

**TOWN OF TUFTONBORO
PLANNING BOARD
July 18, 2019
MINUTES**

Members Present: Matt Young, Chairman, Tony Triolo, Vice-Chairman, Bill Marcussen, Selectmen's Representative, Kate Nesbit, Gary Qua, Laureen Hadley, Members.

Members Absent: John Cameron, Member.

Staff Present: Lee Ann Hendrickson, Administrative Secretary.

Other Present: Justin Pasay, Planning Board Counsel.

Chairman Young opened the meeting at 7:00 PM at the Town House, 247 Middle Road.

Adam Thompson, Fire Chief, announced the occupancy of the Town House has reached capacity.

I. Public Comment

None.

II. Consideration of Minutes

July 11, 2019

It was moved by Tony Triolo and seconded by Laureen Hadley to approve the July 11, 2019 Tuftonboro Planning Board minutes as submitted. All members voted in favor. The motion passed.

III. Scheduled Appointments/Public Hearings

Little Cricket Realty, LLC

Tax Map #55-3-12

Site Plan Review; Change of Use

Dan Marisseau stated a less intensive use is proposed; noting he is leasing 4,000-5,000 SF of the building to a landscape contractor.

Matt Young asked if there are any modifications to the exterior of the building, parking lot or original site plan.

Dan Marisseau stated he took out some trees and installed a culvert.

Matt Young asked if there would be any storage of material or equipment outside.

Dan Marisseau stated Mountainside Landscape Co. is leasing space and parks their vehicles at the site.

Matt Young stated the application has been reviewed and is complete.

It was moved by Kate Nesbit and seconded by Gary Qua to accept jurisdiction of the application. All members voted in favor. The motion passed.

Chairman Young opened the public hearing.

No questions or comments from the public.

It was moved by Tony Triolo and seconded by Laureen Hadley to close the public hearing. All members voted in favor. The motion passed.

It was moved by Laureen Hadley and seconded by Tony Triolo to approve the Little Cricket Realty, LLC Site Plan Review application, Tax Map #55-3-12, as submitted. All members voted in favor. The motion passed.

Donald J. McWhirter and Camp Belknap
Tax Map #39-1-12 and 39-1-13
Boundary Line Adjustment

Matt Young stated the application has been reviewed and is complete.

It was moved by Tony Triolo and seconded by Kate Nesbit to accept jurisdiction of the application. All members voted in favor. The motion passed.

Don McWhirter stated both applicants have negotiated the boundary line adjustment. He noted he spoke to an abutter regarding the proposal and forwarded that abutter the deeds and settlement agreement.

It was moved by Tony Triolo and seconded by Kate Nesbit to open the public hearing. All members voted in favor. The motion passed.

Jeff Ormrod, 54 Bixby Shores Road, requested further clarification of the proposal.

Matt Young stated the boundary line is being moved approximately 30 feet; noting such has been agreed upon by Camp Belknap and Don McWhirter.

The Board reviewed the plan with Mr. Ormrod.

Don McWhirter stated the boundary line adjustment would provide flexibility to address runoff.

Seth Kassels, Camp Belknap, stated he is in agreement with the boundary line adjustment.

It was moved by Tony Triolo and seconded by Gary Qua to close the public hearing. All members voted in favor. The motion passed.

It was moved by Laureen Hadley and seconded by Kate Nesbit to approve the Donald J. McWhirter and Camp Belknap Boundary Line Adjustment application, Tax Map #39-1-12 and 39-1-13, as submitted. All members voted in favor. The motion passed.

David Winchester, Donald Winchester and John Winchester and C&R NH Realty Trust, LLC
Tax Map #40-2-1
12-Lot Subdivision

Matt Young stated the application has been reviewed and is complete. He introduced Justin Pasay, Planning Board Counsel.

It was moved by Tony Triolo and seconded by Kate Nesbit to accept jurisdiction of the application. All members voted in favor. The motion passed.

Chairman Young requested a motion to seal the Planning Board non-public minutes of July 18th.

It was moved by Tony Triolo and seconded by Kate Nesbit to seal the Planning Board July 18, 2019 non-public minutes. All members voted in favor. The motion passed.

Scott Frankiewicz noted Randy Owen and Cindy Pratt are the applicants. He stated the property is located on Farm Island consisting of 13.58 acres and is located in the Island Conservation District. He stated the current zoning is one acre lots with 150' of frontage; noting there is an existing cottage and outhouse located on the lot. He stated he has reviewed the property and determined there is a capacity for 12 lots; noting the lots range from 1 acre to 1.66 acre, each lot including one acre of upland area. He stated one lot would have 350' of frontage. He noted the subdivision meets NHDES regulations (75' well radius and 4,000 SF area for septic suitability; noting State Subdivision approval and Shoreland Permits are required). He stated the proposal does not fall under Alteration of Terrain because 10,000 SF of disturbance is not being proposed. Relative to parking, he stated there is a public parking lot in close proximity of the proposed subdivision.

Tom Sokoloski, TES Environmental Consultants, LLC, stated he delineated the wetlands on the island on 11/2/18; noting the property is forested with a mix of hardwoods and evergreens. He stated the wetlands didn't include streams or vernal pools and that most of the wet area is contiguous with the shoreline. He stated there are poorly drained soils and dense vegetation with shrub understory; noting he did not observe any rare species of vegetation that would require any kind of preservation or interest from the Natural Heritage Bureau.

Andy Sullivan, Counsel for the applicant, stated he reviewed the various letters submitted to the Board. He stated the property is private land with no restrictions other than what the government imposes. Relative to boat traffic, he stated it is a big lake and there are a lot of boats; noting there will be minimal boat traffic added. He stated there would be no impact to the water quality; noting the septic systems would be State approved. He also noted there would be no impact on the loons, bears or eagles; noting there has not been loon nesting observed. He stated loons are threatened however, not considered an endangered species and the loon population has actually increased. He stated there is no archaeological impact or loss of land or impact to historical preservation; noting he reviewed the historic register. He noted parking is available on the main land; noting 11 slips are for sale and rent and there would be no impact or erosion to the Town beach. Referencing noise and light pollution, he stated there would eventually be twelve residential homes with typical residential lighting and noise. Referencing kayak and canoe use and safety of such, he stated there are existing regulations on boat speed therefore, doesn't see a negative impact. He stated the property is not located in a flood zone and with regard to utilities, when the time arises the necessary permits will be sought which will include further oversight of the project. He stated what is being proposed is allowed to be proposed with no need for a Variance or waiver. He noted Chase Island has 29 lots.

Matt Young questioned power and the age and condition of the cable; noting he is aware the cable runs through shallower water between King Davis' property and Farm Island.

Randy Owen stated he has spoken with Mark Taylor, NH Electric Co-op. He stated the over area cables were used until 1938 when they were struck by a sailboat mast; noting underground cable was then installed. He stated if the cable fails that it would be replaced or updated in-kind. He stated the same vintage cable serves Bear Island which has 140 houses.

Matt Young asked who maintains the cable; NH Electric Co-op or the property owner.

Randy Owen stated he believes the electric company installed the cable however, if the cable is changed that he would be required to replace it in-kind. He stated he would be required to place shielding around the shoreline and in the deeper water, the cable would be a direct burial. He noted the existing cable is currently shielded and protected.

Matt Young questioned the location of the wetlands.

Scott Frankiewicz located such on the plan.

Matt Young asked if rare plants were observed.

Tom Sokoloski replied no and noted there is very little signs of wildlife. He stated the Loon Preservation Society conducted a survey; noting there were no nesting areas for eagles in the location of the island.

Gary Qua confirmed that the wetland area cannot be used as part of the acreage for Lot 40-2-11 (lot is 1.13 acres).

Scott Frankiewicz stated the .13 acre is the wetland area on that lot.

Gary Qua verified that all lots exceed the requirement (referencing test pit data).

Scott Frankiewicz stated the seasonal high water table ranged between 16" and 32"; noting such meets State standards. He stated there are a couple of lots that have no wetlands on them.

Gary Qua questioned septic.

Scott Frankiewicz stated enviro-septic advanced systems (clean solutions) would be installed. He stated he doesn't foresee a stone and pipe system.

Gary Qua questioned the Natural Heritage Bureau process.

Scott Frankiewicz stated such includes a GIS website and an area for evaluation is provided; noting he used the draw command feature to denote the area for evaluation (data pull). He stated he requested it three times to ensure the results were accurate; noting he also requested an evaluation of the surrounding areas. He stated there were no registered impacts; noting that if there had been he would have had to gone to the Bureau and review the paper files. He noted that Chase Island had potential impacts.

Gary Qua confirmed the applicant received the reports from the general public.

Referencing the report from the Natural Heritage Bureau, Kate Nesbit noted that a negative result from the Natural Heritage Bureau doesn't mean there aren't sensitive species present on site. She stated the report seems to indicate that an on-site survey would provide better information.

Scott Frankiewicz stated that with the support of the Loon Preservation Society's letter where it states there are no loons present, he feels he has gone over and above for the application to prove that the Natural Heritage Bureau has no registered impacts.

Tom Sokoloski elaborated on the Natural Heritage Bureau (NHB) review process; noting that if there is a known occurrence in the area then a one mile radius is reviewed by the Natural Heritage Bureau. He stated that for eagles, the NHB looks for the nesting habitat as required for that population; noting the same is reviewed for loons. He stated that although the Loon Preservation Society states there may be potential nesting site on the eastern side of the island. He stated that very well may be, but because the area hasn't been selected by the species there may be some flaw there that isn't appropriate for the species to nest. He stated if there is a species of wildlife, the applicant has to approach the NH Fish & Game Department; noting the Fish & Game Department would then have to determine if there is an impact from the project. He noted that the Natural Heritage Bureau review is included as part of the NHDES review.

Gary Qua verified there is decreased impact due to the proposed septic.

Scott Frankiewicz stated the lots are suitable for a four bedroom septic.

Matt Young noted the Subdivision Regulations require that utilities are buried whenever practical. He asked if any issues were observed when the test pits were conducted that would pose a problem for underground utilities.

Scott Frankiewicz replied no.

It was moved by Tony Triolo and seconded by Kate Nesbit to open the public hearing. All members voted in favor. The motion passed.

Jim Rines, White Mountain Survey & Engineering, Inc., stated he was hired by Camp Belknap to perform a peer review. He reviewed his letter/report, dated July 8, 2019, see attached.

Scott Frankiewicz requested time to review the plans and information noted in Mr. Rines' letter.

Cindy Balcius, Stoney Ridge Environmental, LLC, stated she was retained by Camp Belknap. She distributed and reviewed her report, dated July 11, 2019, see attached.

Matt Young noted the Board requests a third party review for subdivision applications.

Craig Starble, 15 & 25 Winnishores Road, stated he is representing himself and as President of the Winnishores Association. He stated he is the owner of the electric easement that goes to Farm Island; noting the electric and phone easement was deeded in 1940. He questioned the condition of the line and length of construction. He asked if the project would require dredging of the bay. He requested that due to impact to the shoreline, that local and Federal permits be received prior to Planning Board approval. He stated he wants to ensure that construction is properly monitored and noted there are a lot of loons, deer, bear, heron and fish in the area (personal observation).

Paul Johnson, 19-Mile Bay, stated he observed an eagle this year. He stated the parking area is packed with trailers and trucks and expressed concern as to where people will park; noting the Police Department needs to something currently.

John Wilkins, Wolfeboro resident, stated he is speaking for the Native Americans that can't speak for themselves (the Abenaki); noting there is a clear indian trail from Wolfeboro to Moultonborough and there was an encampment in the area of 19-Mile Bay. He stated they accessed Farm Island via a land bridge and survived by fishing and hunting. He stated Camp Belknap retained an archaeologist by the name of Victoria Bunker to review their portion of the property and concluded it was a significant archaeological site that there are likely terrestrial and sub-terrestrial artifacts that could tell us more about the Abenaki. He requested the Board have a qualified archaeologist review the additional 13 acres. He stated the loon is a tremendous asset to the State. He submitted a letter from John Connolly, Senior Biologist, Loon Preservation Committee, stating there is sufficiently modest shoreline that the Board should consider ways to enhance the loon population.

Bill Perkins, Wolfeboro resident, stated he is currently serving on the Board of Camp Belknap. He stated he walked the island in 2010 when Camp Belknap was purchasing 7.5 acres on Farm Island; noting Farm Island is a rare resource on Lake Winnepesaukee being one of a very few islands over ten acres that only has a single dwelling that has surviving historic and cultural resources including an early 20th Century cottage with associated outbuildings and a late 19th Century stone foundation likely used by sheltering sheep and continued to convey agriculture in that area. He stated Farm Island contains a cultural landscape that includes significant resources from both its agricultural and early summer uses. He stated when the property was surveyed in 2010, the 1906 cottage had undergone virtually no alterations. He stated Camp Belknap has witnessed no activity since 2010 thus the island remains much as it was for more than 100 years; noting as such, it's a historical and cultural resource in the Town of Tuftonboro. He stated Farm Island's historical significance and high level of integrity of location, design, materials, setting, workmanship, feeling and association make it eligible for the State's Register of Historic Places. He stated the property also has strong potential for listing on the National Register of Historic Places. He stated the island's early 20th century cottage and boat shed retain architectural integrity and are representative of cottages erected in this initial phase of summer residence based on photographs posted on the realtor's website. He stated there is also a well preserved stone foundation erected and used during the island's era of summer pasturing; a typical land

use for islands of this size in the 19th century. He stated that unlike the lake's larger islands such as Bear Island, Farm Island was not large enough to support a farm and stone for the foundation was quarried on the site. He referenced and read from Chapter 5 (Land Use Chapter) of the Master Plan; noting the Master Plan must be adhered to and the preservation of Farm Island does just that. He stated the island should be preserved and placed on the historic registers.

Jacqueline Freese, 43 Rocky Point Road, read the Petition to Decline Subdivision of Farm Island; noting such was signed by over 350 residents, see attached.

Matt Young stated the Planning Board received 9 letters from the following people; Russ Wrigley, Nick Moore, Richard Stone, Carol Haran, Erin Haran-MacCurtain, Kristine Hanscom, Victoria Soletsky, John Cooley, Loon Preservation Committee, and Mr. and Mrs. D'orio.

A member of the public stated loons are all over; noting she has observed deer going back and forth to the island. She stated there would be an impact to the wildlife and expressed concern regarding noise and light pollution.

Jane Blumberg, 7 Chase Island, stated the loons and eagles are coming back. She read the Mission Statement of the Planning Board; noting the subdivision will have an impact.

Kerry Hunt, 27 Durgin Road, expressed concern for increased boat and automobile traffic and parking; noting there is not ample parking in the area of 19-Mile Bay. She expressed concerns for safety with the proposed impact; noting younger kids utilize the beach and residents bike on Union Wharf Road to get to the beach.

Fran Laase, 5 Bay Road, stated the power line feeding the island is no longer in use. He stated Dean Winchester was adamant that the power line would be maintained however, wouldn't allow the electric company on the property. He reviewed a statement he prepared, see attached.

Don McWhirter, 10 North Chase Point Road, stated he is in favor of the subdivision. He stated he has faith in the zoning regulations and was reassured by Cindy Pratt and Randy Owen that they are purchasing the property for their own personal use. He stated the Planning Board will do their job in accordance with the Town's regulations as long as the application meets State and local regulations. He stated everyone had an opportunity to purchase the property but, didn't.

Seth Kessels, 1 Chase Point Road, reviewed a statement he prepared, see attached.

Bob Bahr, 88 Chase Point Road, he reviewed portions of the Land Use Chapter of the Master Plan and requested the Board require a surety bond.

Matt Young stated that whenever there are improvements with a subdivision the Planning Board has required the applicant to post a surety.

Curtis Elliott, 8 Cow Island and Pier 19 Condominium Association (boat slip owner), stated Attorney Sullivan mentioned there are eleven available boat slips for sale in the area; noting he wants to ensure that no one is including the Pier 19 Condominium Association in that count of boat slips for sale. He stated there are currently no boat slips for sale at Pier 19 and there won't be any for sale.

Matt Young asked if an owner could sell a boat slip.

Curtis Elliott replied that any individual could sell however, there are none for sale right now.

Matt Young confirmed that an owner of the Pier 19 Condominium Association could sell their boat slip.

Don Berry, Tuftonboro property owner and President of Lakes Region Conservation Trust, stated it is beyond the mission of the Lakes Region Conservation Trust to object to a particular development proposal. He

stated he appreciates the significant conservation value of the property and is available for assistance if conservation becomes part of the review.

Attorney Matt Johnson, representing Camp Belknap, stated he feels the application is premature. He stated there has been a lot of testimony regarding utilities and that the line may not be sufficient; noting the Subdivision Regulations require feedback from the power company and he is not aware of any feedback relative to such. He questioned how it would expand out onto the island and noted that if it has to be changed or modified in any way that given the depth of the bay there could be dredging and filling necessary. He stated more study of the project needs to be done and expressed concern for the start and completion of the project. He requested the Board to ensure there is financial backing for infrastructure such as a surety or bond.

Matt Young stated the Planning Board generally requires a cost estimate for improvements in addition to a construction observation agreement.

Frank Kenison submitted an article from the Concord Monitor, see attached.

Teresa Rosenberger, NH Preservation Alliance, submitted a letter dated July 18, 2019, see attached. She noted the historic nature of the agricultural history and appears eligible for the NH and National Register of Historic Places.

Ron Albert, 19 Winnishores Road, stated the bay is already overburdened and questioned how to resolve the dilemma. He stated he has observed wildlife. He stated he would like to see the land preserved and asked the abutters and neighbors if they are willing to make the developer whole to allow for another buyer and possibly conservation easement to be placed on the island. He asked for a raise of hands; noting that based on such the community is saying what is needed is a steward for the island.

Judy Herr, 22 Winnishores Road, stated a couple of years ago a sign "loon nesting area" was placed in the cove. She stated she was told by Mr. Cooley (4-5 years ago) that he did not have the staff to monitor the loons in the cove.

Rick Mongeau, 22 Chase Island, stated he is not interested in stopping development on the island rather, he is requesting to limit development for the sake of conservation. He asked what will happen to the center of the island. He recommended expansion of the parking lot in 19-Mile Bay.

Member of the public asked the public if they want to live in an area like Weirs Beach or Lee's Mills; noting there has been development in the area and the future of the store is unknown. She stated the animals have very little free land; noting there will be no room for the animals once the homes are built.

Fran Laase, 5 Bay Road, stated that if the development were on the main land that the Planning Board would require two off road parking spaces per lot. She asked if the Town will allow cars to use the temporary parking lot or will the Town make that lot larger.

Matt Young stated an application on water is different than a subdivision on land. He stated when an applicant proposes a subdivision on land, the Board does not require the applicant to prove they have a place to start from to access their lot. He stated most island customers have a boat slip at a dock that they own or at a marina or launch their boat.

Jim Rines stated that if the subdivision were on land, the Board has the right to conduct a traffic study, environmental study, hydrogeological study and an economic impact study.

Matt Young referenced Dartmouth v. Hanover, see attached, noting the Board has to be consistent in its application of the zoning and law. He stated that due to outstanding issues that need to be addressed by the applicant he requested a motion for continuance.

It was moved by Tony Triolo and seconded by Kate Nesbit to continue the David Winchester, Donald Winchester and John Winchester and C&R NH Realty Trust, LLC application and public hearing to August 1, 2019. All members voted in favor. The motion passed.

Chairman Young stated the August 1, 2019 meeting will be held at the Tuftonboro Elementary School.

IV. Action Items

N/A

V. Discussion Items

N/A

VI. Informational Items

N/A

VII. Other Business

N/A

VIII. Public Comment

None.

IX. Non-Public Session

It was moved by Kate Nesbit and seconded by Tony Triolo to enter non-public session at 9:32 PM to consider legal advice provided by legal counsel per RSA 91-A:3 II.(1). Roll call vote; Matt Young – yes, Tony Triolo – yes, Kate Nesbit – yes, Laureen Hadley – yes, Bill Marcussen – yes, Gary Qua - yes. The motion passed.

The Board re-entered public session at 10:00 PM.

It was moved Kate Nesbit and seconded by Tony Triolo to seal the July 18, 2019 Tuftonboro Planning Board non-public meeting minutes. Roll call vote; Matt Young – yes, Tony Triolo – yes, Kate Nesbit – yes, Laureen Hadley – yes, Bill Marcussen – yes, Gary Qua - yes. The motion passed.

Chairman Young stated the nonpublic session minutes of July 18, 2019 were sealed by a 2/3 vote as required by law.

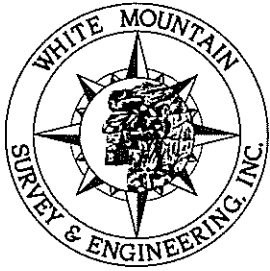
It was moved by Tony Triolo and seconded by Laureen Hadley to adjourn the July 18, 2019 Tuftonboro Planning Board meeting. All members voted in favor.

There being no further business before the Board, the meeting adjourned at 10:01 PM.

Respectfully Submitted,

Lee Ann Hendrickson

Lee Ann Hendrickson



WHITE MOUNTAIN SURVEY & ENGINEERING, INC.

1270 ROUTE 16, POST OFFICE BOX 440
OSSIPEE, NH 03864-0440
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WEB ADDRESS: www.whitemountainsurvey.com

July 8, 2019

Advance Copy via email (frank.kenison@gmail.com)

Frank Kenison, Director
YMCA Camp Belknap
11 Chase Point Road
Mirror Lake, NH 03853

Re: Winchester Subdivision Peer Review
1 Farm Island
Tax Map 40, Block 2, Lot 1

Dear Frank:

As requested, I have conducted a review of the proposed subdivision plan for David, Donald & John Winchester; 1 Farm Island in Tuftonboro, prepared by N.H. Land Consultants dated June 26, 2019.

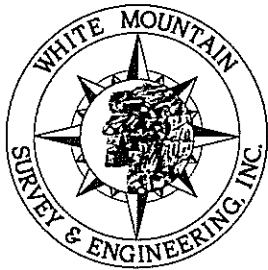
This review was made using the reduced set of plans which you dropped off at my office on June 28, 2019. It should be noted that portions of these reduced plans were clipped off at the edges, so that the entirety of the plans from sheet border to sheet border could not be observed, however the material provided appeared to capture the essence of the submitted information.

My charge, as I understand it, was to simply review the plans for conformance with the town zoning and subdivision regulations as well as the Board of Licensure and Department of Environmental Services standards.

In conducting this review, I made use of the reduced plan set referenced above, the Tuftonboro Zoning Ordinance dated March 2018 (the latest version on their website); Tuftonboro Subdivision Regulations adopted December 15, 2011 (the latest version on their website); the FEMA Flood Map Service Center website (<https://msc.fema.gov/portal/home>); the NHDES Administrative Rules Env-Wq 1000; the NH Board of Land Surveyors Administrative Rules Lan 100-500; and I drew upon my professional experience as a Licensed Land Surveyor; Licensed Professional Engineer; and permitted Designer of Subsurface Disposal Sewage Systems.

Based upon this review, I have observed the following issues which appear either deficient or inconsistent with the requirements of the town and state rules and regulations.

The first observation is that the submitted plans depict topographic mapping which does not identify the vertical datum used nor does it identify how the topography was generated. This is



Frank Kenison, Director
YMCA Camp Belknap
July 8, 2019
Page 2 of 3

lack of information is significant because one of the property boundaries of this lot (the shoreline) is an elevation, which is 504.32 feet NGVD29.

General Note #4 on sheet 2 of 5 reads: "Existing property was surveyed on March 14 & 15th, 2019. Survey was taken to waters edge. Site area @ time of survey was 591,846 SF (13.58 Acres)." A review of the recorded elevations of Lake Winnepesaukee for March 14-15, 2019, is reported as being 502.92' and 502.91' respectively. This means that the actual boundaries of this lot have not been depicted correctly since the lake was approximately 1.4' lower than the legal full lake on the dates of the survey, thereby overstating the size of the parcel. Consequently, the plan does not depict the correct property boundaries as required by Section 3.3.1, C of the Tuftonboro Subdivision Regulations.

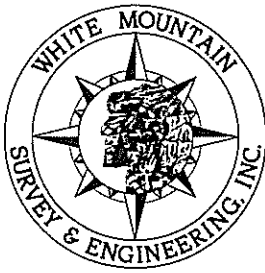
This appears to be confirmed by a close examination of the topographic contours where you can observe the 504-foot contour being shown above the water elevation identifying the limits of the parcel, which if accounted for correctly would be below the legal full lake elevation. To correctly depict the property boundaries, the plan should depict the 504.32' NGVD29 elevation.

Another elevation related observation relates to General Note #9 which reads: "FEMA: Subject parcel is located in Zone X, not within the 100 year flood zone per community panel number 33003C0620D dated March 13, 2019." This is a false statement. As can be observed on the attached FEMA generated Firmette, the 100-year flood elevation of Lake Winnepesaukee has been determined to be elevation 506 feet NAVD88 and the entire westerly and northerly portions, as well as a significant portion of the easterly boundary of the parcel appear to be within the AE 100 year flood zone. Based upon the topography depicted on the plan submitted it is clear portions of the lot lie at or below elevation 506. Depending upon the vertical datum, it could be significant because the NAVD88 is approximately 0.5 feet lower than NGVD29.

You will note that the two benchmarks identified on the submitted plans are identical to the two benchmarks identified on the reference plan. The reference plan does not list vertical datum specifically but does note that the legal full lake elevation of Lake Winnepesaukee is "504.32' NGVD29". The reference plan goes on to note that "the edge of lake as shown hereon is based on aerial photography exposed on 4/24/2008, at which time the water elevation was 503.8'". Therefore, one must conclude that the reference plan and the submitted plans are based upon the same datum and one might conclude that the datum is NGVD29.

If that is the case and the benchmark datum is NGVD29, then the elevations are actually 516.22 for TBM A and 506.56' for TBM B. This means that the topographic elevations are lower than depicted on the submitted plans, so the flood elevation will come further onto the island.

The Planning Board should require the property boundary be shown based on an accurate mapping of the 504.32' contour with a vertical datum of NGVD29 and the flood plain boundary based upon the 506' contour with a vertical datum of NAVD88.



Frank Kenison, Director
YMCA Camp Belknap
July 8, 2019
Page 3 of 3

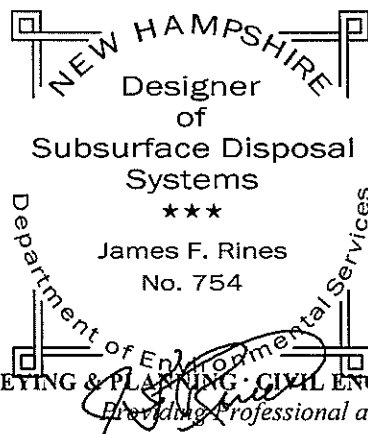
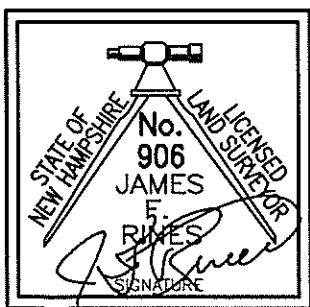
Another observation relates to lot 2-10. That lot has a straight-line tie distance at the shoreline of 145.94 feet. The Zoning Ordinance requires 150 feet of frontage, measured in 50-foot increments. When I use the reduced plans I have, I did not get three 50-foot increments. This lot also appears to violate the minimum with required in Env-Wq 1005.05 which requires that the lot be wide enough to retain the "...on-lot protective well radius specified in Env-Wq 1008.08."

Regarding the lot areas, based upon the test pits submitted the estimated seasonal high-water table (ESHWT) varies between 16" and 32", making the soil type a group 3 soil according the NHDES criteria. A group 3 soil for slopes between 0-8% require a minimum lot size of 48,000 SF and between 8-15% the minimum lot size increases to 53,000 SF. Lots 2-3 through 2-9, and 2-12 and 2-13 are all less than the minimum NHDES requirement of 48,000 SF and many of those lots have an average slope of greater than 8% which means that they would be required to meet the 53,000 square foot minimum lot size which further increases their non-conformity. This would appear to violate Section 4.2.3 and Section 4.3 of the Tuftonboro Subdivision Regulations.

The final item relates to the requirements of Section 4.4.16 of the Tuftonboro Subdivision Regulations pertaining to easements. Easements of record are to be shown and there is no reference to the electrical easement for the power lines that the reference plan identifies nor is there any indication how these new lots will obtain power. Since the lines will have to cross new property boundaries, easements will have to be granted for that purpose. The width and location of these easements could impact the location of effluent disposal areas and they should be depicted on the subdivision plans so that buyers understand how their lots are being impacted.

These observations are the material observations that I believe result in deficiencies and inconsistencies with the required regulations that should require further investigation by the Planning Board. There are several non-material observations that would be worthy of change if this project should move forward such as the correct recording information of the reference plan on sheet 2 of 5 along with the correct spelling of the town in that same note.

If you have any questions or concerns regarding this matter, please feel free to contact me directly at (603) 439-4118, extension 315. In thanking you for your business, I remain



At your service,
White Mountain Survey & Engineering, Inc.

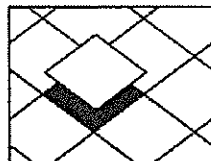
James F. Rines, P.E., L.L.S., C.P.E.S.C.
President

LAND SURVEYING & PLANNING · CIVIL ENGINEERING · EXPERT TESTIMONY · SEPTIC DESIGN
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8. HORIZONTAL DATUM BASED ON MAGNETIC NORTH AS OBSERVED ON 11/09.
9. THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES IN ACCORDANCE WITH AND IN RELATION TO THE CURRENT LEGAL DESCRIPTION, AND IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP, OR DEFINE THE LIMITS OF TITLE.
10. THE LEGAL FULL-LAKE ELEVATION OF LAKE WINNIPESAUKEE IS 504.32' (NGVD29). THE EDGE OF LAKE AS SHOWN HEREON IS BASED ON AERIAL PHOTOGRAPHY EXPOSED ON 4/24/08, AT WHICH TIME THE WATER ELEVATION WAS 503.8'. DUE TO THE ABRUPT AND ROCKY SHORELINE AROUND THE ISLAND, THE HORIZONTAL DISTANCE BETWEEN THESE TWO LAKE ELEVATIONS IS SLIGHT AND WOULD RESULT IN A NEGLIGIBLE DIFFERENCE IN AREA AND FRONTAGE.
11. WATER BOUNDARIES ARE DYNAMIC IN NATURE AND ARE SUBJECT TO CHANGE DUE TO NATURAL CAUSES SUCH AS EROSION OR ACCRETION.

SUBDIVISION PLAN
OF
FARM ISLAND
OWNED BY
DONALD G., & JOHN R. WINCHESTER
FOR
C.A. CAMP BELKNAP, INC.
TAX MAP 40 LOT 2-1
LAKE WINNIPESAUKEE
TUFTONBORO, NEW HAMPSHIRE

BY: J.A.G.	DATE: JAN. 18, 2010
BY: S.V.M.	DRAWING NO.: 2859A
2859B	SHEET 1 OF 2*



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2 NOT FOR RECORDING

WINNIPESAUKEE GRAPH DATA



Historical Lake Level Data.

Current Year Readings

Source: Dam Bureau Records

MSL Correction 500' + Lake Level

1982-2018		1982-2018	Cumulative Precip			Lake Level	Discharge	Estimated Inflow
Minimum Level	Maximum level	Mean Level	in Inches			in Feet	(CFS)	(CFS)
1.61	4.01	3.15	0.78	1/1/2019		3.77	1927	1708
1.56	4.02	3.14	0.78	1/2/2019		3.73	1958	1627
1.58	3.99	3.13	0.92	1/3/2019		3.70	1916	1083
1.57	4.01	3.12	0.92	1/4/2019		3.66	1906	988
1.57	3.98	3.11	0.92	1/5/2019		3.61	1902	903
1.58	3.95	3.09	0.92	1/6/2019		3.57	1891	509
1.62	3.91	3.09	0.92	1/7/2019		3.48	1875	602
1.62	3.85	3.06	1.02	1/8/2019		3.46	1485	773
1.61	3.85	3.06	2.00	1/9/2019		3.46	1490	1334
1.63	3.87	3.05	2.00	1/10/2019		3.46	1487	1029
1.63	3.85	3.05	2.00	1/11/2019		3.40	1489	873
1.6	3.83	3.04	2.00	1/12/2019		3.38	1483	487
1.65	3.82	3.04	2.00	1/13/2019		3.33	1480	564
1.61	3.81	3.02	2.00	1/14/2019		3.29	1258	334
1.69	3.81	3.03	2.00	1/15/2019		3.25	1253	335
1.68	3.8	3.01	2.00	1/16/2019		3.21	1254	234
1.68	3.77	3.01	2.00	1/17/2019		3.17	954	287
1.68	3.78	3.00	2.00	1/18/2019		3.15	954	254
1.7	3.78	3.00	2.00	1/19/2019		3.12	924	558
1.71	3.78	2.99	2.79	1/20/2019		3.12	947	707
1.68	3.78	2.98	3.07	1/21/2019		3.12	940	869
1.71	3.71	2.97	3.07	1/22/2019		3.11	951	718
1.7	3.75	2.96	3.07	1/23/2019		3.09	952	568
1.72	3.79	2.96	3.35	1/24/2019		3.08	720	2408
1.72	3.77	2.95	4.69	1/25/2019		3.32	723	2558
1.71	3.75	2.95	4.69	1/26/2019		3.33	712	2938
1.73	3.74	2.95	4.69	1/27/2019		3.37	710	1164
1.76	3.7	2.95	4.69	1/28/2019		3.37	920	1252
1.76	3.67	2.94	4.69	1/29/2019		3.38	976	1185
1.81	3.66	2.94	5.16	1/30/2019		3.40	970	1125
1.78	3.64	2.92	5.16	1/31/2019		3.39	968	967
1.88	3.59	2.92	5.16	2/1/2019		3.38	962	657
1.85	3.55	2.91	5.16	2/2/2019		3.36	961	729
1.87	3.55	2.90	5.16	2/3/2019		3.36	955	650
1.87	3.6	2.90	5.16	2/4/2019		3.34	955	726
1.85	3.7	2.90	5.24	2/5/2019		3.33	959	726
1.87	3.75	2.90	5.24	2/6/2019		3.33	953	1030
1.87	3.74	2.89	5.61	2/7/2019		3.35	947	1107
1.87	3.73	2.86	5.84	2/8/2019		3.35	960	1035
1.88	3.71	2.87	5.84	2/9/2019		3.34	968	888
1.88	3.7	2.86	5.84	2/10/2019		3.34	967	735
1.96	3.66	2.85	5.84	2/11/2019		3.32	960	827
1.91	3.6	2.83	5.84	2/12/2019		3.32	1014	1059
1.97	3.57	2.83	6.74	2/13/2019		3.35	972	1286
1.98	3.53	2.83	6.82	2/14/2019		3.36	953	1194
2	3.55	2.82	6.82	2/15/2019		3.35	968	885
1.99	3.54	2.82	7.01	2/16/2019		3.34	965	732
2	3.53	2.81	7.01	2/17/2019		3.33	954	731
2	3.55	2.81	7.11	2/18/2019		3.32	965	885
2.01	3.55	2.81	7.21	2/19/2019		3.33	965	582
2.01	3.55	2.80	7.21	2/20/2019		3.28	966	729
2.03	3.54	2.79	7.62	2/21/2019		3.29	946	573
2.07	3.53	2.79	7.62	2/22/2019		3.28	956	719
2.07	3.54	2.79	7.62	2/23/2019		3.25	944	570
2.1	3.62	2.79	7.73	2/24/2019		3.24	961	723
2.11	3.74	2.81	7.98	2/25/2019		3.25	954	648
2.11	3.82	2.82	7.98	2/26/2019		3.21	950	340
2.08	3.9	2.82	7.98	2/27/2019		3.16	955	340
2.18	3.94	2.85	8.06	2/28/2019		3.17	955	495
2.2	3.98	2.84	8.06	3/1/2019		3.15	955	648
2.11	4.1	2.84	8.06	3/2/2019		3.12	955	418
2.23	4.14	2.84	8.06	3/3/2019		3.10	955	573
2.23	4.17	2.82	8.53	3/4/2019		3.10	960	728
2.22	4.18	2.86	8.53	3/5/2019		3.09	960	800
2.22	4.16	2.86	8.53	3/6/2019		3.08	940	563
2.23	4.16	2.86	8.53	3/7/2019		3.05	938	479
2.27	4.11	2.86	8.53	3/8/2019		3.03	939	324
2.28	4.1	2.88	8.53	3/9/2019		3.00	934	401
2.29	4.08	2.90	8.53	3/10/2019		2.98	940	629
2.14	4.14	2.89	9.00	3/11/2019		2.99	933	637
2.29	4.18	2.93	9.00	3/12/2019		2.97	728	490
2.26	4.14	2.94	9.00	3/13/2019		2.94	730	191
2.25	4.19	2.97	9.00	3/14/2019		2.92	725	270
2.24	4.17	2.99	9.00	3/15/2019		2.91	734	574
2.24	4.18	3.00	9.00	3/16/2019		2.92	724	729
2.22	4.15	3.01	9.02	3/17/2019		2.92	728	725
2.22	4.23	3.02	9.02	3/18/2019		2.91	723	572

WINNIPESAUKEE GRAPH DATA



Historical Lake Level Data.

Current Year Readings

Source: Dam Bureau Records

MSL Correction 500' + Lake Level

1982-2018		1982-2018	Cumulative Precip			Lake Level	Discharge	Estimated Inflow
Minimum Level	Maximum level	Mean Level	in Inches			in Feet	(CFS)	(CFS)
2.18	4.2	3.03	9.02	3/19/2019		2.90	726	417
2.14	4.36	3.05	9.02	3/20/2019		2.88	723	298
2.12	4.42	3.06	9.02	3/21/2019		2.87	365	483
2.13	4.49	3.08	9.07	3/22/2019		2.90	362	828
2.28	4.5	3.10	9.71	3/23/2019		2.94	376	983
2.31	4.51	3.11	9.71	3/24/2019		2.95	372	988
2.32	4.52	3.12	9.71	3/25/2019		2.98	375	832
2.35	4.53	3.13	9.71	3/26/2019		3.00	370	757
2.33	4.56	3.15	9.71	3/27/2019		3.00	375	634
2.31	4.54	3.17	9.71	3/28/2019		3.02	238	818
2.32	4.57	3.22	9.71	3/29/2019		3.07	230	846
2.32	4.71	3.27	9.76	3/30/2019		3.08	230	1150
2.41	4.89	3.32	9.76	3/31/2019		3.14	230	1458
2.41	5.01	3.38	10.01	4/1/2019		3.23	234	1842
2.38	5.03	3.42	10.01	4/2/2019		3.29	233	1919
2.38	5.05	3.46	10.05	4/3/2019		3.36	230	1536
2.38	5.03	3.51	10.05	4/4/2019		3.40	234	1309
2.39	5.02	3.56	10.05	4/5/2019		3.43	242	1311
2.38	4.98	3.59	10.20	4/6/2019		3.50	238	1311
2.4	4.94	3.64	10.20	4/7/2019		3.54	232	1692
2.46	4.9	3.66	10.65	4/8/2019		3.62	236	2319
2.46	4.85	3.70	10.97	4/9/2019		3.75	740	2494
2.49	4.79	3.72	11.16	4/10/2019		3.79	756	2359
2.56	4.8	3.76	11.16	4/11/2019		3.83	752	1830
2.61	4.75	3.79	11.16	4/12/2019		3.89	761	1597
2.77	4.68	3.82	11.21	4/13/2019		3.90	749	1440
2.75	4.6	3.84	11.21	4/14/2019		3.92	740	1509
2.97	4.56	3.87	11.49	4/15/2019		3.99	738	1891
3.04	4.49	3.89	11.78	4/16/2019		4.05	746	2354
3.11	4.54	3.95	11.78	4/17/2019		4.13	747	2125
3.16	4.66	3.97	11.78	4/18/2019		4.17	741	1593
3.22	4.82	4.00	11.78	4/19/2019		4.16	760	1596
3.28	4.91	4.01	12.08	4/20/2019		4.24	757	2137
3.3	4.95	4.04	12.57	4/21/2019		4.35	753	2744
3.29	4.97	4.06	12.57	4/22/2019		4.42	743	2428
3.3	4.96	4.07	12.85	4/23/2019		4.45	958	2394
3.39	4.91	4.09	13.13	4/24/2019		4.53	1340	2062
3.4	4.94	4.10	13.13	4/25/2019		4.53	1357	2111
3.4	4.92	4.12	13.13	4/26/2019		4.55	1335	2503
3.42	4.91	4.13	14.71	4/27/2019		4.68	1366	3195
3.43	4.91	4.13	14.76	4/28/2019		4.77	1364	3352
3.42	4.88	4.15	14.76	4/29/2019		4.81	1346	2767
3.43	4.91	4.16	14.81	4/30/2019		4.86	1450	1875
3.42	4.94	4.16	14.81	5/1/2019		4.83	1448	2126
3.44	4.93	4.17	15.13	5/2/2019		4.89	1633	1707
3.5	4.9	4.18	15.18	5/3/2019		4.87	1810	2056
3.48	4.91	4.18	15.52	5/4/2019		4.87	1805	1650
3.54	4.92	4.19	15.52	5/5/2019		4.87	1796	1653
3.53	4.9	4.19	15.52	5/6/2019		4.85	1802	1379
3.56	4.84	4.20	15.52	5/7/2019		4.82	1688	1264
3.58	4.76	4.20	15.62	5/8/2019		4.81	1681	1222
3.58	4.73	4.20	15.62	5/9/2019		4.79	1678	1224
3.57	4.71	4.20	16.01	5/10/2019		4.76	1692	1377
3.55	4.74	4.20	16.21	5/11/2019		4.77	1681	1376
3.55	4.84	4.21	16.21	5/12/2019		4.75	1676	1139
3.51	4.9	4.21	16.21	5/13/2019		4.69	1670	1448
3.5	4.88	4.23	16.85	5/14/2019		4.74	1688	1524
3.51	4.85	4.24	16.85	5/15/2019		4.73	1674	1371
3.51	4.96	4.26	16.85	5/16/2019		4.65	1670	678
3.5	5.18	4.27	17.02	5/17/2019		4.61	1680	528
3.5	5.33	4.28	17.02	5/18/2019		4.58	1683	915
3.5	5.37	4.27	17.02	5/19/2019		4.55	1683	1181
3.58	5.46	4.27	17.54	5/20/2019		4.55	1557	904
3.58	5.44	4.27	17.54	5/21/2019		4.49	1542	1018
3.58	5.47	4.27	17.54	5/22/2019		4.48	1564	708
3.57	5.45	4.26	17.54	5/23/2019		4.44	1548	1093
3.61	5.44	4.27	17.72	5/24/2019		4.43	1548	938
3.62	5.39	4.27	17.72	5/25/2019		4.40	1557	1165
3.61	5.35	4.27	18.17	5/26/2019		4.39	1541	1083
3.62	5.36	4.28	18.17	5/27/2019		4.37	1532	785
3.62	5.32	4.27	18.17	5/28/2019		4.31	1352	1261
3.6	5.26	4.27	19.07	5/29/2019		4.37	1359	1021
3.6	5.22	4.28	19.07	5/30/2019		4.34	1042	1377
3.6	5.24	4.28	19.07	5/31/2019		4.34	1040	498
3.54	5.55	4.29	19.07	6/1/2019		4.30	1022	568
3.53	5.69	4.29	19.07	6/2/2019		4.28	1023	523
3.53	5.83	4.30	19.39	6/3/2019		4.29	675	639
3.51	5.89	4.30	19.39	6/4/2019		4.28	678	256
3.5	5.85	4.30	19.53	6/5/2019		4.24	335	375

WINNIPESAUKEE GRAPH DATA



Historical Lake Level Data.

Current Year Readings

Source: Dam Bureau Records

MSL Correction 500' + Lake Level

1982-2018		1982-2018	Cumulative Precip			Lake Level	Discharge	Estimated Inflow
Minimum Level	Maximum level	Mean Level	in Inches			in Feet	(CFS)	(CFS)
3.51	5.8	4.29	20.43	6/6/2019		4.28	343	1181
3.51	5.84	4.29	20.43	6/7/2019		4.39	336	1564
3.52	5.86	4.29	20.43	6/8/2019		4.40	333	1255
3.55	5.81	4.28	20.43	6/9/2019		4.40	335	533
3.49	5.76	4.25	20.43	6/10/2019		4.40	701	1232
3.46	5.69	4.26	21.11	6/11/2019		4.47	1050	1456
3.55	5.59	4.29	21.21	6/12/2019		4.45	1466	1577
3.54	5.49	4.28	21.21	6/13/2019		4.43	1526	1121
3.43	5.4	4.25	21.57	6/14/2019		4.42	1521	835
3.4	5.35	4.25	21.57	6/15/2019		4.36	1528	678
3.4	5.26	4.24	21.57	6/16/2019		4.32	1515	754
3.37	5.17	4.24	21.80	6/17/2019		4.32	1518	826
3.36	5.2	4.22	21.80	6/18/2019		4.27	1516	824
3.34	5.44	4.22	21.80	6/19/2019		4.23	1509	513
3.33	5.52	4.21	21.80	6/20/2019		4.20	1275	1025
3.3	5.53	4.20	22.52	6/21/2019		4.24	980	774
3.3	5.52	4.19	22.52	6/22/2019		4.19	987	907
3.28	5.48	4.19	22.52	6/23/2019		4.19	985	258
3.28	5.42	4.18	22.52	6/24/2019		4.16	641	448
3.26	5.373	4.16	22.52	6/25/2019		4.15	637	794
3.23	5.3	4.15	23.44	6/26/2019		4.21	644	1561
3.22	5.37	4.14	24.02	6/27/2019		4.28	642	1643
3.21	5.41	4.14	24.02	6/28/2019		4.28	654	1027
3.24	5.34	4.13	24.02	6/29/2019		4.26	634	645
3.3	5.3	4.13	24.22	6/30/2019		4.28	648	913
3.3	5.25	4.12	24.60	7/1/2019		4.30	998	1114
3.27	5.3	4.12	24.60	7/2/2019		4.29	1006	
3.27	5.27	4.12	24.60	7/3/2019		4.26		
3.26	5.16	4.10		7/4/2019				
3.25	5.15	4.09		7/5/2019				
3.25	5.05	4.08		7/6/2019				
3.35	5.02	4.07		7/7/2019				
3.32	4.95	4.06		7/8/2019				
3.27	4.86	4.05		7/9/2019				
3.24	4.77	4.04		7/10/2019				
3.2	4.66	4.03		7/11/2019				
3.2	4.54	4.01		7/12/2019				
3.2	4.48	4.01		7/13/2019				
3.16	4.44	4.00		7/14/2019				
3.15	4.51	3.98		7/15/2019				
3.13	4.53	3.99		7/16/2019				
3.12	4.52	3.98		7/17/2019				
3.11	4.5	3.97		7/18/2019				
3.09	4.47	3.96		7/19/2019				
3.12	4.38	3.95		7/20/2019				
3.08	4.34	3.94		7/21/2019				
3.07	4.31	3.93		7/22/2019				
3.04	4.61	3.92		7/23/2019				
3.05	4.63	3.92		7/24/2019				
3.05	4.62	3.91		7/25/2019				
3.04	4.59	3.90		7/26/2019				
3.05	4.58	3.90		7/27/2019				
3.03	4.55	3.89		7/28/2019				
3.01	4.51	3.88		7/29/2019				
3	4.48	3.88		7/30/2019				
2.98	4.45	3.87		7/31/2019				
2.98	4.45	3.86		8/1/2019				
2.95	4.47	3.85		8/2/2019				
2.9	4.46	3.84		8/3/2019				
2.88	4.45	3.82		8/4/2019				
2.87	4.4	3.82		8/5/2019				
2.84	4.36	3.80		8/6/2019				
2.78	4.35	3.79		8/7/2019				
2.77	4.51	3.78		8/8/2019				
2.74	4.55	3.77		8/9/2019				
2.72	4.55	3.76		8/10/2019				
2.7	4.68	3.76		8/11/2019				
2.69	4.74	3.76		8/12/2019				
2.67	4.73	3.75		8/13/2019				
2.66	4.73	3.74		8/14/2019				
2.72	4.67	3.73		8/15/2019				
2.72	4.63	3.72		8/16/2019				
2.71	4.58	3.70		8/17/2019				
2.68	4.52	3.69		8/18/2019				
2.67	4.47	3.67		8/19/2019				
2.66	4.37	3.66		8/20/2019				
2.64	4.29	3.64		8/21/2019				
2.66	4.25	3.63		8/22/2019				
2.64	4.2	3.61		8/23/2019				

WINNIPESAUKEE GRAPH DATA



Historical Lake Level Data.

Current Year Readings

Source: Dam Bureau Records

MSL Correction 500' + Lake Level

1982-2018		1982-2018	Cumulative Precip		MSL Correction 500' + Lake Level		
Minimum Level	Maximum level	Mean Level	in Inches		Lake Level in Feet	Discharge (CFS)	Estimated Inflow (CFS)
2.63	4.15	3.59		8/24/2019			
2.62	4.12	3.57		8/25/2019			
2.6	4.11	3.56		8/26/2019			
2.58	4.1	3.54		8/27/2019			
2.59	4.06	3.53		8/28/2019			
2.56	4.14	3.53		8/29/2019			
2.53	4.18	3.51		8/30/2019			
2.51	4.18	3.50		8/31/2019			
2.49	4.18	3.48		9/1/2019			
2.47	4.19	3.46		9/2/2019			
2.46	4.14	3.44		9/3/2019			
2.44	4.14	3.43		9/4/2019			
2.43	4.19	3.42		9/5/2019			
2.41	4.28	3.41		9/6/2019			
2.41	4.31	3.40		9/7/2019			
2.41	4.38	3.38		9/8/2019			
2.4	4.37	3.37		9/9/2019			
2.7	4.35	3.37		9/10/2019			
2.66	4.32	3.35		9/11/2019			
2.64	4.27	3.33		9/12/2019			
2.63	4.25	3.32		9/13/2019			
2.59	4.2	3.31		9/14/2019			
2.55	4.14	3.29		9/15/2019			
2.57	4.07	3.28		9/16/2019			
2.55	4	3.28		9/17/2019			
2.56	3.96	3.26		9/18/2019			
2.54	3.9	3.25		9/19/2019			
2.52	3.83	3.24		9/20/2019			
2.51	3.78	3.22		9/21/2019			
2.5	3.81	3.21		9/22/2019			
2.51	3.77	3.20		9/23/2019			
2.51	3.76	3.17		9/24/2019			
2.51	3.72	3.18		9/25/2019			
2.53	3.68	3.18		9/26/2019			
2.52	3.71	3.16		9/27/2019			
2.57	3.72	3.16		9/28/2019			
2.55	3.73	3.15		9/29/2019			
2.53	3.73	3.16		9/30/2019			
2.5	3.71	3.15		10/1/2019			
2.46	3.75	3.14		10/2/2019			
2.45	3.89	3.15		10/3/2019			
2.44	3.91	3.14		10/4/2019			
2.41	3.9	3.13		10/5/2019			
2.39	3.85	3.12		10/6/2019			
2.37	3.85	3.11		10/7/2019			
2.3	3.84	3.10		10/8/2019			
2.31	3.82	3.10		10/9/2019			
2.27	4.05	3.10		10/10/2019			
2.26	4.14	3.10		10/11/2019			
2.27	4.17	3.11		10/12/2019			
2.27	4.13	3.10		10/13/2019			
2.27	4.09	3.11		10/14/2019			
2.27	4.28	3.12		10/15/2019			
2.27	4.75	3.13		10/16/2019			
2.26	4.84	3.13		10/17/2019			
2.27	4.96	3.15		10/18/2019			
2.25	4.97	3.15		10/19/2019			
2.24	4.92	3.15		10/20/2019			
2.24	4.92	3.17		10/21/2019			
2.25	4.87	3.19		10/22/2019			
2.23	4.95	3.19		10/23/2019			
2.21	4.92	3.21		10/24/2019			
2.21	4.95	3.22		10/25/2019			
2.2	5.15	3.23		10/26/2019			
2.15	5.23	3.24		10/27/2019			
2.14	5.24	3.24		10/28/2019			
2.13	5.22	3.24		10/29/2019			
2.1	5.18	3.25		10/30/2019			
2.08	5.16	3.25		10/31/2019			
2.09	5.12	3.25		11/1/2019			
2.08	5.04	3.24		11/2/2019			
2.06	5.01	3.23		11/3/2019			
2.04	4.95	3.23		11/4/2019			
2.04	4.95	3.23		11/5/2019			
2.04	4.8	3.23		11/6/2019			
1.95	4.79	3.22		11/7/2019			
1.98	4.72	3.20		11/8/2019			
1.98	4.69	3.20		11/9/2019			
1.95	4.7	3.19		11/10/2019			

WINNIPESAUKEE GRAPH DATA



Historical Lake Level Data.

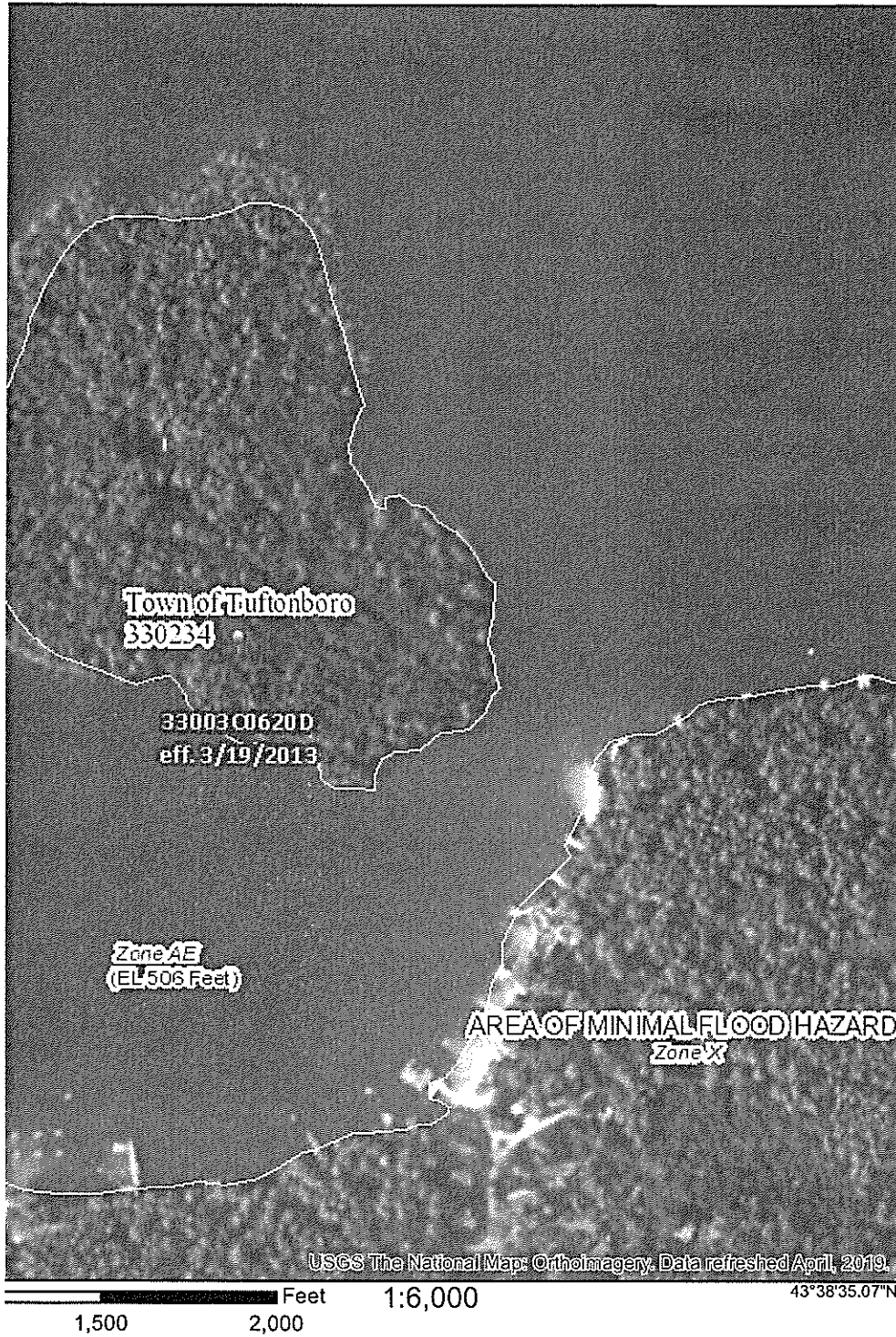
Current Year Readings

Source: Dam Bureau Records

MSL Correction 500' + Lake Level

1982-2018		1982-2018	Cumulative Precip		MSL Correction 500' + Lake Level		
Minimum Level	Maximum level	Mean Level	in Inches		Lake Level in Feet	Discharge (CFS)	Estimated Inflow (CFS)
1.91	4.63	3.20		11/11/2019			
1.88	4.56	3.18		11/12/2019			
1.86	4.56	3.18		11/13/2019			
1.86	4.68	3.18		11/14/2019			
1.85	4.71	3.19		11/15/2019			
1.84	4.7	3.18		11/16/2019			
1.83	4.71	3.19		11/17/2019			
1.8	4.66	3.17		11/18/2019			
1.79	4.68	3.19		11/19/2019			
1.75	4.66	3.18		11/20/2019			
1.74	4.69	3.18		11/21/2019			
1.74	4.56	3.17		11/22/2019			
1.74	4.5	3.16		11/23/2019			
1.73	4.49	3.16		11/24/2019			
1.73	4.5	3.15		11/25/2019			
1.73	4.46	3.15		11/26/2019			
1.72	4.52	3.17		11/27/2019			
1.71	4.48	3.18		11/28/2019			
1.73	4.45	3.18		11/29/2019			
1.76	4.42	3.18		11/30/2019			
1.76	4.39	3.19		12/1/2019			
1.77	4.39	3.19		12/2/2019			
1.76	4.42	3.20		12/3/2019			
1.77	4.39	3.20		12/4/2019			
1.75	4.39	3.20		12/5/2019			
1.75	4.36	3.20		12/6/2019			
1.74	4.34	3.20		12/7/2019			
1.71	4.27	3.19		12/8/2019			
1.73	4.23	3.19		12/9/2019			
1.73	4.2	3.19		12/10/2019			
1.71	4.19	3.19		12/11/2019			
1.72	4.12	3.19		12/12/2019			
1.68	4.09	3.18		12/13/2019			
1.69	4.27	3.19		12/14/2019			
1.72	4.34	3.19		12/15/2019			
1.67	4.35	3.19		12/16/2019			
1.7	4.35	3.18		12/17/2019			
1.73	4.31	3.19		12/18/2019			
1.72	4.27	3.19		12/19/2019			
1.75	4.23	3.18		12/20/2019			
1.7	4.19	3.17		12/21/2019			
1.69	4.15	3.18		12/22/2019			
1.7	4.12	3.19		12/23/2019			
1.72	4.08	3.19		12/24/2019			
1.7	4.03	3.20		12/25/2019			
1.72	4.03	3.20		12/26/2019			
1.69	4.06	3.19		12/27/2019			
1.68	4.04	3.19		12/28/2019			
1.67	4.06	3.19		12/29/2019			
1.66	4.09	3.18		12/30/2019			
1.61	4.06	3.18		12/31/2019			

zard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD		Regulatory Floodway
		0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone 1
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes, Zone X
OTHER AREAS		Area with Flood Risk due to Levee Zone D
		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone
		Channel, Culvert, or Storm Sewer
OTHER FEATURES		Levee, Dike, or Floodwall
		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
MAP PANELS		17.5 Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/6/2019 at 10:12:13 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

JOINS PANEL 0640

48° 36' 00.00" N

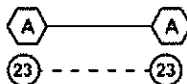
48° 35' 00.00" N

48° 34' 00.00" N

Whiten Brook

feet"

*Referenced to the North American Vertical Datum of 1988



Cross section line

Transect line

45° 02' 08", 93° 02' 12"

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

3100000 FT

5000-foot ticks: New Hampshire State Plane Zone (FIPS Zone 2800), Transverse Mercator projection

489,000m N

1000-meter Universal Transverse Mercator grid values, zone 19

DX5510 X

Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5

River Mile

MAP REPOSITORIES

Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE

FLOOD INSURANCE RATE MAP

March 19, 2013

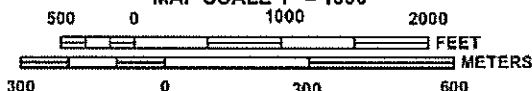
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 1000'



NFP
SURFACE PROGRAM

PANEL 0620D

FIRM

**FLOOD INSURANCE RATE MAP
CARROLL COUNTY,
NEW HAMPSHIRE
(ALL JURISDICTIONS)**

PANEL 620 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MOULTONBOROUGH, TOWN OF	330015	0620	D
TUFTONBORO, TOWN OF	330234	0620	D

(l) For purposes of (b), above, Q shall be the estimated daily flow calculated in accordance with Env-Wq 1008.03(c) or 600 GPD, whichever is greater, except that for campgrounds that existed prior to January 1, 1993, Q may be calculated in accordance with Env-Wq 1008.03(b) so long as no additional lots are created.

(m) Each studio or 1-bedroom apartment shall be figured as 1.5 bedrooms for sewage loading purposes, where a bedroom represents a sewage loading of 150 gallons per day.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

Env-Wq 1005.04 Open Space/Conservation Subdivisions.

(a) Subject to (b), below, the total land area required for a proposed open space/conservation subdivision shall be calculated in accordance with Env-Wq 1005.04(b), where Q is the total combined estimated daily flow of sewage from all proposed structures, calculated as the number of residential structures multiplied by the design flow for each structure or 600 GPD, whichever is greater.

(b) The following shall not be included when calculating the total usable land area of the subdivision:

- (1) The full area of the protective radius of each well; and
- (2) Any other areas required to be deducted pursuant to Env-Wq 1005.02.

(c) Each lot served by an on-lot ISDS shall be of sufficient size to accommodate an EDA of twice the size of the EDA required for the proposed sewage load for that lot as specified in Env-Wq 1016 and any fill extensions associated with the ISDS.

(d) Documents creating an easement for the benefit of the individual lots to permanently protect the area against development that would be inconsistent with the conservation interest instrument requirements specified in Env-Wt 807 shall be submitted to the department with the application for all land areas that:

- (1) Are not part of an individual lot but are otherwise part of the total area required for sewage loading as calculated pursuant to (a), above; or
- (2) Constitute the area required for the protective radius of any well.

(e) The right to use areas dedicated to off-lot ISDS for purposes of wastewater disposal shall be specifically provided by an easement in the deed to the lot. Said rights shall be worded such that they are inseparable from the deed without express written consent from the department and all other governmental agencies having jurisdictional control.

(f) Lot owner responsibility for off-lot ISDS, off-lot water supplies, or both, that are dedicated to the open space/conservation subdivision shall be clearly established in documents submitted to the department and recorded in the chain of title for each lot.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

Env-Wq 1005.05 Lot Width. Each lot in a subdivision other than an open space/conservation subdivision shall be of sufficient width in the areas where the ISDS and the well are to be placed to accommodate all fill extensions specified in Env-Wq 1021.04 and the on-lot protective well radius specified in Env-Wq 1008.08.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES

(b) Subject to Env-Wq 1008.08, the protective area shall be a uniform circle having a radius determined based on the total proposed daily sewage flow, as set forth in Table 1008-4, below:

Table 1008-4: Protected Well Radii for Shallow or Dug Wells or Drilled Bedrock Wells

Daily Sewage Flow (GPD)	Radius (ft.)
0-750	75
751-1440	100
1441-4320	125
4321-14,400	150
14,401-28,800	175
28,801-57,600	200
57,601-86,400	250
86,401-115,200	300
115,201-144,000	350
greater than 144,001	400

(c) A protective well radius that is fully recognized or accorded full recognition by these rules means that the radius shall not be reduced or encroached upon by any septic system component on an abutting lot.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

Env-Wq 1008.07 Protective Well Radii - Uses.

(a) Unless precluded by other state or local regulation, the land surface within a protective well radius may be used for the normal residential or commercial surface activities associated with the structure served by the well, such as buildings, parking areas, recreational activities, and surface water drainage control structures.

(b) No portion of a septic tank, bed, pump chamber, or other such ISDS component shall be within a protective well radius that is accorded full recognition pursuant to Env-Wq 1008.08, except as allowed by Env-Wq 1008.04(c). Pipes connecting such components may be within the protective well radius provided they have an SDR of 26 or equivalent.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

Env-Wq 1008.08 Recognized Extent of Protective Well Radii.

(a) Pursuant to RSA 485-A:30-b, I(b) and (c), the protective well radius shall be contained wholly within the boundaries of any lot created after August 20, 1989, and shall be contained wholly within the boundaries of an existing lot of record to the extent possible. Any protective well radius wholly on the lot shall be accorded full recognition. Where the protective well radius extends across the property line, the portion of the protective well radius on the lot shall be accorded full recognition.

(b) Any portion of a protective well radius extending across a property line onto an easement duly granted by the owner of record of the abutting property and recorded in the registry of deeds for the county in which the property is located shall be accorded full recognition. A copy of the recorded easement shall be submitted with the application.

(c) Any portion of a protective well radius extending across a property line onto land that is precluded from development shall be accorded full recognition without a deeded right to use the abutting property, provided that:

- (1) The use of the abutting property is clearly identified on the plan; and
- (2) The applicant submits a copy of evidence of the development preclusion of the abutting land, as described in (d), below, with the application.

(d) For purposes of (c), above, evidence of development preclusion shall be determined with reference to the reason why the land is precluded from development, as follows:

- (1) Land identified in RSA 227-H:5 shall be evidenced by a copy of the relevant statutory section;
- (2) Land held under the terms of RSA 227-M where the deed precludes development of buildings or subsurface waste disposal systems within the affected area shall be evidenced by a copy of the deed;
- (3) Any surface water or area of very poorly drained soil shall be evidenced by a copy of the portion of a map locating the surface water or very poorly drained soil; and
- (4) Any wetland shall be evidenced by a certification from a permitted designer.

(e) Any protective well radius that extends onto an area precluded from development by other than a recorded easement for the protective well radius shall no longer be recognized by the department as protected if conditions on the abutting lot change to allow development.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

Env-Wq 1008.09 Overlapping Protective Well Radii. Owners of abutting lots may agree to overlap their respective protective well radii for their mutual benefit. In order for the well radii to be accorded full recognition, any such agreement shall be evidenced by cross-easements which shall be duly executed and recorded.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

Env-Wq 1008.10 Non-conforming Protective Well Radii.

(a) Protective well radii shall conform to the requirements in RSA 485-A:30-b.

(b) When the well cannot be installed as shown on the plan due to obstacles of a permanent nature, and the well radius cannot be maintained on-lot or on an area designated in Env-Wq 1008.08 as a result of the alternative placement, the property owner shall, as required by RSA 485-A:30-b, I(g), submit to the department a copy of the amended plan and the recorded standard release form pursuant to Env-Wq 1008.12. The standard release form shall provide written acknowledgment that the consequences of the alternate well location are fully understood by the owner or the owner's agent prior to well installation. Buildings constructed prior to the installation of the well or naturally-occurring geological or topographical features such as ledge outcrops or ravines, which prevent the well construction apparatus from being brought to the designated location, shall be considered obstacles of a permanent nature.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

Env-Wq 1008.11 Recordation of Descriptive Location of Well.

(a) Any time the recognized protective well radius is less than the radius specified in Env-Wq 1008.06, the applicant shall record a narrative description of the actual location of the well which shall include distances and directions from at least 2 permanent features of the lot, such as an iron pin marking a corner boundary or structure foundation.

(b) The description so prepared shall:

- (1) Comply with the requirements of RSA 478:4-a; and
- (2) Be recorded by the owner in the chain of title to the property.

Source. (See Revision Notes #1 and #2 at chapter heading)
#11184, eff 10-1-16

NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES

(b) Minimum lot size, in square feet (ft²), and factors for sewage loading shall be determined based on soil groups and slopes as set forth in Table 1005-1 below, subject to the notes in (c) through (e), below:

Table 1005-1: Minimum Lot Size - Residential, 1 to 4 Bedrooms; Sewage Loading Factors

Soil Group→ Slope ↓	1	2	3	4	5	6
0-8% or A/B	30,000 ft ² 1.0	39,000 ft ² 1.3	48,000 ft ² 1.6	43,500 ft ² 1.45	90,000 ft ² 3.0	See (c)
8-15% or C	33,000 ft ² 1.1	43,000 ft ² 1.43	53,000 ft ² 1.76	48,000 ft ² 1.6	Not Applicable	See (c)
15-25% or D	36,000 ft ² 1.2	46,800 ft ² 1.56	62,000 ft ² 2.08	52,000 ft ² 1.73	Not Applicable	See (c)
25-35% or E	39,000 ft ² 1.3	50,700 ft ² 1.69	72,000 ft ² 2.4	57,000 ft ² 1.90	Not Applicable	See (c)

(c) Very poorly drained soils shall not be counted toward site loading to obtain subdivision approval.

(d) For purposes of determining minimum lot sizes, soil groups shall be as follows:

- (1) Group 1 soils shall be well-drained to excessively well-drained soils with rapid permeability;
- (2) Group 2 soils shall be well-drained soils with moderate permeability;
- (3) Group 3 soils shall be moderately well-drained and well-drained with hardpan;
- (4) Group 4 soils shall be bedrock relatively close to the surface;
- (5) Group 5 soils shall be poorly-drained soils; and
- (6) Group 6 soils shall be very poorly drained soils.

(e) Soil group shall be:

- (1) Determined using the USDA-NRCS web soils survey (WSS), available at <http://websoilsurvey.sc.egov.usda.gov>; and
- (2) Confirmed with one or more test pits dug as specified in Env-Wq 1006.

(f) For individual lots served or proposed to be served by an on-site ISDS and a public water system, the lot size shall be at least 50% of the size shown in Table 1005-1 or 20,000 ft², whichever is larger.

(g) For lots having or proposed to have an on-site water supply with off-lot ISDS, the off-lot area shall meet the required lot size established in accordance with Table 1005-1. In such cases, the lot upon which the structure will be built shall be of sufficient size to accommodate the full protective well radius established by Env-Wq 1008.06.

(h) For lots that have or are proposed to have off-lot ISDS and off-lot public water system, local lot size regulations shall apply.

(i) Where ledge is encountered at less than 4 feet, Group 4 soil lot sizes shall apply.

(j) Manufactured housing park sites with on-site wastewater disposal shall be at least 10,000 ft² multiplied by the factor listed in Table 1005-1.

(k) The minimum lot size for all other commercial and residential subdivisions shall be calculated by dividing the estimated daily flow (Q) of sewage in gallons per day by 2,000 and then multiplying by the sewage loading factor established in Table 1005-1, as indicated in the following formula:

$$\text{Lot Size} = (Q \text{ (gpd)}/2,000 \text{ (gpd/acre)}) \times \text{sewage loading factor}$$

July 11, 2019



Frank Kenison, Director
YMCA Camp Belknap
11 Chase Point Road
Mirror Lake, NH 03853

**RE: Winchester Subdivision Tax Map 40 Lot 2-1
Farm Island, Tuftonboro**

Subject: Environmental Review – 12 Lot Proposed Subdivision

Dear Mr. Kenison:

YMCA Camp Belknap has retained Stoney Ridge Environmental LLC (SRE) to conduct and Environmental Review of the land and immediate surroundings that may be impacted by this proposed 12 Lot Subdivision. This review includes an overview of the existing conditions on site, the lake immediately adjacent to the island, the wetlands on-site, existing wildlife habitat, soils on site and a review of the possible environmental permits that may be required for this large subdivision. As part of this process SRE has reviewed the proposed subdivision plans as submitted to the Town of Tuftonboro, an old subdivision plan that was completed by Doucet Survey and dated March 18, 2010, remotely sensed data and SRE conducted a site walk on Camp Belknap Property on July 8, 2019 in order to gain direct observations of the land and the wildlife. SRE also viewed the island from a boat to understand the overall ecology and interaction of the island with the lake.

General Physiographic Overview

Farm Island is located in 19 Mile Bay in Tuftonboro, NH directly north of Camp Belknap. Clear views of Route 109 and the marina, both located due east can be seen from the island. The island itself, based on a subdivision plan rendered by Doucet Survey and dated March 18, 2010, is currently comprised of two lots, Lot 2-1 at 13.3 acres and Lot 2-2 at 7.5 acres for a total of 20.8 acres. The new proposed subdivision plan by N.H. Land Consultants depicts Lot 2-1 at 13.58 acres and Lot 2-2 at 7.5 acres, for a total of 21.08 acres. It is possible to see the lake from the central portion of the lot to all sides except where the thick evergreens block the view. This is a good way to gauge the size of the island and the potential impacts that can occur from the proposed subdivision.

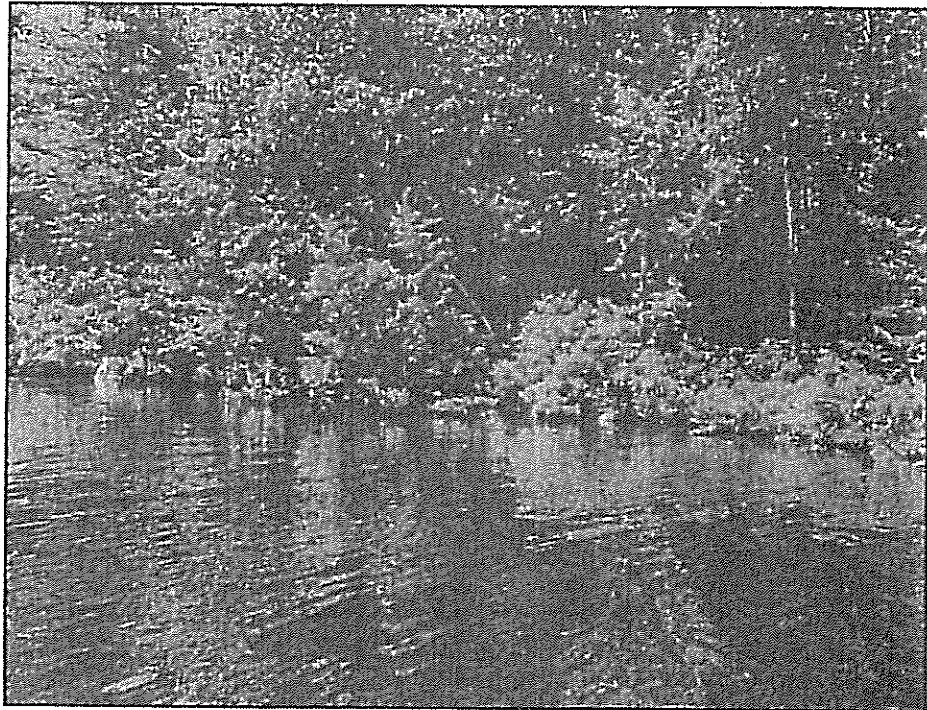
The island, with the exception of the existing house and shed, is completely forested with both deciduous hard woods and evergreen soft woods. The southern portion of the island is dominated by Red Oak, a mast tree, some red maple, with minor components of white pine and hemlock. The understory is mainly comprised of low bush blueberry, high bush blueberry and interrupted fern, wood fern and some other common woodland herbaceous species. The northern portion of the island is dominated by evergreens, mostly eastern hemlock, providing thick cover and large enough to provide a wintering deer yard for the island population of deer. The slopes range from fairly level and gently sloping to some more steeply sloping areas.



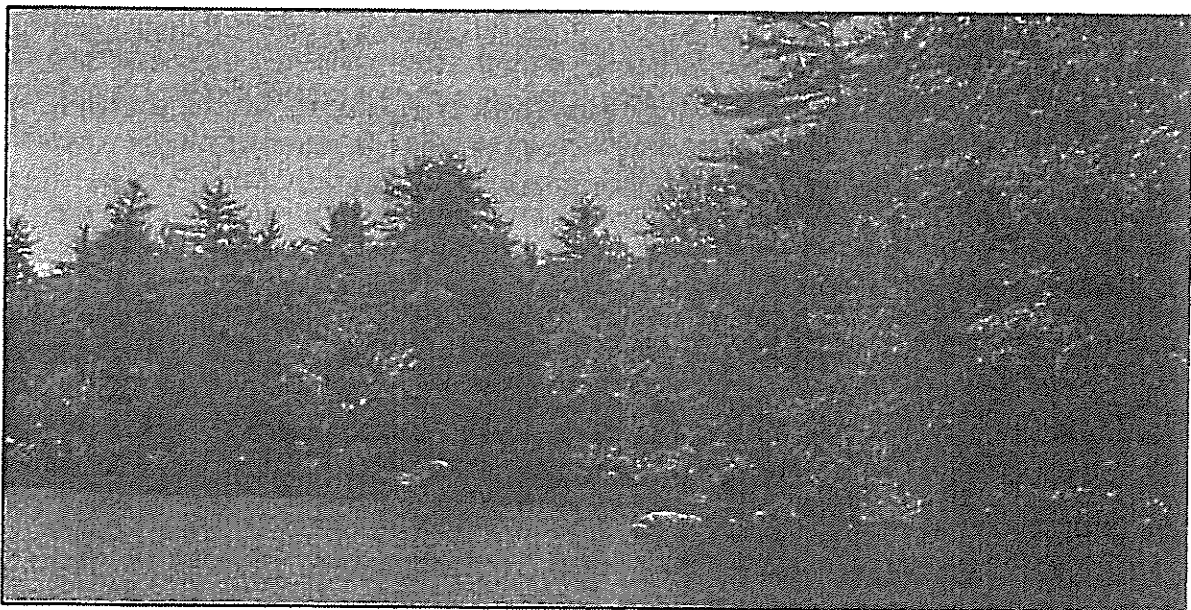
An example of the wooded slopes found on Farm Island.

The area of the lake surrounding the island consists of many different types of habitat that are all elevated due to the undisturbed nature of the island itself. The edges of the island mostly contain thick vegetation, including shrubs and evergreen trees, providing thick dense cover and shade over the water. This shorefront vegetation in addition to the large rocks and boulders and an area of logs in the surrounding waters combined with some small areas of pond weed, provide excellent fish habitat, especially for smaller fish and dace. Turtles, snakes and other reptiles will use the island for reproduction taking advantage of the thick cover and lack of human activity.

View of the bordering vegetative habitat found along Farm Island.



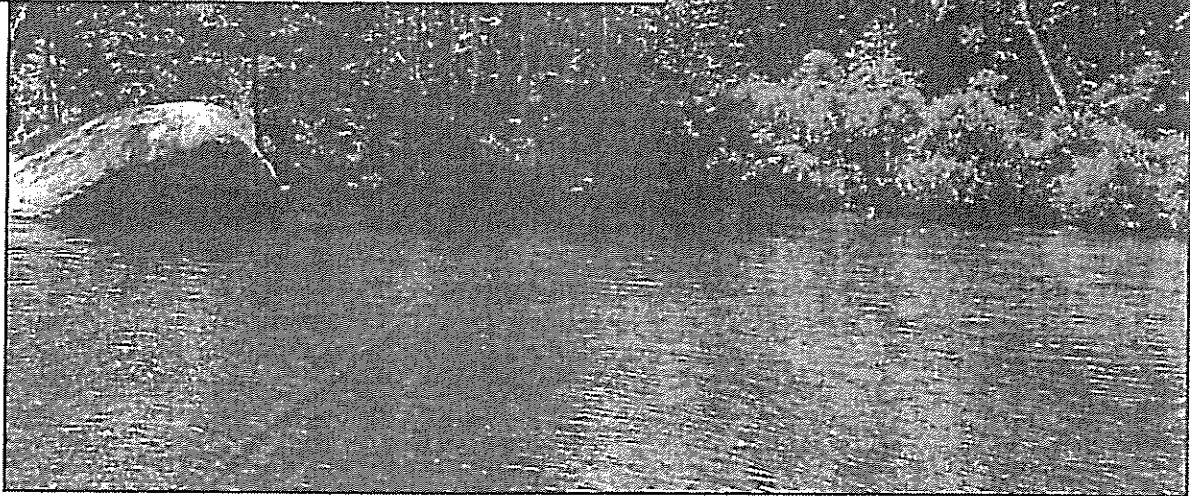
One of the more distinctive features observed in the area of development was a sheltered cove on the east side of the Island. The cove is located along four of the proposed lots, Lot #2-1, Lot #2-10, Lot #2-11 & Lot# 2-12. The shoreline along the cove is heavily vegetated, with overhanging trees and shrubs providing shade along the water's edge and shelter from the wind. Due to the location on the east side of the island, and the points on either side of the cove, the area is well protected from wind, waves and boat traffic traveling down the bay. The relative calm allows for a stable habitat for local fish populations, and provides desirable breeding habitat. Largemouth bass, redbreast sunfish and bluegill are common species found in the lake that nest in shallow waters similar to the observed location. For a successful nesting the males of each species form nests in shallow waters with gravel or sandy substrates. According to the US Fish and Wildlife Service, largemouth bass are intolerant of suspended solids and sediment in their nesting environments. High TSS levels can reduce reproductive success as well as increase stress on the male guarding the nest. Wave action from both boats and wind can furthermore cause nesting failure if the movement deposits sediment over the eggs or collapses the nest walls. Due to the mostly sandy substrate found in the area, it would be a preferred habitat for the redbreast sunfish, whom have a more successful reproduction in sandy environments.



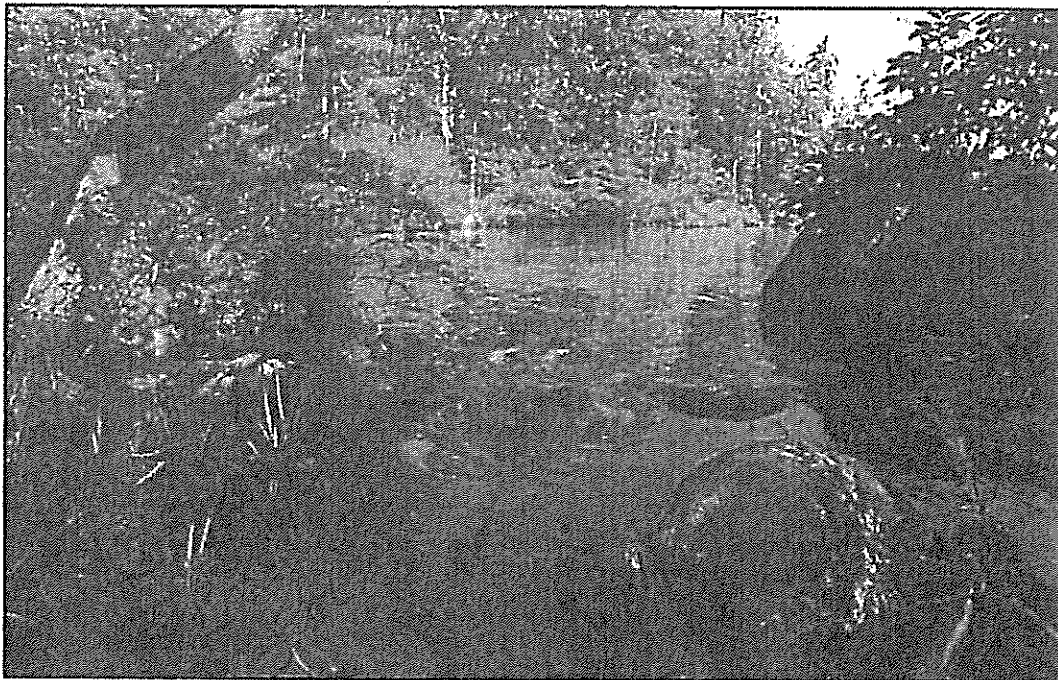
This is a view of the cove area looking south from the northern portion of the island.

The presence of deadfalls and other woody debris fallen from the shore also helps to improve habitat. The structure on the bottom helps to provide shelter to fish fry after they have hatched as well as for macroinvertebrates, which provide a large percentage of these species diets. Given the protection from boat traffic and sheltering effect from the tree cover blocking wind, the area provides beneficial fisheries habitat. The NH Fish & Game Wildlife Action Plan recognizes the importance of this type of habitat and ranks the combination of wooded island habitats surrounded by water in New Hampshire as its Highest Ranked Habitat. (see attachment) The cove also provides a great hunting and food source for species like eagles and hawks and other avian species. The existing mature white pine trees provide roosting and nesting sites.

This cove offers shelter from wind, waves and boat traffic while supplying, vegetative cover, boulders and deadfalls for fish and macroinvertebrate habitat.



The cove also provides quiet, safe potential nesting area for loons. As noted above, the cove is protected from the wind, waves and boat traffic, this provides the quiet environment for loons to reproduce and take care of their young, especially as the island provides the ideal unpopulated buffer to the cove. The development of the four lots and common lake accessory structures like docks and beaches will eliminate the safe breeding grounds providing easy access for predation by common domestic animals and predatory wildlife. The constant boat traffic will discourage nesting and effectively vacate the area of potential future nesting opportunities by loons.



A photograph taken within the cove itself. Note the vegetative dispersion along with the physical structure of the boulders and stones. The lack or limited amount of human activity in this area creates valuable habitat for upland wildlife species, birds, raptors and water-dependent wildlife.

Island Soils

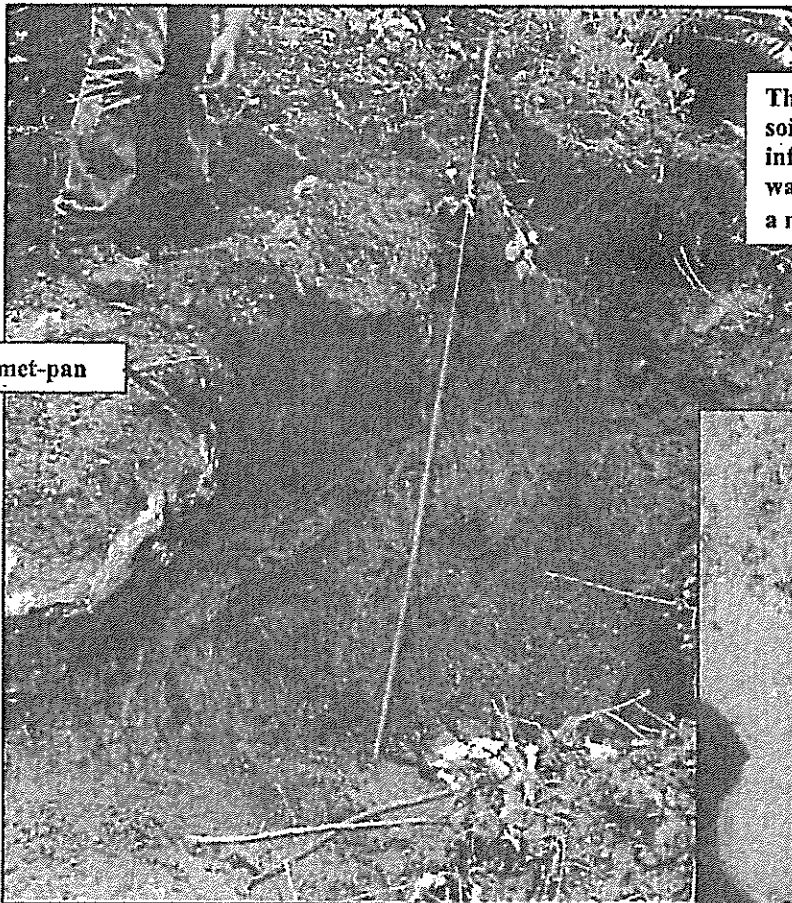
The Island itself is dominantly comprised of dense basal till overlaying ledge. Visually, many areas of the island are speckled with boulders and large stones on the surface. These areas are large enough and common enough that any site specific soil mapping would recognize this condition by utilizing the bouldery and stony descriptors in the soil series name. These boulders and stones extend out into the waters immediately surrounding the island. The NRCS soil mapping units as depicted on the current proposed subdivision plans shows 459B Metacomet fine sandy loam on the southern portion of the island while the northern portion of the island was mapped as a complex of two soils, 980C Henniker-Gloucester. However, based on our site observations and after reviewing the soil test pit data submitted as part of the proposed subdivision the dominant soil type on site is Metacomet which is a moderately well drained soil with high seasonal water tables due to a dense pan. Water movement in the soil profile is also impacted by ledge which was found in the center and in the northeastern portion of the site reaching out into the lake. The soil test pits recorded for the application, in particular Test Pits 4, 5, 6, 7, 8, 9, 10, 11 & 12 are incorrect in the series designation of Henniker-Gloucester. First, a soil test pit cannot be two different named soil types and second, all the test pits recorded by N.H. Land Consultants show a shallow water table of 32 inches or less with a pan making the actual soil type in all the test pits classify as Metacomet Series, a Group 3 Soil. The textural description of silty sand is non-existent by USDA-NRCS soil standards and was erroneously used in every test pit textural description. More than likely this pan horizon probably had a texture of very fine sandy loam.



An example view of the bouldery/stony nature of the topography and soils found on site.

The rough terrain conditions generated by the many boulders, stones and ledge areas coupled with the wet pan soils create difficult construction conditions. Construction will require large

machinery to hammer the large boulders into smaller pieces in order to move and the blasting of ledge may be necessary and if construction is completed in the spring. Metacomet soils tend to be extremely wet and easily rut and compact until after leaf out when the water ponding on the pan subsides. Extra consideration for sediment and erosion control during construction should be part of any development approved at this location due to the sensitivity of the area to impacts from water quality issues. This is especially important when combined with the increase in activity found upstream in the Nineteen Mile Brook Watershed. Currently the island ecology assists in assimilating and diluting the increase in pollutants such as nitrates and chlorides from the nearby Wolfeboro Rapid Infiltration Basin Facility. If improperly designed and maximized to the limit, this development will actually be another source of added nitrates, phosphorous and chlorides. This will add to the cumulative potential water quality issues that will ultimately be reflected in Nineteen Mile Bay. This will increase aquatic invasive species whom specialize in these types of scenarios, out competing native species, impacting boating, fish and wildlife habitat and food supplies and costing municipalities high amounts of money to implement and maintain controls to ensure that boating and swimming can continue.



Metacomet-pan

This is a typical example of Metacomet soils—the dense pan does not allow for infiltration and as a result in the spring water collects on top of the pan creating a muddy mess during construction.



The proposed project as reviewed does not require a NHDES Alteration of Terrain Permit(AoT) because the development is not proposing a road, drainage structures or other infrastructure. The square footage of impact within the NHDES Shoreland Protection Zone will probably crest the AoT threshold of 50,000 sq.ft. but the NHDES AoT program exempts developments with none of the standard infrastructure from having to obtain an AoT Permit. However, the proposed development will need to obtain coverage under the National Pollution Discharge Elimination System (NPDES) USEPA General Construction Permit because more than 1 acre will be disturbed. This will require that a Notice of Intent (NOI) be filed with the EPA, a Stormwater Pollution Prevention Plan be developed and sediment and erosion control be monitored and recorded during the duration of the construction.

Other Required Permitting

All the lots fall under the NHDES Shoreland Water Quality Protection Act, otherwise known as the Shoreland Protection Act. All buildings, accessory structures, septic, wells and any dirt work and tree cutting will have to conform to these rules. This includes limits to impervious areas. It is important to note that the dense pan soils and close locations of ledge are not conducive to infiltration practices and any stormwater control practices incorporated into the development should design practices that work in these conditions to prevent future water quality issues. SRE has included an overlay map of the protected shoreline zones, and where they lay in relation to this development. The Shoreland Protection Act also has cutting restrictions based on a point system within the waterfront buffer. This point system was not developed with island geography in mind. Because of this, the center of the island starting from the 150 foot lake setback line has no restrictions at all with regards to cutting. Based on this, the entire island ecology and landscape can immediately be changed. The current proposed subdivision does not depict the Lake Winnepesaukee Reference Line of 504.32'. The state shoreland setbacks and zones all begin at the 504.32' elevation. SRE has included two plans, one that overlays the proposed subdivision plan and one that overlays an aerial photo of the island. These overlays highlight the proposed subdivision with respect to the shoreland zones and how the lots are affected.

A NHDES Wetlands Permit may be necessary. The current electrical power comes to the island from the mainland via an underground line in the southeast portion of the island where the existing utility easement is shown. The current electrical power supplier does not know if the current power line within the bed of the lake is viable until they look at it and try to send power to it. Assuming the age and condition of this electrical wire is in poor condition, the proposed subdivision will have to submit an application to the NHDES Wetlands Bureau and because the Lake is Public Navigable Waters, the Army Corps of Engineers will also be involved more directly with the permitting process, especially due to the sensitive nature of disturbing lake sediments, fish habitat and potential loon habitat.

Overall Comments

- 1 The density of lots proposed for this subdivision is too much for the type of land and where the land is located. The lot sizes are small and should be increased in size to reflect the type of soil conditions on site, especially for septic purposes.



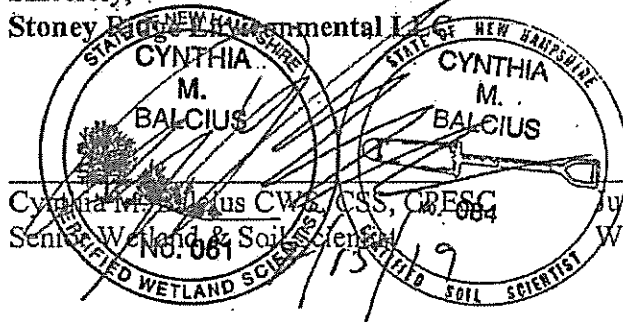
- 2 The area of the cove should be protected and development skewed away from the location. Currently there are four lots that outline the cove location. This will not only displace existing wildlife, it will remove them from the island permanently.
- 3 Tree cutting plans with building footprints should be part of any proposal. The current proposal does not recognize the important ecology and habitat that this island provides. There is no margin for error or 40 acres of forested land to act as a buffer for this development. SRE recommends that a tree cutting plan be considered to protect the mast trees and mature white pine on site as well as the large potential deer yard location within the hemlock dominated area located on the northern side of the island. Further, this cutting plan can decrease the potential for water quality violations on site.
- 4 Whether the lots are developed simultaneously or individually, a solid construction sequence and sediment and erosion control measures specific to each lot's different conditions and physical characteristics should be required.

The current proposed development density will change the island ecology forever. If permanent preservation is not an option, decreasing the allowed density, controlling boat traffic to one area of the island (ie. joint beach and docking facilities), and minimizing the tree cutting can assist in decreasing the overall impact. Once lots are created, every lot will be entitled to a dock, a beach and accessory structures in addition to the houses, septic, sheds etc... This planning phase is an opportunity to measure all the potential impact and instead design a less intense and more environmentally sound development that doesn't exterminate the current ecology, but instead works within it, preserving the rare attributes, protecting the fragile island ecology and habitat that all users of the lake enjoy.

If you have any additional questions or comments regarding this report, please feel free to contact one of us at (603) 776-5825.

Sincerely,

Stoney Ridge Environmental LLC

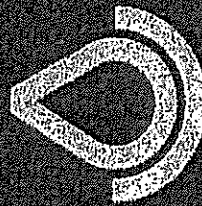


Justin Sherman
Justin Sherman
Wetland & Stream Ecologist



Field Book for Describing and Sampling Soils

Version 3.0



National Soil Survey Center
Natural Resources Conservation Service
U.S. Department of Agriculture
Lincoln, Nebraska

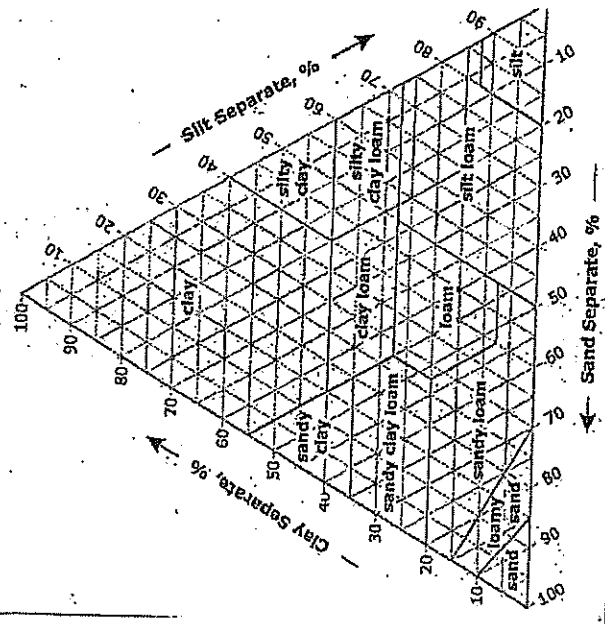
For fragments ≥ 76 mm in diameter, visually estimate the volume percent, which is then converted to a weight basis using the estimated particle density (p) and bulk density (B_d).

TEXTURE CLASS

Texture Class or Subclass	Code
Coarse Sand	cos
Sand	s
Fine Sand	fs
Very Fine Sand	vfs
Loamy Coarse Sand	lcos
Loamy Sand	ls
Loamy Fine Sand	lfs
Loamy Very Fine Sand	lvfs
Coarse Sandy Loam	cosl
Sandy Loam	sl
Fine Sandy Loam	fsl
Very Fine Sandy Loam	vfs
Loam	l
Silt Loam	sil
Silt	si
Sandy Clay Loam	scl
Clay Loam	cl
Silty Clay Loam	sicl
Sandy Clay	sc
Silty Clay	sic
Clay	c

No Silty Sand

(Soil) Textural Triangles:
Fine Earth Texture Classes (—)



TEXTURE MODIFIERS—Conventions for using "Rock Fragment Texture Modifiers" and for using textural adjectives that convey "% volume" ranges for Rock Fragments - Quantity and Size.

Rock Fragment Modifier Usage	Frag. Content Vol. %
No texture class modifier (noun only; e.g., loam)	<15
Use fragment-size adjective with texture class; e.g., gravelly loam.	15 to <35
Use "very" with fragment-size adjective with texture class; e.g., very gravelly loam.	35 to <60
Use "extremely" with fragment-size adjective with texture class; e.g., extremely gravelly loam.	60 to <90
No adjective or modifier. If $\leq 10\%$ fine earth, use the appropriate fragment-size class name for the dominant size class; e.g., gravel. Use Terms Use in Lieu of Texture (see table on p. 2-43).	≥ 90

USDA-NRCS

2-38

September 21

September, 2012

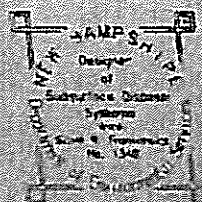
2-37

USDA-NRCS

W. H. RAYMOND
H. C. RAYMOND

impossible
a contour
to go into
water
in come
back out of
the water

PROPOSED PROPERTY INFORMATION			
LOT#	AREA	FRONTAGE	UPLAND AREA
#2-1	72,354 SF (1.08 Ac)	150'+	74,000 SF (1.03 Ac)
#2-3	47,288 SF (1.09 Ac)	150'+	47,288 SF (1.08 Ac)
#2-4	45,999 SF (1.08 Ac)	150'+	45,994 SF (1.04 Ac)
#2-5	45,176 SF (1.04 Ac)	150'+	43,888 SF (1.01 Ac)
#2-8	47,978 SF (1.10 Ac)	350'+	45,588 SF (1.00 Ac)
#2-7	48,526 SF (1.07 Ac)	160'+	43,684 SF (1.00 Ac)
#2-8	45,799 SF (1.05 Ac)	200'+	44,495 SF (1.02 Ac)
#2-9	45,038 SF (1.03 Ac)	350'+	43,755 SF (1.00 Ac)
#2-10	58,692 SF (1.38 Ac)	150'+	57,887 SF (1.13 Ac)
#2-11	40,398 SF (1.13 Ac)	260'+	42,814 SF (1.00 Ac)
#2-12	43,830 SF (1.00 Ac)	150'+	43,628 SF (1.00 Ac)
#2-13	43,684 SF (1.01 Ac)	300'+	43,582 SF (1.00 Ac)



N.H. LAND
Consultants

PROPOSED CONDOMINIUM
TAX MAP 420, LOT 1
TULFORD, NH 03085
AT NH REALTY TRUST, LLC
& R NH REALTY TRUST, LLC
BRANDY OWEN & CYNTHIA PRATT
DONALD & JOHN WINCHESTER

CARROLL DO
JOS HQ 000500
DATE APR 24 20
PC-
52 3-

Map by NH GRANIT



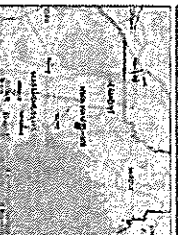
Legend

- State
- County
- City/Town
- WAP 2015: Highest Ranked Wildlife Habitat
- Not For Ranked
- Highest Ranked Habitat in NH
- Highest Ranked Habitat in Region
- Dispersed Landscapes

Map Scale
1: 10,514

© NH GRANIT, www.granit.us
Map Generated: 7/15/2019

Notes



LOCATION METACOMET

NH+MA NY

Established Series

ANA, PBW

04/2016

METACOMET SERIES

The Metacomet series consists of moderately well drained soils that formed in a loamy mantle overlying sandy dense till or loamy dense till characterized by a sandy component on drumlins and glaciated uplands. They are moderately deep to a densic contact and very deep to bedrock. Estimated saturated hydraulic conductivity is moderately high or high in the solum and moderately low to high in the substratum. Slope ranges from 0 to 25 percent. Mean annual precipitation is about 45 inches, and mean annual temperature is about 43 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, frigid Aquic Dystrudepts

TYPICAL PEDON: Metacomet fine sandy loam, on a 3 percent east facing slope in a stony forested area. (Colors are for moist soil.)

Oe--0 to 1 inch; very dark gray (7.5YR 3/1) moderately decomposed plant material. (0 to 4 inches thick)

Ap--1 to 9 inches; dark yellowish brown (10YR 3/4) fine sandy loam; weak fine subangular blocky structure; very friable; common fine and medium roots; 1 percent gravel; very strongly acid; abrupt wavy boundary. (1 to 9 inches thick)

Bw1--9 to 19 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 5 percent gravel; strongly acid; clear wavy boundary.

Bw2--19 to 25 inches; light olive brown (2.5Y 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; 5 percent gravel; few fine faint dark yellowish brown (10YR 4/6) masses of iron accumulation and few medium prominent light olive gray (5Y 6/2) iron depletions; moderately acid; clear smooth boundary. (Combined thickness of the Bw horizons is 7 to 30 inches)

BC--25 to 34 inches; light olive brown (2.5Y 5/6) gravelly loamy sand; massive; friable; few medium and fine roots; 17 percent gravel; few fine and medium faint dark yellowish brown (10YR 4/6) masses of iron accumulation and few medium prominent light olive gray (5Y 6/2) iron depletions; moderately acid, abrupt wavy boundary. (0 to 12 inches thick)

Cd1--34 to 50 inches; light yellowish brown (2.5Y 6/3) sandy loam with 20 percent thin lenses of loamy fine sand and loamy sand; weak medium plates structure with firm consistence in 30 percent of horizon, friable in 70 percent; common fine and medium vesicular pores; 10 percent gravel; common fine and medium prominent yellowish red (5YR 4/6) masses of iron accumulation and few medium faint light

olive gray (5Y 6/2) iron depletions; slightly acid; clear wavy boundary.

Cd2--50 to 65 inches; light yellowish brown (2.5Y 6/3)sandy loam with 20 percent thin lenses of loamy fine sand and loamy sand; weak medium plates with firm consistence in 50 percent of horizon, friable in 50 percent; common fine and medium vesicular pores; 5 percent gravel; common fine and medium prominent dark yellowish brown (10YR 4/6) masses of iron accumulation and common coarse distinct gray (5Y 6/1) iron depletions; slightly acid.

TYPE LOCATION: Merrimack County, New Hampshire, Town of Salisbury, 3500 feet south of the intersection of Rte 127 and a powerline, about 1250 feet west of the powerline. USGS Webster quadrangle; latitude 43 degrees 21 minutes 59 seconds N and longitude 71 degrees 43 minutes 31 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 15 to 36 inches. Depth to densic materials is 20 to 38 inches. Rock fragments range from 0 to 30 percent in the A horizon, 5 to 30 percent in the B horizon, and from 5 to 55 percent in the C horizon. Rock fragments are dominantly granitic and gneissic gravel. Unless limed, reaction ranges from extremely acid to moderately acid in the solum, and strongly acid to slightly acid in the substratum.

The O horizon has hue of 2.5YR to 10YR, value of 2 to 4, and chroma of 1 or 2. It is fibric, hemic, or sapric material.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Texture is very fine sandy loam, fine sandy loam, or sandy loam in the fine earth fraction. Undisturbed pedons have an A horizon that has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 to 4.

Some pedons have a thin E horizon that has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Texture is fine sandy loam, sandy loam, or loamy fine sand in the fine earth fraction.

The Bw horizon has hue of 2.5Y or 10YR, value of 3 to 6, and chroma of 3 to 8. The upper part is very fine sandy loam, fine sandy loam, or sandy loam in the fine earth fraction. The lower part is fine sandy loam or sandy loam in the fine earth fraction. Redoximorphic features in the lower part of the Bw horizon are few to many.

The BC horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 3 to 6. Texture is fine sandy loam, sandy loam, loamy fine sand, or loamy sand, in the fine earth fraction. Redoximorphic features are common or many.

Some pedons have a C horizon that has hue of 2.5Y, value of 4 to 6, and chroma of 2 to 4. Texture is sandy loam, loamy fine sand, or loamy sand in the fine earth fraction. Redoximorphic features are few to many. The C horizon is up to 12 inches thick.

The Cd horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 2 to 4. Texture in the fine earth fraction is loamy fine sand or loamy sand, or it is fine sandy loam or sandy loam with at least 20 percent subhorizons or lenses of loamy fine sand or loamy sand. Sandy lenses are 1/8 inch to 2 inches thick and are friable to loose. In some pedons the lenses are coarse, medium, or fine sand. Consistence is firm or very firm in more than 20 percent of subhorizons. Individual aggregates are friable or firm when removed. Plates are weak or moderate, thin to thick, or the horizon is massive. Redoximorphic features in the Cd are few to many.

COMPETING SERIES: These are the Ashfield, Beechwood, and Middlebrook series. Ashfield soils have rock fragments that are mostly dark colored micaceous schist and have more very fine sand, silt and clay in the Cd horizon. Beechwood soils are from outside Region R. They formed in eolian deposits overlying friable till. Ashfield soils have loamy densic materials with less than 20 percent sandy lenses or subhorizons. Middlebrook soils are moderately deep to bedrock and have rock fragments that are mostly sandstone, siltstone and shale.

GEOGRAPHIC SETTING: Metacomet soils are on drumlins and glaciated uplands. Slope ranges from 0 to 25 percent. The soils are on nearly level to gently sloping tops of broad ridges and drumlins, and on gently sloping to moderately steep back slopes, foot slopes, and toe slopes. The soils formed in stony till of Wisconsin age derived from granitic and gneissic rocks. Mean annual temperature ranges from 40 to 45 degrees F. Mean annual precipitation ranges from 40 to 50 inches. The frost-free period ranges from 90 to 160 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Becket, Henniker, Pillsbury, Peacham, and Skerry soils. The well drained Henniker soils, somewhat poorly and poorly drained Pillsbury soils, and very poorly drained Peacham soils are in a drainage sequence with Metacomet soils. Becket and Skerry soils have spodic horizons and generally occur at higher elevations.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately well drained. Estimated saturated hydraulic conductivity is moderately high or high in the solum and moderately low to high in the substratum.

USE AND VEGETATION: Most of these soils are forested. Principle species include red maple, sugar maple, white oak, red oak, yellow birch, paper birch, eastern white pine, and eastern hemlock. Areas cleared of trees and stones are used primarily for orchards, hay, and pasture.

DISTRIBUTION AND EXTENT: Massachusetts, Massachusetts and New Hampshire; MLRA 144A and 144B. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Fulton County, New York, 2007.

REMARKS: The Metacomet series is established to recognize frigid Aquic Dystrudepts formed in dense, "sandy" till. The concept of sandy till includes Cd horizons that are sandy as well as those that are loamy but have greater than 20% of the fabric of the till as sandy lenses or subhorizons. The densic material has non-pedogenic structure described as plates.

Diagnostic horizons and features recognized in this pedon include:

1. Ochric epipedon - the zone from 0 to 9 inches (Oe and Ap horizons).
2. Cambic horizon - the zone from 9 to 34 inches (Bw1, BW2, and BC horizons).
3. Aquic feature - redox depletions with in 24 inches of the surface (Bw2 horizon).
4. Densic contact - at 34 inches.
5. Densic materials - The zone from 34 to 65 inches (Cd1 and Cd2 horizons).

National Cooperative Soil Survey
U.S.A.



New Hampshire Natural Heritage Bureau

To: Kyle Macdonald
229 Prospect Mountain Road
Alton, NH 03809

Date: 7/15/2019

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 7/15/2019
NHB File ID: NHB19-2205

Applicant: Seth Kassels

Location: Tax Map(s)/Lot(s):
Tuftonboro

Project Description: The Applicant is proposing a subdivision.

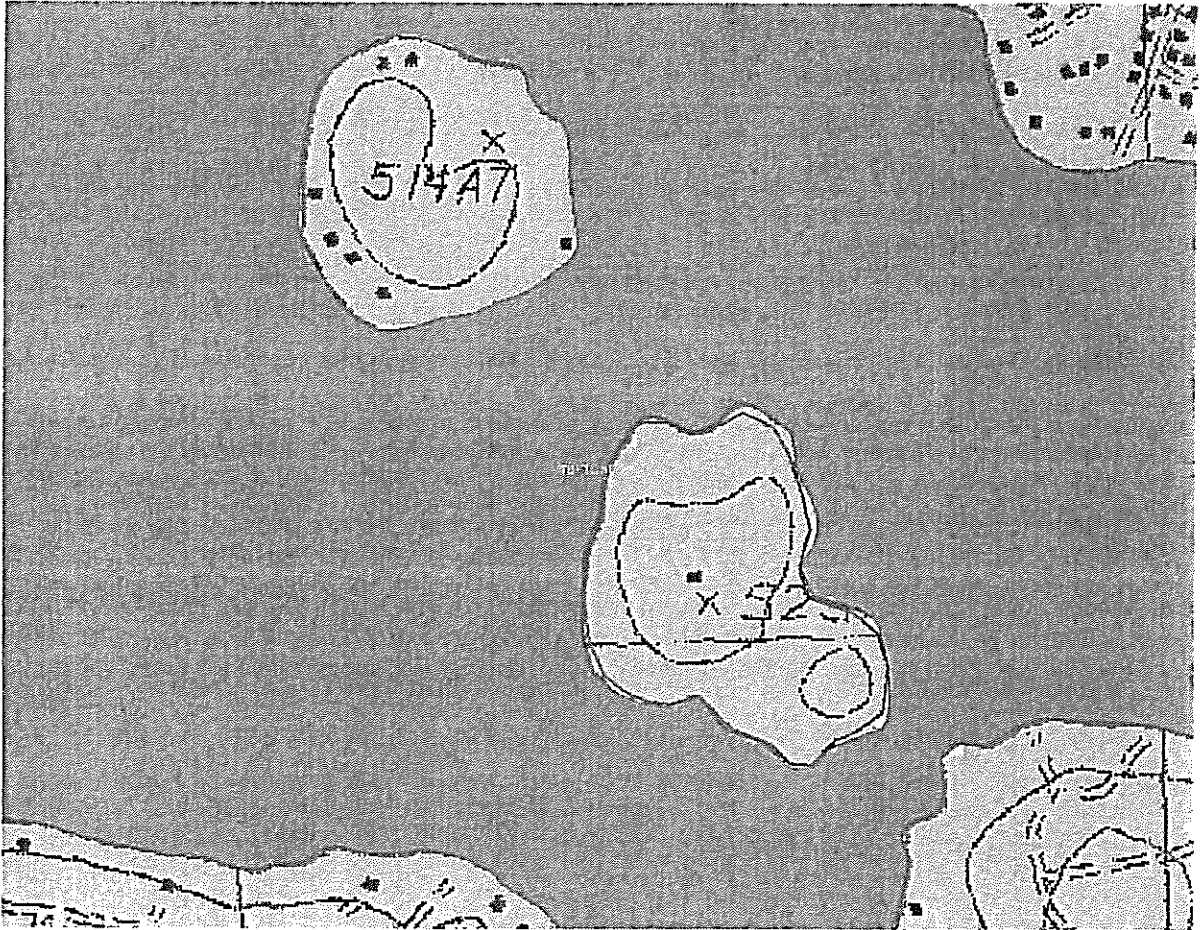
The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

This report is valid through 7/14/2020.



MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB19-2205



SHORELAND WATER QUALITY
PROTECTION ACT LEGEND

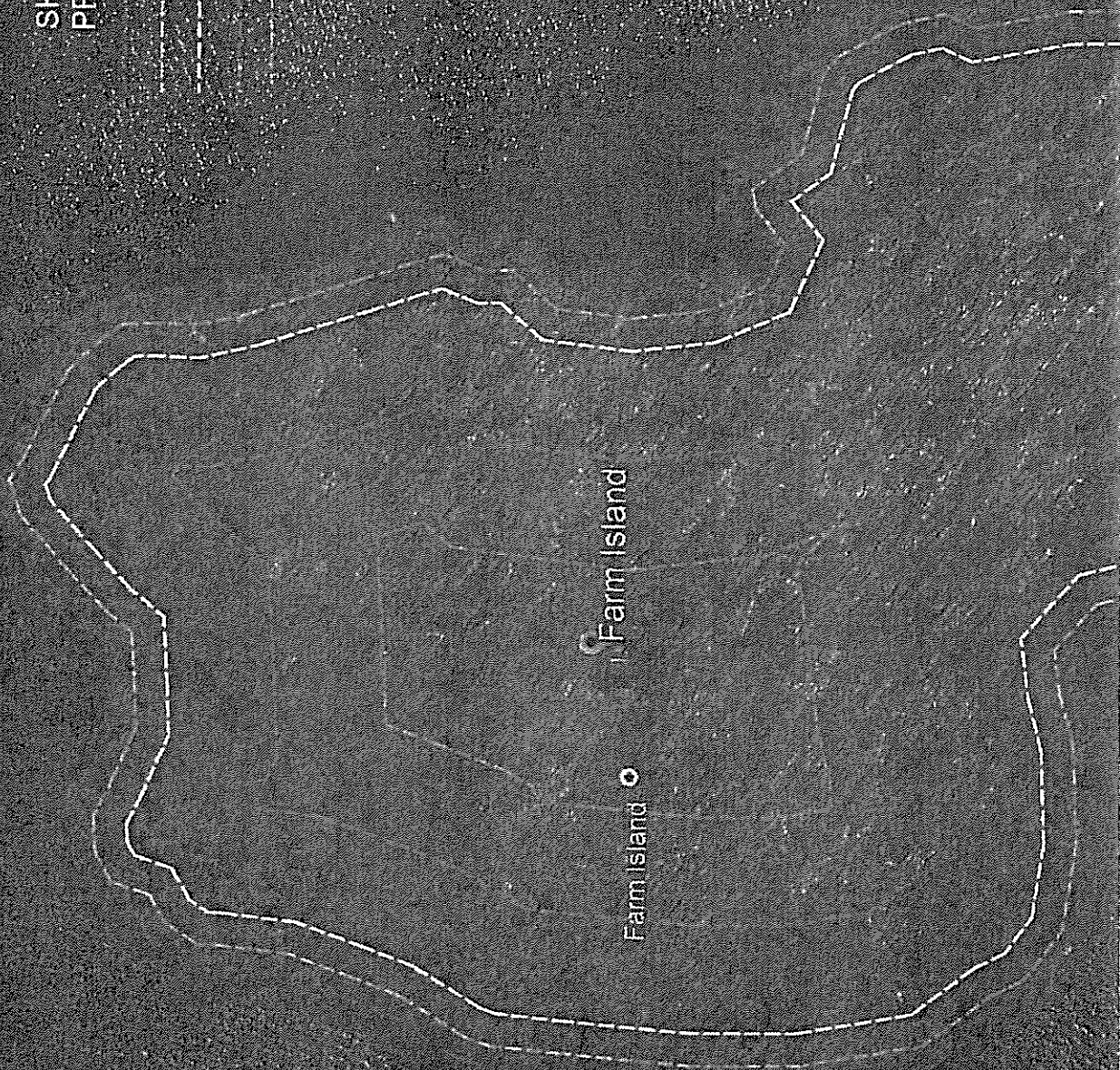
Edge of Water

20' Accessory Structure Setback

50' Primary Structure Setback

150' Woodland Buffer Setback

250' Protected Shoreland



To: Tuftonboro Planning Board Chairman Matt Young and Board Members

From: Francis W. Laase and Ellen Laase
5 Bay Road
Tuftonboro, N.H. (Mirror Lake P.O.) 03853

Date: July 18, 2019

Re': Agenda Item III
David Winchester, Donald Winchester, and John Winchester and
C&R NH Reality Trust, LLC

We wish to make a part of the public record our objection to the proposed 12 acre lot subdivision of Farm Island located in 19 Mile Bay.

First let me say, however, that we are not making an objection to the Winchester Family's right to sell the island they have held for so many years and maintained without developing. Their willingness to keep this island in a natural state has been appreciated and respected by the 19 Mile Bay Family for these many years.

Our objection is to the drastic change from Current Use Conservation to a 12 acre subdivision.

We want to share with the Board why we believe this is not the time for such a change of use for Farm Island.

My wife and I have participated with the UNH Lakes Lay Monitoring Program for the past 23 years. During the summer months we collect water samples from 19 Mile Bay Site A and Site B. The purpose of this volunteer water quality monitoring is to assist the N.H. Department of Environmental Services and the UNH Freshwater Biology Group to collect samples and record data. This information is available from both NHDES and UNH, but let me provide a quick look at what data and information is available.

Document # 1

2017 Sampling Sites and Seasonal Average Water Clarity

You will notice that 19 Mile Bay site A and B at 13.5 feet and 15.1 feet clarity is less clear than 20 Mile Bay at 18 feet and Museum at 24.3 feet clarity.

The second page of the document shows 2017 Sampling Highlights and that the Dissolved Oxygen is shown in Red = Poor= Eutrophic

Water Transparency, Chlorophyll is shown in Blue=Excellent= Oligotrophic

Total Phosphorus is shown in Blue as well at 7.9 only .1 from the

Yellow = Fair= Mesotrophic

These Stations are identified with appropriate numbers for further research.

A 12 acre subdivision and development with 12 new septic systems so closely located to each other on these 12 acres in 19 Mile Bay can only accelerate the degradation of the water quality in the Bay.

Document # 2

Shows a map of the area with Tuftonboro Milfoil presence. Chemical treatment has occurred in 19 Mile Bay at least twice to my knowledge. With an addition of at least 12 boats and docks and the use of barges during the building and developing phase the potential for existing milfoil to spread is a concern. The disruption of milfoil, no matter how small, causes spreading of the milfoil, according to Amy Smugula, DES Inspector.

Document # 3

A Communication from the Lake Winnepesaukee Association October 2018

Moultonborough Bay and Winter Harbor Watershed Management Plan
Indicating the perceived impairments and problems in the Watershed.
Note the Pubic Beach under item 1 and see item 6 Are there any threats to future conditions, such as accelerated development patterns ?
Certainly this 12 acre subdivision on Farm Island is a perceived threat. The survey of the watershed and field reconnaissance has started and is currently ongoing as recent as this week.

Document # 4

Site Specific Project Plan for Moultonborough Bay and Winter Harbor Watershed
Management Plan
October 29, 2018
Under the NH Nonpoint Source Grant Program

See page 6 regarding the concern and potential threat to the Bay from the Rapid Infiltration Wastewater Disposal System located in Wolfeboro just over the Tuftonboro Town line. A seven-mile stretch of 19 Mile Brook outlets to 19 Mile Bay could be affected after slope failures and groundwater seeps discovered within six weeks of operation. Again this is an ongoing study not yet completed.

Document # 5

Board of Selectmen Meeting Minutes Feb. 4 2019
Re': Appointments : Normandeau Associated Inc.
To study the impact to 19 Mile Brook as a result of the town of Wolfeboro's operation of the RID discharge. This study is not yet completed.

Document # 6

Normandeau Associates

19 Mile Brook Watershed Baseline Environment Assessment Project No. 24254.000

Copied in part: Special attention to page 15 "19 Mile Brook.....since 2009, indirectly received nearly all of the Wolfeboro Rapid Infiltration Basin facility wastewater discharge through groundwater infiltration adjacent to the brook....."

Document # 7

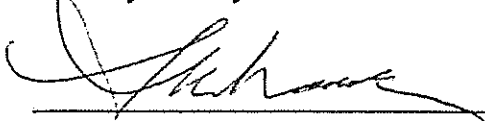
Town Beach Redesign Work Sheet and article from the Tuftonboro Times Winter 2019.

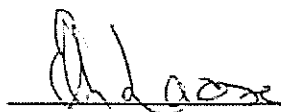
Design of work to be started at the Town Beach at 19 Mile Bay to improve the drainage and erosion problems that have been ongoing at the public beach. A perched beach retaining wall is proposed.

All these are ongoing environmental studies and work in the 19 Mile Bay area along with the continued water monitoring by Aries Engineering, Inc. that has been taking place at a number of monitoring wells since 2000 for PCE contaminates. PCE contaminates were released as a result of a fire in 1989 from a plastic bag printing business. Four families on Bay Road have lost their well water supply since 2002, including the Laase Family.

We urge you not to approve this subdivision and development until all of these ongoing studies have been completed. The Planning Board, Developer, 19 Mile Bay and area property owners and residents, town beach swimmers as well as the entire town of Tuftonboro needs and deserves to have these reports and recommendations prior to your approval to this subdivision.

Thank you for your consideration.

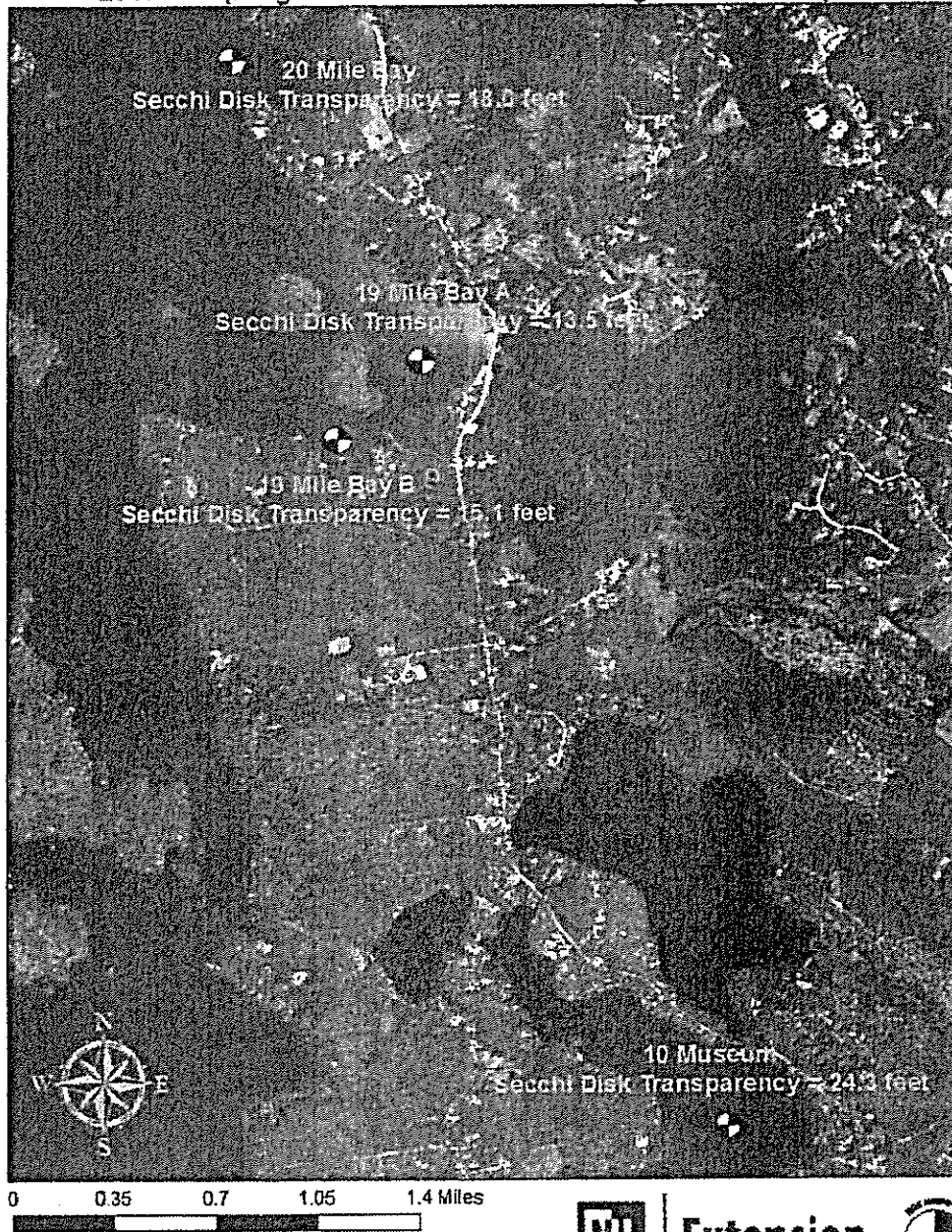


Francis W. Laase

Ellen Laase

Figure 7. Lake Winnepesaukee Tuftonboro, NH

2017 sampling sites and seasonal average water clarity



Aerial Orthophoto Source: NH GRANIT
Site location GPS coordinates collected by the UNH Center for Freshwater Biology



Extension



Test Site depth & Clarity

19 mile A Site

depth: 36 feet

Average Clarity: 13.5

19 mile Bay B Site

depth: 21.3 feet

Average Clarity 15.1 f

Compare with the
Test Sites

20 mile Bay 18.0

Museum 24.3 f

LAKE WINNIPESAUKEE

(TUFTONBORO)

2017 SAMPLING HIGHLIGHTS

Station 20 Mile Bay

Tuftonboro, NH



Extension

Blue = Excellent =
Oligotrophic

Gray = Fair =
Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

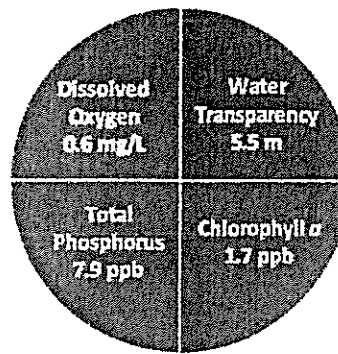


Figure 1. 20 Mile Bay Water Quality (2017)

Station 20 Mile Bay (Figure 7) was used as a reference point to represent the water quality near 20 Mile Bay. Water quality data displayed in Tables 1, 2 and 3 were collected in the surface waters with the exception of the dissolved oxygen data that were measured near the lake bottom.

Table 1. 2017 Lake Winnepesaukee Seasonal Averages and NH DES Aquatic Life Nutrient Criteria¹

Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	20 Mile Bay Average (range)	20 Mile Bay Classification
Water Clarity (meters)	4.0 – 7.0	2.5 – 4.0	< 2.5	5.5 meters (4.5 – 6.6)	Oligotrophic
Chlorophyll <i>a</i> ¹ (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 14.9	1.7 ppb (1.1 – 2.8)	Oligotrophic
Total Phosphorus ² (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 21.0	7.9 ppb (5.2 – 14.9)	Oligotrophic
Dissolved Oxygen (mg/l)	5.0 – 7.0	2.0 – 5.0	< 2.0	0.6 mg/L (0.4 – 1.4)	Eutrophic

¹ Dissolved oxygen concentrations were measured on August 24, 2017 between 12.0 and 16.0 meters, in the bottom waters.

Table 2. 2017 Lake Winnepesaukee Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					20 Mile Bay Average (range)	20 Mile Bay Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	20.1 color units (range: 10.7 – 31.0)	Lightly tea colored
Alkalinity (mg/L)	< 0.0 acidified	0.1 – 2.0 extremely vulnerable	2.1 – 10 moderately vulnerable	10.1 – 25.0 low vulnerability	> 25.0 not vulnerable	8.0 mg/L (range: 7.5 – 8.4)	Moderately Vulnerable
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			7.3 units (range: 7.3 – 7.3)	Optimal range for fish growth and reproduction
Specific Conductivity (uS/cm)	< 50 uS/cm Characteristic of minimally impacted NH lakes		50–100 uS/cm Lakes with some human influence		> 100 uS/cm Characteristic of lakes experiencing human disturbances	75.4 uS/cm (range: 75.1 – 75.7)	Characteristic of lakes with some human influence

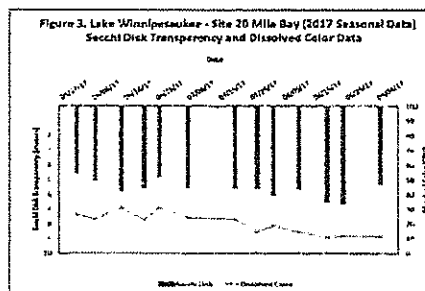
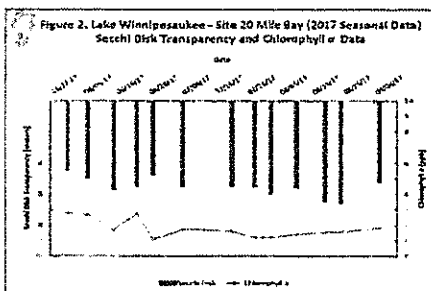


Figure 2 and 3. Seasonal Secchi Disk transparency, chlorophyll *a* and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll *a* and/or color concentrations.

Stations:

A 43,648644 - 71,281807

B 43,644836 71,287661

19 mile Bay Stations:

A WMO- 19 AL

B WMO 19 BL

* 2015
307 Reading
Since 5/28/19
to
9/7/2015

LONG-TERM TRENDS

WATER CLARITY: Tuftonboro – Site 20 Mile Bay water clarity measurements, measured as Secchi Disk transparency, display a trend of decreasing water clarity over the twenty-six years of water quality monitoring between 1992 and 2017 (Figure 4).

CHLOROPHYLL: Tuftonboro – Site 20 Mile Bay chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, have oscillated among years but have been relatively stable over the twenty-six years of water quality monitoring between 1992 and 2017 (Figure 4).

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The 20 Mile Bay total phosphorus measurements have oscillated among years but have been relatively stable over the twenty-four years of water quality monitoring between 1994 and 2017 (Figure 4).

COLOR: The 20 Mile Bay color data, the result of naturally occurring "tea" colored substances from the breakdown of soils and plant materials, have oscillated among years but display an increasing trend over the twenty-six years of water quality monitoring between 1992 and 2017 (Figure 4).

Figure 4. Lake Winnepesaukee - Site 20 Mile Bay (1992-2017)
Long-term Secchi Disk Transparency and Chlorophyll *a* Data

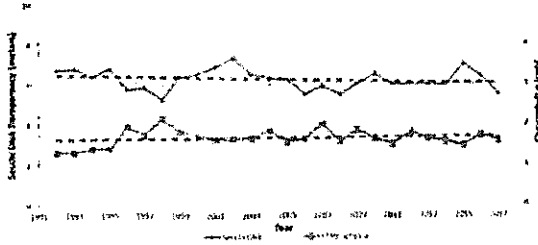


Figure 5. Lake Winnepesaukee - Site 20 Mile Bay (1992-2017)
Long-term Total Phosphorus and Dissolved Color Data



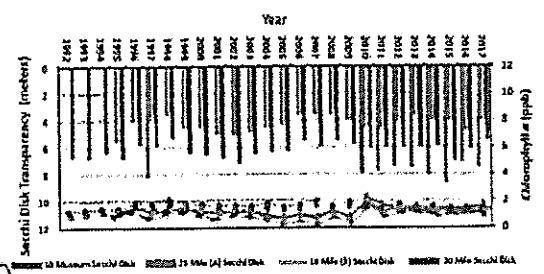
Table 3. Lake Winnepesaukee Seasonal Average Water Quality Inter-site Comparison (2017)

Site	Average (range) Secchi Disk Transparency (meters)	Average (range) Chlorophyll <i>a</i> (ppb)	Average (range) Total Phosphorus (ppb)
10 Museum	7.4 (range: 6.4 – 8.4)	1.2 (range: 0.7 – 2.1)	6.0 (range: 3.3 – 7.5)
19 Mile Bay (A)	4.1 (range: 3.0 – 5.5)	1.7 (range: 1.2 – 3.1)	5.8 (range: 5.5 – 6.1)
19 Mile Bay (B)	4.6 (range: 4.0 – 5.5)	1.6 (range: 1.3 – 2.2)	6.1 (single value)
20 Mile Bay	5.5 (range: 4.5 – 6.6)	1.7 (range: 1.1 – 2.8)	7.9 (range: 5.2 – 14.9)

Figures 4 and 5. Long-term changes in the Lake Winnepesaukee – 20 Mile Bay water clarity (Secchi Disk depth), chlorophyll *a*, water color and total phosphorus concentrations measured between 1992 and 2017. These data illustrate the relationship among plant growth, water color and water clarity. Total phosphorus data are also displayed and are oftentimes correlated with the amount of plant growth.

Figure 6 and Table 3. Inter-site comparison of the annual Lake Winnepesaukee (Tuftonboro) water clarity and chlorophyll *a* concentrations. The inter-site comparison data provide a general sense of the variability among the four long-term sampling locations.

Figure 6. Winnepesaukee (Tuftonboro)
Inter-site Comparison (1992-2017)



Recommendations

Implement Best Management Practices within the Lake Winnepesaukee watershed to minimize the adverse impacts of polluted runoff and erosion into the lake. Refer to "Landscaping at the Water's Edge: An Ecological Approach" and "New Hampshire Homeowner's Guide to Stormwater Management: Do-It Yourself Stormwater Solutions for Your Home" for more information on how to reduce nutrient loading caused by overland run-off.

- http://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf
- <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf>

19 mile Bay A & B

Document
Lake Winnepesaukee
Tuftonboro

Legend

- Tuftonboro Milfoil_070915
- Wboro and Tboro Docks and More_061815

Town Boundary



0 0.3 0.6 1.2
Miles

MELVIN VILLAGE MARINA

NAP, GRANT

19 MILE BAY

NAP, GRANT

THE BASIN/WINTER HARBOR

NAP, GRANT

NAP, GRANT

Lake Winnepesaukee Association

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October 2018

Moultonborough Bay and Winter Harbor Watershed Management Plan

Worksheet: What do we already know?

1. What are the known or perceived impairments and problems in the watershed

The Moultonborough Bay subwatershed (MB) lies within the communities of Moultonborough, Tuftonboro, and Wolfeboro with an area of approximately 29,778 ac. Four major stream complexes contribute water inflow to the lake, Melvin River, Wingate Brook, Twentymile Brook, and Nineteenmile Brook; however, the major volume of water to Moultonborough Bay is from Moultonborough Bay Inlet, which lies upstream from the sub-basin.

Two public areas within the MB sub-watershed are currently on the 303(d)/305 b list for a severe impairment for primary contact recreation use due to elevated concentrations of E. coli bacteria, with TMDLs scheduled to occur by 2021.

*Melvin Village Lake – Town Pier
Public Beach, Tuftonboro*

Aquatic Life – Cyanobacteria hypatoxic microcystins, Lake Winnepesaukee, and Mirror Lake

A major concern and potential threat to the lake's health is the Rapid Infiltration Wastewater Disposal System (RIWDS) located in Wolfeboro just over the Tuftonboro/Wolfeboro town line. A seven-mile stretch of Nineteenmile Brook lies down gradient of the RIWDS. The RIWDS is permitted to discharge up to 600,000 gpd of treated municipal wastewater.

Cyanobacteria bloom in Winter harbor on August 30

Closed landfill seepage

2. Do we already know the causes and sources of any water quality impairments in the watershed?

3. What information is already available and what analyses have been performed to support development of the management plan? ...

UNH LLMP WQ data for Moultonborough Bay and Winter Harbor
Mirror Lake Watershed Restoration Plan

4. Have the relative contribution for major type of sources of the pollutant or stressors causing impairment been estimated?

This will be done as part of the modeling work for the restoration plan

5. Are there any historical or ongoing management efforts aimed at controlling the problems and stressors?

Ordinances and regulations at the community level

Moultonborough:

Stormwater Management Ordinance

Groundwater Protection Ordinance

Comprehensive Shoreland Protection Ordinance

Wetland Resources Conservation Overlay District

Steep Slopes Protection Ordinance

Tuftsboro:

Wetlands Conservation District

Floodplain Development Ordinance

Wolfeboro:

Stormwater Management Regulations - target 10,000 s.f. or greater

Wetlands Conservation Overlay District

Groundwater Protection Overlay District

Steep Slope Protection

Ongoing management efforts in obtaining conservation easements, conservation lands

Milfoil eradication efforts - Joint IMF Committee, Mirror Lake Watershed Committee

Outreach and education

Lake Host Program

Weed Watchers Program

Water Quality Monitoring Program

6. Are there any threats to future conditions, such as accelerated development patterns?

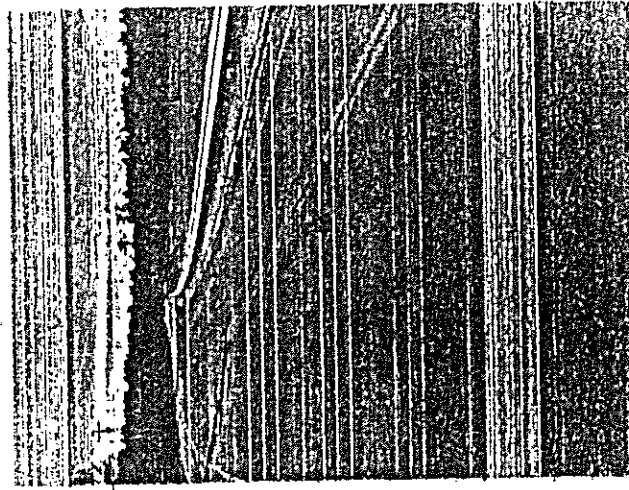
7. Have any additional concerns or goals been identified by stakeholders?

Summary of Field Reconnaissance

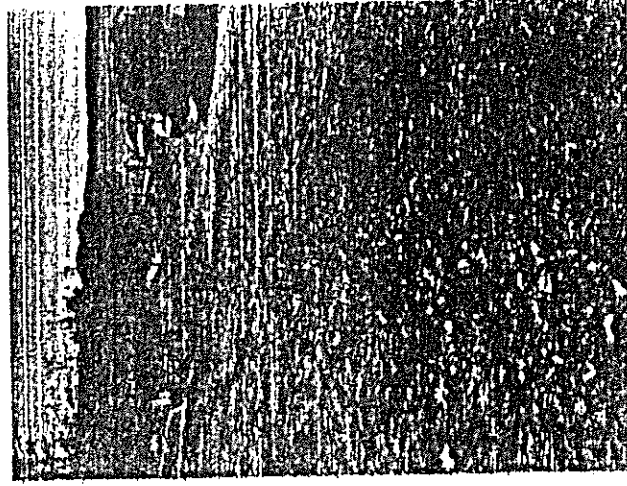
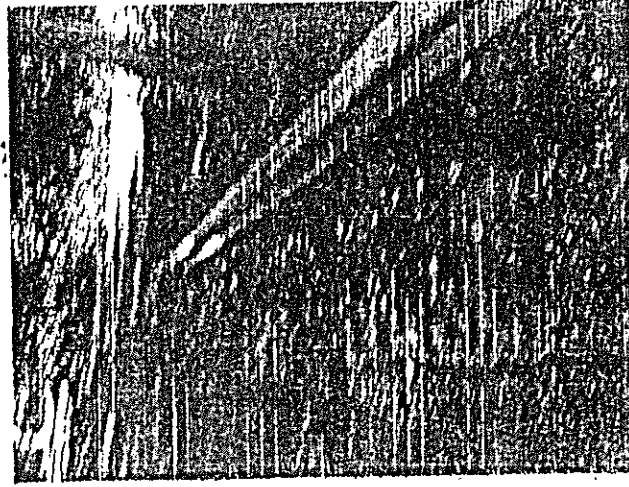


Field Reconnaissance

- Evidence of erosion/sediment deposition
- Direct connection to lake or trib
- Highly accessible and visible areas



19 Mile Run



Summary of Field Reconnaissance



Moultonborough Bay BMP and Monitoring Opportunity Sites

Site 1 – Bay Road Beach Parking Lot

Site 2 – Pier 19 Grocer

Site 3 – Pier 19 Grocer

Site 4 – Boat ramp across from Pier 19 Grocer

Site 5 – Three catch basins on Route 109

Site 6 – High Street Culvert

Site 7 – Lake Road

Site 8 – Lake Road

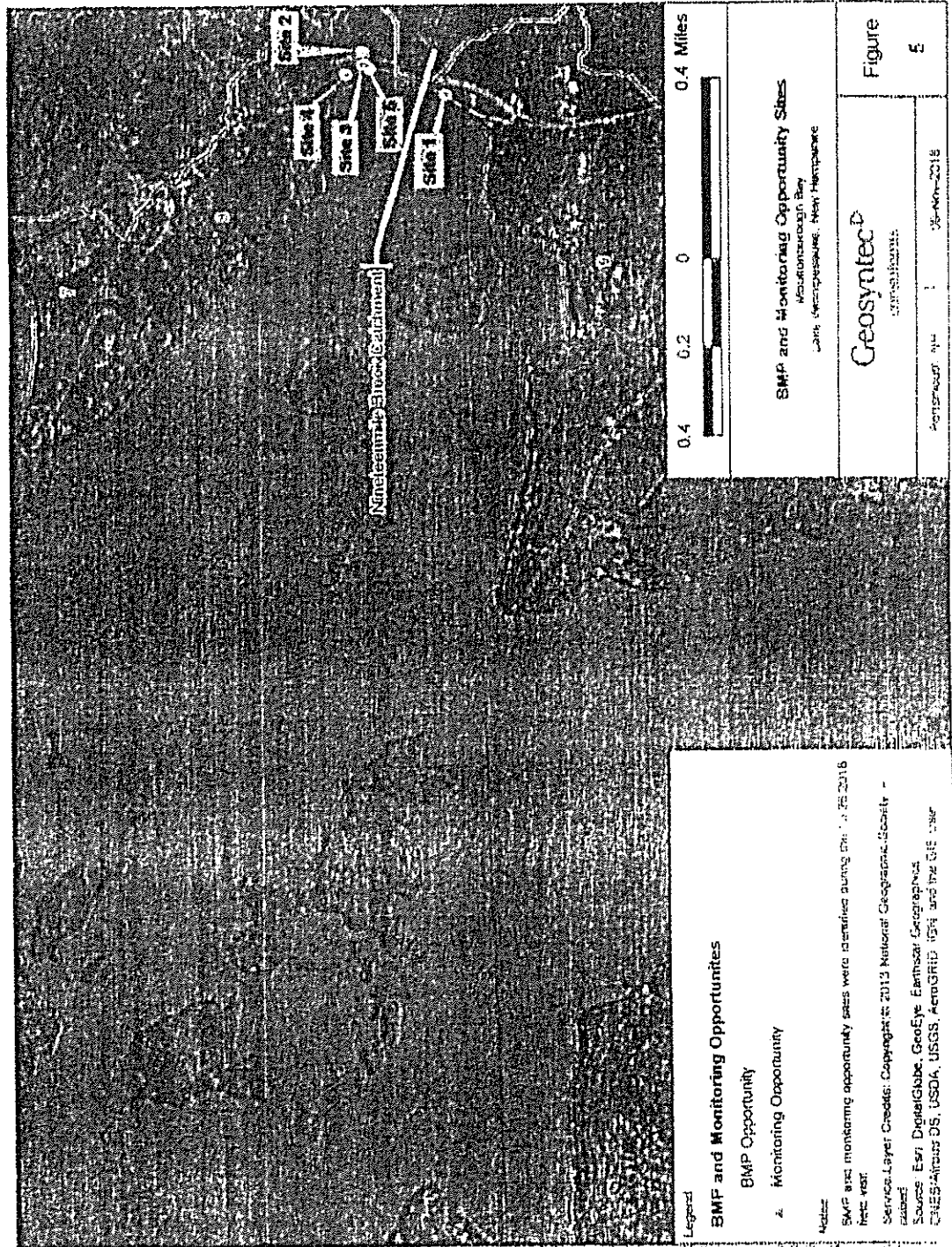
Site 9 – Melvin Wharf

Site 10 – Wingate Brook Under 109A

Monitoring Opportunity Site 1 – Golf Course stream outfall into Shelter Cove

Monitoring Opportunity Site 2 – Golf Course stream outfall into Senter Cove

Summary of Field Reconnaissance



Team #4

7/17/2019
Copied in Part 2

SITE-SPECIFIC PROJECT PLAN for:
Moultonborough Bay and Winter Harbor Watershed Management Plan
NHDES Project Number: RP-17-M-04

Under the New Hampshire Section 319 Nonpoint Source Grant Program QAPP
RFA# 08262 (Currently under review for 2018 update)

October 29, 2018

Prepared by:

Geosyntec Consultants
75 Congress Street, Suite 301
Portsmouth, NH 03801
(603) 205-8052

For Review:

Project Manager:

Signature/Date
Patricia Tarbev, LWA

Technical Project Manager/QA Officer:

Daniel H. Bourdeau 10/29/18
Signature/Date
Daniel Bourdeau, PE, Geosyntec Consultants

NHDES Project Manager:

Signature/Date
Jeff Marcoux, NHDES

Program Quality Assurance Coordinator:

Signature/Date
Stephen Landry, NHDES

NHDES Quality Assurance Manager:

Signature/Date
Vincent Perelli, NHDES

For Receipt:

EPA Nonpoint Source Program Coordinator:

Signature/Date
Erik Beck, NHDES

The MB and WH WMP project builds on six years of effort by the LWA to develop a comprehensive lake-wide management plan for Lake Winnepesaukee and is a continuation of a community-based watershed planning effort to improve, protect and/or restore all of the water resources within the lake's watershed.

Lake Winnepesaukee, NHLAK700020110-02-19, is currently on New Hampshire's 2016 303(d) list of threatened or impaired waters for primary contact recreation use due to the occurrence of cyanobacteria (NHDES, 2016). Despite its impaired status (lake-wide), Winnepesaukee water quality is considered good. From 2009-2013, the median total phosphorus concentration for Lake Winnepesaukee was 6.4 µg/L and the mean chlorophyll-a concentration was 1.9 µg/L, well below the State of New Hampshire aquatic life use support thresholds for an oligotrophic waterbody.

The majority of surface water entering MB comes through MB Inlet. A watershed restoration plan has been developed for MB Inlet, which has historically exhibited excessive levels of in-lake total phosphorus and significant infestations of exotic, aquatic plant species.

ANN
→
A concern and potential threat to the MB and WH health is the Rapid Infiltration Wastewater Disposal System (RIWDS) located in Wolfeboro just over the Tuftonboro/Wolfeboro town line. A seven-mile stretch of Nineteenmile Brook lies down gradient of the RIWDS and Nineteenmile Brook outlets to Nineteenmile Bay, part of the MB subwatershed. The RIWDS is permitted to discharge up to 600,000 gallons per day of treated municipal wastewater. The town of Tuftonboro had raised concerns with the RIWDS and its potential for increased phosphorus loading to Nineteenmile Brook, conducting a baseline environmental assessment of Nineteenmile Brook in 2008 prior to the construction of the RIWDS in 2009. The environmental assessment conducted by Normandeau Associates determined that: "Baseline studies for water quality, aquatic and wetland wildlife and aquatic habitat and associated fish and macroinvertebrates all indicate that Nineteen Mile Brook from about ¼ mile above the Tuftonboro/Wolfeboro town line is a high quality small stream, typical of New Hampshire streams largely unaffected by cultural development."

After slope failures and groundwater seeps were discovered within six weeks of operation, the Tuftonboro Conservation Commission again contracted with Normandeau Associates to provide additional environmental assessment services. During the spring of 2009, Normandeau conducted a stream gaging program to quantify potential water loading to Nineteenmile Brook from the RIWDS. During late summer/fall of 2009, an algal study was conducted after algae were observed in the brook and at the location of the groundwater seeps.

Operational problems have continued to arise from the operation of the RIWDS. While the town of Wolfeboro is actively seeking solutions, development of a watershed management plan would assist in determining the overall impact that increased nutrient loading to Nineteenmile Brook from the RIWDS, and ultimately Nineteenmile Bay (part of MB subwatershed) may have from this potential source.

Two public areas within the MB sub-watershed (Melvin Village Lake – Town Pier and Public Beach, Tuftonboro) are currently on the 303(d)/305(b) list for a severe impairment of primary contact recreation use due to elevated concentrations of *E. coli* bacteria, with

TMDLs scheduled for 2021. The public beach in Tuftonboro is located at the mouth of Nineteenmile Brook.

The WH subwatershed includes Mirror Lake (located in the town of Tuftonboro), which is impaired for primary contact recreation due to cyanobacteria concentrations/blooms. Water quality data from WH shows generally higher than average lake levels of total phosphorus. The Mirror Lake Protective Association completed a watershed restoration plan for Mirror Lake in 2012 and is actively implementing best management practices (BMPs) to reduce nutrient loading within the watershed. Information from the completed restoration plan will assist in the development of the WMP for WH.

7-Project Description and Schedule

Empirical- and theoretical-based models will be used to estimate current phosphorus loading to MB and WH as well as current in-lake concentrations of phosphorus. Existing water quality data will be used to verify input parameters and results. Model results will be used to help estimate the loading reductions needed to achieve in-lake water quality goals established through a collaborative stakeholder engagement process. Table 3 contains the anticipated schedule for the modeling tasks.

Table 3. MB and WH WMP Modeling Schedule

Activity	Anticipated Start Date	Anticipated Completion Date
Watershed Phosphorus Loading Model	Nov. 2018	March 2019
In-Lake Total Phosphorus Concentration Model	Dec. 2018	March 2019
Future Loading Model/Build-out Analysis	Jan. 2019	March 2019
BMP Phosphorus Reduction Estimates	April 2019	August 2019

8-Historical Data Information

Geosyntec will review available water quality data for Lake Winnepesaukee, MB and WH provided by LWA to determine the extent of the data set and if the data set is "acceptable" for use in estimating the assimilative capacity of MB and WH. All data that LWA will provide is NHDES data contained in the NHDES Environmental Monitoring Database. The following data sources are considered to have inherent acceptable accuracy and precision standards and are acceptable for the purposes of watershed management planning, including but not limited to (NHDES, 2010):

- USGS Stream Gage Data
- FEMA Flood Insurance Study data
- USGS or USDA aerial photo coverages
- NHDES data contained in the NHDES Environmental Monitoring Database (EMD) that is flagged as final data and has been through QA/QC procedures
- Volunteer or other monitoring data contained in the NHDES EMD that is flagged as final data and has been through QA/QC procedures
- NH fish and Game data

Table 3: Data sets for the MB and WH loading models

Data	Purpose	Source(s)
Watersheds	Nutrient Loading	NH Granit
Precipitation	Nutrient Loading, In-lake Nutrient Concentration	National Climatic Data Center (NCDC) or United States Geological Survey (USGS)
Land Use	Nutrient Loading	NH Granit
Septic System Inventory	Nutrient Loading	Towns of Tuftonboro and Wolfeboro
Build Out Conditions for Watershed	Nutrient Loading	State of New Hampshire, Towns of Tuftonboro and Wolfeboro, LRPC
Septic System Wastewater characteristics	Nutrient Loading	EPA
Event Mean Concentration of Stormwater Constituents	Nutrient Loading	NHDES and published literature
Best Management Practices Pollutant Removal Efficiencies	Nutrient Loading	NHDES Stormwater Manual
Historical Water Quality Data	Model verification	NHDES
Evapotranspiration	In-lake Nutrient Concentration	USGS
Bathymetry	In-lake Nutrient Concentration	NHDES, NH Fish and Game Department

Watershed Phosphorus Loading

The septic system load will be calculated based on the number of septic systems located within three tiers of parcels around the perimeter of the MB and WH waterbodies. The first tier of parcels has water frontage, the second tier is separated from the water by another parcel, and the third tier is separated from the water by two parcels. The formula used will be:

$$S = \sum_{i=0}^n B_i \cdot n_i \cdot Q_c \cdot m_i \cdot P_w \cdot \theta$$

Where:

S is the total P load from septic systems (lbs);

h is the total number of homes considered in the inventory;

B_i is the number of bedrooms served by the system;

n_i is the average number of persons per bedroom;

Q_c is the per-capita daily water use (69.3 gal/person/day, from the Onsite Wastewater Treatment Systems Manual (EPA, 2002));

m_i is the number of months that the home is occupied;

P_w is the concentration of phosphorus in wastewater (10 mg/L, from the Onsite Wastewater Treatment Systems Manual (EPA, 2002)); and

$$p = \frac{L}{A(q_s(1 + \tau_w))}$$

where p is the mean in-lake phosphorus concentration (mg/L), L is the annual phosphorus load (grams/yr), A is the lake area (m^2), τ_w is hydraulic residence time (yr), q_s is hydraulic overflow rate (m/yr).

Hydraulic residence time reflects the results of a water budget that Geosyntec will calculate for the MB and WH with the following formula:

$$\tau_w = \frac{V}{Q}$$

where Q is the annual discharge passing through the waterbody (m^3/yr), and V is the waterbody volume (m^3). Annual discharge, Q , will be estimated by subtracting an estimate of evapotranspiration from annual average precipitation from the region. Values of evapotranspiration and precipitation are available from the United States Geological Survey (USGS). Volume, V , is estimated based on bathymetry maps provided by NHDES.

Emily Campbell of Geosyntec will review the results of the Vollenweider model and compare it to available in-lake water quality data from the spring overturn period. A sensitivity analysis may be performed with the parameter values for τ_w (hydraulic residence time) and Q (annual discharge passing through the waterbody).

Because of the imperfect nature of any model to predict processes within natural systems, the Kirchner-Dillon (1975) model will also be used to estimate in-lake phosphorus concentration. The average of the two empirical models will be used as the predicted TP value for each of the waterbodies.

Julia Keay of Geosyntec will peer review the modeling, and Daniel Bourdeau will provide modeling oversight and senior review.

Future Loading Model/Build-Out Analysis

Geosyntec will work with the LWA to establish two scenarios to be modeled, including natural background (i.e., pristine condition) and full build-out condition. The build-out model will be based on "full build-out" conditions to estimate future phosphorus loads from a fully developed watershed. This assumes the population associated with future development of the watershed is based on state population trends, regardless of economic issues. Geosyntec will work with the LWA to review state population trends and projections for the area. LRPC and the Towns of Tuftonboro and Wolfeboro will be consulted to obtain parcel data and zoning regulations. Geosyntec will use this data to estimate changes in land use and resulting pollutant loading (using the watershed phosphorus loading model described above) as follows:

- The projected population density obtained through the state will be subtracted from the current population estimated for the region (obtained from LRPC). The projected increase in population density for each town will be converted into the

projected number of new homes for each town using standard state values for the average house hold size. This calculated value represents the number of new homes to be developed to reach full build out.

- The number of new homes to be developed will be multiplied by the average lot size and used to estimate the projected increase in developed residential land use in each town. Average lot size will be taken from current zoning regulations from each of the towns.

• Commercial and industrial land use will be increased proportionally to the projected population. Specifically, the current area of industrial and commercial land use will be scaled proportionally to the ratio of projected population to current population.

- The projected increase in developed area (i.e., commercial, industrial and residential land uses) will be used to convert undeveloped land use in the current land use condition. The revised land use distribution will be used to generate a projected nutrient load at build out using the modeling described above.

11 – Quality Objectives and Criteria

The utility of model outputs, and the confidence in decisions made on those outputs, are only as strong as the data used to build and calculate the model. Geosyntec Project Manager Daniel Bourdeau will make certain that all data used to inform model outputs have gone through QA/QC analyses. The bulk of water quality and GIS data used in this project will be obtained through NHDES and will therefore have been through a screening process for quality assurance and completeness. Water quality data will be obtained from the LWA. The historical water quality data for Winnepesaukee, MB and WH has been collected by volunteers in the UNH Lakes Lay Monitoring Program (LLMP). Each season's data is reviewed by UNH Center for Freshwater Biology to ensure QA/QC protocols have been met before it is transferred to NHDES for acceptance into the Environmental Monitoring Database (EMD) managed by NHDES. Geographical Information Systems (GIS) spatial data will be obtained by Geosyntec to use in the watershed phosphorus loading model. GIS land-use data will be obtained from the State of New Hampshire GIS website (GRANIT). The New Hampshire Land Cover Assessment 2001 (or NHLC01) consists of the most recent and detailed classification of land cover in New Hampshire based on satellite images acquired between 1990 and 1999, with further revisions in 2001 (GRANIT).

12 – Quality Control

Quality control checks will be performed by Geosyntec's Task Manager Julia Keay to ensure that information collected for the project is accurately entered into spreadsheets. QA/QC checks will be conducted on all spreadsheets for inconsistencies. If errors are identified, Geosyntec Project Manager Daniel Bourdeau will review the input values, identify and correct the error to ensure that no incorrect information is used in any model calculation. In addition, Geosyntec Task Manager Julia Keay will review all modeling inputs, calculations, and outputs for the purpose of QA/QC. All QA/QC issues identified will be properly documented, along with the appropriate steps taken to resolve the issues.

13 - Data Evaluation of Load Reduction Estimates

Julia Keay and Daniel Bourdeau of Geosyntec will conduct a one-day field watershed assessment to identify potential locations for site specific stormwater best management practices (BMPs). Geosyntec will identify several sites where stormwater BMPs could be installed. During the field assessment, Geosyntec will look for areas of accelerated erosion, discharge points (e.g., storm drain outfalls) from stormwater drainage systems servicing developed portions of the watershed, and road/development adjacent to the lake. Geosyntec will estimate the contributing area to each of these potential BMP sites and stormwater phosphorus load reduction estimates will be calculated by multiplying the estimated phosphorous load to the BMP (using the Simple Method, as described in the NHDES Stormwater Manual (NHDES, 2008b)) by the BMP phosphorus removal efficiency percentage. BMP phosphorus removal efficiencies available from NHDES will be used; if removal efficiencies are not available through NHDES, additional sources such as EPA may be used. Geosyntec's experience in BMP construction will inform estimates of potential finished cost of the BMP. The result will be a list of potential BMP's with predicted pollutant load removal estimates and the associated costs and benefits of each, allowing for prioritization of the BMP options.

14 - Final Products and Reporting

The following deliverables will be provided to the Project Manager, Patricia Tarpey, and NHDES during the project period:

- Technical memorandum detailing the calculations and determination of the assimilative capacities for WH and MB.
- Technical memorandum describing the process for establishing the MB and WH water quality goals detailing the information and models used.
- Technical memorandum summarizing the results of Objective 5 tasks, including:
 - Pollutant load modeling results for current conditions;
 - In-lake response model results for current watershed conditions; and
 - Modeling results for additional scenario modeling for pristine and build-out conditions.
- Technical memorandum summarizing the results of the watershed assessment conducted and the structural and non-structural BMPs proposed to achieve phosphorus load reductions to meet water quality goals.

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**TOWN OF TUFTONBORO
BOARD OF SELECTMEN
240 MIDDLE ROAD, P.O. BOX 98
CENTER TUFTONBORO, NH 03816
Telephone: (603) 569-4539 Fax: (603) 569-4328
www.tuftonboro.org**

Selectmen's Meeting
8:30 am – Town Offices

Monday February 4, 2019

The official video of this meeting can be found on the Town of Tuftonboro's YouTube channel at:
<https://www.youtube.com/channel/UCCUmJqZvFTS23RMEFSDQZmw>.

MINUTES

Present: Chairman Bill Marcussen, Selectman Lloyd Wood, Selectman Chip Albee and Administrative Secretary Karen Koch.

CALL TO ORDER

Chairman Marcussen called the Selectmen's meeting to order at 8:30 am.

NON-PUBLIC SESSION

At approximately 8:33 am, Selectman Wood moved to enter non-public session per RSA 91-A: 3 II (e) for litigation, seconded by Selectman Albee. Roll call vote: Marcussen – Yes; Albee – Yes; Wood – Yes. At approximately 8:47 am, Selectman Albee moved to come out of non-public session and back into public session, seconded by Selectman Wood with all in favor. Selectman Wood moved that these non-public minutes be sealed, seconded by Selectman Albee with all in favor.

After a brief recess, Chairman Marcussen reconvened the public session at 9:02 am and led the pledge of allegiance.

PUBLIC INPUT

None.

REVIEW AND APPROVAL OF MINUTES

Selectman Albee moved to approve the 1/28/19 meeting minutes as written, seconded by Selectman Wood with all in favor. Selectman Albee moved to approve the first 1/28/19 non-public meeting minutes as written, seconded by Selectman Wood with all in favor. Selectman Albee moved to unseal these 1/28/19 non-public meeting minutes, seconded by Selectman Wood with all in favor. Selectman Albee moved to approve the second 1/28/19 non-public meeting minutes as written, seconded by Selectman Wood with all in favor. Selectman Albee moved to approve the 2/1/19 meeting minutes as written, seconded by Selectman Wood with all in favor.

APPOINTMENTS

Normandeau Associates, Inc. conducted a 19 Mile Brook RIB baseline study in 2008. Joel Detty and Harry Stewart, of Normandeau Associates, Inc., presented the findings of their recent 19 Mile Brook RIB Discharge file review ([CLICK HERE](#) to view their report) to the Selectmen as well as a revised proposal and cost estimate for an updated baseline study ([CLICK HERE](#) to view). The file review confirmed increased levels of chloride and nitrogen found in surface areas nearest the RIB discharge with decreasing concentration downstream in the main stem of 19 Mile Brook. They noted that Wolfeboro currently can't operate under the terms of their permit as the design rate of 600,000 gallons per day discharge fails. They need to operate below 300,000 gallons per day. The same points that were sampled in 2008 would be sampled with the proposed study. Based on the results of the 2008 study and their recent file review, Normandeau Associates recommended a surface water quality monitoring program that includes monthly sampling and continuous monitoring. Adding to the surface water quality study and adding some time to the final report for macroinvertebrates increased the original cost estimate for the updated baseline study from \$41,255 to \$45,870. Their final report is

estimated to be completed by the end of November. Normandeau confirmed for Steve Wingate that they can share information that pertains to the Watershed Management Plan to Geosyntec as they work on the updated study. At the very least the Town will supply the final report to Geosyntec for reference. The Selectmen accepted the proposal, contingent on Town Meeting approval, and will adjust the amount in the 19 Mile Brook warrant article to \$45,870.

Steve Wingate and Larry Gil reviewed Sanborn Head & Associates second opinion of the closed landfill seepage ([CLICK HERE](#) to view report). Sanborn Head & Associates did not find that there is a significant issue at the site. Their report recommends the potential need for additional analysis and data collection efforts for groundwater monitoring. The report concludes that contamination from the unlined landfill appears to be limited to the area down gradient of monitoring well MW6 based on lower contamination levels shown from other monitoring well locations. The migration of contamination appears to be confined to the shallow groundwater. It was discovered that the cover material used to cap the landfill is made up of a material described as 50% short paper fiber and a potential source of PFAS. It was agreed to share this second opinion with Stantec to have them provide their recommendations for improving monitoring including the effect this would have on cost and permitting. Mr. Wingate and Mr. Gil expressed their disappointment with Stantec's performance and feel that it is worthwhile to look into a new trustworthy vendor. Although Chairman Marcussen understands these concerns he recognizes that the monitoring service that Stantec has provided for Tuftonboro has satisfied the State requirement and at a reasonable cost. There was discussion regarding the potential to put monitoring out to bid.

Steve Wingate met with the Selectmen to discuss the Conservation Commission's proposed warrant article. The Commission would like to propose an article that allows them to receive a full 50% of Land Use Change Tax (LUCT) collected annually, removing the \$5,000 annual cap amount that is currently in place (per Article 12 of the 2002 Town Meeting). Mr. Wingate gave a background on current use and LUCT and explained the reasoning for the Conservation Commission's request for an increase in funding. Selectman Albee shared his hesitation with giving funds to an unelected official to spend tax money without having tax payer approval. Mr. Wingate responded that although some small expenditures are made without Selectmen approval, large expenditures such as acquisitions, need to go before the Selectmen for approval before being spent. (There are RSAs that limit how the fund can be spent.) Historical dollar amounts of LUCT revenue were reviewed. An average of \$48,000 has been received over the last few years. Removing the cap amount would allow a potential of \$24,000 (estimated) a year to be put into the Conservation Fund. Selectman Albee shared his uneasiness with the amount being unlimited and the effect this would have on revenue. The Selectmen agreed with Chairman Marcussen's suggestion to increase the cap to \$10,000 instead. Mr. Wingate will try to get feedback from the Conservation Commission on the suggested \$10,000 cap amount before the Selectmen finalize the warrant.

SIGNATURE FILE

Selectman Albee moved to approve an abatement recommendation for PID 60-3-5 (formerly 60-3-8), seconded by Selectman Wood with all in favor. Selectman Wood moved to approve a change of compensation form for Abbi Gillis, seconded by Selectman Albee with all in favor. Selectman Albee moved to approve LRPC Household Hazardous Waste Letter of Commitment for 2019 for \$4119, seconded by Selectman Wood. This amount is slightly more than the estimated budgeted amount of \$4050 but Clay Gallagher will find the remaining funds within the Transfer Station budget. Hazardous waste collection dates are 7/27/19 and 8/3/19. Selectman Wood added that citizens of Tuftonboro can still go to Wolfeboro on other dates but they would need to pay for disposal. Vote passed with all in favor.

SELECTMEN'S UPDATE

Selectman Wood shared that the TAC Committee is having a roundtable meeting Wednesday regarding crushed glass. The Selectmen will review potential annual report covers at their 2/11/19 meeting. The Selectmen will hold a work session on 2/15/19 at the Fire Station to sign the warrant.

Selectman Albee shared that the Budget Committee meets tomorrow evening. He shared his frustration with the obligations that Tuftonboro now has due to issues with Wolfeboro's RIB.



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January 24, 2019

Mr. William Marcussen
Town of Tuftonboro
P.O. Box 98 240 Middle Road (Route 109A)
Center Tuftonboro, NH 03816

Re: Nineteen Mile Brook Watershed Baseline Environmental Assessment
Normandeau Project No. 24254.000

Dear Mr. Marcussen:

Normandeau Associates, Inc. (Normandeau; NAI) is pleased to provide this report to the Town of Tuftonboro summarizing our comprehensive file review and environmental evaluation of the Wolfeboro Rapid Infiltration Basin Facility (RIB). We have reviewed all of the readily available materials on file with the New Hampshire Department of Environmental Services (NHDES) and have provided you a summary of the most relevant data on the overall state of water quality in Nineteen Mile Brook, any documented changes over time in the brook, and any apparent effects on surface water quality from the operation of the RIB discharge. Nineteen Mile Brook is a high quality stream and a valuable natural resource to the region and we thank you for the opportunity to perform this preliminary study. It is our recommendation that further environmental studies be completed and that existing and available data continue to be reviewed to ensure the integrity of Nineteen Mile Brook as explained in our Recommendations section of this report.

Background

In 2008 Normandeau Associates, Inc. completed a baseline environmental study of the Nineteen Mile Brook watershed on behalf of the Tuftonboro Conservation Commission (TCC). The study was completed to evaluate the potential environmental impacts associated with a recently permitted (not yet constructed) subsurface rapid infiltration discharge of up to 600,000 gallons per day of treated municipal wastewater (potentially expandable to 2 million gallons per day) in the neighboring Town of Wolfeboro, NH. This discharge is located near the Wolfeboro/Tuftonboro town line and is within the watersheds of Nineteen Mile Brook, Whitten Pond and Lake Winnepesaukee. The TCC commissioned the study due to significant concerns regarding the potential impact of the discharge on general stream, pond and lake water quality, macroinvertebrates, fisheries, wetlands, public health and lake and stream ecology.

The 2008 NAI study provided an assessment of aquatic habitat, surface water quality, benthic macroinvertebrate communities, wildlife and fish populations, and rare, threatened, and endangered species within a seven mile section of Nineteen Mile Brook, including Whitten Pond. Our study resulted in the following findings:

"Baseline studies for water quality, aquatic and wetland wildlife and aquatic habitat and associated fish and macroinvertebrates all indicate that Nineteen Mile Brook from about ¼ mile above the Tuftonboro/Wolfeboro town line is a high quality small stream, typical of New Hampshire streams largely unaffected by cultural development. During the 2008 summer sampling program, water quality was found to be good to excellent in all locations and during each sampling event, based on field and laboratory measurements of selected water quality parameters. There was no significant evidence of water quality

degradation, upstream to downstream, except for slight increases in conductivity during oil sampling events. These increases may reflect the slightly greater amount of development present in the lower portion of the study area, but no upstream/downstream relationship was evident in chemical analyses from the laboratory tests. Regardless, one must conclude that water quality is excellent throughout the study area by any traditional method of assessment.

With respect to wildlife, Nineteen Mile Brook and its adjacent riparian zone currently provides good to high quality habitat for a range of wildlife species, including reptiles and amphibians. Spatial variations in species observed appear to be related to natural variations in habitat quality throughout the study area as a result of the physical morphology of the stream bed and surrounding upland, and the variations in vegetation. These variations are primarily influenced by beaver activity in many locations at the current time. All species of wildlife observed in the study area were common species that were expected to be present and more or less abundant. No listed threatened or endangered species were found and none that are known to exist in Tuftonboro are expected to be present due to a lack of appropriate habitat. The lower reaches of Nineteen Mile Brook and floodplain appear to be especially suitable for the wood turtle which is considered vulnerable by the State of NH.

Aquatic habitat was determined to be excellent for supporting fish and benthic macroinvertebrates, based on the results of surveys in 4 sample locations. The benthic macroinvertebrate community was classified moderately impaired, slightly impaired, and non-impaired at Stations 4, 3, and 2, respectively, but this impairment appears to be entirely natural, resulting from differences in habitat characteristics, such as substrate composition and current velocity. Fish data indicated a good quality, coldwater community at all sampling locations."

The Wolfeboro Rapid Infiltration Basin groundwater discharge project was made operational in 2009 after the conclusion of our baseline environmental studies in Nineteen Mile Brook in 2008. The RIB discharge site experienced performance issues shortly after the system began operating in 2009 with increased flows from pre-existing seep areas above Nineteen Mile Brook which resulted in discrete channelization in previous areas of sheetflow, erosion from the hillslope and sediment deposition in the adjacent wetland areas above Nineteen Mile Brook. In 2009 a slope failure was documented in the seep areas as well as the development of a sink hole and downslope sand migration into wetland areas. In response to the performance issues, discharge rates were reduced below design and permit limits from 600,000 gallons per day (GPD) to 300,000 to 500,000 GPD in an attempt to reduce the groundwater flow rates emerging from the seep areas. Further sediment erosion and deposition in Nineteen Mile Brook associated with the site was documented in 2010 and sediment deposition controls were installed at weirs in the seep areas in response. Flows were further reduced from the RIBs to 200,000 to 400,000 GPD in 2010 and 200,000 to 300,000 GPD in 2011. A piping system was added to the groundwater breakout areas on the hillslopes to convey water away from the seep areas and wetlands directly to the sand traps above Nineteen Mile Brook. An Administrative Order by Consent was issued by NHDES in 2015 citing the groundwater breakouts and resulting erosion and deposition as violations of the Wolfeboro RIB discharge permit. Further engineering controls are being evaluated by Wolfeboro and their consultants in coordination with NHDES to restore the function of the RIB discharge system while protecting the impacted water resources in the area of the project.

On October 15, 2018 Steve Wingate of TCC requested NAI to provide a study plan to repeat the 2008 studies completed by NAI on Nineteen Mile Brook. The goal of the studies would be to determine any environmental changes in the watershed since construction and activation of the Wolfeboro rapid infiltration discharge and provide a new baseline environmental study. Normandeau developed a proposed scope of services that is generally consistent with the 2008 study with assessments of aquatic habitat, benthic macroinvertebrates, fish, aquatic and wetland wildlife, rare, threatened and endangered species, and surface

water quality. We also proposed to review the Wolfeboro rapid infiltration discharge permit file, including any water quality data collected and reported as a permit condition, to evaluate water quality including any trends or other changes since activation of the rapid infiltration discharge. We presented our proposal to the Tufonboro Board of Selectmen on Tuesday, November 6, 2018 during a selectmen's meeting. After reviewing the proposal, the Board of Selectmen, Mr. Steve Wingate, and Normandeau agreed the best approach would be to complete a full file review for the Wolfeboro rapid infiltration discharge permit and then use the results of the file review to revise our proposed study plan to target areas of need for additional field studies. Normandeau completed a file review in December 2018 and January 2019 that included collecting and reviewing the publicly available information (via NHDES Onestop Data Portal) in the Wolfeboro Groundwater Discharge Permit file. The amount of information available in the groundwater permit file is extensive and we found it necessary to focus our efforts and limited budget on only the file materials determined to be most relevant to the objective of this study – i.e. determining the state of water quality in Nineteen Mile Brook following nine years of operation of the Wolfeboro rapid infiltration discharge. This report discusses the general findings of the permit file review, including specific supporting data of the most critical information, and also highlights the needs for additional information missing from the site history based on our understanding of the observed or potential project impacts on water quality.

Methods

Normandeau performed a file review for the Wolfeboro Rapid Infiltration Basin Facility (Whitten Site) Groundwater Discharge Site #200707014 by obtaining and reviewing the Groundwater Discharge Permits issued for the Site in 2007, 2012, and 2017 and the associated file materials (applications, reports, memos, data submittals, etc.) for the Site as accessed from the NHDES Onestop website. Our objective was to evaluate the state of surface water quality in Nineteen Mile Brook and its tributaries in the vicinity of the RIB Site since our initial baseline study in 2008 and operation of the RIB discharge commenced in 2009. Much of the Project file was dedicated to the engineering aspects of the Project including geotechnical information, discharge flow rates, groundwater quality and elevations, and groundwater discharge zones and responses to the unexpected groundwater breakouts and associated problems. The engineering and groundwater aspects of the Project were beyond the scope of our study which was focused on surface water quality. Surface water sampling was collected extensively as part of the project including routine monitoring required as a permit condition as well as additional monitoring collected for Project performance evaluation and in an effort to ensure surface water impacts were minimized. Much of the surface water data record was available from the NHDES Onestop web site, although some gaps exist in the record, i.e. in 2010 when there were reporting errors and in 2013 and 2014 when non-permit surface water data is not available from Onestop.

Surface water data including water chemistry and physical parameters, biological data, and stream habitat data were reviewed and when deemed relevant entered into a project spreadsheet database. We then reviewed the surface water quality data relative to water quality standards and guidance criteria, as applicable. We also created time series figures from the water chemistry data to evaluate the change in surface water quality over time at the Site and reviewed the water chemistry data relative to position in the watershed to determine whether there were spatial patterns in surface water quality at the site. Habitat data collected as part of the Rapid Bioassessment Protocols were scored and assessed for the years available (2013, 2015) and compared to RBP data from our 2008 study. Macroinvertebrate data were collected in 2013, 2014, and 2015 as a permit requirement and the original taxa counts presented were informally evaluated using the Hilsenhoff Biotic Index to determine the overall tolerance of the macroinvertebrate community sampled in Nineteen Mile Brook.

Results

Site Description – The main stem of Nineteen Mile Brook flows through the Site south of the hill top/slope on which the RIB discharge is located and flows westerly into Whitten Pond and eventually into Lake Winnepesaukee. An unnamed tributary to Nineteen Mile Brook flows south around the east side of the hill top/slope on which the RIB discharge is located and joins Nineteen Mile Brook approximately a quarter mile upstream of Whitten Pond. On the southwest slope of the hill on which the RIB discharge is located there are two areas of groundwater seeps with hillside wetlands (Western Groundwater Discharge Area and Central Groundwater Discharge Area) that discharge from culverts beneath the Site access road as small surface water tributaries to Nineteen Mile Brook. Engineering reports show that the majority of RIB discharge water passes through these seep areas and then enters Nineteen Mile Brook as surface water through two minor tributaries (referred to as WGDA Tributary and CGWDA Tributary in this report). Surface water sampling stations were established along the main stem of Nineteen Mile Brook and the Unnamed Tributary, as well as in the Groundwater Discharge Areas. The table below lists the sampling stations that were reviewed for this report and their position in the watershed. Figure 1, from Meeting Minutes for a NHDES meeting on October 2, 2015, shows the Site and sampling station locations.

Table 1. Surface water sampling stations on Nineteen Mile Brook and tributaries

Station ID	Easting	Northing	Surface Water Body
19MB-01	1100230	412039	Main Stem Nineteen Mile Brook
19MB-02	1098627	412735	Main Stem Nineteen Mile Brook
19MB-04	1096086	413100	Main Stem Nineteen Mile Brook
19MB-06	1099847	412663	Unnamed Tributary
19MB-07	1098580	412856	Western Groundwater Discharge Area
19MB-08	1099044	413022	Western Groundwater Discharge Area
19MB-09	1099010	412441	Central Groundwater Discharge Area
19MB-10	1099193	412778	Central Groundwater Discharge Area
19MB-11	1099441	412694	Access road east of Central Groundwater Discharge Area
19MB-12	1099921	412866	Unnamed Tributary
19MB-13	1100020	412970	Unnamed Tributary
19MB-14	1100128	413033	Unnamed Tributary
19MB-15	1100225	413337	Unnamed Tributary
19MB-16	1100068	413482	Unnamed Tributary
19MB-17	1099852	413581	Unnamed Tributary
19MB-18	1099729	412147	Unnamed Tributary
19MB-19	1099651	412143	Main Stem Nineteen Mile Brook
19MB-20	1099014	412355	Main Stem Nineteen Mile Brook
19MB-21	1098437	412866	Main Stem Nineteen Mile Brook

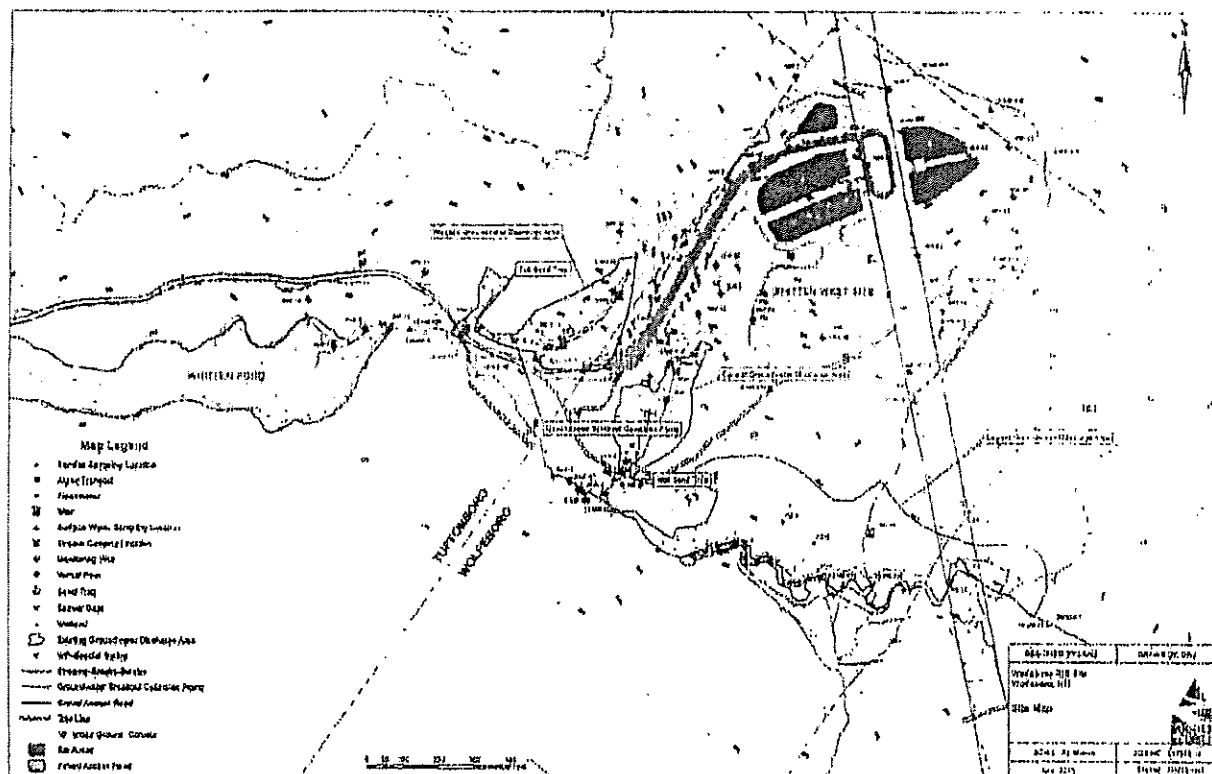


Figure 1. Site Map

Surface water chemistry -- The Wolfeboro RIB Site project file had water chemistry data for the period July 2007 through August 2017 at the time of our research. Stations 19MB-1 (an upstream reference station), 19MB-4 (downstream of the Project Influence at the Rte 109 crossing), and 19MB-21 (downstream of the Project Influence above Whitten Pond) have the most comprehensive surface water quality records for the Project and have sampling requirements under the current and previous permits. Other water quality monitoring stations in the Western Groundwater Discharge Area (19MB-7, 19MB-8) and the Central Groundwater Discharge Area (19MB-9, 19MB-10) have extensive records as well and are monitored routinely. Other stations in the Project area have more sporadic records and were included in our analysis as much as possible. Multiple water chemistry parameters were monitored at each of the stations, including nutrients, which are the primary pollutants of concern from wastewater treatment facility discharges. Our review of data focused primarily on nutrients including total phosphorus and nitrate, although other parameters including chloride were also reviewed for patterns, trends, and water quality exceedances.

Table 2. RBP Habitat scores by year and location

	2008				2013		2015	
	Downstream Station - near mouth of Nineteen Mile Brook	Downstream Station - downstream of Whitten Pond	Downstream Station - upstream of Whitten Pond	Reference Station - Near 19MB-01	Downstream Station	Reference Station	Downstream Station	Reference Station
Station	1	2	3	4	21A	19MB1	21A	19MB1
Total RBP Score	158	154	151	159	136	155	155	175
Habitat Value	Excellent	Excellent	Excellent	Excellent	Good	Excellent	Excellent	Excellent

Benthic Macroinvertebrates – In our 2008 Nineteen Mile Brook baseline study, we evaluated the in-stream macroinvertebrate community to assist with determining the overall state of water quality in the brook. Macroinvertebrates are variably sensitive to water quality and the abundance of various taxa can effectively indicate high quality streams versus impaired streams and can be useful in tracking changes in water quality over time. In the 2008 study we sampled macroinvertebrates at four locations on the main stem of Nineteen Mile Brook – Station 1 was near the mouth of the brook, Station 2 was below Whitten Pond, Station 3 was above Whitten Pond, and Station 4 was upstream of the proposed discharge area. We used a kick-net method of sampling the benthic community which is a different method from later benthic sampling under the 2012 and 2017 Groundwater Discharge Permits which used a deployed artificial substrate sampler ("rock basket"). The differences in sampling methods don't allow for statistically rigorous direct comparison. However we can qualitatively review the results from both methods and generally evaluate indications of impairment from the available data. The macroinvertebrate data from the 2008 Baseline Study indicated moderate impairment at Station 1, slight impairment at Station 2, and no impairment at Station 3, all relative to reference Station 4, which had an overall good water quality rating. NHDES evaluated the 2013 and 2014 macroinvertebrate data submitted as part of the Groundwater Discharge Permit requirements and determined an Index of Biotic Integrity, which is the summation of a number of macroinvertebrate statistical metrics. For the 2013 macroinvertebrate data, the upstream reference station 19MB-01 had an IBI score of 66.55 which "passed" the threshold of 65.44, while the downstream station 19MB-21 had an IBI score of 53.63 which "failed" to meet the threshold score of 65.49. In 2014, both 19MB-01 and 19MB-21 failed to meet the threshold IBI scores, with scores at 62.49 and 60.88, respectively. These results may indicate impairment, although we were unable to formally develop all of the indices to provide a more comprehensive evaluation within the scope of this project. An informal (not statistically rigorous) evaluation of one metric, the Hillenbrand Biotic Index, indicate fair to excellent IBI values as determined from the 2013, 2014, and 2015 macroinvertebrate data. Multiple indices also indicate a pattern of slightly higher water quality in the reference station as compared to the downstream station affected by the RIB discharge, although, again, this is an informal and preliminary evaluation.

Recommendations

Nineteen Mile Brook is a high quality coldwater habitat stream that, since 2009, indirectly receives nearly all of the Wolfboro Rapid Infiltration Basin Facility wastewater discharge through groundwater infiltration adjacent to the brook. Given the site history associated with the RIB discharge, including performance issues significant enough to warrant an Administrative Order by Consent from NHDES citing a

Note
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violation of the RIB Facility Groundwater Discharge Permit and, based on the available data presented in this report, which show evidence of surface water quality impacts likely resulting from the RIB discharge (primarily chloride and nitrate), we feel that continued environmental monitoring and environmental data evaluation is prudent and justified. Normandeau previously presented to Traftonboro, on October 26, 2018, a proposal for baseline environmental monitoring on Nineteen Mile Brook that included several studies for completion in 2019. Included in those studies were surface water quality (chemistry), aquatic habitat assessment, macroinvertebrates, fish, wildlife, and rare, threatened, and endangered species evaluation. Following this file review, we generally concur with those recommendations, although we feel that adding continuous specific conductance monitoring, as a surrogate for chloride, may be valuable. We also conclude that a wildlife study may be unnecessary at this point and that the other proposed studies remain higher priority. The results of this file review have also helped to identify further analyses that should be performed on existing and newly collected data including a review of surface water quality antidegradation requirements in NH and implications for water chemistry in Nineteen Mile Brook as well as a rigorous statistical analysis of macroinvertebrate data. Normandeau will review and revise our proposal for additional environmental studies on Nineteen Mile Brook, based on the findings highlighted in this report, and submit a revised proposal to the Town of Traftonboro for review.

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Exhibit 1

Approved for release by NSA on 08-25-2014 pursuant to E.O. 13526

1. The first step in the process of identifying a problem is to recognize that a problem exists. This involves gathering information about the situation and identifying the specific issue that needs to be addressed.

1. NAME

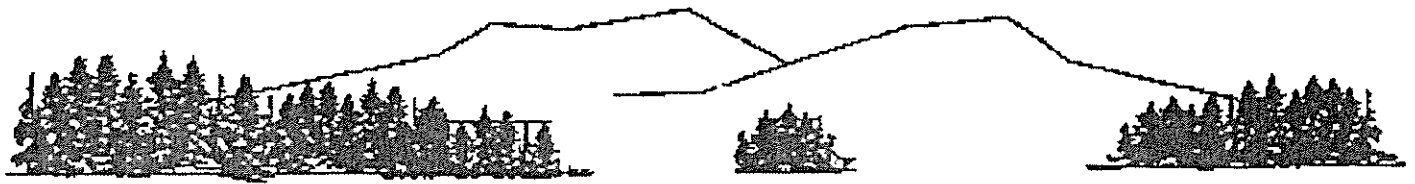
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The Tufonboro Times



Vol XXI, No 1

A Quarterly Newsletter Published by the Tufonboro Association

Winter 2019

Selectmen receive road paving study, improve facilities

Most of us remember the severe winter storm on Election Day in March 2017. Significant snowfall during the day followed by high winds in the late afternoon and evening rendered many roads impassable due to downed trees and utility lines. Most areas of town experienced power interruptions; some outages continued for several days. Ballot counting was completed by flashlight after the Town House lost power. The town applied for and received reimbursement from the Federal Emergency Management Agency (FEMA) for some of the extraordinary costs incurred with this storm. Those funds were used this past fall to upgrade electrical service at the Town House and install an automatic standby emergency generator. The town is also in the process of installing emergency generators at the Highway Garage and Transfer Station.

In 2018, the town contracted with Lakes Region Planning Commission to assess the pavement condition on all 28 miles of paved town roads. In late fall, the final report was presented, including detailed current pavement condition and a schedule of recommended maintenance and paving activities for the next 10 years. Based on this study, the Selectmen are recommending an increase in the road repaving warrant article to \$285,000 for 2019. Following the recommended maintenance schedule, including the use of existing and additional maintenance procedures, should result in an improvement in the overall condition of town roads from the current 68% (Fair) to 83% (Excellent) over the 10-year period.

Visitors to the Town Offices may notice the new entrance doors to the main entryway. They replace deteriorated wooden doors that were original to

the building. They will provide improved energy efficiency, increased security, and better accessibility with their automatic operators. New doors from the entryway vestibule into the central hall and the police station will be installed in the next few weeks. Improved outdoor lighting has also been added for the front entrance walkway.

Work continues preparing the 2019 town operating budget. The Selectmen recently identified capital projects for inclusion on the warrant. They include:

Renovation and expansion of the Tufonboro Free Library – The Library Board of Trustees and Capital Campaign committee have achieved strong private fundraising, with over 62% of the project cost raised to date in contributions and pledges. When combined with existing capital reserves, this makes the expansion achievable with single year project funding.

Update and conversion of town tax maps – Converts existing tax map data into GIS format and provides full tax map data access online.

19 Mile Bay beach improvements – Design work was completed in 2018 to improve drainage, eliminate standing water and enhance the winter lake access point. An improved perched beach retaining wall will decrease the existing tripping hazard and improve sand retention. Rain gardens and parking lot reconfiguration will redirect water runoff away from the lake. This will result in improved lake water quality and make the area more user friendly.

19 Mile Brook Baseline Study Update – A baseline study was conducted in 2008, when the Town of Wolfeboro was building their wastewater effluent

rapid infiltration basin adjacent to 19 Mile Brook near the Tufonboro town line. This study will update the 2008 work and identify any changes in water quality and plant and animal life in the brook, as Wolfeboro prepares to increase their discharge rate from the basin.

Town Elections and Town Meeting are coming. On Tuesday, March 12, voters will elect one Selectman, one Supervisor of the Checklist, a Trustee of the Trust Funds, a Cemetery Trustee, a Library Trustee and two Budget committee members. Polls are open from 8 a.m. until 7 p.m.

On Wednesday, March 13, Town Meeting will begin at 7:30 p.m. to act on articles in the town warrant. Mark your calendars and come out to participate in your town government!

Town government rests on the shoulders of our Boards, Commissions and Committees, composed of volunteer members who generously contribute their time and expertise in service to the community. Appointments to these bodies are for a 3-year term, with many volunteers serving multiple terms. Please contact the town offices if you are interested in serving.

For happenings in Town or to see when various boards and committees meet please check out the Town website at www.tufonboro.org. We encourage all to attend not only Selectmen's meetings but any other board or committees that may be of interest. Have a safe and happy winter.

Tufonboro Board of Selectmen
Bill Marcussen, Chairman
Chip Albee
Lloyd Wood

Proposed library building project boosted by fundraising

The long-anticipated Tufonboro Free Library addition and renovation project took a giant step closer to reality on January 4, when library Trustees met with the Selectmen and Town Treasurer in a work session to review the current status of the Library Building Fund and to determine the best way forward.

The projected project cost, revised in August 2018, is estimated at \$1,997,000. As of January 5, 2019, the Library Building Fund totals \$995,045.25

in cash, with an additional \$246,250 in confirmed pledges. The Town's Library Capital Reserve Fund, established by voters in 2010, totaled \$422,731.46 as of November 30, 2018. This represents a combined total of \$1,664,026.71 in cash and pledges, leaving a balance of \$332,973.29 still to be raised. (Note: Contributions to the Library Building Fund are still welcome and are fully tax deductible. Information packets and pledge cards are available at the library.)

After considering the potential negative drag of three- or five-year financing at 5.75% or higher interest rates, and following Town Treasurer Jack Widmer's strong recommendation, the Selectmen voted unanimously to forgo bonding or a bank loan, and instead to place the remaining balance on the warrant for a vote at Town Meeting, to be paid in one year. Because no money will be borrowed, approval will require a simple majority vote.

Continued on page 10

CONCORD MONITOR

My Turn: A crucial moment for Winnepesaukee's Farm Island

By EILEEN McNAMARA

For the Monitor

Published: 7/14/2019 12:25:13 AM

The future of Farm Island on Lake Winnepesaukee is not a NIMBY issue; it's a preservation and protection issue.

Neighbors of one of the few large uninhabited islands remaining in New Hampshire's biggest lake are not saying "not in my backyard"; they're asking, "Do we know what we're doing?"

The Tuftonboro Planning Board on Thursday is set to consider a proposal to develop a pristine property without first determining the impact a 12-parcel subdivision would have on a fragile loon population, water quality in nearby 19-Mile Bay, and the experience of boys at Camp Belknap who paddle canoes from basecamp on the Tuftonboro shore every summer to sleep under the stars on the 7.5 acres of Farm Island that the 116-year-old YMCA camp already owns.

The 13.3 unspoiled acres at issue have been owned by generations of the Winchester family since 1905. The uninhabited summer house built by Maria and George Winchester in 1906, the only dwelling ever erected on the island, still stands. In the 19th century, farmers used the island to pasture sheep and to keep cows and pigs. A well-preserved stone foundation at the southeast end of the island is a reminder of Winnepesaukee's role in the agricultural history of the Lakes Region. The artifacts in its soil speak to a time when the lake itself was long the preserve of local Abenaki tribes.

"Farm Island is a valuable resource for archeological sites and provides a high degree of archeological clarity for well preserved and intact terrestrial and submerged pre-contact Native American and post-contact European American archeological resources, potentially spanning thousands of years of human occupation," according to a report prepared this month by Victoria Bunker, an archeological consultant, for Camp Belknap. "This degree of integrity at diverse sites of multiple time periods is rare," she wrote, maybe even worthy of a slot on the State or National Register of Historic Places.

The potential loss of that history and this natural resource to multiple septic systems and private docks has prompted an outcry from those who love the lake and its more than 260 islands. More than 200 people have signed a petition opposing the subdivision of Farm Island, now owned by three brothers, Donald, David and John Winchester.

No one disputes the right of the Winchester brothers to profit from the sale of their personal inheritance. But when private property is entangled with the public good the calculus is not so simple. The signatories to the petition opposing the sale of Farm Island to two inexperienced developers are asking only that the Planning Board do its due diligence and delay any decision until a complete environmental assessment is conducted of the proposed project.

The Winchesters are not without options should the planning board reject or delay the pending subdivision proposal. Camp Belknap has offered to purchase and preserve the 13.3 acres on Farm Island now for sale. Had it been financially able, Camp Belknap would have bought the entire island in 2010 when it purchased 7.5 acres. It is in a better position to do so now, according to Seth M. Kassels, the executive director of Camp Belknap.

The island is still listed with the Multiple Listing Service as “active, under contract” with Maxfield Real Estate for \$1,495,000, down from an original asking price of \$2 million.

“That’s a large amount of money for Camp Belknap,” Kassels acknowledged, “but if this current purchase and sale agreement were to fall apart, Camp Belknap, with the help of our neighbors and alumni, would make every effort to purchase the island with the goal of preserving it for generations to come.”

Residents of nearby Chase Island report that developers are not alone in staking a claim to the sought-after wooded preserve. In recent days, they have seen a bald eagle among the pines that blanket Farm Island, fishing in 19-Mile Bay.

Maybe it’s a sign.

(Eileen McNamara, a former Pulitzer Prize winning columnist for the “Boston Globe,” is the director of the journalism program at Brandeis University. She lives in Moultonborough.)

Tuftonboro Planning Board
P.O. Box 98
240 Middle Road
Center Tuftonboro, NH
03816

July 18, 2019

Dear Tuftonboro Planning Board,

The following is a petition which was circulated by the "Friends of Farm Island" to residents of Tuftonboro. As you can see, there are more than 350 residents who are very concerned about the subdivision of Farm Island. All of us would request that the Planning Board take ample time to have impact studies done on all the areas of concern before beginning the deliberations on the subdivision.

Thank you.

Petition to Decline Subdivision of Farm Island

We, the undersigned, request the Tuftonboro Planning Board to decline the subdivision application for David, Donald and John Winchester, Tax Map 40 – Lot 2-1, 1 Farm Island, Tuftonboro submitted by C&R NH Realty Trust, LLC for a 12 parcel subdivision.

Farm Island is presently owned by Camp Belknap (7.5 acres) and the Winchester Family (13.3 acres). The Camp Belknap portion of the island is currently only used as an overnight camping site for the campers. The camping is conservation friendly with a leave no trace policy and no carbon footprint. There is no impact on the surrounding area. The Winchester portion of the island which consists of 2/3rds of the island is uninhabited. The proposed 12 lot subdivision by C & R Realty will create a major change to the island.

We have the following concerns regarding the development of Farm Island:

1. Increase in boat traffic on 19 Mile Bay
2. Impact on the water quality on 19 Mile Bay
3. Impact on the loon population
4. Archeological impact – artifacts on island
5. Loss of and historic preservation of the last original island farm on the Lake
6. Increase in mainland traffic and parking
7. Impact on dock availability on mainland
8. Shoreline protection disturbances
9. Impact of 12 septic systems on the water quality
10. Impact to town beach
Erosion? Site pollution? Noise? Safety of swimmers and kayakers?
11. Increase in the use of the public ramp
12. Overburdening the existing easement for electrical power
13. Flood hazard zone impacts

In order for the Planning Board to conduct the appropriate review of the 12 parcel subdivision on Farm Island, the following needs to be done:

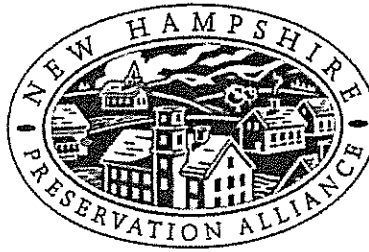
1. Environmental Impacts
 - Is an Alteration of Terrain permit required?
 - Shoreline Protection impacts
 - Wetland impacts
 - Septic system impacts
 - Army Corps of Engineers reviews
2. Is a Federal 106 review under the National Historic Preservation Act required?

3. Boat traffic study of 19 Mile Bay
 - Increased traffic
 - Impact on safety of kayakers, swimmers, etc
 - Impact on loons
4. Mainland traffic study
 - Increased traffic
 - Parking
5. Impact on abutters – Camp Belknap
 - Camp Belknap uses Farm Island for camping experience for campers
 - Will the camp be able to continue using Farm Island if there are 12 new residences on the Island? Liability and safety concern for campers..
 - Safety of campers on the island
 - Safety of campers in water
 - Light and noise pollution
6. Impact on residents of Chase Island and 19 Mile Bay
 - Safety in water for swimmer and kayakers
 - Light and noise pollution
 - Boat traffic
 - Potential impacts on Lake quality of life
7. Public walking tour of Island prior to approval

Thank you for your consideration of our concerns.

Signatures to the Petition to Decline Subdivision of Farm Island

	Name	Address	Signature
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____



BOARD OF DIRECTORS

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EXECUTIVE DIRECTOR
JENNIFER GOODMAN

July 18, 2019

Matt Young
Chairman, Planning Board
Town of Tuftonboro
240 Middle Road
Center Tuftonboro, NH 03816

Re: Farm Island


Dear Chairman Young and members of the Board:

The N.H. Preservation Alliance urges your consideration of the importance of the history and significance of Farm Island in your assessment of the current development proposal before the Planning Board.

As the statewide historic preservation non-profit organization, the N.H. Preservation Alliance supports community leaders and property owners across the state with all kinds of historic preservation projects and activities. Last year, we provided referrals and technical advice to hundreds of property owners and helped over 100 community-based rehabilitation, re-use and stewardship projects -- supporting efforts to bring private investment and other resources to towns and cities. As you know, historic preservation activity is an important ingredient in places where people want to live, work and visit or recreate.

We consider lakeside camps a vulnerable "endangered species" because of market pressures and land use decision-making. We have been working with property owners and conservation organizations to better understand the significance of these places and develop stewardship strategies. We understand from the work of preservation consultant Elizabeth Hengen that Farm Island is a rare resource on Lake Winnepesaukee and that it appears eligible for the New Hampshire and National Register of Historic Places.

Please let us know if you have any questions, and thank you for your consideration.

Sincerely,

Jennifer Goodman
Executive Director

Thank you for giving me the opportunity to speak on behalf of Camp Belknap and the sole abutter to the plot of land being discussed for subdivision tonight.

You have received quite a bit of information this evening and I recognize as a group of volunteers you have a lot of items to review and address. I thank you for the time and energy each of you expends to support the town. Your stewardship of the town's present and future development is extremely important and I appreciate your leadership in these matters.

As the sole abutter I thought I might take a few minutes to provide Camp Belknap's perspective and concerns on this property.

Camp Belknap arrived to our present location in 1907, We Camp Belknap as an organization have watched our 19-mile bay develop over the generations and we have gone from less than 5 abutters to having approximately 50 abutters in over 100 years.

Belknap started as 17 acres has grown to 300 acres. We presently have just over 1,100 boys experience Belknap each summer. Of these 1,100 boys approximately 25% or 275 of our campers are NH residents and approximately 12% of all the Tuftonboro boys who are of camper age also attend Camp Belknap. In addition, approximately 10% of our campers, receive full ride scholarship with the majority of these boys coming from within Carroll County. Camper Safety is and always has been our top priority and we manage risks with great intention to allow our boys to experience the lake in a multitude of manners.

Camp Belknap's request to the planning board is the following:

- 1.) That the planning board consider this proposed subdivision as having a regional impact. That the development requires regional planning commission review as well as notice and review by those towns which may also be impacted by the proposed subdivision and not just a town planning board decision. We Camp Belknap believe this project has a regional impact for the following reasons:
 - I. Water quality of the lake interacts with many towns bordering our wonderful resource of lake Winnepesaukee as well as additional natural resources
 - II. Traffic and parking concerns need to be addressed on the state highway that connects multiple towns and is the main commerce thoroughfare in the town.
 - III. Many people use the 19-mile bay boat ramp to access other towns in addition to Tuftonboro. Lake traffic should be considered and a safety review of how many boats our lake can handle before
 - IV. The proposed development will have negative impacts on historic or cultural resources.
 - V. The existing development abuts land that is being conserved and will fragment fragile lakefront habitat.

- VI. There has not been a subdivision since the late 70's on an island on lake Winnepesaukee and probably even longer since one has been in Tuftonboro. It seems like a great burden on the town's volunteer planning board to determine the best practices on island development, when the regional planning boards and various state review boards would most likely have experience and provide additional support and considerations to the review of this project.
- VII. Finally, the Pier 19 store is under contract with a multitude of potential development options and the impact of Wolfeboro's Rapid Infiltration bed is still up for research and debate. I urge the planning board to look at the interaction of all three projects together and not silo each item individually.
- 2.) Please consider the expert testimony tonight submitted as important items in whether the subdivision should be approved. I encourage the planning board to consider each item as outlined prior to any decision
 - 3.) Please consider the magnitude of this development. The subdivision in front of you calls for homes twice the size of the last 20 island homes purchased on the lake which has averaged ~ 1,300ft².
 - 4.) No matter what decision is made, please take the time you need to make sure that the decision is outlined clearly so that all parties involved are informed of all expectations, this will reduce the chance of conflict and confusion later on if development were to happen. This will also make sure that all parties involved are held accountable for their actions, in the timeliness expected and that plans if approved are clearly outlined so that no environmental mishaps might occur.

As we sit here today, I believe that our Bay's fate is at a cross roads. My boys each summer morning paddle across the bay to join their fellow classmates as members of the tuftonboro torpedoes and I find myself in the early fall as camp slows down enjoying peaceful moments at the town beach as my boys play with friends and neighbors.

This subdivision may create the largest impact to our bay in our 116-year history. We ask the planning board to methodically review the potential impacts not only to Camp Belknap, but our town and the region as a whole.

In closing I ask you to seek counsel from the regional planning board and get the appropriate state review board's engagement before issuing a final decision.

Thank you

Lake Winnepesaukee Association

P.O. Box 1624
Meredith, NH 03253



Love the Lake

(603) 581-6632
mail@winnepesaukee.org

www.winnepesaukee.org
www.winnepesaukeegateway.org

July 17, 2019

Matt Young, Chair
Tuftonboro Planning Board
P.O. Box 98
Tuftonboro, NH 03816

RE: Proposed Subdivision Plan for Farm Island, Tuftonboro

Dear Matt,

The Lake Winnepesaukee Association (LWA) has recently been contacted regarding the proposed subdivision plan for Farm Island. Concern has been raised by local residents on potential water quality impacts to Nineteenmile Bay from development of Farm Island.

Our organization is working on the development of a watershed management plan for Moultonborough Bay. The overarching goal in watershed management planning is to reduce nutrient loading to the lake. Over thirty years of data have shown an increasing trend in phosphorus loading, which promotes plant and algal growth.

As part of the project, we have hired an environmental consultant to assist us in conducting watershed and water quality analyses to determine water quality impacts from current nutrient loading to Moultonborough Bay, as well as future impacts to water quality if the watershed area were developed or built out to its maximum capacity. Unfortunately, we are in the early stages of the nutrient modeling analyses and don't have the final results; however, we can use the phosphorus export coefficients for forested land and low density residential to estimate the impacts from the proposed development of Farm Island.

The estimates indicate that development will result in a **1636% increase** of phosphorus loading to Nineteenmile Bay (Table 1). There will be additional impacts from nitrogen loading, and total suspended solids, which have not been estimated.

As the Planning Board knows, soil composition should be considered when evaluating the proposed development. The USDA Natural Resource Conservation Service Soil Survey indicates that the majority of soils on Farm Island fall within Hydrologic Soil Group C, 62%. Group C soils have a slow infiltration rate when thoroughly wet and therefore a moderately high runoff potential. These consist chiefly of soils having a layer that impedes the downward

Working to protect the water quality and natural resources of
Lake Winnepesaukee and its watershed now and for future generations.

movement of water or soils of moderately fine texture or fine texture. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 to 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures (U.S.D.A Natural Resource Conservation Service, 2007).

The remaining 38% of the soils on Farm Island fall within Hydrologic Soil Group B/D, medium to very slow infiltration. These estimates are not site specific, but obtained from the USDA Natural Resource Conservation Service Soil Survey. The information was collected at scales ranging from 1:12,000 to 1:63,360. More details were gathered at a scale of 1:12,000 than at a scale of 1:63,360. The mapping is intended for natural resource planning and management by landowners, townships, and counties.

Table 1. Nutrient Loading Estimates

	Farm Island	Farm Island Subdivision
Land Use (acres)		
Low density Residential	0	12
Forest	20.8	8.8
Phosphorus Load (lb/yr)	.66	9.7
Septic Load (lb/yr)	0	1.76
Total Phosphorus load (lb/yr)	0.66	11.46

I urge the Planning Board to require an environmental assessment be done to determine not only water quality impacts, but potential impacts to the aquatic and wildlife habitats as well.

Sincerely,

Patricia Tarpey
Executive Director

VICTORIA BUNKER, INC

Summary of Archeological Effort

**Farm Island
YMCA Camp Belknap, Inc.
Tuftonboro, NH**

**Prepared by Victoria Bunker, PhD
Victoria Bunker, Inc.
Archeological Consultant**

July 2019

**In-House File Document, Contains Confidential Information
Not Intended for Distribution**

Introduction

A Phase I-A archeological survey was completed by Victoria Bunker, PhD, for 7 acres on the southern side of Farm Island in Tuftonboro, NH, on behalf of YMCA Camp Belknap, Inc. The archeological survey was conducted in June, 2019, and included background documentary research and field inspection. A brief summary of results is presented in this document.

As a result of the Phase I-A archeological survey effort, archeological resources associated with late nineteenth to early twentieth century occupation were recorded on the property. These resources include stone wall alignments near the northern property line and a suite of features at the southeastern end of the property.

Further, as a result of documentary review and field inspection, it is the professional opinion of Victoria Bunker, PhD, that the Farm Island property exhibits the potential for terrestrial and submerged archeological resources associated with both pre-contact Native American and post-contact European-American occupations.

Summary of Significance

Farm Island is a valuable resource for archeological sites and provides a high degree of archeological clarity for well-preserved and intact terrestrial and submerged pre-contact Native American and post-contact European-American archeological resources, potentially spanning thousands of years of human occupation. This degree of integrity at diverse sites of multiple time periods is rare, allowing for significant preservation of archeological sites and the data they contain. As such, it is recommended that archeological resources of Farm Island be considered potentially eligible to the State or National Register of Historic Places.

Documentary Research

The archival sources reviewed included:

- EMMIT, the NH Division of Historical Resources confidential archeological data base of archeological survey reports and inventory of previously recorded archeological sites
- NH Old Graveyards Data base
- Artifact inventories prepared by Victoria Bunker for the Libby Museum
- The Chester Price Map of Historic Indian Trails, New Hampshire Archeological Society
- USDA Web Soil Survey
- 1861 Walling Map of Tuftonboro
- 1892 Hurd Map of Tuftonboro
- 1909 and 1956 USGS Winnepesaukee Quadrangles
- 1940-50 Aerial Photo, Camp Belknap archives
- 1923 John Hayley, *Tuftonboro, New Hampshire, An Historical Sketch*
- 2003 John Grossman, *Celebrating 100 Years, 1903-2003, YMCA Camp Belknap*
- Various publications regarding maritime and terrestrial Native American and European-American archeological resources, agriculture, industries, and transportation in New Hampshire
- Various web sites with data pertinent to Tuftonboro's history and archeological resources
- 2006 Tuftonboro, NH Master Plan, Prepared and adopted by the Tuftonboro Planning Board
- Data prepared by Elizabeth Hengen, Architectural Historian
- Interview with Seth Kassels, Executive Director, YMCA Camp Belknap, Inc.

Field Survey

The field survey included:

- Victoria Bunker, PhD, accompanied by Samuel Blake, MA (Underwater Archeologist) completed pedestrian (walkover and visual) survey of the entire 7-acre parcel and shoreline during two field visits (June 13 and 19, 2019)
- Photography of the property's landscape and cultural features
- Recording, photography and scaled field mapping of cultural features and components
- Observations on the island setting, terrain, natural resources and any evidence for prior impact in the property

Farm Island Setting

Farm Island is a 20-acre, wooded island located in Lake Winnepesaukee, northeast of the Camp Belknap shore, in Tuftonboro, NH. The island is sheltered in the mouth of Nineteenmile Bay, with Chases Island to the north and Chase Point to the west.

The shoreline of Farm Island is composed primarily of boulders and stones, however, the Camp Belknap shoreline and the nearby 19 Mile Bay Beach public swimming area are sandy. The bottom of the lake between Farm Island and the shore is composed of stone, with a maximum water depth of 25 feet in the channel between the island and the Camp Belknap shore.

Originally, Farm Island was connected to the mainland by a natural land bridge, located between the main shoreline and the southeastern tip of this island (the present-day location of a power line crossing) and is visible today at low water. Following construction of the Lakeport dam circa 1861, the level of Lake Winnepesaukee was artificially raised by 3 to 5 feet, submerging the land bridge. Local lore suggests that the land bridge was used during historic times as a livestock crossing. Prior to the nineteenth century, the land bridge would have also created a protected cove on the southern side of the island, safe from the prevailing winds and rough waters of the open lake.

Farm Island rises to approximately 20 feet above the present-day lake levels. The terrain on the island is level to gently sloping. Soils on the island are stony with numerous surface boulders present. Soils have been mapped as Metacomet fine sandy loam (459B) and Henniker-Gloucester fine sandy loam (980C)(USDA Web Soil Survey).

Farm Island is wooded with mixed conifers and hardwoods, and an understory which includes wild blueberries, shrubby growth and juniper. A circa 1911 photograph indicates that the island had both cleared and wooded areas. Later historic photos indicate that the forest had grown to cover most of the island and by the 1950s the entire island was wooded. The presence of juniper bushes on the island indicates that the landscape was over-grazed historically. Pastured farm animals, including cows and cattle, prefer leafy plants; when the land is “let go” unpalatable juniper will take over and thrive (Wessels 1997). Vestiges of juniper remain visible today in patches where sunlight filters through the tree canopy.

A variety of wildlife species inhabit Tuftonboro. Game animals include deer, moose, bear and smaller mammals in addition to birds and migratory waterfowl. Trout, bass and other fish are found in Lake Winnepesaukee along with crawfish, fresh water mussels and other species (Tuftonboro Master Plan, Lakesrpc.org).

Today, the 7-acre property is used for outdoor camp activities. Pathways lead to a tent platform and campfire rings. There are no standing buildings within the 7-acre property. Buildings are located on the adjacent 13-acre portion of the island. A NH Electric Cooperative power line is located outside the 7-acre parcel. It extends between the standing cottage and the southern shoreline, with a submerged cable that connects to the mainland.

Pre-Contact Native American Resource Potential

The Lakes Region was a focus of pre-contact Native American settlement from the Paleoindian period (c. 11,500-10,000 B.P.) through the time of contact with first European explorers, land surveyors, soldiers, missionaries and colonists in the 1600s. Abundant, artifact-rich and diverse archeological sites, representing the entire pre-contact period are present along the edges of rivers, streams, lakes, ponds and wetlands in this region. Together, these sites provide a compelling record of the importance of the Lakes Region, with its diverse environments and resources, to Native people during the past. Larger streams, rivers and an interconnected network of bays and lakes, provided natural transportation corridors for travel by canoe or foot, further affording access to the Merrimack River valley and the seacoast. In addition to abundant fish, game and plant resources, sources of distinctive stone for flaked stone tool manufacture are known in the Lakes Region.

Pre-contact Native American archeological sites have been previously recorded around the entire shoreline of Lake Winnepesaukee and on several of its islands, as well as on the margins of streams which flow into and out of the lake, with components as old as 10,000 years before present. Sites have also been recorded in Tuftonboro, with artifacts including a variety of stone tools and pottery sherds representing a chronological sequence from approximately 7000 years before present to approximately 500 years before present.

While no pre-contact Native American archeological sites have been previously recorded for the island, the island exhibits the potential for Native American archeological site occurrence in both terrestrial and submerged contexts.

Variables which contribute to the Native American archeological resource potential for Farm Island include:

- Analogy to the setting of other Lake Winnepesaukee sites on rocky islands
- The protected nature of Farm Island's setting in Nineteenmile Bay and its former configuration as a peninsula overlooking a sheltered cove would have been attractive to past people
- The abundant plant and game resources available on the island and in its immediate surrounds, including the course of Nineteenmile Brook, other nearby small streams and wetlands would have been ideal for Native American hunting and gathering economy
- Proximity to known habitation locations and villages which would have provided social and cultural connections
- Lack of prior impact or disturbance (such as deep agricultural plowing, development, sand or gravel pits, roadways, utilities) which would adversely affect site preservation either in subsurface or submerged contexts
- Underwater conditions offer optimal preservation conditions due to the anaerobic environment in cold water and the channel bottom configuration of stones as opposed to soft, shifting sands

Farm Island is archeologically sensitive for pre-contact Native American archeological resources. The island exemplifies qualities of particular interest for town culture and history as itemized in the Tuftonboro Master Plan (Lakesrpc.org 2006:41) including shallow coves where sunken dugout canoes may exist as well as areas along the shoreline, especially in proximity to brooks which flow into the lake.

Therefore, it is expected that pre-contact Native American sites, features, artifacts or other elements could occur on the island or underwater along former shorelines or at the location of the now-submerged the land bridge. It is expected that underwater resources may include dugout canoes, made from pine or birch that grew on the island, as well as the tools used to make them. Terrestrial resources are expected to include stone tools, ceramics and features such as cooking hearths.

Post-Contact European-America Resources and Resource Potential

Originally, Tuftonboro was part of a vast wilderness that stretched beyond the lowland coastal townships of New Hampshire, Maine and Massachusetts. Following the French and Indian Wars, lands in the interior were granted and in 1750 John Tufton Mason inherited lands which were to become Tuftonboro. By the 1770s, roads were laid out and settlement began. Great changes occurred during this time: the Revolutionary War was fought, a new country was created, and New Hampshire became a state.

By the 1790s towns and villages began to prosper and energetic construction had been established. Tuftonboro was incorporated in 1795. In the early 1800s, Tuftonboro's economy was largely agricultural with early settlement at Center Tuftonboro, Federal Corner, Tuftonboro Corner, Canaan Brighton, Mirror Lake and Melvin Village. Lands were cleared, sawmills were built and Tuftonboro grew as an agricultural rather than a manufacturing town.

By the late nineteenth and early twentieth centuries, travel began to increase with a rise in tourism. Steamboats and steam locomotives changed transportation around and across Lake Winnepesaukee. Because the railroad never extended to Tuftonboro, the steamboat became an essential method of transportation. Soon, Tuftonboro became a popular destination for summer visitors. Summer camps, cottage, boarding houses and hotels grew up along the shores of Mirror Lake and Lake Winnepesaukee.

While no archeological sites had been previously recorded on Farm Island, post-contact European-American archeological resources were identified during this survey. In addition, the island exhibits potential for other archeological site occurrence in both terrestrial and submerged contexts.

In the 1850s, Farm Island was so-named for its agricultural use. This island played an integral in nineteenth century agriculture, used for livestock grazing and other related activities which are reflected in archival sources and in field observations.

The recorded history of Farm Island spans some 165 years as follows:

- 1854: Farm Island received its name
- 1850s to 1890s: Farm Island had multiple owners, engaged in agriculture and farming. These included Albert Chase who owned the island in the late nineteenth century and had one of the largest flocks of sheep in town.
- 1904-1905: Farm Island was sold and the existing cottage was built for use as a summer home

Archeological components recorded during the 2019 field inspection include:

- A stonewall enclosure was recorded straddling the property line on the northern side of the 7-acre property. This feature is rectangular in outline, measuring approximately 35 x 50 feet in size. The walls are low, constructed of 1 to 3 courses of field stones and are partially disarticulated. This feature likely served as an enclosure for agricultural uses.
- A suite of 4 related features were recorded at the southern margin of the 7-acre property. These include a dry-laid stone foundation (Feature 1), a below-grade stone quarry (Feature 2) with an extension of quarry boulders at grade (Feature 2A), a dry-laid stone well (Feature 3), and a series of low walls (Feature 4).
 - *Feature 1* is a dry-laid stone foundation, with a footprint measuring approximately 12 feet x 30 feet. The interior foundation base exhibits aligned stones which may have served as footings for posts or piers. The foundation was built into the natural slope and oriented north/south with the southern end open to face the shoreline. Side walls are stepped, with mortar repairs found on the eastern wall. One of the foundation stones exhibits a pneumatic drill mark. Because compressed-air hand tools were developed and used for drilling rock in the 1880s (Simmons 1997:8), the foundation construction is believed to post-date the 1880s. While the function of the building which once stood on this foundation is unknown, it likely served as an agricultural outbuilding, perhaps used as an animal shelter or a storage building, root cellar, workshop, ice house or other function (Hubka 1984:61ff). The building may have been intended for use as a “bank barn” built into the slope. Bank barns were popular in the mid-1800s to keep horses, cows, pigs and hens cool in the summer and warm in the winter. However, air circulation was problematic and by 1868 farmers “placed sills upon pillars” in these barns (Visser 2012: 442-443). The building may also have been intended for use as a sheep shelter. These shelters were often open at one end for easy exit and entry (Visser 202: 163-164). Albert Chase, who owned the island between 1878 and 1893, had one of the town’s largest flocks of sheep, and probably used the island as a pasture. Frank Staples, who bought the island in

1894, had the right to remove all buildings standing on the island as well as barbed wire fencing (used for cows or cattle) and woven wire fencing (used for sheep or hogs) when the island was sold to John Edgerly in 1904. Data from archival sources, including deeds and nineteenth century agricultural census, confirm the island's use for livestock (per Elizabeth Hengen historical research). Other archival data substantiate the agricultural use of the island and include local lore about cows being driven across the land bridge and notation that boys at Camp Belknap using a cow pasture as a playing field (Grossman 2003:31). The prevalence of juniper in the island's understory and the occurrence of short grasses in exposed rocky soils observed during field inspection, are key indicators of over-grazing by sheep and cows during the nineteenth century (Wessels 1997).

- *Feature 2* is a stone quarry where boulders were extracted and split. The feature is located approximately 20 feet west of the foundation and consists of jumbled stone in a depression. The depression was excavated below grade, with a mound of back-dirt on the northern margin. A low, dry laid wall is positioned in the southeastern corner of the feature. Diagnostic marks on several stones indicate that the "plug and feather" or "feather and wedge" method was primarily used to split the rocks into manageable size and shape. This method was introduced to northern New England after 1830. It utilized a "plug drill" with a "V" point that was hammered and rotated to create a round hole, penetrating 2 to 3 inches into the stone. A pair of half-round "feathers" was inserted into the hole and a wedge of "plug" was placed between these shims. The pressure of the plug caused the stone to split (Garvin 2001:45). This technique, while introduced in the early 1800s, persisted through the nineteenth century. Several stones in the quarry exhibited pneumatic drill marks, post-dating 1880. An extension of the quarry was defined as Feature 2A, located on the northwestern side of Feature 2. This quarry area also consists of a jumble of stone, but was not excavated below grade. It is likely that these features are contemporaneous with the foundation and the stone used for construction of the foundation was acquired from the quarry area. The quarry likely dates to the late nineteenth century and reflects a pattern of farming that often developed hand-in-hand with small-scale seasonal and resource-specific industries such as timbering and quarrying. Typically, farmers turned to quarrying during the off-season and boulder quarrying was one of many diversified agrarian activities.
- *Feature 3* is a circular stone-lined well located close to the shoreline south of the quarry area. This feature is visible at ground surface, but the depth of the well was not confirmed.
- *Feature 4* is a series of low dry-laid stone walls located west of Feature 2A. These walls were constructed of several courses of field stone; no split stone was observed. A small, square alignment was noted on the southern side of several intersecting stone walls. The walls may have served as animal enclosures or may be the footings of a small outbuilding related to agricultural activities.

Variables which contribute to the European-American archeological resource potential for Farm Island include:

- A suite of archeological features, recorded in this survey and detailed above
- The location of Farm Island along a steamboat transportation route
- Archeological manifestations of island use over the course of 165 years with a transition from nineteenth century agricultural use to twentieth century summer occupation
- Relationship to Camp Belknap for a variety of activities
- Lack of prior impact or disturbance (such as deep agricultural plowing, development, sand or gravel pits, roadways, utilities) which would adversely affect site preservation either in subsurface or submerged contexts
- Underwater conditions offer optimal preservation conditions due to the anaerobic environment in cold water and the channel bottom configuration of stones as opposed to soft, shifting sands

Farm Island is archeologically sensitive for post-contact European-American archeological resources in addition to the features recorded during this survey. The island exemplifies qualities of particular interest for town culture and history as itemized in the Tuftonboro Master Plan (Lakesrpc.org 2006:41) by analogy to a dugout canoe found elsewhere in town that was built by early settlers. Because the island is undeveloped, its natural and cultural scenic qualities are also considered important as stated in the Tuftonboro Master Plan (Lakesrpc.org 2006:31, 44).

Therefore, it is expected that terrestrial post-contact European-American sites, features, artifacts or other elements could occur on the island in subsurface contexts. Components may be related to agricultural land use associated with visible features recorded during field inspection. Other components may also occur related to subsequent summer occupation, recreation and Camp Belknap activities. It is also expected that post-contact European-American underwater resources could be found along former shorelines or at the location of the now-submerged the land bridge. It is expected that underwater resources may include wharves, piers, canoes or other small craft, as well as elements associated with lake travel such as steamboats or seaplanes that docked at the camp.

Archeological Value

The undisturbed setting of Farm Island provides a high degree of archeological resource preservation, an unusual occurrence in Lake Winnepesaukee. Landscape modification at Farm Island is negligible within the 7-acre parcel. Uses are limited to camp activities and have not impacted the subsurface archeological context. The construction of a single cottage and outbuildings within the 13-acre parcel has minimally affected the subsurface archeological context.

European-American archeological resources recorded during survey are intact and exhibit integrity. Therefore, they have the ability to provide information on a dynamic period of history during the transition from late nineteenth century agriculture to early twentieth century summer recreation.

Importantly, the island retains integrity of place. The setting remains compelling – people can look across the lake or bay and see nearly the same view that people saw one hundred years ago. Further, the lack of impact is a rare quality for both pre-contact Native American and post-contact European-American archeological resource preservation on land and under water.

It is the professional opinion of Victoria Bunker, PhD, that the 7-acre property on Farm Island exhibits a high degree of archeological resource sensitivity for both terrestrial and submerged archeological resources, potentially spanning thousands of years of occupation. In addition to the features recorded during this survey, resources may include artifacts, features and components related to pre-contact Native American and post-contact European-American habitation, land use and activities. Therefore, Farm Island is considered a valuable resource for archeological sites and is able to contribute information to our knowledge of the past. As such, it is recommended that archeological resources of Farm Island be considered potentially eligible to the State or National Register of Historic Places.

It is recommended that complete archeological survey be conducted to identify archeological resources within any locations that might be impacted by future activities, such as building construction, utility line placement, or installation of docks.

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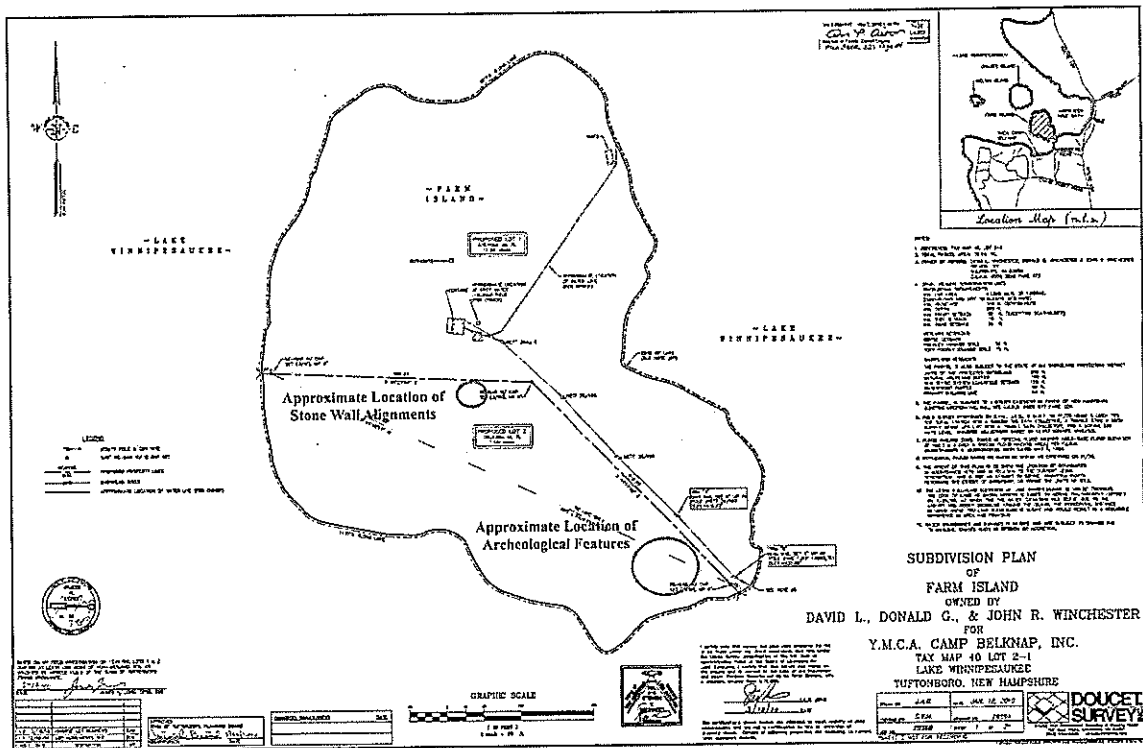
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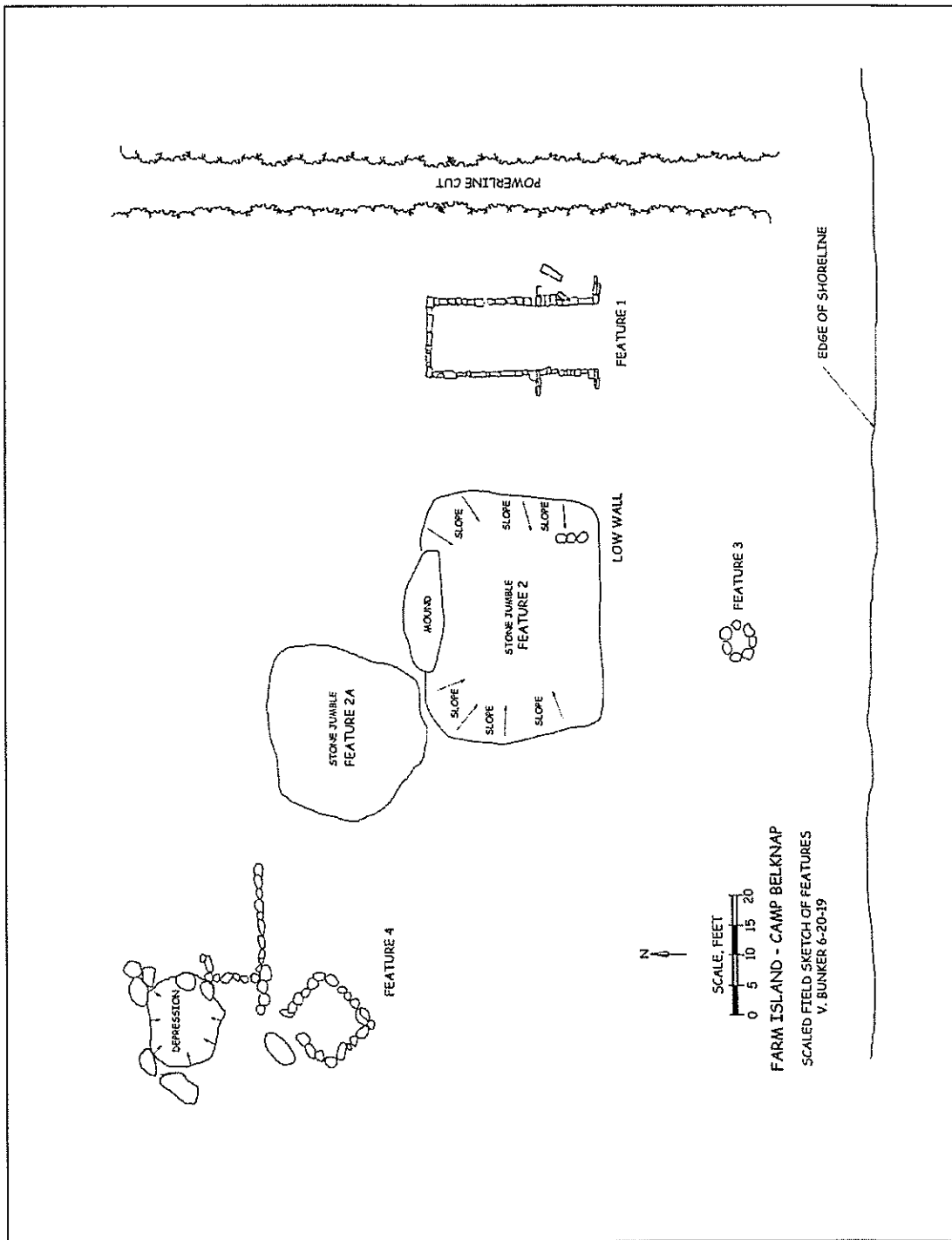
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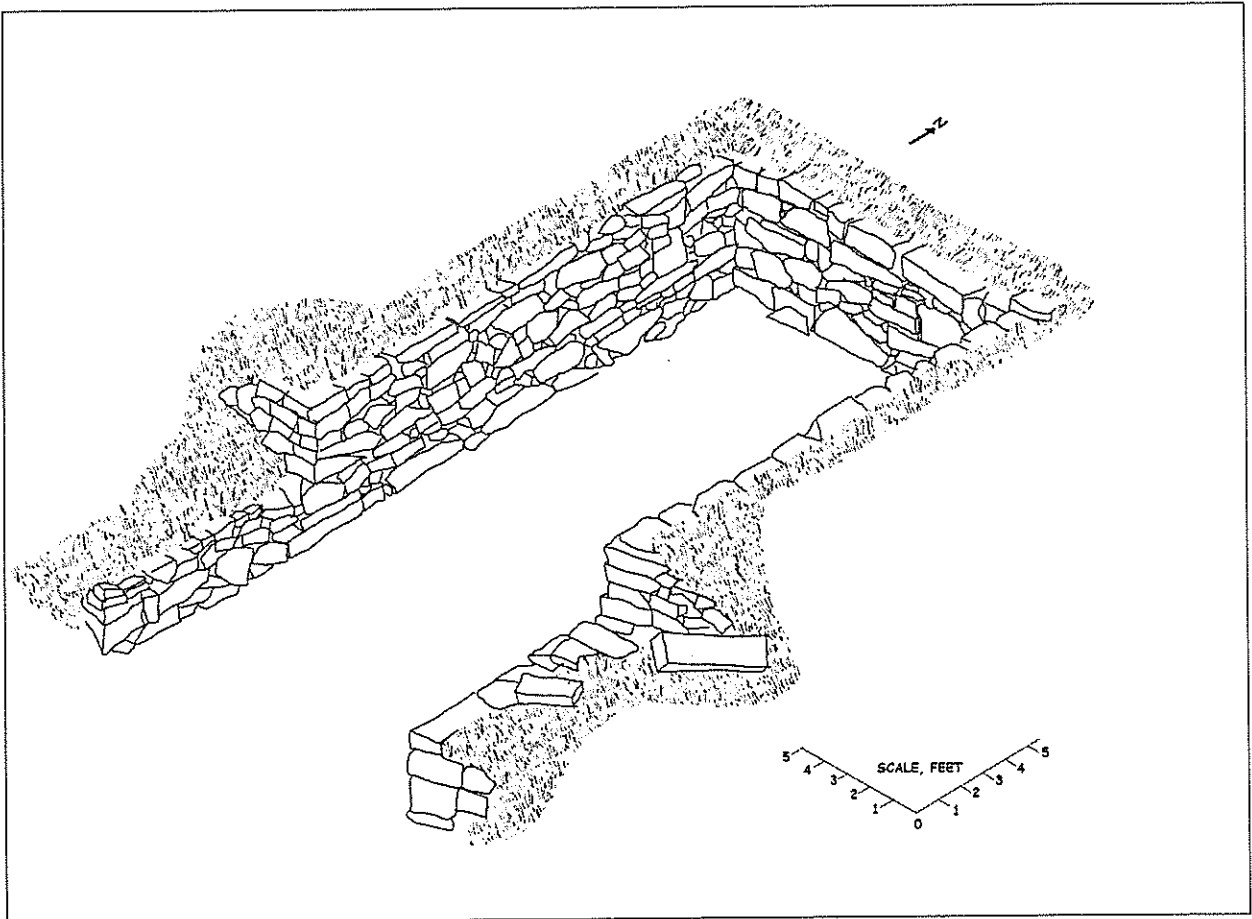
USDA Web Soil Survey



Approximate Location of Stone Wall Alignments and Archeological Features on Plan



Field Sketch of Archeological Features



Schematic Drawing of Feature 1 Foundation