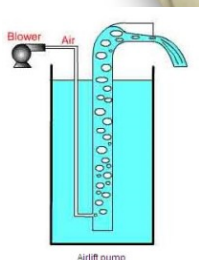
Chamber 3. Aerobic Contact Filtration Chamber
(both board and cylindrical hollow mesh media) oxygen rich zone for aerobic microbe digestion activity, solids filtration and nitrification of ammoniac nitrogens to nitrates

Chamber 2. Anaerobic Contact Filtration Chamber (spherical-skeleton filter media) organic matter decomposition by micro-organisms, suspended solids captured and nitrates are denitrified

Chamber 1. Sedimentation Chamber (separates solids and greases)

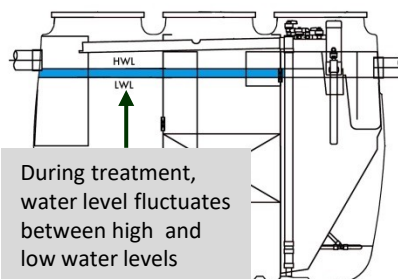
Overflow Effluent Weir

Flow Equalization
When water level exceeds LWL, treated water is discharged through Chamber 3B via the Effluent Air Lift pump. If water level exceeds HWL, then treated water is also discharged through an overflow effluent weir.

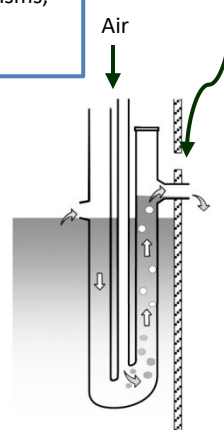


Airlift pump

Airlift Pumps. This generic illustration shows the mechanics of the "airlift pumps" used in this system, which are simple pipe conduits through which pressurized air (from blower) is introduced at the bottom and by fluid pressure, water is carried up the pipe by ascending bubbles.



During treatment, water level fluctuates between high and low water levels



November 17, 2018

Summit #18218

Jim Cummings
PO Box 957
Windham, ME 04062

Reference: Nitrate-Nitrogen Assessment
Cook Road Retirement Community
306 Gray Road, Windham, Maine (Tax Map 9 / Lot 5)

Dear Dustin:

Summit Geoengineering Services (SGS) performed this nitrate-nitrogen assessment to estimate the groundwater quality impact caused by the proposed subsurface wastewater disposal systems for the Cook Road Retirement Community. The proposed development consists of forty-six (46) two-bedroom retirement home units and a clubhouse on approximately 13-acres of forestland located on the west side of Gray Road in Windham, Maine. A site location map showing the site and vicinity is provided as Attachment 1.

Information used for this investigation includes a preliminary development site plan prepared by Terradyn Consultants, LLC, a preliminary septic system investigation report prepared by SGS, and published soil maps, geologic maps and literature.

Site Setting

The site is located on the west side of a north-south trend ridge that runs along Gray Road (Route 202) as shown on Figure 1 in Attachment 1. Site topography is for the most part internally draining with drainage off-site where wetland areas intersect the southern property boundary. Existing grade elevation contours show that the site includes areas within three watersheds. The approximate location of watershed divides is provided on Figure 2 in Attachment 1.

Review of Maine Geological Survey maps¹ indicate the surficial geology at the site and vicinity is mapped as glacial till with areas of exposed or shallow bedrock. No mapped significant sand and gravel aquifers are located within approximately 1 mile of the property. Glacial till consists of moderate compact, poorly sorted, weakly to non-stratified mixture of silt, sand, pebble, cobbles and boulders deposited by glacial ice, and is generally deposited directly on top of bedrock.

SGS observed soils on-site during field explorations for siting the proposed subsurface wastewater disposal fields. Soils at the proposed disposal field locations consist of fine sandy loam to gravelly sandy loam soils derived from ablation till or lodgment till. Depths to the seasonal high groundwater table ranged from at the ground surface in low lying wetland areas, to greater than 4 feet below the ground surface in the northeast portion of the property along Gray Road.

¹ <https://www.maine.gov/dacf/mgs/pubs/index.shtml>

Areas of shallow depth to bedrock soils occur throughout the property and are most prevalent on the western side of the property (along the woods road) and near the wetland areas in the central and southeastern areas of the property.

Water Supply

The proposed development will be served by public water via a Portland Water District water main on Gray Road (Route 202). Properties on Gray Road in the site vicinity are served by public water. Adjoining properties to the north and northwest on Cook Road are served by on-site wells.

Wells located within 200 feet of the site boundary were field located by SGS using tape measurements to nearby property boundary markers and are shown on plans prepared by Terradyn Consultants, LLC. The proposed disposal fields are located more than 200 feet from existing water supply wells.

Subsurface Wastewater Disposal Fields

The proposed development will be served by ten (10) subsurface wastewater disposal systems, as shown on Preliminary Septic System Investigation prepared by SGS and dated November 17, 2018 (Attachment 2). Design information for the proposed subsurface wastewater disposal systems is summarized in the table below.

Subsurface Wastewater Disposal Systems

System Designation	Units Served	Design Flow (GPD)	Subsurface Wastewater Disposal System Description
A	1 and 2	360	Eljen Geotextile Sand Filter (GSF) Disposal Field
B	3 thru 6	720	ADS High-Capacity Plastic Chamber Disposal Field Fuji Clean CE10 Advanced Treatment System ²
C	7 thru 10	720	ADS High-Capacity Plastic Chamber Disposal Field Fuji Clean CE10 Advanced Treatment System ²
D	11 and 12	360	ADS High-Capacity Plastic Chamber Disposal Field
E	13 and 14	360	ADS High-Capacity Plastic Chamber Disposal Field
F	15 thru 25	1,980	ADS High Capacity Plastic Chambers Disposal Field Fuji Clean CEN7 Advanced Treatment System ³ (units 23-25)
G	31 thru 36 + clubhouse	1,180	Concrete Chambers Disposal Field Fuji Clean CEN-series Advanced Treatment System ³ (units 31-36)
H	26 thru 30	900	Two (2) Stone Beds Fuji Clean CEN-series Advanced Treatment System ³
I	37 thru 40	720	Eljen Geotextile Sand Filter (GSF) Disposal Field
J	41 thru 46	1,080	Eljen Geotextile Sand Filter (GSF) Disposal Field

Notes:

1. GPD = gallons per day; mg-N/L = milligrams nitrogen per liter
2. Fuji Clean CE-series units treat septic tank effluent to 20 mg-N/L total nitrogen
3. Fuji Clean CEN-series units treat septic tank effluent to 10 mg-N/L total nitrogen

Nitrate-Nitrogen Assessment

A nitrate-nitrogen assessment was performed to estimate the distance from the disposal fields at which the concentration in groundwater would reach the Federal National Primary Drinking Water Standard and the Maine Maximum Exposure Guideline of 10 milligrams nitrogen per liter (mg-N/L). The average concentration of nitrate in septic tank effluent and discharged from the disposal field used in this assessment is 40 mg-N/L.² The concentration of nitrate-nitrogen in treated effluent discharged from the disposal fields that are connect to Fuji Clean CEN-series and CE-series advanced treatment systems are 10 mg-N/L and 20 mg-N/L, respectively (documentation is provided in Attachment 2).

The concentration of nitrate-nitrogen in groundwater downgradient of the disposal fields will reduce as it flows away from the disposal field and mixes with groundwater, is removed by vegetation, or is converted to nitrogen gas by soil microbes in wetland areas (denitrification).

Based on our understanding of site geology, treated septic tank effluent will drain to the disposal field and infiltrate downward through unsaturated soil until a seasonally perched water table above the bedrock surface and/or a hydraulically restrictive hard pan is encountered. Thereupon flow is lateral and hydraulically downgradient. The direction of shallow groundwater flow for the subsurface conditions observed at this site is downhill (topographically downgradient) and toward the wetland areas located at the bottom of each watershed.

The capacity of wetlands³ to remove nitrogen from shallow groundwater through plant uptake and microbial activity is significant. Research into the capacity of planted and unplanted wetlands to remove nitrogen at concentration similar to those in treated septic system effluent show nitrogen removal rates in excess of 95% for planted wetlands and removal rates of 25% to 36% in unplanted (natural) wetlands. Using the 25% nitrate removal rate in Lin et. al. (2002)⁴ a wetland area nitrate removal rate of 0.0825 grams per square meter is calculated.

The capacity of the wetlands in each of the site watersheds was evaluated in concert with the design and of the proposed subsurface wastewater disposal fields and layout. Advance treatment units (Fuji Clean CE-series or CEN-series units) were selected to balance the mass of nitrogen in treated effluent discharged to disposal fields within a watershed to the nitrogen removal capacity of the on-site wetlands within each watershed. As a conservative assumption, no dilution of shallow groundwater by the infiltration of precipitation is considered in our assessment.

Based on our calculations, there are sufficient wetland areas in each watershed to reduce the concentration of nitrate-nitrogen in shallow groundwater to a concentration less than 10 mg-N/L at the property boundary. Calculations are provided in Attachment 3 and summarized in the table below.

² MEDEP, Site Location of Development Permit Application (October 2015) Section 17.B.2.(a).

³ US EPA (2005), Riparian Buffer Width, Vegetative Cover, and Nitrogen Removal Effectiveness: A review of Current Science and Regulations. EPA/600/R-05/118.

⁴ Lin, et. al. (2002), Effects of macrophytes and external carbon sources on nitrate removal from groundwater in constructed wetlands. Environmental Pollution, v. 119, pp. 413-420.

Nitrate-Nitrogen Assessment Summary

Watershed	Disposal Fields in Watershed	Total Nitrogen in Effluent Loading to Watershed ¹	Area of Wetland Along Flow Pathway ²	Concentration of Nitrate-Nitrogen in Groundwater at the Property Boundary
1	D, E, F, G, H, I and J	492 grams	5,969 square meters	8.7 mg-N/L
2	A, B and C	121 grams	1,469 square meters	6.2 mg-N/L

Notes

1. Total nitrogen in effluent discharged to disposal fields in each watershed is estimated based on the concentration of nitrate-nitrogen (total nitrogen) in effluent (10, 20, or 40 mg-N/L) and the design flow of each individual use. Calculations provided in Attachment C.
2. The area of the wetland located along the flow path through the wetland is less than the total area of the wetland. Fringe wetland areas not directly downgradient of a disposal field and the wetland fill area for the proposed roadway were excluded from this calculation.

Conclusion:

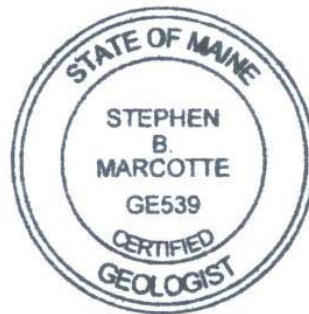
The subsurface wastewater disposal systems serving the proposed Cook Road Retirement Community will not result in an increase of nitrate-nitrogen above 10 mg/L in groundwater at the property boundary.

Our findings are based on our interpretation of site conditions and the information provided to us. If there are changes in development layout, or proposed septic system location and advanced treatment system, we request the opportunity to review the changes and conduct further analysis as necessary to confirm the changes do not alter our conclusions.

Sincerely yours,
Summit Geoengineering Services



Stephen B. Marcotte, C.G., L.S.E.
Senior Geologist



Enclosures

Attachment 1

Figures

PLAN REFERENCE

USGS TOPOGRAPHIC MAP FOR NORTH
WINDHAM, MAINE 15-MINUTE QUADRANGLE

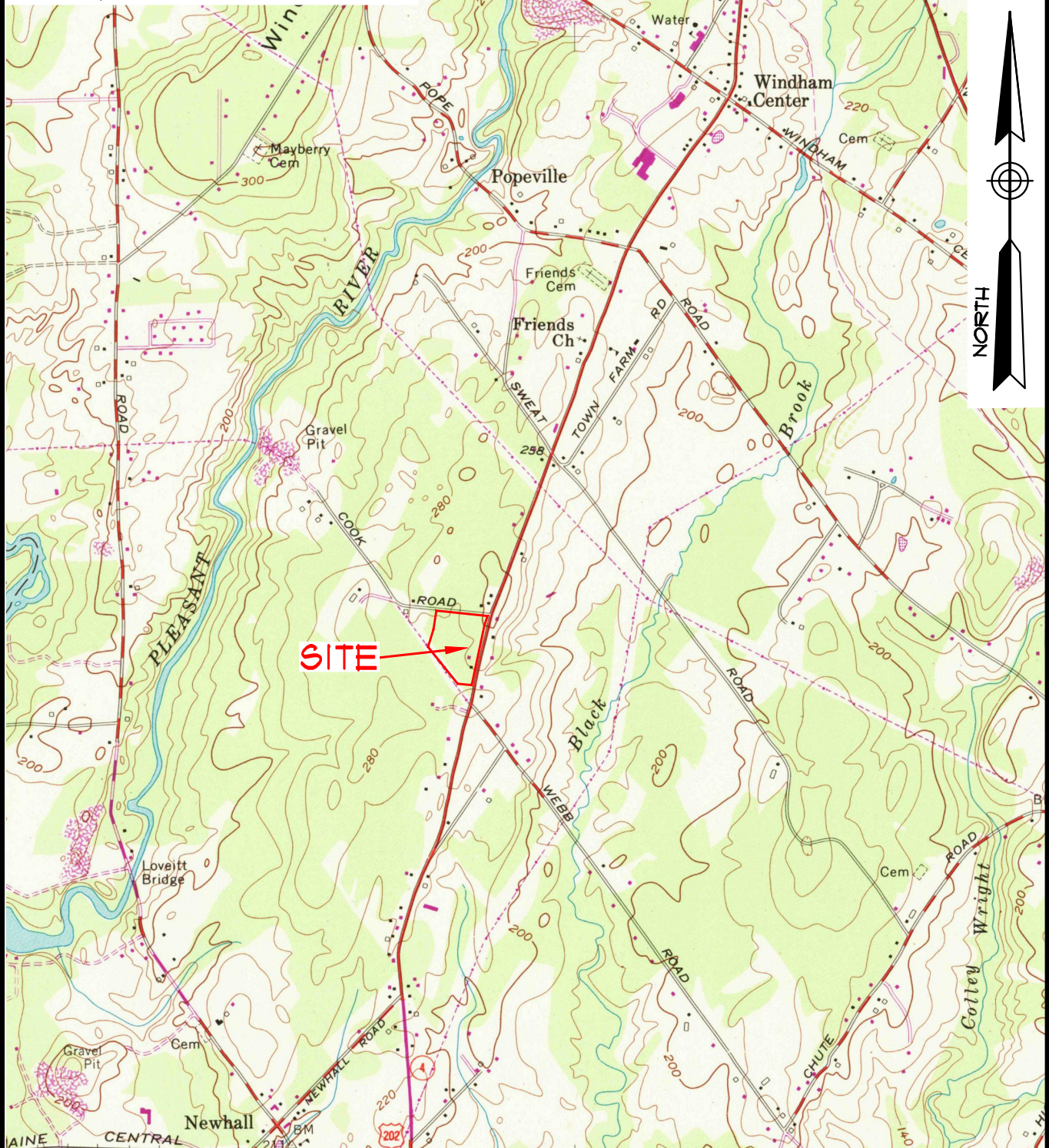


FIGURE 1: SITE LOCATION PLAN COOK ROAD RETIREMENT COMMUNITY

GRAY ROAD - WINDHAM, ME
PREPARED FOR
JAMES CUMMINGS

DATE: 11-17-2018	DRAWN BY: SBM	CHECKED BY: SBM
JOB: 18218	SCALE: 1" = 2000'	FILE: 18218 MAP

145 LISBON ST. - SUITE 101
LEWISTON, ME 04240
Tel.: (207) 576-3313

173 PLEASANT STREET
ROCKLAND, ME 04841
Tel.: (207) 318-7761

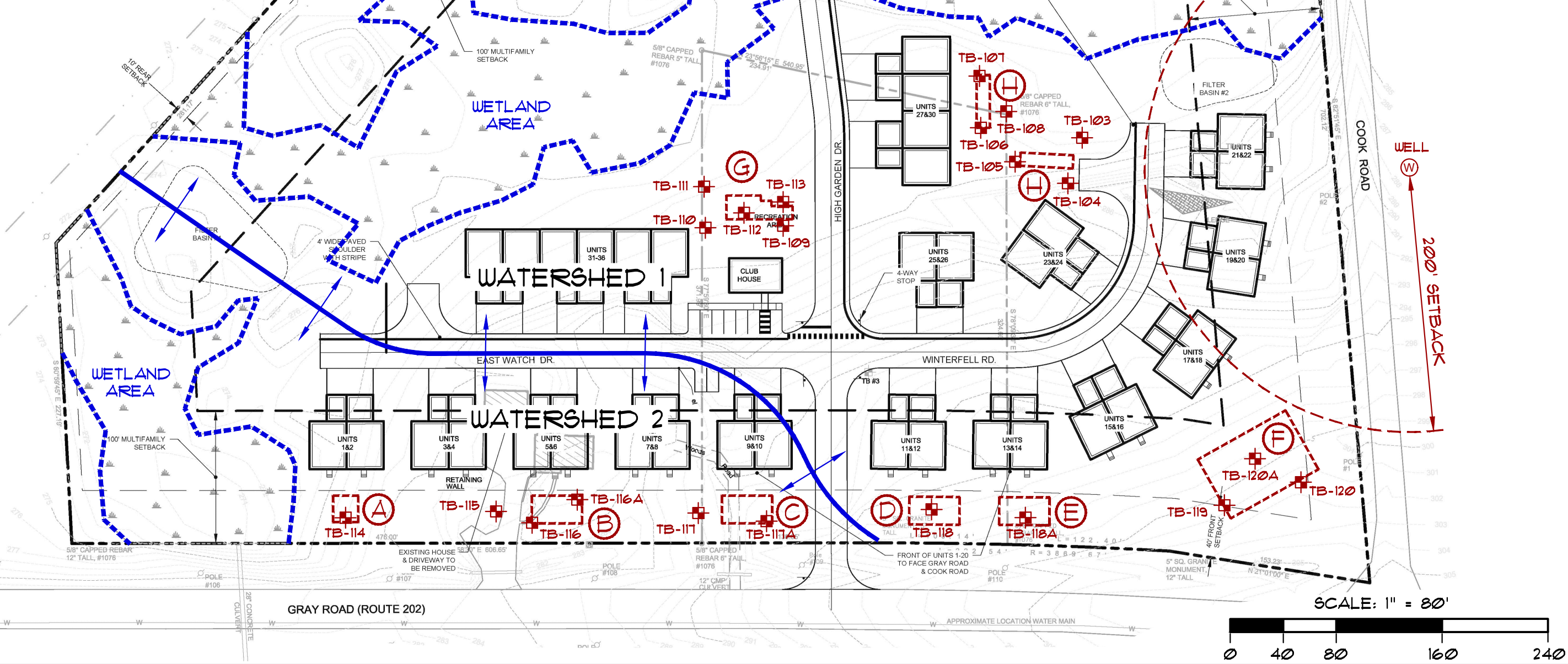
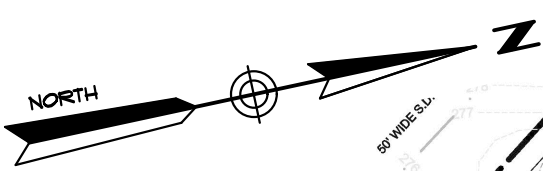
SUMMIT
GEOENGINEERING SERVICES
www.summitgeoeng.com

PLAN REFERENCE

"COOK ROAD RETIREMENT COMMUNITY, 306 GRAY ROAD, SKETCH PLAN", DATED OCTOBER 25, 2018, PREPARED BY TERRADYN CONSULTANTS, LLC.

LEGEND

- ✚ TB-121 SUMMIT TEST BORING (BY HAND AUGER)
- Ⓜ SEPTIC SYSTEM AREA AND DESIGNATION LABEL
- - - - - EDGE OF WETLAND
- WATERSHED DIVIDE



PROJECT: COOK ROAD RETIREMENT COMMUNITY 306 GRAY ROAD - WINDHAM, ME	CLIENT: JIM CUMMINGS	TITLE: NITRATE-NITROGEN ASSESSMENT SITE PLAN	SCALE: 1" = 80'	DATE: NOVEMBER 17, 2018	DRAWN BY: KRF	APPR BY: SBM
PROJ.#: 18218		FIGURE: 2		SUMMIT GEOENGINEERING SERVICES		145 LISBON ST. - SUITE 101 LEWISTON, ME 04240 Tel: (207) 576-3313

Attachment 2

Preliminary Septic System Investigation Report

November 17, 2018
Summit #18218

Jim Cummings
PO Box 957
Windham, ME 04062

Reference: Preliminary Septic System Investigation
Cook Road Retirement Community
306 Gray Road, Windham, Maine (Tax Map 9 / Lot 5)

Dear Mr. Cummings:

Summit Geoengineering Services (SGS) completed a Preliminary Septic System Investigation at the above referenced 13-acre property in November 2018. The purpose of the investigation was to evaluate soils and site conditions for septic system suitability in accordance with the State of Maine Subsurface Wastewater Disposal Rules (August 3, 2015) for first-time systems.

Information used for this investigation includes a preliminary development site plan prepared by Terradyn Consultants, LLC that incorporates a standard boundary survey and topographic survey completed by Wayne Wood & Company.

Proposed Development

The proposed Cook Road Retirement Community consists of forty-six (46) two-bedroom units and a clubhouse. The proposed development will be served by public water via a Portland Water District (PWD) water main from Gray Road, and on-site subsurface wastewater disposal systems.

Water Supply Well Survey

SGS contact the PWD customer services center and verified that all properties within 200 feet of the site along Gray Road are served by public water. It is therefore assumed that no potable drinking water wells are in use at properties on Gray Road within 200 feet of the site property boundary.

The three homes on Cook Road in the vicinity of the site are served by drilled bedrock wells. The drilled wells for 7 Cook Road and 12 Cook Road are located within 200 feet of the property boundary and were approximately located using tape measurements to property pins or utility poles shown on the Terradyn Consultants, LLC site plan. The drilled well serving 17 Cook Road is located more than 200 feet from the property boundary.

Soil Profile and Drainage Conditions

SGS completed a thorough survey of soils on the property with a hand shovel, hand auger and/or tile probe. Soil test locations were located using tape measurements to surveyed site features, and grade stakes laid out by Wayne Wood and Company at select building location corners, and along the proposed road center lines. The twenty-seven (27) soil test pit or boring locations are shown on the site plan included as Attachment 1. Soil test pit / boring logs are provided in Attachment 2.

Soil at the tested locations consisted of fine sandy loam to a gravelly sandy loam soils derived from ablation or lodgment till. Depths to the seasonal high groundwater table ranged from at the ground surface in low lying wetland areas, to greater than 4 feet below the ground surface in the northeast portion of the property along Gray Road.

Areas of shallow depth to bedrock soils occur throughout the property and are most prevalent on the western side of the property (along the woods road) and near the wetland areas in the central and southeastern areas of the property.

Soil at proposed disposal field locations are classified as soil profile 2 and 3. The stone bed square foot equivalent loading rate for soils is medium-large (3.3 square foot per gallon per day).

Proposed Subsurface Wastewater Disposal Fields

SGS selected ten (10) locations on the property for subsurface wastewater disposal fields. The disposal field locations were arranged such that the footprints are on soils meeting first-time system criteria, and applicable setbacks are met for property lines, proposed building foundations, proposed on-site stormwater treatment structures, off-site ditches along Gray Road, and off-site water supply wells on Cook Road. It is assumed that all buildings will have full foundations.

The proposed disposal field locations and system designations (A through J) are shown on the site plan provided in Attachment 1. Disposal field design flows range from 360 gallons per day (GPD) to 1,980 GPD. Where necessary, Fuji Clean CE-series and CEN-series advanced treatment systems are proposed to allow for a reduction in disposal field area size and for treatment of nitrogen to meet nitrate-nitrogen concentration requirements¹ in groundwater at the property boundary. Fuji Clean CE-series and CEN-series models allow for 50% and 75% reduction in disposal field size, respectively (documentation provided in Attachment 3).

At each disposal field location, the limits of fill extensions were estimated using soils information and existing grade topographic contours. Based on our analysis, the fill extensions will be wholly located on the property and minor wetland filling for disposal field fill extension will be required at one proposed disposal field location (Disposal Field I at TB-101/TB-102).

The ten (10) subsurface wastewater disposal systems proposed, dwelling units served and design flows are summarized in the table below.

¹ A groundwater nitrate-nitrogen assessment was prepared by SGS and is presented under separate cover.

Proposed Subsurface Wastewater Disposal Systems

System Designation	Units Served (No. 2-bedroom units served)	Design Flow (GPD)	Proposed Leachfield / Treatment Tanks
A	1 & 2 (2)	360	20 ft x 19 ft – Eljen Geotextile Sand Filter (GSF) 1,000-gallon septic tank
B	3,4,5,6 (4)	720 ¹	21 ft x 38 ft - ADS High Capacity BioDiffuser Plastic Chambers 1,500-gallon septic tank Fuji Clean CE10 (serves 4 units)
C	7,8,9,10 (4)	720 ¹	21 ft x 38 ft - ADS High Capacity BioDiffuser Plastic Chambers 1,500-gallon septic tank Fuji Clean CE10 (serves 4 units)
D	11 & 12 (2)	360	21 ft x 38 ft - ADS High Capacity BioDiffuser Plastic Chambers 1,000-gallon septic tank
E	13 & 14 (2)	360	21 ft x 38 ft - ADS High Capacity BioDiffuser Plastic Chambers 1,000-gallon septic tank
F	15 – 22 (8) 23 – 25 (3)	1,440 540 ²	51 ft x 76 ft - ADS High Capacity BioDiffuser Plastic Chambers (2) – 2,000-gallon septic tanks (1) – 1,500-gallon septic tank (serves units 23, 24 and 25) Fuji Clean CEN7 (serves units 23, 24 and 25)
G	31 – 36 (6) + clubhouse	1,080 ² 100 ³	(19) 4 ft x 8 ft Concrete Chambers w/ 6" stone below and 12" stone around perimeter (non-rectangular) (1) – 1,500-gallon septic tanks (2) – 1,000-gallon septic tank Fuji Clean CEN10 (serves 4 units) Fuji Clean CEN5 (serves 2 units) Clubhouse treated with 1,000-gallon septic tank only
H	26-30 (5)	900 ²	Two (2) 10 ft x 40 ft Stone Beds 1,500-gallon septic tank Fuji Clean CEN14 (serves 5 units)
I	37-40 (4)	720	11 ft x 68 ft – Eljen Geotextile Sand Filter (GSF) 2,000-gallon septic tank
J	41-46 (6)	1,080	19 ft x 60 ft – Eljen Geotextile Sand Filter (GSF) 2,000-gallon septic tank 1,000-gallon septic tank

Note:

1. Fuji Clean CE-series units allow for 50% disposal field size reduction. Effluent total nitrogen equal to 20 mg-N/L.
2. Fuji Clean CEN-series units allow for 75% disposal field size reduction. Effluent total nitrogen is equal to 10 mg-N/L.
3. The clubhouse is assumed to be an assembly area (meeting hall) with 50 persons (patrons) during an average day. The design flow is calculated as follows: 2 GPD/person x 50 persons = 100 GPD.

CONCLUSIONS

The proposed subsurface wastewater disposal systems for the Cook Road Retirement Community meet the State of Maine Subsurface Wastewater Disposal Rules (August 3, 2015) criteria for first-time systems.

Note that a complete HHE-200 application for each proposed subsurface wastewater disposal system must be prepared by a Licensed Site Evaluator and approved by the Local Plumbing Inspector prior to installation.

If you have any questions concerning this letter, please feel free to contact me.

Sincerely yours,
Summit Geoengineering Services



Stephen B. Marcotte, C.G., L.S.E.
Maine Licensed Site Evaluator #387



enclosures

Attachment 1

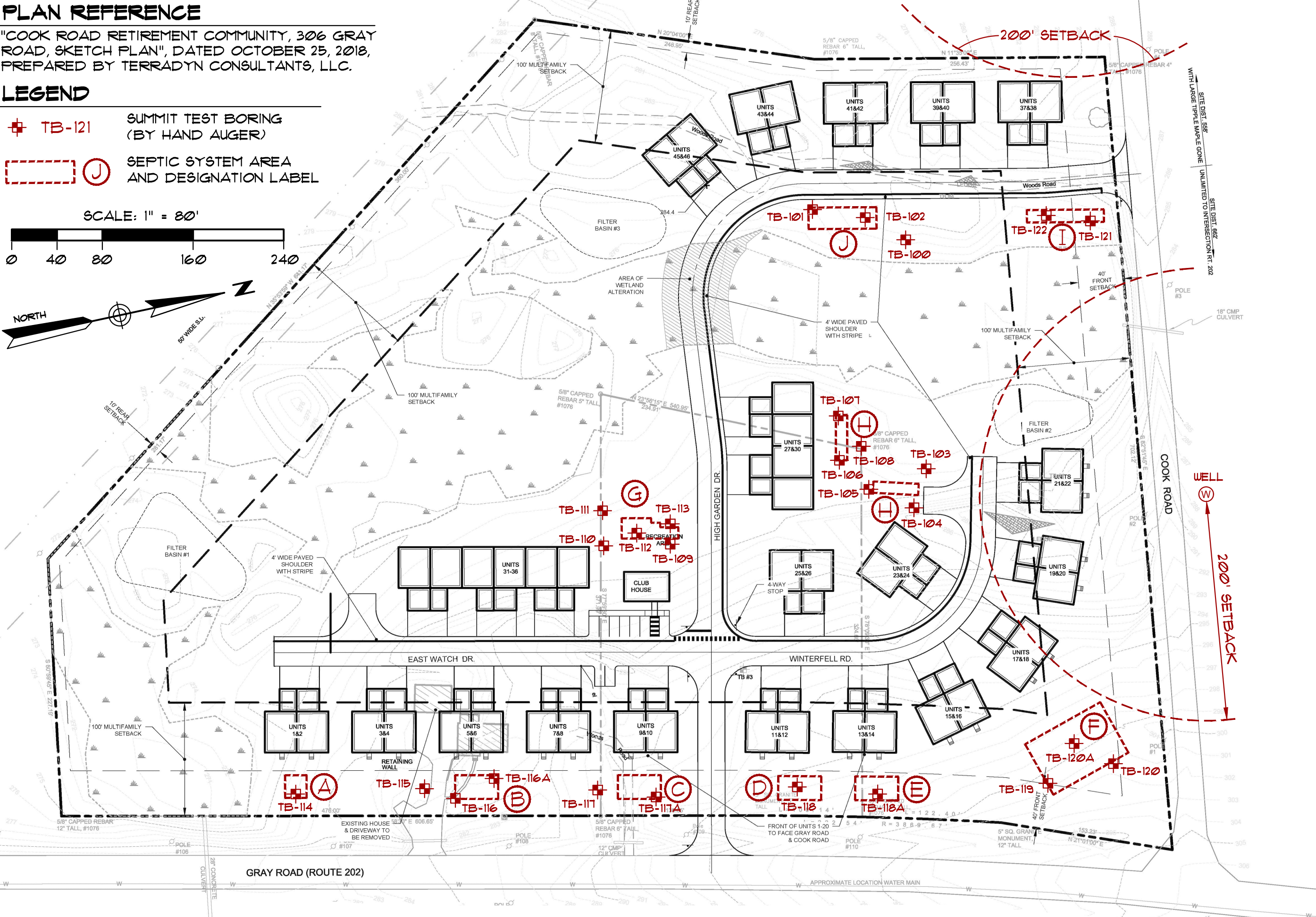
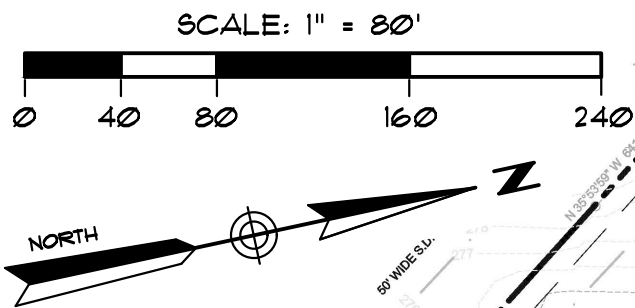
Septic System Location Plan

PLAN REFERENCE

"COOK ROAD RETIREMENT COMMUNITY, 306 GRAY ROAD, SKETCH PLAN", DATED OCTOBER 25, 2018, PREPARED BY TERRADYN CONSULTANTS, LLC.

LEGEND

- TB-121 SUMMIT TEST BORING (BY HAND AUGER)
- SEPTIC SYSTEM AREA AND DESIGNATION LABEL



PROJECT: COOK ROAD RETIREMENT COMMUNITY 306 GRAY ROAD - WINDHAM, ME		CLIENT: JIM CUMMINGS	
TITLE: SEPTIC SYSTEM LOCATION PLAN		DRAWN BY: KRF	APPR BY: SBM
SCALE: 1" = 80'		DATE: NOVEMBER 17, 2018	
145 LISBON ST. - SUITE 101 LEWISTON, ME 04240 Tel: (207) 576-3313		SUMMIT GEOENGINEERING SERVICES	
PROJ.#: 18218		FIGURE: 1	

Attachment 2

Soil Test Pit and Boring Logs

Observation Hole # TB-101 □ Test Pit ■ Boring


3 " Depth of organic horizon above mineral soil

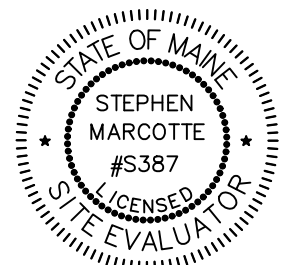
Texture	Consistency	Color	Mottling
Gravelly Fine Sandy Loam	Friable	Dark Brown	None Noted
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	None Noted
Bedrock at 18 to 24"			

Soil	Classification	Slope	Limiting Factor
<u>2</u> Profile	<u>All</u> Condition	<u>5%</u> Percent	<u>18 to 24"</u> Depth

□ Groundwater
□ Restrictive Layer
■ Bedrock

Observation Hole #	<u>TP-103</u>			■ Test Pit	□ Boring
<u>1</u> "	Depth of organic horizon above mineral soil				
Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	
			Dark Brown		
	Gravelly Fine Sandy Loam	Friable	Yellowish Brown		
			Olive Brown to Olive	Common & Distinct	
		Somewhat Firm			
		Bedrock at 28"			
Soil	Classification	Slope	Limiting Factor	■ Groundwater □ Restrictive Layer □ Bedrock	
<u>3</u> Profile	<u>C/AIII</u> Condition	<u>13%</u> Percent	<u>15"</u> Depth		

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: 	Date: 11/16/2018
Name Printed/typed: STEPHEN B. MARCOTTE	Cert/Lic/Reg.# <div style="border: 1px solid black; padding: 2px; display: inline-block;">387</div>
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	



SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF
SUBSURFACE CONDITIONS AT PROJECT SITESProject Name:
306 GRAY ROAD PROPERTYApplicant Name:
JIM CUMMINGSProject Location (municipality):
WINDHAM

Observation Hole # TB-104 ☐ Test Pit ☒ Boring

1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive Brown to Olive	Common & Distinct
	Somewhat Firm		
Bedrock at 28"			

Soil Classification Slope Limiting Factor ☒ Groundwater
2/3 C/AIII 12% 15" ☐ Restrictive Layer
 Profile Condition Percent Depth ☐ Bedrock

Observation Hole # TB-105 ☐ Test Pit ☒ Boring

1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive	Common & Distinct
Bedrock at 20"			

Soil Classification Slope Limiting Factor ☐ Groundwater
2 C/AIII 6% 20" ☐ Restrictive Layer
 Profile Condition Percent Depth ☒ Bedrock

Observation Hole # TB-106 ☐ Test Pit ☒ Boring

1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive	Common & Distinct
Bedrock at 24"			

Soil Classification Slope Limiting Factor ☐ Groundwater
2 C/AIII 6% 24" ☐ Restrictive Layer
 Profile Condition Percent Depth ☒ Bedrock

Observation Hole # TB-107 ☐ Test Pit ☒ Boring

1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
		Olive	Common & Distinct
Bedrock at 24"			

Soil Classification Slope Limiting Factor ☐ Groundwater
2 C/AIII 6% 24" ☐ Restrictive Layer
 Profile Condition Percent Depth ☒ Bedrock

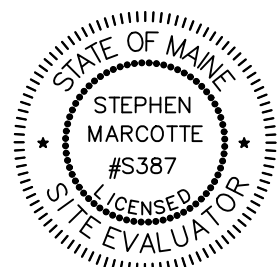
INVESTIGATOR INFORMATION AND SIGNATURE

Signature: 

Date: 11/16/2018

Name Printed/typed: STEPHEN B. MARCOTTE

Cert/Lic/Reg.# 387

Title: ☒ Licensed Site Evaluator
☐ Certified Geologist☐ Other:

SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF
SUBSURFACE CONDITIONS AT PROJECT SITESProject Name:
306 GRAY ROAD PROPERTYApplicant Name:
JIM CUMMINGSProject Location (municipality):
WINDHAM

Observation Hole # TB-108 ☐ Test Pit ☒ Boring
3 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Dark Yellowish Brown	
			Common & Distinct
	Firm	Olive	
Refusal w/ probe in Hardpan at 33"			

Soil Classification Slope Limiting Factor ☒ Groundwater
3 D 6% 10" ☐ Restrictive Layer
 Profile Condition Percent Depth ☐ Bedrock

Observation Hole # TB-109 ☐ Test Pit ☒ Boring
1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Brown	
Gravelly Fine Sandy Loam	Friable		None Noted
		Yellowish Brown	
Bedrock at 25"			

Soil Classification Slope Limiting Factor ☐ Groundwater
2 AIII 2% 25" ☐ Restrictive Layer
 Profile Condition Percent Depth ☒ Bedrock

Observation Hole # TB-110 ☐ Test Pit ☒ Boring
1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
		Dark Brown	
Gravelly Fine Sandy Loam	Friable	Yellowish Brown	
			Common & Distinct
	Firm	Olive/Gray	
Refusal with probe in hardpan at 42"			

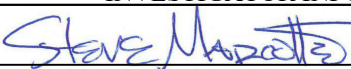
Soil Classification Slope Limiting Factor ☒ Groundwater
2 C/AIII 6% 24" ☐ Restrictive Layer
 Profile Condition Percent Depth ☐ Bedrock

Observation Hole # TB-111 ☐ Test Pit ☒ Boring
1 " Depth of organic horizon above mineral soil

Texture	Consistency	Color	Mottling
Gravelly Fine Sandy Loam		Dark Brown	
	Friable	Yellowish Brown	
Gravelly Sandy Loam to Loamy Sand		Olive Brown	Common & Distinct
	Dense		
Refusal with probe in possible bedrock 25"			

Soil Classification Slope Limiting Factor ☐ Groundwater
2 D/AIII 6% 25" ☐ Restrictive Layer
 Profile Condition Percent Depth ☒ Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE

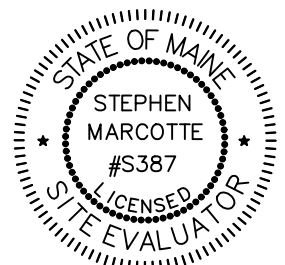
Signature: 

Date: 11/16/2018

Name Printed/typed: STEPHEN B. MARCOTTE

Cert/Lic/Reg.#

387

Title: ☒ Licensed Site Evaluator
☐ Certified Geologist☐ Other:

Observation Hole # TB-112 □ Test Pit ■ Boring

1 " Depth of organic horizon above mineral soil


Texture	Consistency	Color	Mottling
Gravelly Fine Sandy Loam	Friable	Dark Brown	
		Yellowish Brown	
		Olive Brown	Common & Distinct
Bedrock at 24"			

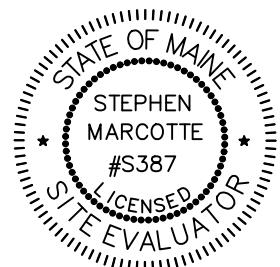
Soil Classification Slope Limiting Factor □ Groundwater
2 C/III 6% 24" □ Restrictive Layer
Profile Condition Percent Depth ■ Bedrock

Observation Hole #	<u>TB-113</u>			<input type="checkbox"/> Test Pit	<input checked="" type="checkbox"/> Boring
<u>1</u> "	Depth of organic horizon above mineral soil				
Depth below mineral surface (inches)	Texture	Consistency	Color	Mottling	
			Dark Brown		
	Gravelly Fine Sandy Loam	Friable	Yellowish Brown		
			Olive Brown	Common & Distinct	
		Bedrock at 24"			
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input checked="" type="checkbox"/> Bedrock	
<u>2</u> Profile	<u>C/AIII</u> Condition	<u>6%</u> Percent	<u>24"</u> Depth		

Observation Hole # <u>TB-114</u>		<input type="checkbox"/> Test Pit	<input checked="" type="checkbox"/> Boring	
<u>1</u>	Depth of organic horizon above mineral soil			
Depth below mineral soil surface (inches)	Texture	Consistency	Color	
	0			
	6		Dark Brown	
	12	Friable	Yellowish Brown	
	18			
	24	Gravelly Fine Sandy Loam	Olive Brown	Common & Distinct
	30			
	36	Refusal with probe on hardpan or possible bedrock at 32"		
	42			
	48			
Soil	Classification	Slope	Limiting Factor	
<u>2/3</u>	<u>C/AIII</u>	<u>10%</u>	<u>18"</u>	
Profile	Condition	Percent	Depth	

Observation Hole #		<u>TB-115</u>		<input type="checkbox"/> Test Pit	<input checked="" type="checkbox"/> Boring
<u>0"</u> (lawn)		Depth of organic horizon above mineral soil			
Texture	Consistency	Color		Mottling	
		Brown			
Gravelly Fine Sandy Loam	Friable	Yellowish Brown		None Noted	
Refusal with auger at 32"					
Refusal with probe in hardpan or possible bedrock at 38"					
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input checked="" type="checkbox"/> Bedrock	
<u>2/3</u> Profile	<u>AIII</u> Condition	<u>7%</u> Percent	<u>>=32"</u> Depth		

INVESTIGATOR INFORMATION AND SIGNATURE		
Signature:		Date: 11/16/2018
Name Printed/typed:	STEPHEN B. MARCOTTE	Cert/Lic/Reg.# <div style="border: 1px solid black; padding: 2px; display: inline-block;">387</div>
Title:	<input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist <div style="margin-left: 100px;"><input type="checkbox"/> Other:</div>	



SOIL PROFILE / CLASSIFICATION INFORMATION

DETAILED DESCRIPTION OF
SUBSURFACE CONDITIONS AT PROJECT SITESProject Name:
306 GRAY ROAD PROPERTYApplicant Name:
JIM CUMMINGSProject Location (municipality):
WINDHAM

Observation Hole # TB-116 ☐ Test Pit ☒ Boring

0" (lawn) " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0			Brown	
6				
12				
18	Gravelly Fine Sandy Loam	Friable	Yellowish Brown	None Noted
24				
30				
36				
42	Refusal with auger at 30"			
48	Refusal with probe in hardpan or possible bedrock at 41"			
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>2/3</u> Profile	<u>A/III</u> Condition	<u>5%</u> Percent	<u>>=30"</u> Depth	<input checked="" type="checkbox"/> Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock

Observation Hole # TB-116A ☐ Test Pit ☒ Boring

0" (lawn) " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0				
6	Gravelly Fine Sandy Loam (Fill around home)	Friable	Brown to Olive	Relic Mottling Noted
12				
18			Brown	
24	Gravelly Sandy Loam	Friable	Yellow Brown	None Noted
30				
36				
42	Refusal with auger at 32"			
48	No Refusal with probe to 48"			
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>2</u> Profile	<u>C/B</u> Condition	<u>5%</u> Percent	<u>>=32"</u> Depth	<input type="checkbox"/> Restrictive Layer
				<input type="checkbox"/> Bedrock

Observation Hole # TB-117 ☐ Test Pit ☒ Boring

0 " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0			Brown	
6				
12	Gravelly Fine Sandy Loam	Friable		None Noted
18			Yellowish Brown	
24				
30				
36				
42	Refusal with auger at 24"			
48	Refusal with probe on assumed bedrock at 36"			
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>2</u> Profile	<u>C/AIII</u> Condition	<u>5%</u> Percent	<u>>=24"</u> Depth	<input checked="" type="checkbox"/> Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock

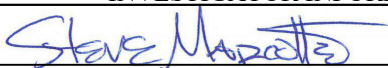
Observation Hole # TB-117A ☐ Test Pit ☒ Boring

0 " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0			Brown	
6				
12	Gravelly Fine Sandy Loam	Friable	Yellowish Brown	None Noted
18				
24				
30				
36	Refusal with auger at 18"			
42	Refusal in hard pan at 28"			
48	Small borrow area into hardpan is downslope			
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>3</u> Profile	<u>C</u> Condition	<u>5%</u> Percent	<u>>=18"</u> Depth	<input checked="" type="checkbox"/> Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE

Signature:



Date:

11/16/2018

Name Printed/typed:

STEPHEN B. MARCOTTE

Cert/Lic/Reg.#

387

Title:

☒ Licensed Site Evaluator☐ Certified Geologist☐ Other:

Observation Hole # TB-118A □ Test Pit ■ Boring

1 " Depth of organic horizon above mineral soil


Texture	Consistency	Color	Mottling
		Brown	
Sandy Loam	Friable	Yellowish Brown	None Noted

Refusal with probe on possible bedrock at 18" to 24" in area of proposed disposal field

Soil	Classification	Slope	Limiting Factor
<u>2</u> Profile	<u>All</u> Condition	<u>5%</u> Percent	<u>18-24"</u> Depth

□ Groundwater
□ Restrictive Layer
■ Bedrock

Observation Hole # <u>TB-120</u>		<input type="checkbox"/> Test Pit	<input checked="" type="checkbox"/> Boring
<u>1</u>	Depth of organic horizon above mineral soil		
Depth below mineral soil surface (inches)	Texture	Consistency	Color
			Brown
	Fine Sandy Loam	Friable	
			Yellowish Brown
			None Noted
	Refusal with auger at 24"		
	Refusal with probe on bedrock at 32"		
Soil	Classification	Slope	Limiting Factor
<u>2</u>	<u>AIII</u>	<u>7%</u>	<u>32"</u>
Profile	Condition	Percent	Depth
			<input type="checkbox"/> Groundwater
			<input type="checkbox"/> Restrictive Layer
			<input checked="" type="checkbox"/> Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: 	Date: 11/16/2018
Name Printed/typed: STEPHEN B. MARCOTTE	Cert/Lic/Reg.# <div style="border: 1px solid black; padding: 2px; display: inline-block;">387</div>
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	


Observation Hole #						TB-121	<input type="checkbox"/> Test Pit	<input checked="" type="checkbox"/> Boring
<u> 1 </u> " Depth of organic horizon above mineral soil								
	Texture		Consistency		Color		Mottling	
0					Dark Brown			
6								
12	Gravelly Fine Sandy Loam		Friable		Yellowish Brown			
18					Olive Brown		Common & Distinct	
24								
30								
36	Refusal with auger at 20"							
42	Refusal with probe on bedrock at 29"							
48								
Soil		Classification		Slope	Limiting Factor		<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock	
<u>2</u>		<u>D/AIII</u>		<u>6%</u>	<u>12"</u>			
Profile		Condition		Percent	Depth			

Observation Hole # _____ ☐ Test Pit ☐ Boring

_____ " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
	0			
6				
12				
18				
24				
30				
36				
42				
48				

Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater
<u>Profile</u>	<u>Condition</u>	<u>Percent</u>	<u>Depth</u>	<input type="checkbox"/> Restrictive Layer
				<input type="checkbox"/> Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE		
Signature:		Date: 11/16/2018
Name Printed/typed:	STEPHEN B. MARCOTTE	Cert/Lic/Reg.# <div style="border: 1px solid black; padding: 2px; display: inline-block;">387</div>
Title:	<input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist <div style="margin-left: 100px;"><input type="checkbox"/> Other:</div>	

Attachment 3

Fuji Clean Advanced Treatment System Information



Paul R. LePage, Governor
Tel. (207) 287-2070

Mary C. Mayhew, Commissioner

Department of Health and Human Services
Maine Center for Disease Control and Prevention
286 Water Street
11 State House Station
Augusta, Maine 04333-0011
Tel. (207) 287-8016
Fax (207) 287-9058; TTY (800) 606-0215
Fax (207) 287-4172

October 12, 2016

Fuji Clean, LLC
Attn.: Bennette D. Burkes, P.E.
1518 Willow Lawn Drive, Suite 300
Hnerico, VA 23230

Subject: Modified Approval for General Use, Fuji Clean System, CE and CEN Series

Dear Mr. Burkes:

The Division of Environmental and Community Health has reviewed your proposal for reductions in disposal field sizing and reduced separation form limiting factors for systems which incorporate the Fuji Clean System, CE and CEN Series (Fuji Clean) wastewater treatment systems. This request is predicated upon the ability of the Fuji Clean system to produce BOD5 and TSS levels below 10 mg/l, each.

The Division approves the request for reduced disposal field area and reduced separation distances as follows:

1. A minimum separation distance of 12 inches shall be maintained between the seasonal high groundwater table and the lowest elevation of the system's disposal field;
2. A minimum separation distance of 12 inches shall be maintained between bedrock and the lowest elevation of the system's disposal field;
3. Stone beds and trenches are allowed a 75 percent reduction in size, based upon the standard sizing requirements of the Rules;
4. Proprietary devices such as but not limited to plastic chambers and gravel-less pipe trenches are allowed a 50 percent reduction in size based upon the standard sizing requirements of the Rules, absent prohibitions by manufacturers;
5. Eljen GSF units may be used with Fuji Clean systems, but with no reduction in size; and
6. Maintenance agreement contracts must be included with all system installations. Terms and duration of the contracts shall be in accordance with Fuji Clean's company policies.

Because installation and maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of this system. Further, the Division strongly recommends that property owners enter into long term maintenance contracts with Fuji Clean, in accordance with Fuji Clean's company policies.

Should you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in blue ink that reads "James A. Jacobsen". The signature is fluid and cursive, with a long horizontal stroke at the end.

James A. Jacobsen
Project Manager, Webmaster
Division of Environmental Health
Drinking Water Program
Engineering Review Team
e-mail: james.jacobsen@maine.gov

/jaj

xc: File



Department of Health
and Human Services
Maine People Living
Safe, Healthy and Productive Lives

Paul R. LePage, Governor

Ricker Hamilton, Commissioner

Tel. (207) 287-2070

Drinking Water Program

Department of Health and Human Services
Maine Center for Disease Control and Prevention
286 Water Street
11 State House Station
Augusta, Maine 04333-0011
Tel.: (207) 287-8016; Fax: (207) 287-9058
TTY Users: Dial 711 (Maine Relay)
Fax (207) 287-4172

April 9, 2018

Fuji Clean USA, LLC

Attn.: Scott Samuelson, Managing Director

41-2 Greenwood Road

Brunswick, ME 04011

Subject: Disposal Field Size Reduction, Fuji Clean Models CEN5, CEN7, CEN10, and CEN21

Dear Mr. Samuelson:

The Division of Environmental and Community Health has reviewed your proposal for 75 percent reductions in disposal field sizing compared to the standard sizing requirements in the Maine Subsurface Wastewater Disposal Rules for systems which incorporate Fuji Clean Models CEN5, CEN7, CEN10, and CEN21 wastewater treatment systems. This request is predicated upon the ability of the Fuji Clean system to produce BOD5 and TSS levels below 10 mg/l, each as verified in the NSF report dated April 2015.

The Division approves the request for reduced disposal field area and reduced separation distances as follows:

1. A minimum separation distance of 12 inches shall be maintained between the seasonal high groundwater table and the lowest elevation of the system's disposal field;
2. A minimum separation distance of 12 inches shall be maintained between bedrock and the lowest elevation of the system's disposal field;
3. Stone beds and trenches are allowed a 75 percent reduction in size, based upon the standard sizing requirements of the Rules;
4. Proprietary devices such as but not limited to plastic chambers and gravel-less pipe trenches are allowed a 75 percent reduction in size based upon the standard sizing requirements of the Rules, absent prohibitions by manufacturers; and
5. Maintenance agreement contracts must be included with all system installations. Terms and duration of the contracts shall be in accordance with Fuji Clean's company policies.

This letter supersedes the letter dated October 12, 2016.

Because installation and maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of this system.

Should you have any questions, please feel free to contact me at (207) 287-5695, or by fax at (207) 287-4172.

Sincerely,

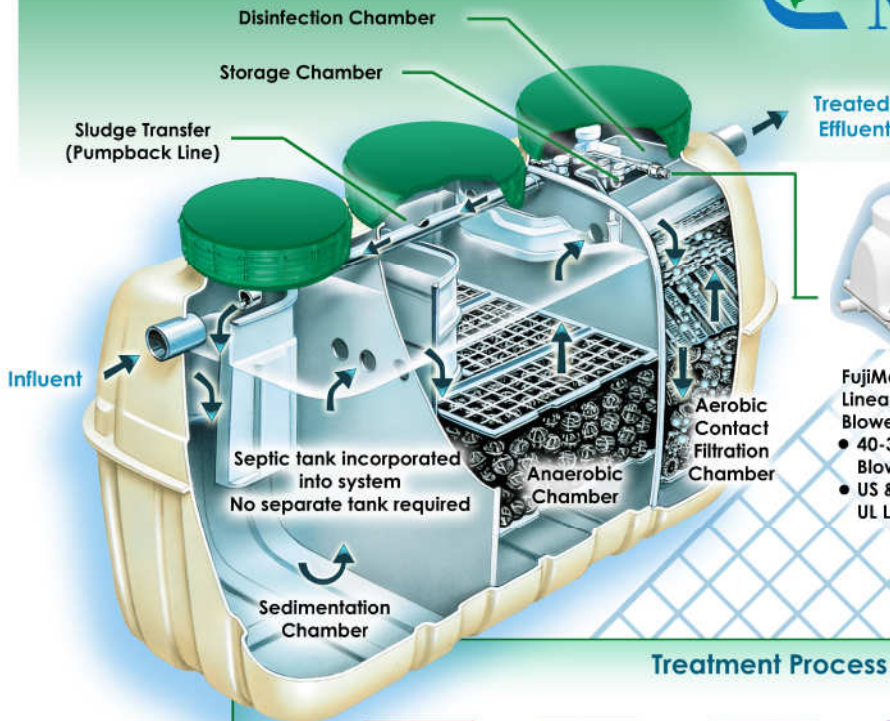


James A. Jacobsen, Environmental Specialist IV
Division of Environmental and Community Health
Drinking Water Program
Engineering Review Team
286 Water Street, Augusta, ME 04333
e-mail: james.jacobsen@maine.gov

xc: File

/jaj

MODEL CE & CEN SERIES *Technical Specification Sheet*



**FujiMac RII
Linear Diaphragm
Blower**

- 40-300L/min Blower Options
- US & CAN UL Listed

Fuji Clean Advantages

- Over 2 million installed systems worldwide
- 1-tank system – no septic tank necessary
- No moving parts in tank
- Built-in equalization - levels variable inflow
- NSF 40 and 40/245 certified
- TN removal to 70+% with CEN models
- Phosphorous reduction technology
- Smallest footprint vs. competitors
- Lowest power use vs. competitors
- Lightweight tank - easy installation
- Quick and easy O&M - no mess
- Rapid startup and restart for seasonal homes

Treatment Process

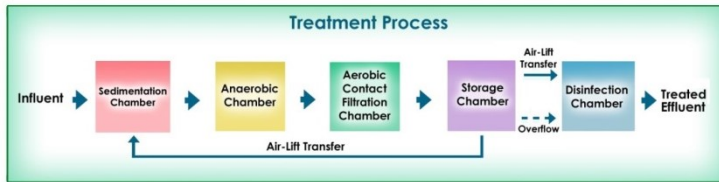


Design Specification Table	CE Series BOD, TSS, TN							CEN Series BOD, TSS, Enhanced TN			
MODEL:	CE5	CE7	CE10	CE14	CE21	CE30	CE6KG	CEN5	CEN7	CEN10	CEN21
Load Hydraulic (GPD)	360	540	720	1,000	1,900	2,700	6,000	360	540	720	1,900
EFFLUENT (assumes domestic strength influent):											
BOD – Effluent (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
BOD (removal pounds/day)	.52	.73	1.04	1.46	2.08	3.12	6.93	.69	.97	1.38	2.9
TSS (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
TN (mg/L)	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10	10	10	10
BLOWER DETAIL:											
Blower Model	MAC80R	MAC80R	MAC100R	MAC100R	MAC150R	MAC200R	MAC200R (3)	MAC80R	MAC100R	MAC100R	MAC200R
Normal Pressure (kPa)	15	15	18	18	20	20	20	15	18	18	20
Airflow Volume (CFM; L/Min.)	2.8 CFM 80 L/MIN	2.8 CFM 80 L/MIN	3.5 CFM 100 L/MIN	3.5 CFM 100 L/MIN	5.3 CFM 150 L/MIN	7.0 CFM 200 L/MIN	21.0 CFM 600 L/MIN	2.8 CFM 80 L/MIN	3.5 CFM 100 L/MIN	3.5 CFM 100 L/MIN	7.0 CFM 200 L/MIN
Power Use (kWh/day)	1.1	1.1	1.6	1.6	2.4	3.4	10.2	1.1	1.6	1.6	3.4
Weight (lbs.)	11	11	11	11	13	13	13 x 3	11	11	11	13
Outlet Diameter (OD, inches)	0.70	0.70	0.70	0.70	1.0	1.0	1.0 x 3	.070	0.70	0.70	1.0
TANK DETAIL:											
Material	Fibre-Reinforced Plastic							Fibre-Reinforced Plastic			
Height (inches)	61.8	65.7	73.6	77.4	81.3	87.2	87.2	65.7	73.6	77.4	87.2
Length (inches)	85	95.7	98.8	118.9	152.8	183.7	434.7	95.7	98.8	118.9	183.7
Width (inches)	43.7	49.2	56.7	68.9	72.4	78.3	115.3	49.2	56.7	68.9	78.3
Weight (lbs.)	397	463	705	926	1,168	1,543	2,900	463	705	926	1,543
Inlet Invert (inches)	49	53	61	62	65	71	67	53	61	62	71
Outlet Invert (inches)	47	51	59	59.5	63	69	64	51	59	59.5	69
Access Ports		2@20"	2@20"	2@20"	2@20"	2@20"	4@24"x24"	2@20"	2@20"	2@20"	2@20"
Quantity & Diameter (inches)	3@20"	1@24"	1@24"	1@24"	1@24"	1@24"	3@24"x48"	1@24"	1@24"	1@24"	1@24"
Tank Volume Total (gallons)	545	749	1,069	1,498	2,252	3,199	7,267	749	1,069	1,498	3,199

Treatment Process Overview

Fuji Clean's "contact filtration" treatment is a simple, well engineered process that consists of a controlled, circuitous flow train through anaerobic and aerobic chambers and in direct contact with assorted proprietary fixed film medias on which biological digestion of organic matter occurs. Media is also designed and positioned to provide mechanical filtration of process wastewater.

The system includes two air lift pumps (see diagram below) The Recirculating Airlift Pump returns process water and sludge from the aerobic zone to the sedimentation chamber, recirculating 2-4 times inflow per day for CE models and 4-6 times inflow for CEN (enhanced denitrification) models. The Effluent Airlift Pump is designed to help equalize flow and discharge treated effluent.



Two Air Lift Pumps. One Recirculating Air Lift pump sending process water and solids back to Chamber 1, and one Effluent Air Lift Pump for measured discharge of treated effluent. (See airlift pump info below).

Chamber 3B. Disinfection Chamber (final zone before discharge – option for chlorination tablet disinfection)

Chamber 3A. Storage Chamber (settling zone)

Sludge Transfer
(Recirculating air lift pumpback) See airlift pump info below.

Outlet

Inlet

Powered by the FujiMAC "R" Series Blowers State-of-the-art linear diaphragm air blowers manufactured by Fuji Clean Co sized to provide about 2.8 cubic feet per minute to most residential systems.

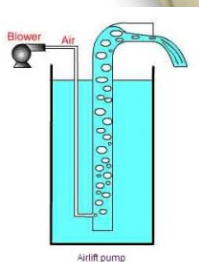
Chamber 3. Aerobic Contact Filtration Chamber
(both board and cylindrical hollow mesh media) oxygen rich zone for aerobic microbe digestion activity, solids filtration and nitrification of ammoniac nitrogens to nitrates

Chamber 2. Anaerobic Contact Filtration Chamber (spherical-skeleton filter media) organic matter decomposition by micro-organisms, suspended solids captured and nitrates are denitrified

Chamber 1. Sedimentation Chamber (separates solids and greases)

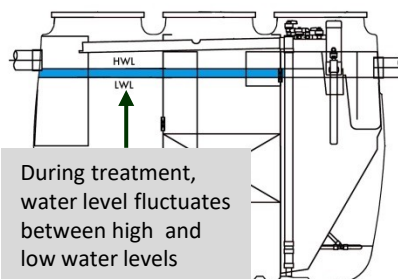
Overflow Effluent Weir

Flow Equalization
When water level exceeds LWL, treated water is discharged through Chamber 3B via the Effluent Air Lift pump. If water level exceeds HWL, then treated water is also discharged through an overflow effluent weir.

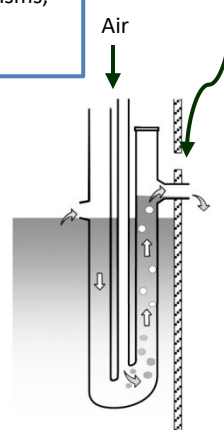


Airlift pump

Airlift Pumps. This generic illustration shows the mechanics of the "airlift pumps" used in this system, which are simple pipe conduits through which pressurized air (from blower) is introduced at the bottom and by fluid pressure, water is carried up the pipe by ascending bubbles.



During treatment, water level fluctuates between high and low water levels



Attachment 3

Wetland Nitrate-Nitrogen Removal Calculations



WETLAND NITROGEN REMOVAL CALCULATIONS (WATERSHED 1)

Date: 11/17/2018

Project: Cook Road Retirement Community

Project #: 18218

Summit Personnel: Stephen B. Marcotte, C.G., L.S.E.

Site Location: Gray Road, Windham, Maine - Watershed 1

Assumptions: Wetlands remove nitrogen through both plant uptake and microbial activity (denitrification). The capacity of planted and unplanted wetlands to remove nitrogen at concentration similar to those in treated septic system effluent show nitrogen removal rates in excess of 95% for planted wetlands and removal rates of 25% to 36% in unplanted (natural) wetlands. Assuming a 25% nitrate removal rate, the nitrate removal rate of the wetland on site is calculated to be 0.0825 grams-N per square meter.

The nitrate-nitrogen plumes from subsurface wastewater disposal fields D, E, F, G, H, I and J will flow to and through an on-site wetland area approximately 83,000 square feet in size. Approximately 65,000 square feet of wetland is located along the anticipated flow pathway through this wetland prior to crossing the property boundary. The flow pathway length ranges from approximately 400 feet (Disposal Field G) to 900 feet (Disposal Field I).

The combined flow from the seven disposal fields is 6,580 gallons per day and the weighted average concentration of nitrate-nitrogen is 28.51 mg-N/L, as summarized in the table below.

System	Design Flow (GPD)	Nitrate-Nitrogen Concentration in Effluent (mg-N/L)
D	360	40
E	360	40
F (Units 15-22)	1440	40
F (Units 23-25)	540	10
G (Dwellings)	1080	10
G (Clubhouse)	100	40
H	900	10
I	720	40
J	1080	40

Total Design Flow 6580 GPD

Weight Average Concentration Nitrate
Nitrogen in Treated Effluent 28.51 mg-N/L

Calculations:

Nitrogen Loading from Disposal Fields	
6,580 gallons per day	24908.0 liters/day
28.51 mg-N/L	710127.0 mg-N/day
	710.1 grams-N/day
Wetland Size & Nitrogen Removal Rate	
65,000 square feet	5968.8 sq. meters
0.0825 grams / sq. meters / day	
Results	
492.42 grams / day removed	
217.70 grams / day remaining	
8.74 mg-N/L in groundwater after wetland treatment	

References:

Lin, et. al. (2002), Effects of macrophytes and external carbon sources on nitrate removal from groundwater in constructed wetlands. Environmental Pollution, v. 119, pp. 413-420.



WETLAND NITROGEN REMOVAL CALCULATIONS (WATERSHED 2)

Date: 11/17/2018

Project: Cook Road Retirement Community

Project #: 18218

Summit Personnel: Stephen B. Marcotte, C.G., L.S.E.

Site Location: Gray Road, Windham, Maine - Watershed 2

Assumptions: Wetlands remove nitrogen through both plant uptake and microbial activity (denitrification). The capacity of planted and unplanted wetlands to remove nitrogen at concentration similar to those in treated septic system effluent show nitrogen removal rates in excess of 95% for planted wetlands and removal rates of 25% to 36% in unplanted (natural) wetlands. Assuming a 25% nitrate removal rate, the nitrate removal rate of the wetland on site is calculated to be 0.0825 grams-N per square meter.

The nitrate-nitrogen plumes from subsurface wastewater disposal fields A, B and C will flow to and through an on-site wetland area approximately 23,000 square feet in size. Approximately 16,000 square feet of wetland is located along the anticipated flow pathway through this wetland prior to crossing the property boundary. The flow pathway length is approximately 300 feet.

Disposal Field A has a design flow of 360 gallons per day (GPD) and treated effluent discharged to the disposal field will have a concentration of 20 mg-N/L total nitrogen.

Disposal Fields B and C each have a design flow of 720 GPD, Fuji Clean CE-series treatment units and treated effluent discharged to the disposal field will have a concentration of 20 mg-N/L nitrate-nitrogen.

The combined flow from both disposal fields is 1,800 gallons per day and the weighted average concentration of nitrate-nitrogen is 24 mg-N/L.

Calculations:

Nitrogen Loading from Disposal Fields	
1,800 gallons per day	6813.7 liters/day
24 mg-N/L	163529.7 mg-N/day
	163.5 grams-N/day
Wetland Size & Nitrogen Removal Rate	
16,000 square feet	1469.2 sq. meters
0.0825 grams / sq. meters / day	
Results	
121.21 grams / day removed	
42.32 grams / day remaining	
6.21 mg-N/L in groundwater after wetland treatment	

References:

Lin, et. al. (2002), Effects of macrophytes and external carbon sources on nitrate removal from groundwater in constructed wetlands. Environmental Pollution, v. 119, pp. 413-420.

STORMWATER MANAGEMENT PLAN

Cook Road Retirement Community Windham, Maine

The following Stormwater Management Plan has been prepared for Mr. Jim Cummings to evaluate stormwater runoff and erosion control for the proposed Cook Road Retirement Community project to be located off Cook Road & Gray Road (Route 202) in Windham, Maine.

Site Calculations

Total Property Area	12.88 Ac (+/-)
Total Proposed Impervious Area	2.77 Ac (120,766 sf)
Total Disturbed/Developed Area	5.93 Ac (258,260)

Existing Conditions

The development parcel is located on the southwesterly side of the Cook Road/Gray Road (Route 202) in Windham, Maine. The development property is approximately 12.88 acres and will contain a proposed 46 unit retirement community. The site contains a single family home near the midpoint of the Gray Road frontage. The remainder of the lot is an undeveloped forest. There is a centrally located wetland area that bisects the site. The wetland area spans the site from north to south and is generally located between 300' and 400' from Gray Road. A copy of the U.S.G.S. Quadrangle Map (North Windham) is attached to this submittal.

The property is located in the Pleasant River Watershed, just upstream from the confluence of the Pleasant River & Presumpscot River.

Proposed Development

The applicant intends to construct a forty six unit retirement community with associated club house, parking areas & amenities. Each two story duplex unit will contain a garage. One unit will feature a two car garage, while the other will have a one car garage. The club house will be a one story, 1,040 square foot building with an associated on-street parking. There will be a paved shoulder running through the project to provide for improved pedestrian safety. The site will be landscaped to meet the Town of Gray ordinance requirements. The total proposed building coverage on the site is 51,200 SF. This development will feature three under-drained filter basins.

The main road will cross the central wetland area. A Tier 1 wetland alteration permit will be required.

Flooding

The development area is not located within a 100 year flood zone according to the Federal Insurance Rate Map 230189 0030 B. See attached map.

Modeling Assumptions

The onsite stormwater facilities were sized utilizing the USDA Soil Conservation Service (SCS) TR-20 Runoff Simulation Model, as contained in the HydroCAD computer software program (Version 10.0). Runoff curve numbers were determined for each direct watershed by measuring the area of each hydrologic soil group within each type of land cover. Weighted curve numbers were then calculated using curve numbers for various cover types and hydrologic soil groups, assuming “good” conditions as defined in U.S Soil Conservation Service (SCS) publications. Times of concentration and travel times were determined from site topographic maps in accordance with SCS procedures. A maximum length of 150 feet was used for sheet flow.

All of the watersheds’ peak runoff rates were analyzed for the 25-year frequency, 24-hour duration storm events to ensure that the onsite stormwater facilities were properly sized. A Type III rainfall distribution was applied to these storms. The rainfall amounts for Cumberland County southeast) are as follows:

Storm Frequency Precipitation (in./24 hr)	
2-year	3.1
10-year	4.6
25-year	5.8
100-year	8.1

Onsite & Offsite Soils

The soils were delineated from the Cumberland County Medium Intensity Soil Survey as shown on the Soil Data Viewer on the NRCS website (See attached map). The soil survey reports that the watershed soils are as summarized below:

Soil Type Summary Table		
Soil Symbol	Soil Name	HSG
BgB	Belgrade	B
HrB, HrC	Lyman-Tunbridge	D
PbB	Paxton	C
Sn	Scantic	D
Sp	Sebago Mucky Peat	A/D
SuD2	Suffield	C

The medium intensity soil survey indicates that much of the site contains hydrologic group C & D. We have modeled the upland areas as hydrologic group C and wetlands as hydrologic group D soils to ensure that the drainage structures are properly sized.

Water Quantity (Flooding Standard)

The following table summarizes the results of stormwater calculations for the design storm events for the project areas. Calculations and computer modeling sheets are provided with this report.

Table 1 - Stormwater Runoff Summary Table Pre-Development vs. Post-Development						
Study Point #	2Yr/24Hr (cfs)		10Yr/24Hr (cfs)		25Yr/24Hr (cfs)	
	Pre	Post	Pre	Post	Pre	Post
1	7.6	7.2	13.9	13.9	17.1	17.1
2	0.5	0.5	1.3	1.1	2.0	1.5

As the above result table shows, the post-development flow rates for the 2, 10, and 25-year/24 hour design storm events do not exceed the pre-development conditions.

Water Quality (BMP Standard)

The water quality requirements will be met by the construction of two gravel wetlands, one filter basin and selectively placed roof drain filter strips. A table showing a detailed breakdown of treatment by watershed can be found on the Post Development Watershed Map.

The impervious and developed treatment percentages are detailed below:

Impervious Area: The project will result in the creation of approximately 120,776 SF of impervious area in the form of roadway, sidewalks, driveways & roof. Approximately 2,736 SF of roadway will be built over the wetland crossing. Therefore, approximately 118,030 SF of new impervious area needs to be treated. Filter Basin #1 also treats a portion of the Cook Road right of way. The stormwater basins & filter strips will result in the treatment of approximately 116,954 SF of impervious area resulting in a treatment percentage of $(116,954/118,030) \times 100\% = 99.09\%$.

Percentage of Treatment of the Impervious Area =99.1% (95% req'd)

Project Developed Area: The project will result in the creation of approximately 258,000 SF of developed area. Three stormwater basins & roof drain filter strips will result in the treatment of approximately 217,591 SF of the developed area resulting in a treatment percentage of $(217,591/258,000) \times 100\% = 84.3\%$

Percentage of Treatment of the Developed Area = 84.3% (80% required)

Housekeeping and Maintenance & Inspection guidelines are attached to this report.

BMP Sizing

Gravel Wetland #1

Forebay

STAGE (FT)	AREA (SF)	STORAGE (CF)
274.5	100	0
275	150	63
275.5	200	150

Cell #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
274	1300	0
275	1800	1550
275.5	2050	2513

Cell #2

STAGE (FT)	AREA (SF)	STORAGE (CF)
274	1300	0
275	1800	1550
275.5	2050	2513

Total Pond

STAGE (FT)	AREA (SF)	STORAGE (CF)
274	2700	0
275	3750	3163
275.5	4300	5175
275.51	4800	5175
276	5326	7656
276.5	5843	10453
277	6400	13313

WATERSHED IMPERVIOUS AREA=	44,934	SF
WATERSHED LANDSCAPED AREA=	32,300	SF
REQUIRED WATER QUALITY VOLUME=	4,821	CF
PROVIDED WATER QUALITY VOLUME=	5,175	CF

The required water quality volume was calculated by multiplying the impervious area by 1.0" and the landscaped area by 0.4".

Gravel Wetland #2

Forebay

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	150	0
277	270	210
277.5	330	360

Cell #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	700	0
277	1047	873
277.5	1220	1440

Cell #2

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	700	0
277	1047	873
277.5	1220	1440

Total Pond

STAGE (FT)	AREA (SF)	STORAGE (CF)
276	1550	0
277	2363	1957
277.5	2770	3240
277.51	3215	3240
278	3638	4919
278.5	4059	5845
279	4500	8820

WATERSHED IMPERVIOUS AREA=	24,478	SF
WATERSHED LANDSCAPED AREA=	22,487	SF
REQUIRED WATER QUALITY VOLUME=	2,789	CF
PROVIDED WATER QUALITY VOLUME=	3,240	CF

The required water quality volume was calculated by multiplying the impervious area by 1.0" and the landscaped area by 0.4".

Filtration Basin #1

STAGE (FT)	AREA (SF)	STORAGE (CF)
278	2250	0
279	3000	2625
279.4	3300	3885
280	3750	6000
281	4500	10125

WATERSHED IMPERVIOUS AREA= 30,389 SF
WATERSHED LANDSCAPED AREA= 36,875 SF
REQUIRED WATER QUALITY VOLUME= 3,799 CF
PROVIDED WATER QUALITY VOLUME= 3,885 CF

The required water quality volume was calculated by multiplying the impervious area by 1.0" and the landscaped area by 0.4".

Roof Dripline Filter Bed

We propose to provide treatment for the rear portion of the roof on Units 23-46. The bed is required to provide volume for 1" of runoff from the contributing area and store it within a reservoir bed. The bed sizing is as follows:

Area of Roof: 28' x 18' = 504 SF

Treatment Volume Required: Area x runoff depth: 504 SF x 1/12 FT = 42 CF

Bed Sizing:

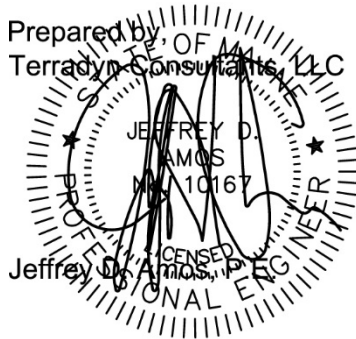
Porosity = 40% Bed Length = 28' Bed Width = 3' Bed Depth = 1.5

Available Volume= 28' x 3' x 1.5' x 0.40 = 50 CF.

The design is adequate since the available volume exceeds the required volume.

Summary

Based on the results of this evaluation, the proposed stormwater design is not expected to cause flooding, erosion or other significant adverse effects downstream of the site.



Attached:

- U.S.G.S. Quadrangle Map
- FEMA Flood Map
- NRCS Medium Intensity Soil Survey
- Pre-Development Hydrocad Calculations
- Post Development Hydrocad Calculations
- 100 Year Pond Capacity Check
- Pond Drawdown Table
- Maintenance & Inspection of Stormwater Facilities
- Housekeeping Plan
- Pre & Post Development Watershed Maps