100 International Drive, Suite 152, Portsmouth, NH 03801
Tel: 603.570.6319

September 2, 2022

Andrew Koff, PG
NHDES Drinking Water Groundwater Bureau
New Hampshire Department of Environmental Services
29 Hazen Drive
Concord, NH 03302-0095

Re: **Preliminary Report and LGWP Application**
Proposed North Well – Corbin Road Site
Town of Newport, New Hampshire

Dear Mr. Koff:

On behalf of the Town of Newport, Weston & Sampson is pleased to submit the enclosed Preliminary Hydrogeological Report and Large Groundwater Withdrawal Permit Application, for a proposed supply well (the North Well) for the Town of Newport, New Hampshire.

This document includes a Pumping Test Proposal with required appendices and figures. The report uses data and information developed in connection with recent and previous investigations to analyze and discuss hydrologic, geologic, environmental, and groundwater quality conditions with respect to the proposed well site.

If you have any questions concerning this report submittal, please do not hesitate to call me at 603-570-6319.

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Frank Getchell, NH PG,
Senior Technical Leader, Water Resources

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

LARGE GROUNDWATER WITHDRAWAL PERMIT APPLICATION NOTIFICATION FORM

Drinking Water and Groundwater Bureau

Notice of Submittal to the New Hampshire Department of Environmental Services

RSA 485-C:21, Env-Wq 403

PROJECT LOCATION

Site Name and Owner (if different than Applicant)	**Proposed North Well Site, Owned by Town of Newport NH**
Address	**Corbin Road**
Tax Map/Lot Number	**218 / 9000**
Municipality(s) in Potential Impact Area	**Town of Newport**
Community Water Supplier(s) in Potential Impact Area	**Town of Newport; Cary and Allen Street Development**

APPLICANT

Name	**Todd Cartier**
Affiliation	**Town of Newport Public Works, Director**
Mailing Address	**15 Sunapee Street, Newport, NH, 03773**
Phone Number	**603-863-3650**
Email Address	**tcartier@newportnh.gov**

APPLICATION PREPARER (provide imprint of professional license stamp)

Name	**Frank Getchell**
Company Name	**Weston & Sampson Engineers Inc.**
Mailing Address	**100 International Drive, Suite 152, Portsmouth, NH, 03801**
Phone Number	**603-570-6319**
Email Address	**Frank.Getchell@wseinc.com**

*Notice to application preparer: Provide copies of certified mail receipts to NHDES immediately following each submittal.

SUBMITTAL INFORMATION

SUBMITTAL TYPE **DATED: 9/2/2022**

- ☒ Preliminary Application
- ☐ Preliminary Application – Supplemental Information
- ☐ Final Report
- ☐ Final Report – Supplemental Information
- ☐ Permit Renewal Application
- ☐ Other: _____

PROJECT TYPE

- ☒ Public Water Supply
- ☐ Bottled/Bulk Water Supply
- ☐ Irrigation Water Supply
- ☐ Process Water Supply
- ☐ Other: _____

1. Type of proposed water source: _____ Bedrock well(s), **X** Overburden well(s), _____ Spring
2. Number of proposed water sources: **1**
3. Proposed cumulative withdrawal volume in gallons per day: **576,000**

Project Summary: (please provide a brief description of your proposed project in the space below)
Proposed installation of gravel packed screen public community groundwater supply for the Town of Newport. See attached plan.

NOTE: Per RSA 485-C:21, the deadline to request a public hearing for this project is fifteen (15) days following receipt of the Preliminary Application or Final Report. For more information, see the NHDES fact sheet WD-DWGB-22-15 regarding the Large Groundwater Withdrawal permitting process.

LargeGW@des.nh.gov or phone (603) 271-8866
PO Box 95, Concord, NH 03302-0095
www.des.nh.gov

REPORT CERTIFICATION STATEMENT

By signing this report the signer certifies that the information contained in or otherwise submitted with this report is true, complete and not misleading to the best of the signer's knowledge and belief.

By signing this report the signer understands that submission of false, incomplete or misleading information is grounds for:

- Not approving the report;
- Revoking any approval that is granted based on the information;
- Suspending or revoking the professional license held by the signer if the department is the licensing authority or referring the matter to the appropriate licensing authority for potential action against the professional license held by the signer if other than the department; and
- If the signer is acting as or on behalf of a listed engineer as defined in Env-C 502.10, debarring the listed engineer from the roster.

By signing this report, the signer understands that they are subject to the penalties specified in NH law, currently RSA 641:3, for making unsworn false statements.

By signing this report, the signer and applicant agree to comply with all applicable rules and conditions of the approval, if one is issued.

SIGNATURES

APPLICANT/CONTACT PERSON: Frank Getchell	**DATE**	**9/2/2022**
PRINTED NAME: Frank Getchell		
***REPORT PREPARER: Frank Getchell**	**DATE**	**9/2/2022**
PRINTED NAME: Frank Getchell		
PROFESSIONAL LICENSE TYPE: P.G.		
PROFESSIONAL LICENSE NUMBER: 00572		

**This cover page must bear the stamp or seal of the NH-licensed Professional Engineer (P.E.) or Professional Geologist (P.G.) who prepared the report.*

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Large Production Wells and Wells for Large Community Water Systems

Drinking Water and Groundwater Bureau

Rule: Env-Dw 302

REPORT COVER PAGE

PROJECT NAME	**Proposed North Well Site**
PROJECT TOWN	**Town of Newport**
PWS ID	**1741010**

APPLICANT (Project/Water System Owner)

Name	**Todd Cartier**
Mailing Address	**15 Sunapee Street, Newport, NH, 03773**
Daytime Phone Number	**603-863-3650**
Email Address	**tcartier@newportnh.gov**

WELL SITE OWNER (Property Owner)

Name	**Todd Cartier**
Mailing Address	**15 Sunapee Street, Newport, NH, 03773**
Daytime Phone Number	**603-863-3650**
Email Address	**tcartier@newportnh.gov**

PROJECT CONTACT/REPORT PREPARER

Name	**Frank Getchell**
Company Name	**Weston & Sampson Engineers Inc.**
Mailing Address	**100 International Drive, Suite 152, Portsmouth, NH, 03801**
Daytime Phone Number	**603-570-6319**
Email Address	**Frank.Getchell@wseinc.com**

PUMPING TEST PERFORMER/CONTACT

Name	**Frank Getchell**
Mailing Address	**Weston & Sampson Engineers Inc.**
Daytime Phone Number	**603-570-6319**
Email Address	**Frank.Getchell@wseinc.com**

SUBMITTAL INFORMATION

1. Project Type:
   - a. ☐ New well(s) for New System.
   - b. ☒ New well(s) for Existing System.
   - c. ☐ Replacement well(s) for Existing System.
   - d. ☐ Hydrofractured or Deepened well(s) for Existing System.

2. Proposed permitted production volume in gallons per day: **576,000 gpd**

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APPLICANT	Todd Cartier	**DATE**	9/2/22
PRINTED NAME	**Todd Cartier**		
***REPORT PREPARER**	Frank Getchell	**DATE**	9/2/2022
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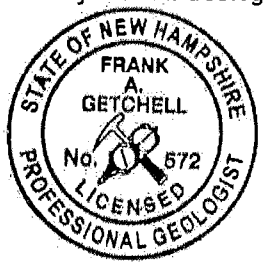

For additional information contact NHDES' Community Well Siting program manager at (603) 271-8866.

Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

REPORT

September 2022

TOWN OF
Newport
NEW HAMPSHIRE

Preliminary Hydrogeological Report and Large Groundwater Withdrawal Permit Application

Proposed North Well

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1.0 INTRODUCTION

The Town of Newport (Town) has retained Weston & Sampson Engineers, Inc. (Weston & Sampson) to develop and assist with the permitting of a new groundwater supply source on a Town-owned parcel of land (the Site) located north of the Parlin Field Airport (Figure 1). As part of our services, Weston & Sampson has prepared this Preliminary Hydrogeological Report (the Report) on behalf of the Town for submittal to the New Hampshire Department of Environmental Services (NHDES) in support of a Large Groundwater Withdrawal Permit Application for the proposed public water supply well (aka the proposed North Well).

The future use of the proposed North Well by the Town will require a Large Groundwater Withdrawal permit since the anticipated pumping demand will be approximately 400 gallons per minute (gpm) or 0.576 million gallons per day (MGD). As such, this Report was prepared in accordance with the supporting information guidelines specified by NHDES Code of Administrative Rules Part Env-Dw 302: Large Production Wells and Wells for Large Community Water Systems, and Part Env-Wq 403: Large Groundwater Withdrawals. The following sections are designed to provide as much current and detailed information regarding the proposed well site and expected construction and testing goals as possible.

1.1 Site Description

The land parcel selected for the proposed water supply well installation site is located in the northern part of Town, situated to the west of Route 10 and surrounded by various undeveloped and residential/rural properties. The Parlin Field airport is located directly south of the site, on the opposite side of Corbin Road. The proposed well-site parcel is one of three contiguous parcels owned and/or controlled by the Town. The parcel is occupied by wetlands, the eastern riparian corridor of the North Branch Sugar River, and woodlands. Corbin Road and Route 10 border the parcels along the eastern and southern perimeters of the site, respectively. The well site is accessed by way of a wooded path off of the Town's Haserlat Park Road, the entrance to which is off of Corbin Road. A Site Map of the subject parcel(s) shows the locations of previous test wells completed at the Site along with the location of the proposed North Well (Figure 2). The Site and contiguous parcels fall within the Black-Ottauquechee watershed (USGS #01080106) of the Sugar River, which is a smaller drainage basin within the lower Connecticut River drainage basin. The Site parcels (Site Parcels) are underlain by overburden materials comprising a primarily unconfined sand and gravel (stratified drift) aquifer system that covers approximately 0.55 square miles of the Sugar River valley upgradient of the proposed North Well site.

1.2 Subsurface Exploration and Background

The Town of Newport drinking water supply currently relies on two water sources: groundwater from the Pollards Mill Well located in the southern part of the Town and surface water from Gilman Pond, located in the nearby Town of Unity. The combined reliable yield of these two sources does not allow the Town to meet the applicable NHDES's Supply Capacity Requirements, and therefore the Town is seeking to develop an additional source.

As part of it efforts to locate an additional source, Emery & Garrett Groundwater Investigations, LLC (EEGI) was previously retained by the Town to conduct a review of available subsurface exploration work and preliminary yield evaluation program for several accessible land parcels. The results of the EGGI work were summarized in its August 2014 report to the Town entitled "Groundwater Exploration and Development Program Evaluation of Potential New Groundwater Sources". The study focused on five

separate areas referred to as potential groundwater development zones and identified as NNH-SG1, NNH-SG2, NNH-SG3, NNH-SG4 and NNH-SG5, respectively. All of these areas were targeted by EGGI since they overlie an extensive glacial meltwater deposited (stratified drift) sand and gravel aquifer system underlying much of the local Sugar River watershed. These areas were identified and rated by prior studies as exhibiting hydrogeologic conditions favorable for potentially supporting a high yielding groundwater supply [i.e., exhibiting high groundwater bearing capacity as reflected by aquifer transmissivity values of greater than 2,000 square feet per day (ft^2/d) or 15,000 gallons per day per foot (gpd/ft)]. Based on its findings, EGGI concluded that zones NNH-SG1, NNH-SG2, and NNH-SG3 had the greatest hydrogeologic favorability for supporting a future supply well for the Town and potentially possessing the ability to meet long-term groundwater quality protection needs for a future well. In order to further prioritize these three zones with respect to the selection of a site for a future Town supply well, EGGI recommended completing a Phase II effort that would entail geophysical surveys and the installation and testing of small-diameter exploration wells at locations within potential groundwater development zones NNH-SG-1, NNH-SG2 and NNH-SG-3.

Based on the available information, EGGI implemented a small diameter test well drilling program between October 2018 and March 2019, focused on potential groundwater development zones NNH-SG1 and NNH-SG2. The main goals of the test well drilling program were to provide site-specific determinations of aquifer stratigraphy, grain-size characteristics, and thickness, future well yield potential, and background groundwater quality. The small-diameter test wells were drilled by S.W. Cole Explorations, LLC, a licensed drilling company, and advanced using 4-inch diameter casing and the drive and wash drilling methodology.

Selected completed wells were subsequently pumped for a short duration by EGGI staff using a small diameter test submersible pump. The pumping rate and corresponding water level in the respective well were measured over the test duration by the EGGI staff and used to calculate the corresponding specific capacity value for the tested well. The determined specific capacity values were used to project the potential yield of a future large diameter well at the respective locations and thus enabled relative ranking of the corresponding sites relative to further evaluations.

Based on the results of the short-term testing and corresponding calculated specific capacity values combined with the encountered subsurface conditions, the site associated with the exploratory well completed in the southernmost part of NNH-SG1 (NNH-1D) was identified by EGGI as having the best potential for supporting the development of a future supply well for the Town. As a result, the proposed North Well is intended to be located in zone NNH-SG1 near small diameter test well NNH-1D. The locations for all of the test wells installed as part of the exploration of zone NNH-SG1 are shown on Figure 2, and the respective well logs are provided as Appendix A. A summary of construction details and testing results reported by EGGI for the small diameter exploratory wells completed at zone NNH-SG1 is provided in Table 1 below:

Table 1: Zone NNH-SG1 Test Well Drilling Summary from EGGI

Well ID[1]	Well Diameter (inches)	Depth to Bedrock (ft bgs)[2]	Total Depth (ft bgs)	Screen Interval (ft bgs)	Depth to Static Groundwater (ft bgs)	Available Drawdown[3] (feet)	Specific Capacity (gpm/ft)[4]
NNH-1A	2	NE[5]	32	15 - 25	16.85	NA[6]	NT[7]
NNH-1B	3	80	80	58 – 73	11.82	46.18	6.9
NNH-1D	3	NE	107	35 - 50	15.92	19.1	490.0
NNH-1E	3	NE	42	24.1 – 34.1	10.79	13.31	3.7
NNH-1H	2	NE	52	17 - 27	5.15	11.84	NT
NNH-1I	3	43	46	33 - 43	11.48	21.52	4.3
NNH-1J	3	NE	62	42 - 57	21.48	20.52	14.7

Notes:
(1) See Figure 2 for locations.
(2) Feet below ground surface.
(3) Based on the difference between the reported static groundwater level and the top of the screen interval.
(4) Gallons per minute per foot of drawdown.
(5) Reportedly not encountered.
(6) Not applicable since static groundwater level is reportedly below the top of the screen interval.
(7) Well not tested.

2.0 PRELIMINARY CONCEPTUAL HYDROGEOLOGIC MODEL

A preliminary conceptual hydrogeologic model (CHM) developed for the portion of the aquifer system in the vicinity of zone NNH-SG1 and the proposed North Well site was developed using subsurface, geologic, and hydrologic information available from previously published reports [e.g., United States Geological Survey (USGS)] and the reported results of the EGGI exploratory efforts. The following subsections describe in detail the aquifer characteristics and boundary conditions assumed in the development of the preliminary CHM. Hydrogeologic cross-sections were developed to illustrate the distribution of the stratified glacial deposits comprising the targeted aquifer system (Figures 2, 3A, and 3B, respectively).

2.1 Surficial Geology

Currently, the publicly available surficial geology mapping of the Newport area is primarily limited to work completed by the USGS (Moore, 1994). According to the available USGS information, the surficial materials underlying the Town were generally deposited approximately 10,000 to 13,000 years ago due to a series of glacial ice advances and retreats during the Wisconsin glaciation period. The corresponding glacial materials can generally be described as either "till" or "stratified drift" (aka "outwash"). The materials classified as till generally consist of a heterogenous mixture of clay through cobble size materials deposited directly by the glacial ice primarily on the encountered bedrock surface. As such, till is often encountered at grade in higher elevation areas, and beneath overburden materials occurring in valleys and other lower elevation areas. Stratified drift or outwash typically consists of sorted, relatively homogenous layers of clay, silt, sand, gravel, and layers of varying mixtures of these materials that were deposited by glacial ice meltwater.

Those geologic deposits that coincide with the formation of the local aquifer in the vicinity of zone NNH-SG1 and that are potentially favorable for groundwater supply development were deposited as the glacial ice retreated northward through the Sugar River Valley and emanated a mixture of meltwater and sediment. The meltwater carried sediment generally consisted of clay through cobble size materials that were deposited along the front of the ice margin and downstream. The coarser of these materials generally occur closer to the former ice front while the finer grain size materials were deposited further away. As a result of variations in the glacier front location, and meltwater discharge timing and location, the respective materials were deposited in layers. Locally, the finer of the grain-size materials accumulated in glaciolacustrine lakes and ponds that occupied areas further downstream where past ice margin deposits and/or valley sides helped to form temporary impoundments. The topography formed by these meltwater features corresponds to the outwash plain (and underlying aquifer) that extends from the Town of Croydon along the valley of the North Branch Sugar River southward through the Town of Goshen.

2.2 Bedrock Geology

Bedrock underlying the overburden in the Site area consists of metamorphic rock identified as the Bethlehem Gneiss (Billings, 1956). The structures (e.g., fractures, faults, and folds) associated with this metamorphic rock are oriented ("strike") in a mostly north-northeast to south-southwest direction. Major faults in the area are mainly oriented parallel to this regional structural strike, yet some of the faults associated with local igneous intrusive rocks can be oriented in directions that are oriented obliquely to that of the prevalent metamorphic structural grain (Moore 1984). Groundwater in the bedrock typically occupies the more significant of the metamorphic structures, with minimal to none occupying the rock

matrix. As such, the preliminary CHM developed for the Site and surrounding zone NNH-SG1 assumes that the bedrock underlying the stratified drift aquifer exhibits minimal hydraulic connectivity and forms a low to impermeable barrier to the overlying overburden deposits.

2.3 Surface Hydrology

As indicated by Figure 8, the Site is located within the USGS defined Black-Ottauquechee watershed (#01080106) and the North Branch Sugar River sub-basin (#010801060404). According to the corresponding USGS mapped hydrography, the major surface water outlet for the sub-basin is the North Branch Sugar River. The closest reach of the North Branch River is approximately 520 feet from the proposed North Well location. The confluence of the southward flowing North Branch Sugar River with the main stem of the westward flowing Sugar River is approximately 3,040 feet downstream from the proposed North Well location (Figures 1 and 2).

2.4 Hydrogeology

The stratified drift aquifer tapped by the existing wells and proposed North Well at the Site is locally orientated in a roughly north-south direction and consists mostly of layers of fine to coarse sand with some thin beds of fine gravel and silt. Based on the test well drilling performed by EGGI between 2018 and 2019, the aquifer is considered to be locally unconfined (i.e., no evidence of significant silt and/or clay layers occurring beneath the groundwater surface) with groundwater levels generally occurring between 5 and 21 feet below ground surface (ft bgs). Based on the encountered aquifer thicknesses and groundwater levels, the saturated thickness of the aquifer at the Site is expected to vary from 30 feet to 90 feet. Given the general topography of the Site area, nearby surface-water flow direction, and groundwater depths, the local groundwater flow direction is anticipated to be towards the west-southwest. The distribution of local groundwater elevations ("head") reported for wells in the vicinity of the Site, indicate that the corresponding groundwater hydraulic gradient is approximately 0.004 feet vertical per foot horizontal.

2.5 Local Aquifer Properties

According to USGS Water-Resources Investigations Report, 92-4013 (Moore, et al., 1994), the transmissivity of the aquifer (measure of the ability of the entire saturated thickness of the comprising materials to transmit groundwater) in the immediate vicinity of the Site is relatively high at about 4,000 ft^2/day or greater. The hydraulic conductivity (often referred to as "permeability") of the aquifer materials (measure of the ability of groundwater to move through a unit thickness of the comprising materials) is determined by dividing the aquifer transmissivity by its saturated thickness for a specific location. Based on the currently available information, the hydraulic conductivity of the aquifer materials in the Site area is estimated to range between 190 to 800 feet per day (ft/day). Site-specific transmissivity and hydraulic conductivity values will be established as part of the pumping test program being proposed in connection with this Report (discussed below).

The storativity of the aquifer (aka storage coefficient) is reflective of the amount of groundwater that can be released from the comprising materials per unit change in head. The storativity values representative of unconfined (or "water table") aquifers usually range from 0.30 to slightly less than 0.10 (unitless). Semi-confined ("leaky") to confined ("artesian") aquifers usually exhibit storativity values ranging from 10^{-2} to 10^{-4} or lower, respectively. Under unconfined conditions, the aquifer in the Site area is anticipated to exhibit groundwater level (and corresponding saturated thicknesses) increases and decreases directly related to changes in the amount of groundwater in storage. Based on the subsurface conditions encountered during the EGGI test well drilling program, the portion of the aquifer in the Site area is

assumed to be unconfined. As such, the storativity (reflective of specific yield of the corresponding materials) of the aquifer at the proposed well site is estimated to range between 0.20 to 0.30 (Morris and Johnson, 1967). Site-specific storativity values for the local aquifer will be established as part of the pumping test program being proposed in connection with this Report (discussed below).

Being an unconfined aquifer, natural groundwater recharge in the Site area is generally derived from infiltrating precipitation, primarily along the areal extent of the aquifer, and locally where the abutting hillsides are in contact with the aquifer materials. However, being unconfined, the future pumping of the proposed North Well (at 400 gpm) may also influence local surface water bodies which under normal conditions not only receive runoff from precipitation events but are also influenced by naturally occurring groundwater discharge from the local aquifer. As such, the water levels in the nearby reach of the North Branch Sugar River and associated wetlands will be monitored as part of the pumping test program being proposed in connection with this Report (discussed below). This data will be used to project the potential for impacts from the future use of the proposed North Well on the river as reflected by variations in the vertical water-level gradients observed before, during and after the pumping test is conducted. A more detailed description of our proposed field data collection and evaluation techniques is provided in Section 7.0 of this Report.

3.0 SANITARY PROTECTIVE AREA, WELLHEAD PROTECTION AREA AND POTENTIAL IMPACT AREA

3.1 Sanitary Protection Area

As per NHDES Env-Dw 302, establishment and mapping of a Sanitary Protective Area (SPA) for the proposed North Well is necessary to confirm that there will be minimal risk from future groundwater contamination when the well is placed in use. Based on the proposed withdrawal rate of the North Well (400 gpm or 576,000 gpd) and the corresponding radii required by Table 302-1 of Env-Dw 302, a 400-foot radius SPA is required for the proposed North Well at its anticipated installation location (Figure 2). The projected SPA overlaps Town-owned parcels 218-008-000, 218-009-000 and 218-010-000. Therefore, the SPA meets the applicable requirements of Env-Dw 302.10 (d-f).

3.1.1 Land Use within Sanitary Protection Area

Land-use data from 2001 was mapped within the 1,000-foot radius around the proposed North Well location to help identify possible conditions that may need to be considered and/or addressed with respect to the corresponding proposed SPA and immediately abutting properties (Figure 4). Existing conditions and uses of the surrounding land and properties identified by the available data include open wetland, open water, agriculture, forest (mixed, hemlock, beech, oak), residential, and cleared/disturbed open land. Since the most currently available land use data is reflective of conditions occurring as of 2001, a comparison between 2001 and 2019 was completed using Google Earth. Based on this comparison it is evident that there has been minimal change to the land parcels comprising the Site and surrounding area since 2001.

3.2 Preliminary Wellhead Protection Area

Using the information presented above regarding the reported local aquifer properties and the anticipated location and use of the proposed North Well, a corresponding preliminary wellhead protection area (WHPA) as required by Env-Dw 302 was developed and mapped (Figure 5). The respective downgradient and cross-gradient limits or "stagnation points" of the WHPA for the proposed North Well were estimated based on "uniform flow" and Dupuit assumptions, which include treating the subject aquifer as being homogenous and laterally infinite (Todd, 1959). The corresponding downgradient (x) and cross-gradient (y) groundwater divides were calculated as follows:

$$x = \frac{Q}{2\pi Ti}, \qquad y = \frac{Q}{2Ti}$$

where: x = distance from well to the downgradient stagnation point (feet)
y = distance from the well to the cross-gradient stagnation points (feet)
Q = withdrawal rate (gpd)
T = Transmissivity (gpd/ft)
i = hydraulic gradient (unitless)

The resulting calculated stagnation points are about 770 feet in the downgradient direction (x) and about 2,410 feet in the cross-gradient direction (y) from the proposed well site, assuming a long-term pumping rate of 400 gpm (576,000 gpd). These calculations are based on the information presented in Section 2.0, as well as an estimated hydraulic gradient of 0.004 ft/ft. The estimated hydraulic gradient was determined from the difference between two consecutive topographic contour lines along the floor of

North Branch Sugar River valley, in the area adjacent to the Site, that assumes the groundwater surface closely mimics the local topography. The resulting preliminary WHPA mapped about the proposed North Well site and adjusted for actual topographic conditions, surface-water watershed divides, and mapped stratified drift aquifer extent is shown on Figure 5.

3.3 Contamination and Wellhead Protection Program

In accordance with Env-Dw 302.24 and 302.25, a contamination control and wellhead protection program is required for inclusion in the final report. The Town currently has a contamination control and wellhead protection plan in place for its existing water supplies (Gilman Pond and Pollards Mill Well) that is incorporated into the Source Water Protection Plan (SWPP) prepared as part of its chemical monitoring waiver program (2021). This plan will be modified to incorporate and accommodate the future use of the proposed North Well.

3.4 Wellhead Protection Area Refinement

The preliminary conceptual hydrogeologic model and preliminary estimate of the WHPA for the study area prepared in accordance with Env-Wq 403.09 and Env-Dw 302.11, and as presented in this Report will be refined based on the results of the proposed pumping test program described below. The conditions encountered as part of the installation of the proposed North Well and results of the pumping test program and along with a discussion of their use in refining the preliminary WHPA will be included in the final report to be prepared in accordance with Env-Wq 403.15 and Env-Dw 302.22.

3.5 Potential Impact Area

Guidelines specified in Env-Wq 403 require that a Potential Impact Area (PIA) associated with the proposed pumping well be determined and mapped for inclusion in this Report. The PIA is defined as the area where groundwater and surface-water resources may be adversely impacted by the proposed use of the North Well assuming continuous pumping for 180-days at the anticipated maximum rate without the influence of recharge from rainfall or snowmelt (RSA 485-C:21, V-e.). The PIA is assumed to conservatively be developed through an intersecting combination of the projected areal extent of the cone of depression (aka zone of influence as defined by the radius of influence) for the proposed well; the maximum extent of the anticipated recharge area for the withdrawal; and, if applicable, the downgradient extent of the WHPA.

3.5.1 Conceptual Cone of Depression

Given that sufficient data is currently unavailable to calculate the site-specific extent of the cone of depression (COD) for the proposed North Well, a corresponding radius of influence can be projected using the Cooper-Jacob solution and the available hydrogeologic information for zone NNH-SG1. The Cooper-Jacob equation projects the theoretical radius of influence (r_0) about a well as follows:

$$r_0 = \sqrt{\frac{0.3Tt}{S}}$$

where: r_0 = radius of influence (feet)
T = aquifer transmissivity (gpd/ft)
t = pumping duration (days)
S = aquifer storativity (unitless)

Based on the CHM developed for the Site aquifer, a transmissivity value of 4,000 ft^2/day (about 29,900 gpd/ft), a storativity value of 0.2, and a pumping duration of 180-days were used to calculate the theoretical radius of influence (used to define the corresponding cone of depression) about the proposed North Well location, The resulting calculated radius of influence is about 2,800 feet and the corresponding zone of influence (lateral extent of the COD) about the proposed well site is shown on Figure 6. The actual radius of influence (and corresponding COD) which reflects the site-specific hydrogeologic conditions, local recharge influences, and utilized pumping rate and duration will be determined from the data collected as part of the proposed pumping test described below.

3.5.2 Recharge Area

The recharge area currently assumed to contribute to the groundwater pumped by the proposed North Well and used to define the PIA is estimated to mainly be reflective of the topography in the vicinity of the Site area, the upgradient and local downgradient extent of the stratified drift aquifer, and extent of the cone of depression that is projected to form in repone to the pumping of the well. Based on these topographic and hydrogeologic factors the total recharge area currently projected to contribute groundwater to the proposed North Well under pumping conditions is approximately 1.29 square miles (mi^2) and shown on Figure 6. Based on the currently available hydrogeologic information and calculation results, the recharge area extent roughly coincides with that of the preliminarily defined WHPA.

3.5.3 Downgradient Area

The downgradient extent of the PIA was determined by delineating the area encompassing the COD and the overlapping extent of the downgradient portion of the stratified drift aquifer (southern extent) relative to the location of the proposed North Well.

3.6 Groundwater Mass Balance

In considering the potential for the Site groundwater resources to support the proposed pumping by the Town of the North Well at 400 gpm (0.576 MGD), the availability of aquifer recharge needs to be determined. As previously discussed, future pumping and long-term yield estimation of the proposed North Well is anticipated to rely primarily on the amount of recharge available to the local stratified drift aquifer via precipitation infiltration. In order to estimate the amount of potentially available recharge derived from precipitation infiltration, several primary components of the hydrologic cycle need to be quantified relative to the local climate and hydrologic conditions. These include precipitation, infiltration (includes shallow and deep groundwater recharge), runoff (surface and shallow subsurface), and evapotranspiration (combined return of water to the atmosphere via evaporation and by transpiration by plants).

Based on the USGS StreamStats Report for the Site area as summarized in Appendix B, the delineated basin-average mean-annual precipitation amount for the years 1971 through 2000 based on the corresponding Parameter-elevation Relationships on Independent Slopes Model (PRISM) is equal to 40.2 inches per year (in/yr). Assuming losses to runoff and evapotranspiration, recharge to the stratified drift aquifer can be estimated as a remaining percentage. Based on other studies in the New England region, including those summarized in the USGS paper “Assessment of Groundwater Resources in the Seacoast Region of New Hampshire, 2008”, recharge to stratified drift aquifer in the Site area is estimated to be approximately 50% of the annual precipitation amount (assumes the balance is lost to runoff and evapotranspiration). Therefore, recharge available to the stratified drift aquifer in the area of the North Well property is assumed to be approximately 20.5 in/yr.

As previously discussed, the primary source of recharge to the stratified drift aquifer being targeted as a source of groundwater for the proposed North Well is infiltrating precipitation. Based on the use of PRISM and findings of studies completed elsewhere, the expected amount of available recharge is 20.5 in/yr. The extent of the aquifer currently being considered as the corresponding source of recharge for the proposed North Well is delineated with the PIA shown on Figure 6. By applying the recharge rate to the corresponding aquifer area, the annual amount of available recharge expressed in units of gallons per minute and millions of gallons per day can be calculated and compared to the proposed use of the well by Town to determine the potential viability of it as a supply source. The annual recharge amount potentially available from the aquifer is calculated as follows:

$$Q=R*A$$

where: Q = recharge rate for total aquifer area
R = unit recharge rate
A = aquifer recharge area

Given a recharge rate of 20.5 in/yr (equivalent to 1.71 feet per year), a total aquifer recharge area of 1.29 mi^2 [about 36,000,000 square feet (ft^2)], the corresponding amount of recharge potentially available to the proposed North Well is about 61,500,000 cubic feet (ft^3) per year or about 1.3 MGD. Assuming that the Town use of the well will be 400 gpm or 0.576 MGD, the aquifer is anticipated to be more than capable of supporting its use to mee the Town's demand. Site-specific aquifer characteristics useful in substantiating the adequacy of the available recharge to meet the long term demands of the proposed North Well will be established as part of the pumping test program being proposed in connection with this Report (discussed below).

4.0 PRELIMINARY CONTAMINATION SOURCE INVENTORY AND WATER RESOURCE AND USE INVENTORY

4.1 Potential Contamination Source Inventory

As per Env-Dw 302.12, a Potential Contamination Sources (PCS) inventory was conducted for the proposed North Well Site area. The PCS inventory was developed using available records from NHDES, currently available information from the Town including the SWPP, and observations made during a windshield survey of the Site area conducted by Weston & Sampson on July 5, 2022.

4.1.1 NHDES OneStop Database and Mapper

Weston & Sampson queried NHDES's OneStop Database and Data Mapper, the clearinghouse for environmental site information in New Hampshire, to identify any PCS located within or near the delineated preliminary WHPA and PIA for the proposed North Well.

A query of the OneStop Database and Data Mapper yielded a total of 235 PCS within the Town of Newport. Based on the subsequent geo-referencing of the respective locations, only three of the identified PCSs were noted within the preliminary WHPA (Appendix C). The extent of the preliminary WHPA and locations of the three PCSs are shown in Figure C.1. All three PCS are located in the Town.

The first and closest PCS location consists of the Parlin Field Airport (NHDES #4416) which is identified as an underground storage tank (UST) facility. Two (2) USTs reportedly exist at the airport, one is identified as being "closed" and the other as "active". The second active PCS consists of the former Moose Lodge site (NHDES #17271) and is identified as an "On-premise Use Facility Containing Fuel Oil". No history of leakage was reported. The third PCS, the former Dartmouth Motors facility, (NHDES #63975), is identified as "Underground Storage Tank Facility" with two closed USTs. According to the NHDES database, all three (3) PCS locations have no history of release or contamination. All three PCS site are located downgradient (to the south) of the proposed North Well and therefore do not appear to present a threat to current groundwater quality at the Site.

4.1.2 Town of Newport

A search by Weston & Sampson of environmental information available from the Town of Newport website (https://www.newportnh.gov/) did not result in the identification of any PCS locations within or proximal to the area comprising the preliminary WHPA for the proposed North Well. The SWPP prepared for the Town did not identify any PCS locations within or proximal to the area comprising the preliminary WHPA for the proposed North Well.

4.1.3 Windshield Survey

A Weston & Sampson hydrogeologist conducted a Windshield Survey of the area roughly encompassing the preliminary WHPA on July 5, 2022. In addition, the hydrogeologist conducted a site-reconnoiter of the Site and area along Corbin Road north of the Parlin Field Airport. No PCS were identified as a result of this effort, indicating that only those identified in Section 4.1.1 comprise the only known PCS at this time.

4.2 Water Resource and Use Inventory

As per NHDES regulation Env-Wq 403.11, a combined Preliminary Water Resource and Use Inventory was completed relative to the area encompassing the preliminary North Well WHPA. The inventory was developed by reviewing available published reports, and NHDES and Town information.

The completed inventory focused on the existence and (if applicable) location of the following NHDES-specified uses and infrastructure within the northern extent of Town, and proximal to the preliminary WHPA and PIA:

- Public water supply withdrawals and impoundments;
- Registered water users including withdrawals, recharges, deliveries, and releases;
- Permitted surface water discharges;
- Permitted groundwater discharges;
- Areas served by public water supply systems and the locations of their withdrawals;
- Areas served by public sewer and the locations of the discharge;
- Private wells within an area that extends a distance of 1,000 feet outside of the estimated limit of the COD projected to occur as a result of the proposed pumping of the North Well; and
- Any other water uses that might be influenced by the proposed withdrawal.

A map and supporting information regarding the areas served by public water supply and sewer systems, registered water users, permitted surface-water discharges, permitted groundwater discharges, and the locations of withdrawals and discharges necessary for inclusion in the Preliminary Water Resource and Use Inventory is provided in Appendix D.

4.2.1 Water-Related Natural Resources

Water-related natural resources within the Site area include:

- A sand-and-gravel (stratified drift) aquifer
- Wetlands and riparian corridor
- North Branch Sugar River and Sugar River

4.2.2 Public Water Supply Withdrawals and Impoundments

The NHDES' OneStop "Public Water Systems" database was queried by Weston & Sampson for the possible existence of public water supply withdrawals and impoundments within the preliminary WHPA. The resulting database returns indicated that eight (8) active public water supplies are located within the Town. Seven (7) of these are either located outside of the preliminary WHPA or have insufficient address information to enable an accurate location determination. A table summarizing the identified systems and their locations relative to the preliminary WHPA for the proposed North Well is provided as Table D.1. The one system identified as being proximal to the preliminary WHPA consists of the "Cary and Allen St Dev" water supply (NHDES #17420010) which is a community system that serves 43 single family residences southeast of the Site. The system supply is provided by an on-site gravel pack well with a total depth of 82 feet and reported yield of 365 gpm.

The queried NHDES' OneStop "Public Water Systems" database and web geographic information system indicated that no impoundments exist within the preliminary WHPA and PIA for the proposed North Well.

4.2.3 Registered Water Users and Private Wells

The OneStop database was queried regarding registered water users within the preliminary WHPA. No such potential water users (e.g., bottled water facilities), were identified in Town by OneStop. However, OneStop identified 397 construction records for water wells occurring within the Town boundaries. As per NHDES Env-Dw 302 requirements, the applicable well construction records were used to identify the corresponding address, property owner's name and address, and purpose and estimated yield for those private wells within 1,000 feet of the projected COD and 1,000 feet of the preliminary WHPA associated with the proposed North Well. A summary of the respective wells is provided in Table D.2.

Based on the available GIS data provided by NHDES, Weston & Sampson identified approximately sixteen (16) wells (ranging in purpose between scientific, exploration, agriculture, domestic) as being located within or adjacent to (within 1,000 feet) the preliminary WHPA. Based on the extent of the preliminary WHPA proposed by Weston & Sampson (developed from the preliminary CHM) and a review of tabulated and graphical NHDES GIS database information:

- approximately sixteen (16) "water well inventory" identified wells are located within the preliminary WHPA and/or 1,000-feet buffer (Figure D.1),
- one public water supply source is located adjacent to the preliminary WHPA or buffer

4.2.4 Permitted Surface Water Discharges

The NHDES GIS database query results indicate that there are no surface water discharges (NPDES Outfalls) located within or adjacent to (within 1,000 feet buffer) the preliminary WHPA.

4.2.5 Permitted Groundwater Discharges

The NHDES OneStop and GIS database query results indicate that there are twenty-four (24) groundwater discharge permits identified as occurring at locations within the Town. Weston & Sampson geo-referenced the respective addresses provided by OneStop and compared the locations to the extent of the preliminary WHPA. Of the total 24 possible locations none appear to be located within the preliminary WHPA.

4.2.6 Public Sewer

In accordance with Env-Wq 403.11(d)(6), the areas in the Town served by public sewer were located using OneStop. None of the identified public sewered areas exist within or adjacent to (within 1,000 feet) the preliminary WHPA.

4.2.7 Wetlands

According to the National Wetland Inventory (NWI) database, identified wetlands occupy the north-northwest corner of the Site, approximately 190 feet from the proposed North Well location and extending on to the abutting property to the northwest. As discussed below, these water levels at these wetlands will be monitored during the proposed pumping test.

4.2.8 Floodplains

The extend of the FEMA determined 100-Year Flood Plain for the abutting North Branch Sugar River in the vicinity of the proposed North Well location is shown in Figure 2. The corresponding flood plain limit for the respective river reach is located approximately 40 feet from the proposed North Well site. The corresponding Flood Insurance Rate Map used to determine these locations and distances is provided as Appendix E.

4.2.9 Natural Heritage Bureau

As per NHDES Env-Dw 302 and Env-Dw 402, the New Hampshire Natural Heritage Bureau (NHB) was contacted requesting a determination as to the existence of any rare wildlife, plant, or natural communities in the vicinity of the proposed North Well site that might be designated as being endangered and of special concern, respectively (Appendix F). Of these two species (Brook Floater and Wood Turtle), only the Brook Floater (endangered species) is reported by the NHB to occur within 1,000 feet of the proposed North Well site. The NHB provided mapping indicates that the Brook Floater (a freshwater mussel) has been observed in the nearby reach of the North Branch Sugar River. As such, the nearby river reach will be monitored for water level and temperature response in both the channel and underlying streambed (hyporheic zone) during the proposed pumping test.

4.3 Preliminary Contamination Source and Water Resource and Use Refinement

The preliminary inventory of potential contamination sources, and water resource and uses will be updated if its findings are more than 90 days old at the time the post-pumping test final report is prepared. If warranted, the results of the updated inventories will be included in the final report and prepared in accordance with Env-Wq 403.18 and Env-Dw 302.23.

5.0 POTENTIAL EFFECTS OF PROPOSED WITHDRAWAL

The potential effects of the proposed North Well groundwater withdrawal on water resources and users in the Site area were projected in accordance with Env-Wq 403.12 as described above. The projections are based on the preliminary CHM, the preliminary COD resulting from pumping conditions, and the currently known geologic and hydrologic conditions associated with the corresponding projected PIA. There is currently no short-term pumping test data that can be applied to estimating the effects of the proposed withdrawal on the local groundwater levels in the area, however, at this time no adverse impacts to the local water resources are being anticipated based on the proposed withdrawal rate of 400 gpm.

In order to substantiate and refine the conditions assumed in the developed preliminary CHM, the actual North Well will be installed and evaluated by way of a long-term pumping test. A network of overburden wells and staff gauge/piezometer pairs will be used to monitor water level responses in the local aquifer, wetlands, and surface-water bodies (North Branch Sugar River) prior to, during, and following the pumping test. The groundwater pumped during the test will be discharged approximately 400 feet downgradient of the pumping well at a location anticipated to not affect the performance of the test and adequacy of the collected data. Upon completion of the pumping test, the data will be analyzed to estimate the impact of the withdrawal on the local water resources and establish the long-term yield of the proposed North Well relative to the withdrawal permit being requested by the Town. If it is determined that future adverse impacts may result from the proposed use of the well, a long-term monitoring and reporting program will be developed to address the anticipated NHDES requirements for the permitting of a large groundwater withdrawal.

6.0 PRELIMINARY WATER QUALITY CONDITIONS

As discussed above, the proposed North Well location was selected based on its proximity to the reported highly favorable test well NNH-1D. Besides evaluating the yield potential, the groundwater quality of the local aquifer was also assessed. On December 18, 2018, EGGI collected samples from Test Well NNH-1D and submitted them for laboratory analyses. The corresponding analytical report is attached in Appendix G and the results are summarized in Table 2 below.

As shown, all of the targeted water quality parameters were detected at levels below the respective NHDES Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs), with the exception of manganese and pH. To substantiate the compliance of the groundwater quality for the local aquifer under long-term pumping conditions representative of the proposed use of the North Well by the Town, water samples will be collected during the extended pumping test in accordance with Env-Dw 302.15.

Table 2: Preliminary Water Quality Results for Test Well NNH-1D from EGGI

Analyte	MCL	SMCL	Concentration
Iron (mg/l)	–	0.3	0.031
Manganese (mg/l)	—	0.05	**0.106**
Sodium (mg/l)		250	17
Arsenic (mg/l)	0.05	–	ND
pH	–	6.5-8.5	**5.8**
Total Dissolved Solids (mg/l)	–	500	82
Chloride (mg/l)	–	250	28
Hardness (mg/l)	–	–	39
Nitrate (mg/l)	10	–	ND
VOCs	Contaminant Dependent	–	ND
SOCs	Contaminant Dependent	–	ND

7.0 PROPOSED PUMPING TEST PLAN

7.1 Introduction

As discussed above, a long-term pumping test, consistent with NHDES requirements for the permitting of a large groundwater withdrawal, will be conducted in connection with the proposed North Well. The proposed pumping test plan (the Plan) described below is intended to afford the collection of the data necessary to determine the safe yield, refine the preliminary wellhead protection area, and evaluate potential impacts associated with the future use of the North Well by the Town. Given that the Town anticipates using the future North Well at a withdrawal rate of 400 gpm (0.576 MGD), the proposed pumping test will be conducted in accordance with NHDES Code of Administrative Rules: Env-Dw 302 "Large Production Wells and Wells for Large Community Water Systems"; and Env-Wq 403 "Large Groundwater Withdrawal (pumping rate in excess of 57,600 gpd)". Specifically, the proposed Plan is intended to address the applicable requirements of sections Env-Dw 302.14 "Proposal for Pumping Test"; and Env-Wq 403.11 "Withdrawal Testing Program Design".

The proposed North Well is anticipated to be installed on Town property, north of Corbin Road, at a location with coordinates 43^{o} 23' 29.316" N, 72^{o} 11' 3.144" W (Figure 1). The testing proposed herein, will be conducted on the production well actually constructed at the Site. As such, the test and subsequent data evaluations will be conducted assuming a pumping rate of 400 gpm, which is equivalent to 100% of the demand being pursued by the Town for the future use of the North Well. A submersible pump and with adequately sized portable generator will be used to pump the well during the test. The temporary pump will be selected based on the anticipated total dynamic head (TDH) requirements associated with the discharge pipe diameter and length, and projected pumping level for the well.

7.2 Construction Design

Based on the available information provided as part of the exploration and short-term testing of the small diameter test well (NNH-1D) completed at the Site, the proposed North Well is expected to be completed as a 24-inch x 18-inch, gravel-packed, screened well at a completion depth of between 100 and 110 ft bgs. The proposed production well will be designed and constructed in accordance with Env-Dw 302.26 and RSA 482-B, We 100 et seq. A preliminary construction design for the proposed North Well is included in Appendix H (Figure H.1).

7.3 Pumping Rate

As discussed above, the proposed production well will be pumped during the test at a rate of approximately 400 gpm (576,000 gpd) for a period of 7 days in accordance with the guidelines specified by Env-Dw 302.14. The water will be discharged about 400 feet downgradient from the withdrawal location, into the nearby reach of the North Branch Sugar River Figure 7. An application for a Temporary Discharge Permit will be submitted to the NHDES for the surface water discharge of the groundwater produced during the withdrawal test.

7.4 Water-Level Observation Network

The proposed water-level observation network described herein is designed to allow for the collection of data at nearby surface-water (e.g., wetlands, streams, ponds) and groundwater resources necessary for assessing potential impacts from the proposed withdrawal and refining the preliminary CHM presented in Section 2.0 of this document.

7.4.1 Location

The locations of the observation wells, piezometers, and staff gauges proposed for water-level monitoring during the test are shown on Figure 7. These observation points were selected based upon the respective monitored water resource and locations relative to the extent of the preliminary COD and related CHM, as well as access logistics.

7.4.2 Construction Details

Existing observation wells, and test-dedicated staff gauges and nested piezometers will be used during the test (Figure 7). Table 3 summarizes the proposed monitoring locations for the pumping test.

Table 3: Proposed Monitoring Locations for Pumping Test

Proposed Monitoring Location	Approximate Distance from Proposed North Well (Feet)	Direction	Resource Type
Proposed North Well	-	-	Stratified Drift Aquifer
OB-B	99	Northeast	Stratified Drift Aquifer
NNH-1D	150	West	Stratified Drift Aquifer
SG/PZ-1	257	North	Wetland/Overburden
NPW-2 or NPW-5	432	Southwest	Stratified Drift Aquifer
SG/PZ-2	525	Northwest	Sugar River/Streambed
OB-1-22	710	Northeast	Stratified Drift Aquifer
NNH-1H	900	Northwest	Stratified Drift Aquifer
SG/PZ-4	973	Southwest	Sugar River/Streambed
SG/PZ-3	986	Northwest	Sugar River/Streambed
NNH-1I	2,608	Northwest	Stratified Drift Aquifer
NNH-1J	3,100	Northwest	Stratified Drift Aquifer
NNH-1E	3,422	Northwest	Stratified Drift Aquifer
NNH-1B	3,569	Northwest	Stratified Drift Aquifer
NNH-1A	3,810	Northwest	Stratified Drift Aquifer
AMB-1-22	4,916	Southeast	Stratified Drift Aquifer

7.4.3 Observation Wells

Nine existing wells will be monitored during the proposed pumping test (OB-B, NNH-1D, NPW-2, NNH-1H, NNH-1I, NNH-1J, NNH-1E, NNH-1B and NNH-1A) and one new observation well (OB-1-22) will be

installed (Figure 7). Selected observation wells will be fitted with a dedicated pressure transducer for automatic measuring and recording of water levels at the respective location.

Proposed observation well OB-1-22 will be completed as a small diameter well advanced into the stratified drift aquifer at a depth approximately similar to that of the proposed North Well. Samples will be collected during the advancement of the well borehole and used to complete a geologic log of the encountered conditions. The currently anticipated construction specifications for the proposed observation well are detailed below in Table 4:

Table 4: Observation Well Construction

Observation Well Construction Specifications	
Well Diameter	2-inch
Well Screen Material	PVC
Slot Size	10 slot
Screen Length	10 feet
Well Casing	Schedule 40 PVC
Sand Pack	Natural
Well Seal	Bentonite

7.4.4 Piezometers/Staff Gauges

The pumping test observation network is also designed to determine the potential for induced infiltration from the nearby surface water bodies and wetlands (Figure 7). Water-level data will be collected from a series of staff gauge/piezometer pairs installed in the nearby wetlands and upstream, proximal, and downstream reaches of the North Branch Sugar River. A total of four staff gauge/piezometer pairs will be installed by advancing a well point into the stream/wetland bottom such that measurements inside and outside of the staff gauge can be ascertained.

Each of the pairs will be outfitted with a dedicated pair of pressure transducers to measure and record water levels. Water levels on the outside of the staff gauge will also be monitored throughout the testing. A engineer scaled measuring tape will be affixed to the outside of each piezometer with tenth-of-a-foot graduations. A diagram illustrating the typical construction of a staff gauge/piezometer pair is provided in Appendix H (Figure H.2).

7.4.5 Ambient Well

One small diameter ambient well (AMB-1-22) will be constructed outside of the anticipated COD and used to monitor background regional trends throughout the pumping test program. The well will be constructed in a manner similar to that of OB-1-22 (see above). This well is not expected to be subject to the groundwater level influences from the pumping of the proposed North Well.

7.4.6 Private Wells and Water Users

In accordance with Env-Wq 403.13 (i), the owners of all private wells located within 1,000 feet of the proposed withdrawal location, and selected, representative water users within the extent of the preliminary WHPA (representing the area that extends 1,000 feet outside the estimated maximum extent of the projected COD) will be notified of the upcoming pumping test. Weston & Sampson on behalf of the Town will request permission to access the respective properties and monitor water levels during the proposed pumping test. Table 5 below summarizes water users within 1,000 feet of the estimated extent of the projected COD:

Table 5: Water Users to Monitor within 1,000 Feet of Withdrawal

Water User	Distance from North Well (Feet)	Direction	Resource Type
177.0090 (31 Camel Hump Road)	3,647	Northeast	Bedrock Aquifer (Private Well)
177.0205 (Oak Street)	3,823	Southwest	Bedrock Aquifer (Private Well)
Cary and Allen Street Development (PWS ID: 1742010)	2,543	Southeast	Stratified Drift Aquifer (Water Supply Well)

Of the water users identified in the table above, only the "Cary and Allen Street Development" well taps the same aquifer as that tapped by the proposed North Well. The two identified private wells tap the underlying bedrock aquifer which the preliminary CHM assumes to be limited in hydraulic connectivity. Weston & Sampson intends to provide the questionnaire form attached in Appendix I to each of the private well owners located within 1,000 feet of the proposed withdrawal.

7.5 Streamflow Depletion

The nested staff gauges and piezometers will be used to measure surface water and groundwater level interactions to evaluate potential streamflow impacts and induced infiltration of surface water from North Branch Sugar River as a result of pumping during the 7-day pumping test. The dedicated transducer pairs will be used to collect water level and temperature data necessary for establishing the occurrence of such an influence.

7.6 Flow Measuring Device and Pumping Test Discharge

The water will be pumped into North Branch Sugar River, located 400 feet northwest (downgradient) of the North Well via an adequately sized and non-leaking discharge pipe (Figure 7). The drilling contractor will be directed to supply and install a ball-valve for regulating flow and a circular orifice weir of appropriate size to determine flow measurements (flow range of 300 to 500 gpm) accurate to within +/- 3% of the test pumping rate. The pumping rate shall be measured and recorded at least as often as water level measurements for the pumping well, after the first 10 minutes of pumping (Env- DW 302.13 (e))

7.7 Meteorological Data

The National Oceanic and Atmospheric Administration (NOAA) Station in Newport, New Hampshire (USC00275868) will be used as a source of local precipitation data for the test period. The weather station is located about 1 mile south of the proposed North Well.

7.8 Water Quality Sampling and Testing

An appropriately sized sampling port will be installed in the discharge pipe at a location between the well head and flow-regulating valve supplied by the drilling contractor. The valve shall be made of PFAS free material and installed with non-PFAS thread sealing compounds.

7.8.1 Field Parameters

During the prolonged pumping test, the following field parameters will be measured and recorded at the sampling tap over the duration of the test:

- pH
- odor
- turbidity
- color/sediment content
- conductivity
- temperature

7.8.2 Laboratory Parameters

Samples will be collected by the on-site Weston & Sampson hydrogeologist and submitted for analyses by applicable EPA Methodologies by a New Hampshire certified laboratory. The samples will be collected in accordance with Env-Dw 302.15 from the dedicated sampling tap at the wellhead using laboratory supplied containers and hand-delivered to the laboratory on ice and within required holding times. A completed chain-of-custody will accompany each sample delivery. A schedule of sample collection timing and corresponding targeted analytes is provided in Table 6 below:

Table 6: Sampling Collection Schedule

Day	Analyses
1	VOCs, Iron, Manganese, pH, Specific Conductance, Hardness, Chloride, Sodium and Nitrate
2	-
3	VOCs, Iron, Manganese, pH, Specific Conductance, Hardness, Chloride, Sodium and Nitrate
4	-
5	Total Coliform Bacteria, Radionuclides, Inorganics, VOCs, Nitrite, Nitrate, 1,4-Dioxane, PFAS (537.1), and MPA

7.9 Pumping Test Performance

The pumping test data collection efforts will be broken down into an antecedent period (background), pumping period, and recovery period. The schedule and duration for the manual collection of water levels during each period is summarized in Table 7 below:

Table 7: Pumping Test Program Monitoring Schedule

Period	Days	Approximate Timing for Manual Measurement Collection
Antecedent	1 through 7	One morning and one afternoon
Pumping	1	Once every minute for first 10 minutes Once every 10 minutes for remainder of first hour
	2	Once every 100 minutes for remainder of Day 1 and Day 2
	3 through 5	Twice per day, at least 2 hours apart
Recovery	1	Once every minute for first 10 minutes Once every 10 minutes for remainder of first hour
	2	Once every 100 minutes for remainder of Day 1 and Day 2
	3 through 5	Twice per day, at least 2 hours apart

The pumping period will be conducted for a minimum of 5-days with no more than two-hours total shutdown per day for generator maintenance and fueling (stabilization period excluded). The production well pumping level will be considered stabilized when the calculated drawdown has not varied more than 0.5 feet (6 inches) during the final 24 hours.

7.9.1 Records

Pumping rates, weather conditions, and water levels in the utilized observation wells, staff gauges, piezometers, and pumping well will be recorded for all the antecedent, pumping, and recovery periods. Water level measurements and/or corresponding drawdown values will be graphically documented in the field. The information will be recorded in a field notebook and/or on dedicated forms that will be kept on site for the duration of the test.

Water levels will be measured and recorded at selected observation locations using dedicated transducers and data loggers set to record at least once per minute throughout the proposed testing program. In addition, water levels will be manually measured using electric water level meters. Periodic measurements will be made with an electronic water-level meter in wells equipped with data loggers to verify the results. All water level readings shall be measured and recorded to the nearest 0.01-foot.

7.9.2 Static Water Level Determinations

As per Table 7 above, static water level measurements will be collected twice a day during the 7-day antecedent period for all nearby observation wells, staff gauges, piezometers, and the ambient and private wells.

7.9.3 Drawdown Calculations

Drawdown will be calculated for all observation wells, staff gauges, piezometers, production well, and the ambient well with the reference static water level corresponding to that measured immediately prior to commencement of the pumping test unless otherwise indicated.

7.9.4 Recovery

Readings will be collected for as many days as the pumping well was pumped, or until 90% recovery has been obtained, whichever occurs first.

7.10 Pumping Test Analysis

At the conclusion of the pumping test and recovery period, all data will be downloaded from the dataloggers and verified/calibrated with hand measurements taken with the electronic water-level meter. Corrections will be made to the drawdown and recovery data to account for ambient water level trends, precipitation events, and partial penetration effects, where warranted. Aquifer transmissivity and storativity values, along with recharge contributions will be calculated using time-drawdown, distance-drawdown, and time-recovery methods (e.g., Jacob Straight Line). The results will be compared with the assumptions used to develop the CHM and discussed in accordance with Env-Dw 302.29 (e)(4).

8.0 IMPACT DESCRIPTION

The pumping test data will be analyzed to estimate the impact of the withdrawal on the local water resources, possible NHB species of interest, and other water resource users. The potential impacts will be assessed based on the refined CHM and documented withdrawal conditions, along with consideration of the updated water resource and use inventory as per Env-Wq 403.19. If it is established that adverse impacts may occur, a long-term monitoring and reporting program will be developed to accompany the operation plan for the proposed withdrawal submitted to the NHDES. The collected data will be used to provide further assessment of whether adverse future impacts will occur. If warranted, a withdrawal impact mitigation plan will be developed in accordance with Env- Wq 403.31 and a revised production volume for the withdrawal will be proposed for incorporation into the corresponding permit.

9.0 WATER CONSERVATION PLAN

According to the NHDES, a Water Conservation Plan for the Town of Newport has not been submitted to date for its water supply system but is not currently considered to be out of compliance. As such, a Conservation Management Plan will be prepared in connection with the future permitting application for the proposed North Well.

10.0 REFERENCES

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Summary of Hydrologic and Physical Properties of Rock and Soil Materials, U.S. Geological Survey, Morris, D.A. and Johnson, A.I.,1967

FIGURES

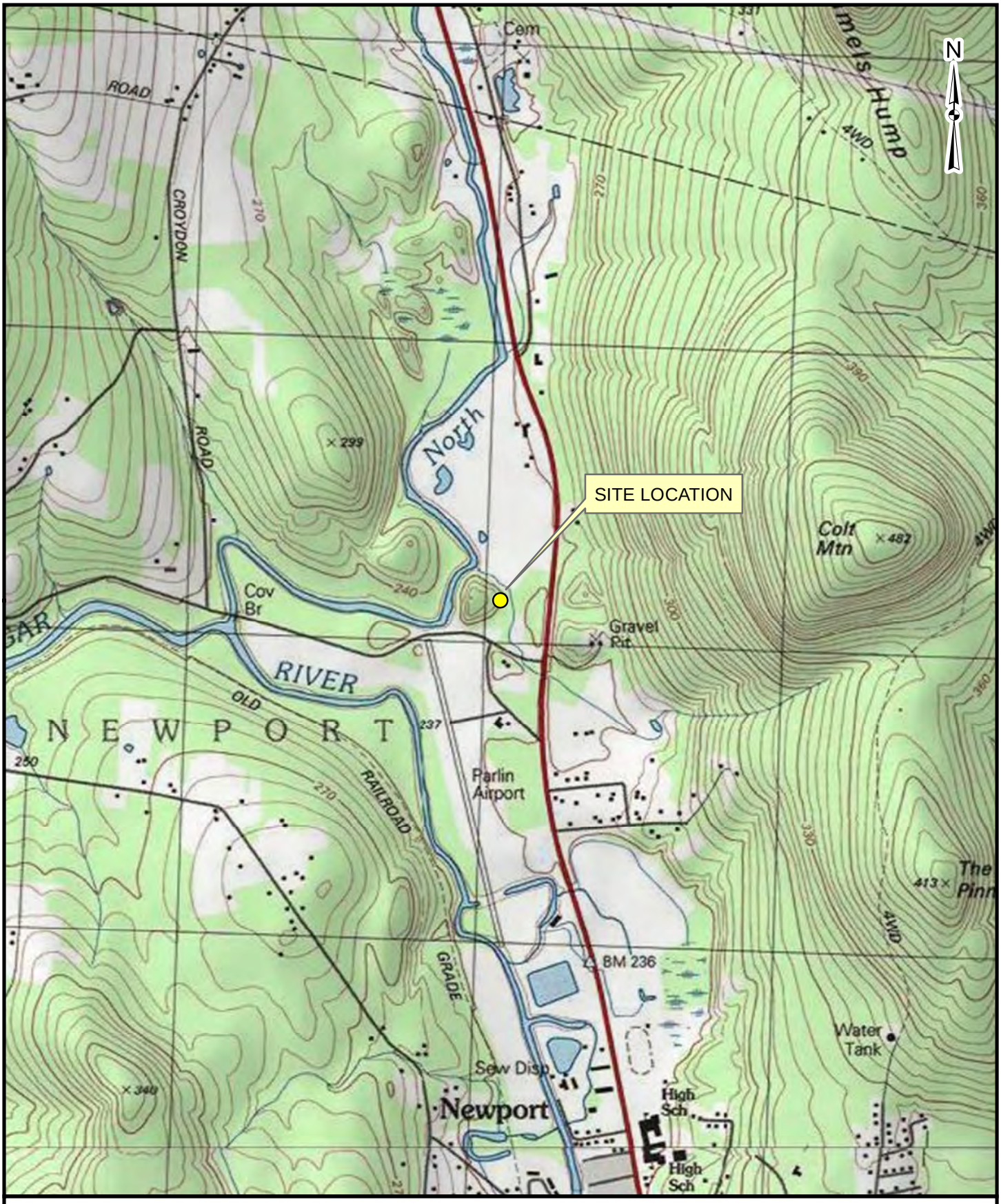


FIGURE 1
TOWN OF NEWPORT, NH
PROPOSED NORTH WELL

LOCUS MAP

2,000 0 2,000

Scale In Feet

Weston & Sampson

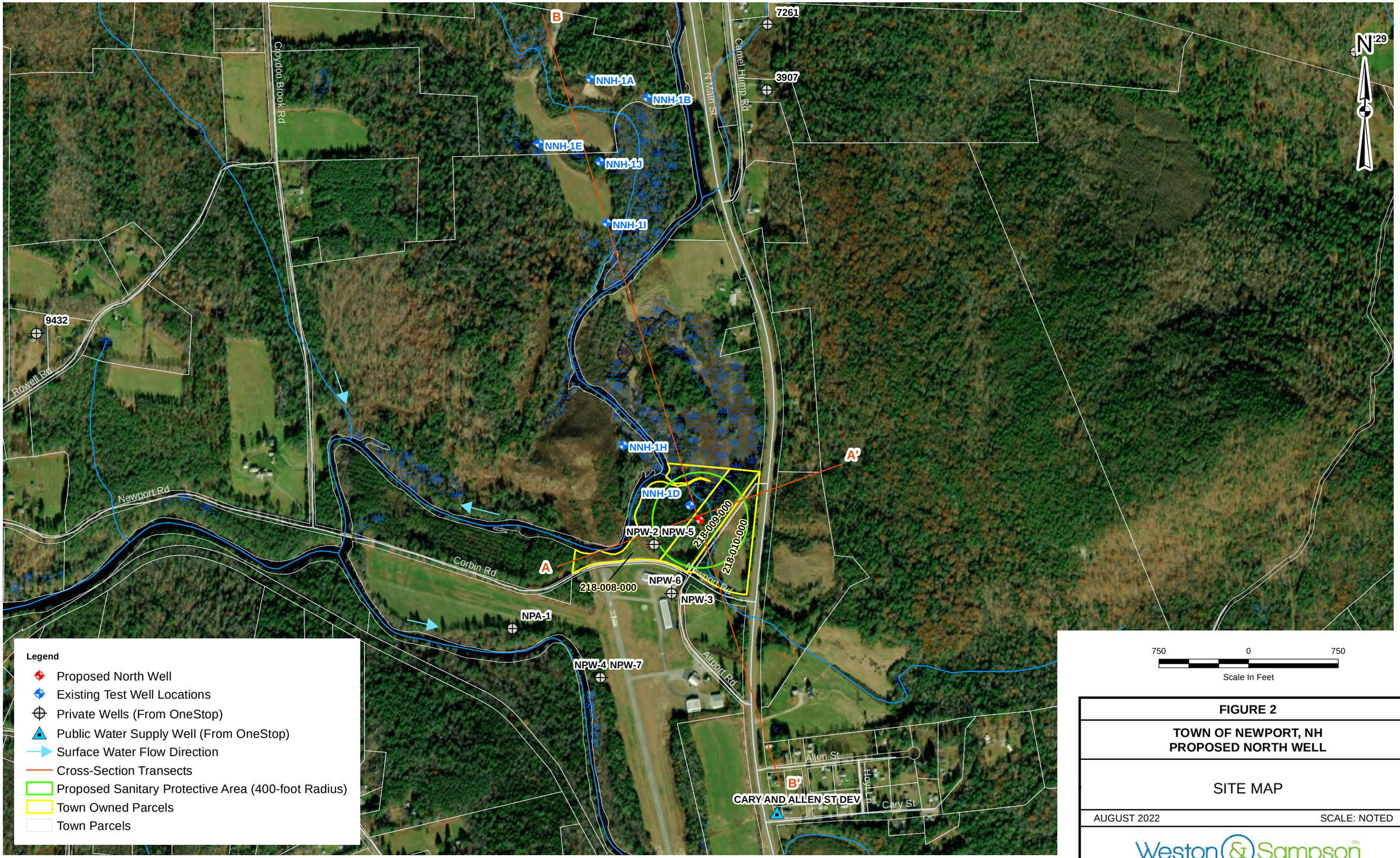


FIGURE 2

TOWN OF NEWPORT, NH
PROPOSED NORTH WELL

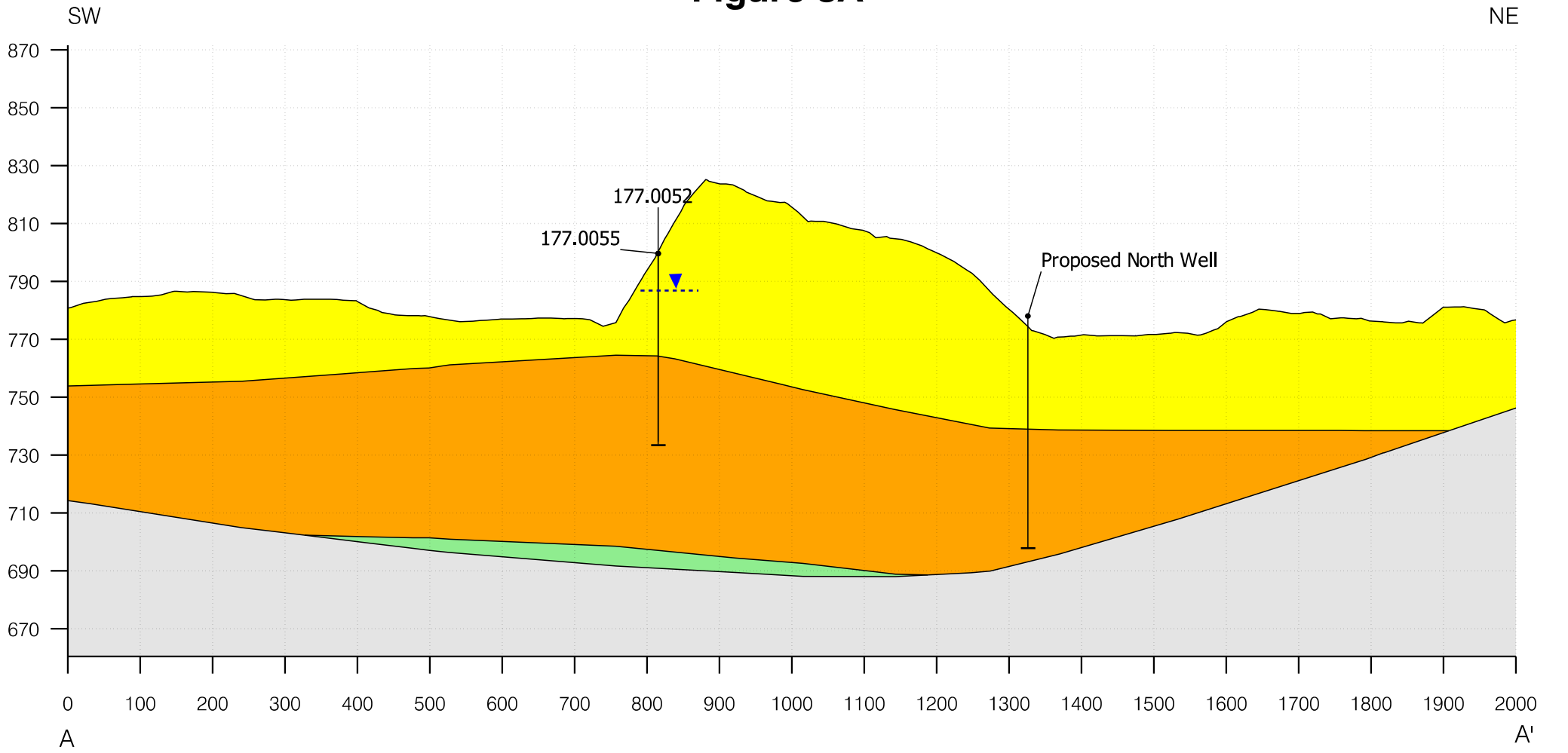
SITE MAP

AUGUST 2022 SCALE: NOTED

Weston & Sampson

Path: P:\NH\Newport\Eng22-0626 North Well\007 GIS\MapFiles\SiteMap.mxd **User:** GetchelJ **Saved:** 8/17/2022 9:56:17 AM **Opened:** 8/17/2022 10:00:17 AM

Proposed North Well
Projected Hydrogeologic Cross-Section A-A'
Figure 3A



Note: Wells within 100 feet projected into transect.

Scale: 1:2,400

Vertical exaggeration: 4x

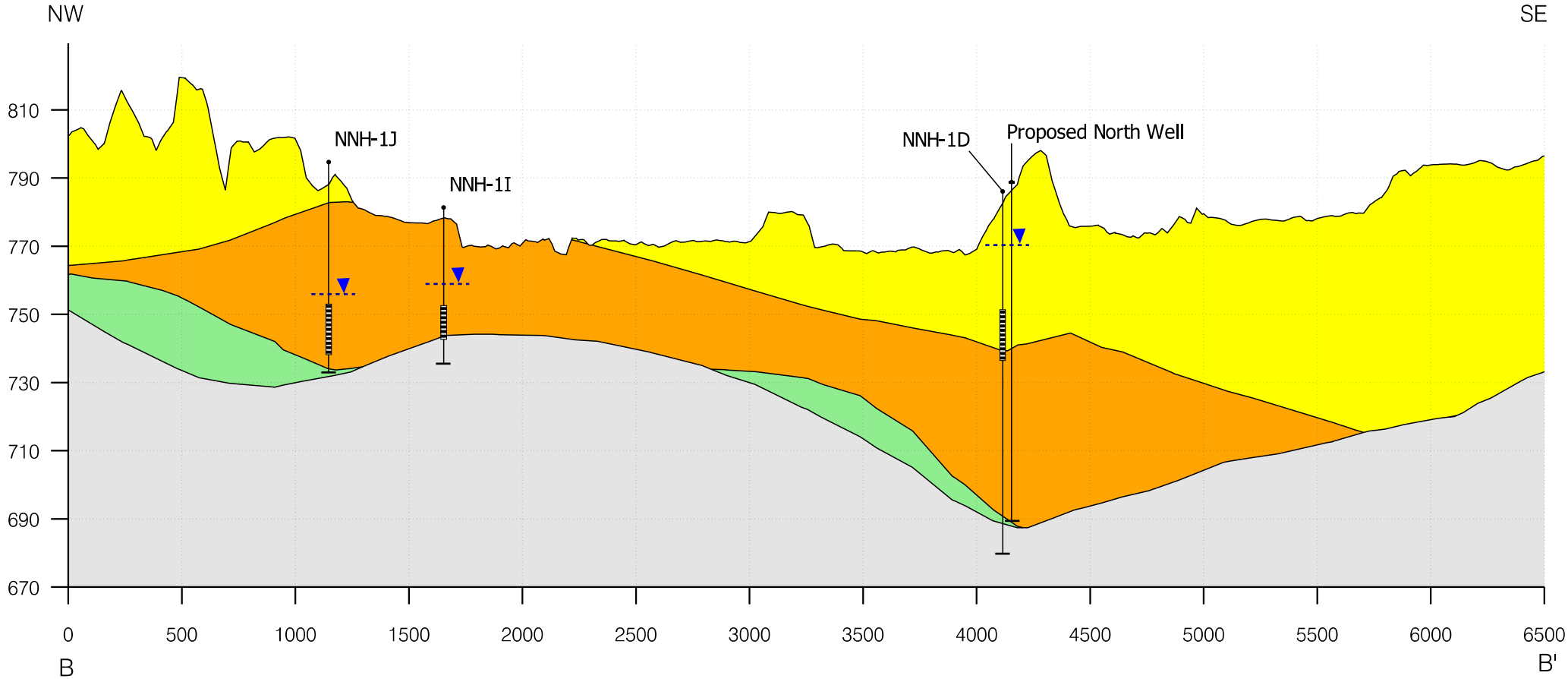
0ft 500ft

Legend

- Bedrock
- Outwash (Fine Unit)
- Outwash (Coarse Unit)
- Till
- Static Water Level Measurement at Installation

Weston & Sampson

Proposed North Well
Projected Hydrogeologic Cross-Section B-B'
Figure 3B



Note: Wells within 100 feet projected into transect.

Legend

- Bedrock
- Outwash (Fine Unit)
- Outwash (Coarse Unit)
- Till
- Screen Interval
- Static Water Level Measurement at Installation

Scale: 1:7,700

Vertical exaggeration: 15x

0ft 1000ft

Weston & Sampson

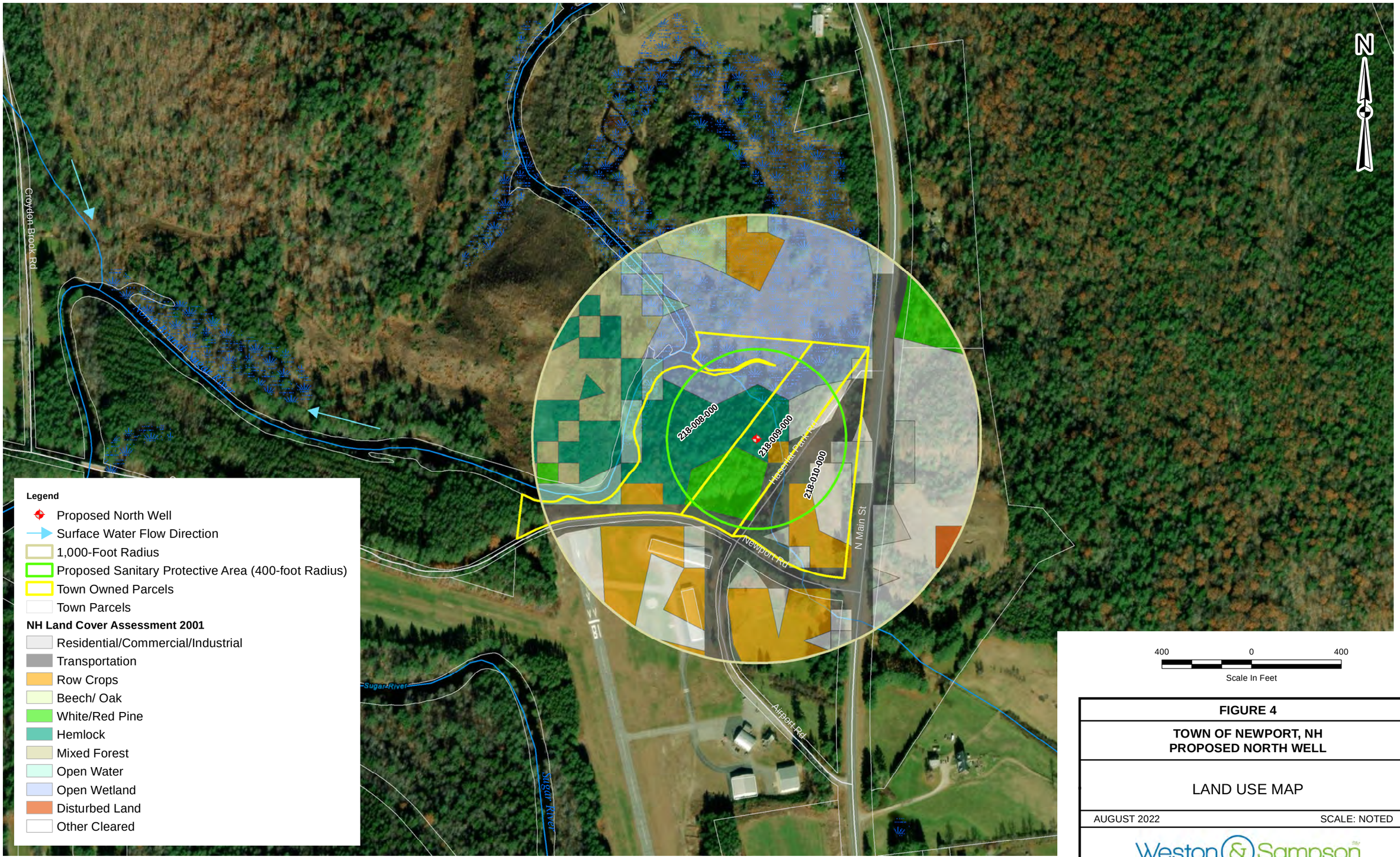


FIGURE 4

TOWN OF NEWPORT, NH
PROPOSED NORTH WELL

LAND USE MAP

AUGUST 2022 SCALE: NOTED

Weston & Sampson

Path: P:\NH\Newport\Eng22-0626 North Well\007 GIS\MapFiles\Landuse.mxd **User:** GetchellJ **Saved:** 8/17/2022 10:30:40 AM **Opened:** 8/17/2022 10:33:05 AM

N

Croydon Flat

Camels Hump

Colt Mtn

North

Cov Br

Gravel Pit

RIVER

Parlin Airport

ROAD

CROYDON ROAD

OLD RAILROAD

NEWPORT

1,000 0 1,000

Scale In Feet

Legend

- Proposed North Well
- Preliminary Wellhead Protection Area
- Proposed Sanitary Protective Area (400-foot Radius)
- Preliminary Recharge Area

FIGURE 5

TOWN OF NEWPORT, NH
PROPOSED NORTH WELL

PRELIMINARY WELLHEAD PROTECTION AREA

AUGUST 2022 SCALE: NOTED

Weston & Sampson

N

Croydon Flat

Camels Hump

4WD

ROAD

CROYDON

ROAD

North

Colt Mtn

Cov Br

RIVER

OLD

RAILROAD

Parlin Airport

Gravel Pit

NEWPORT

330 252 300 331 270 210 390 337

Legend

- Proposed North Well
- Preliminary Potential Impact Area
- Preliminary Cone of Depression (2,842-foot Radius)
- Proposed Sanitary Protective Area (400-foot Radius)
- Preliminary Recharge Area

1,000 0 1,000

Scale In Feet

FIGURE 6

TOWN OF NEWPORT, NH
PROPOSED NORTH WELL

PRELIMINARY POTETNIAL IMPACT AREA
AND CONE OF DEPRESSION

AUGUST 2022 SCALE: NOTED

Weston & Sampson

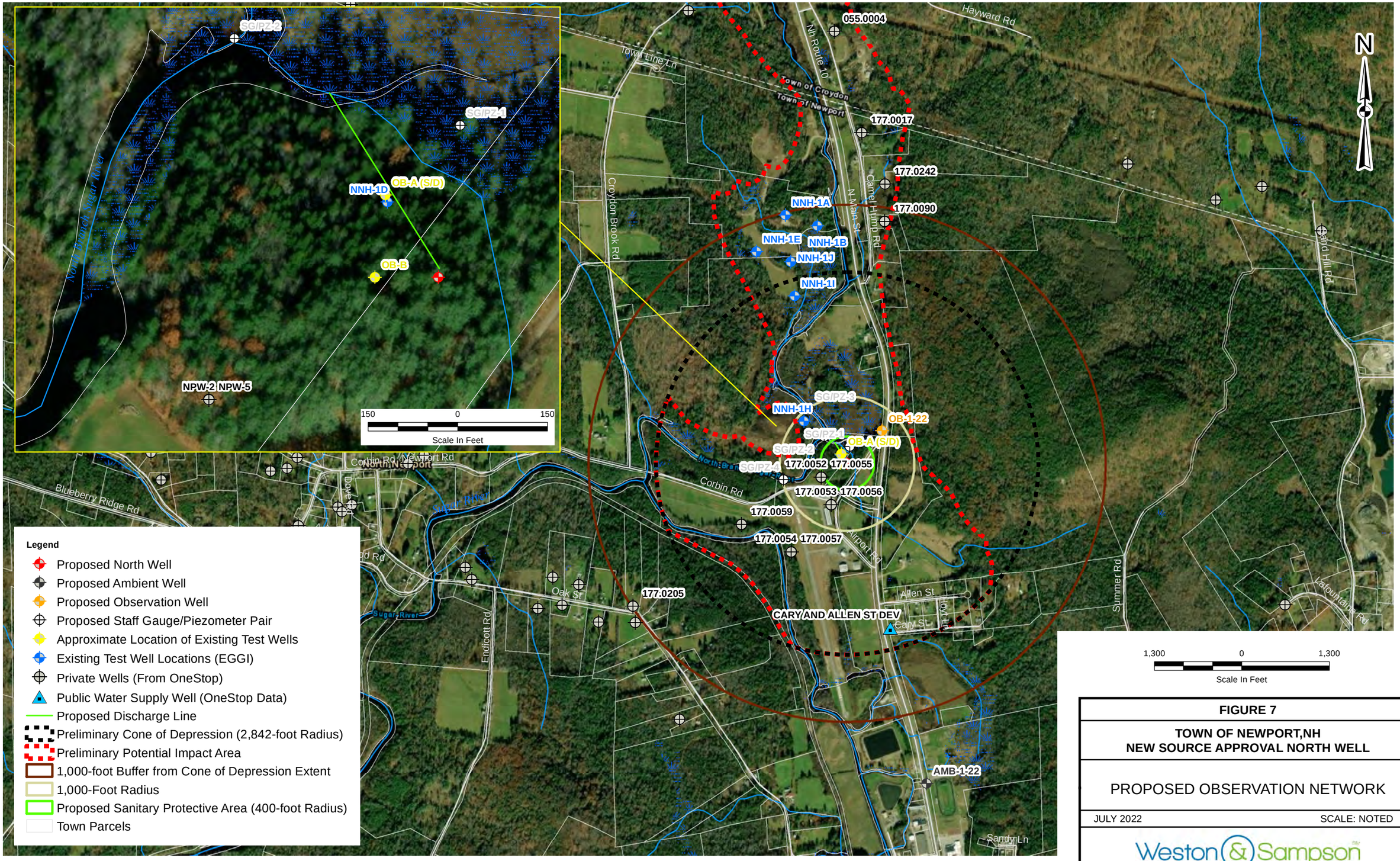


FIGURE 7

TOWN OF NEWPORT,NH
NEW SOURCE APPROVAL NORTH WELL

PROPOSED OBSERVATION NETWORK

JULY 2022 SCALE: NOTED

Weston & Sampson

Path: P:\NH\Newport\Eng22-0626 North Well\007 GIS\Mapfiles\ProposedObsNetwork.mxd User: GetchelJ Saved: 8/17/2022 11:18:09 AM Opened: 8/17/2022 11:18:38 AM

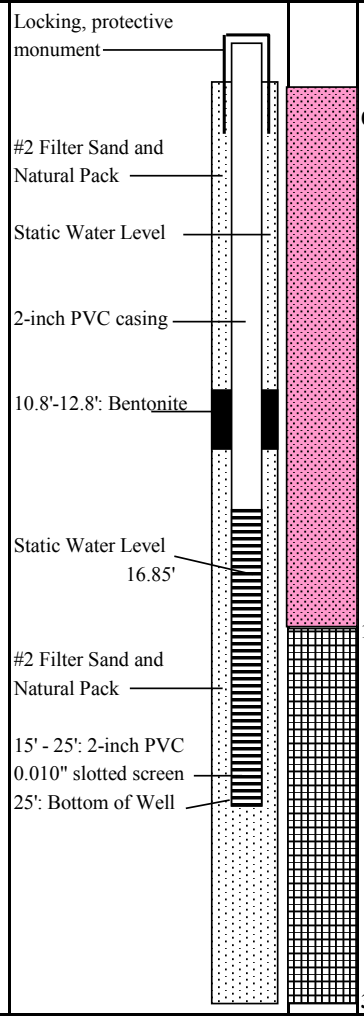
APPENDIX A

Boring Logs

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1A
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: December 10, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 32' **Total Depth of Well:** 25.0'
Depth to Bedrock/Till: not intercepted / 19'
Static Water Level: 16.85' (4/10/19)
Screen Interval (Slot Size): 15.0' - 25.0' (0.010" slotted)



DEPTH (feet)	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
0 - 19'	**0' - 19': Brownish, generally, poorly-sorted beds of fine to coarse sand with pebbles to cobbles, trace silt.**	
15'-17'	15'-17': Split Spoon: Brownish, poorly sorted fine to coarse sand, little silt, trace pebbles.	3-4-6-14 (8 inches)
17'-19'	17'-19': Split Spoon: Brownish, poorly sorted fine to coarse sand (top) Bottom of spoon, rock fragements, and dense till.	20-17-19-33 (7 inches)
19' - 32'	**19' - 32': Gray, Dense Till.**	
30'-32'	30'-32': Split Spoon: Gray, dense silty to pebble till.	34-30-30-40 (6 inches)
32'	**32': Bottom of Boring. Bedrock not intercepted.**	

DRAFT

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-1A

Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.

Till - Tight, silty sand to boulders.

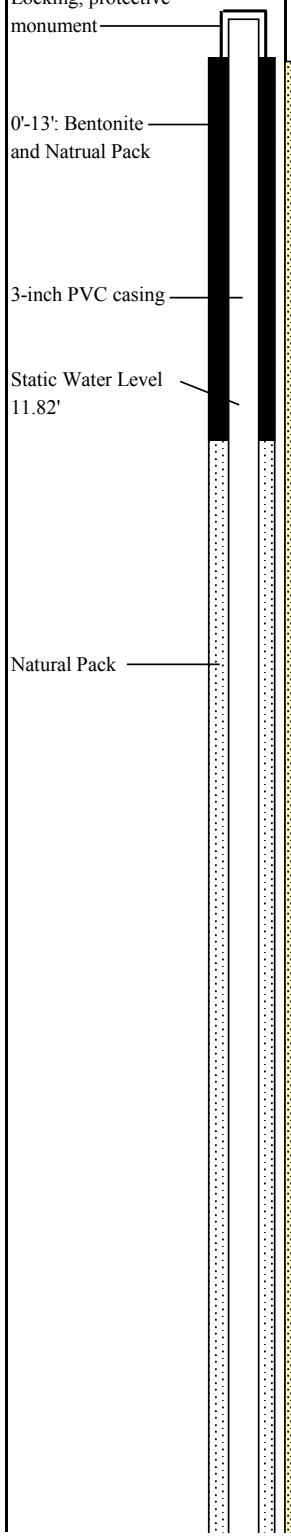
PERCENTAGES USED IN SAMPLE DESCRIPTIONS

Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1B
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: December 10-11, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 80' **Total Depth of Well:** 73'
Depth to Bedrock/Till: 80' / 76'
Static Water Level: 11.82' (12/20/18)
Screen Interval (Slot Size): 58' - 73' (0.020" slotted)



DEPTH (feet)	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
+2		
0		
1	**0' - 60.5': Brownish, well-sorted beds of silt to fine sand, some coarse sand, trace pebbles.**	
2		
3		
4		
5		
6		
7		
8		
9		
10	10'-12': Split Spoon: Brown, well sorted silt and fine sand.	3-4-5-6
11		(12 inches)
12		
13		
14		
15		
16		
17		
18		
19		
20	20'-22': Split Spoon: Brown, well sorted silt and fine sand.	3-4-6-7
21		(2 inches)
22		
23		
24		
25		
26		
27		
28		
29		
30	30'-32': Split Spoon: Brown, well sorted silt and fine sand.	H-H-2-5
31	Gray clay and silt in tip of spoon.	(12 inches)
32		
33		
34		
35		
36		
37		
38		
39		
40	40'-42': Split Spoon: Brown, dense silt and fine sand.	8-12-14-15
41		(10 inches)
42		
43		
44		
45		
46		
47		
48		
49		
50	50'-52': Split Spoon: Brown, well sorted silt and fine sand.	7-8-9-10
51		(11 inches)

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1B
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: December 10-11, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 80' **Total Depth of Well:** 73'
Depth to Bedrock/Till: 80' / 76'
Static Water Level: 11.82' (12/20/18)
Screen Interval (Slot Size): 58' - 73' (0.020" slotted)

DEPTH (feet)	WELL CONSTRUCTION	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
52				
53				
54				
55				
56				
57				
58				
59				
60			60'-62': Split Spoon: Top of spoon, brown, well sorted silt and fine sand.	8-21-20-9
61	58' - 73': 3-inch PVC		Bottom of spoon, rock fragments, pebbles, and silt.	(12 inches)
62	0.020" slotted screen		**60.5' - 76': Brownish, generally, poorly-sorted beds of fine to coarse sand**	
63			**with pebbles to cobbles, little silt.**	
64				
65			65'-67': Split Spoon: Silty, fine to coarse sand, and pebbles to cobbles.	19-27-47-37
66				(15 inches)
67				
68				
69				
70			70'-72': Split Spoon: Silty, fine to coarse sand, and pebbles to cobbles.	7-13-22-34
71				(10 inches)
72				
73	73': Bottom of Well			
74				
75			75'-77': Split Spoon: Silty, fine to coarse sand, and pebbles to cobbles.	38-50+
76			Three inches of till in tip.	(8 inches)
77			**76' - 80': Gray, Dense Till.**	
78				
79				
80			**80': Bottom of Boring. Bedrock Surface.**	

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-1B

- Generally, well-sorted beds of silt to fine sand, little medium to coarse sand, trace pebbles.
- Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.
- Till - Tight, silty sand to boulders.
- Weathered to Competent Bedrock.

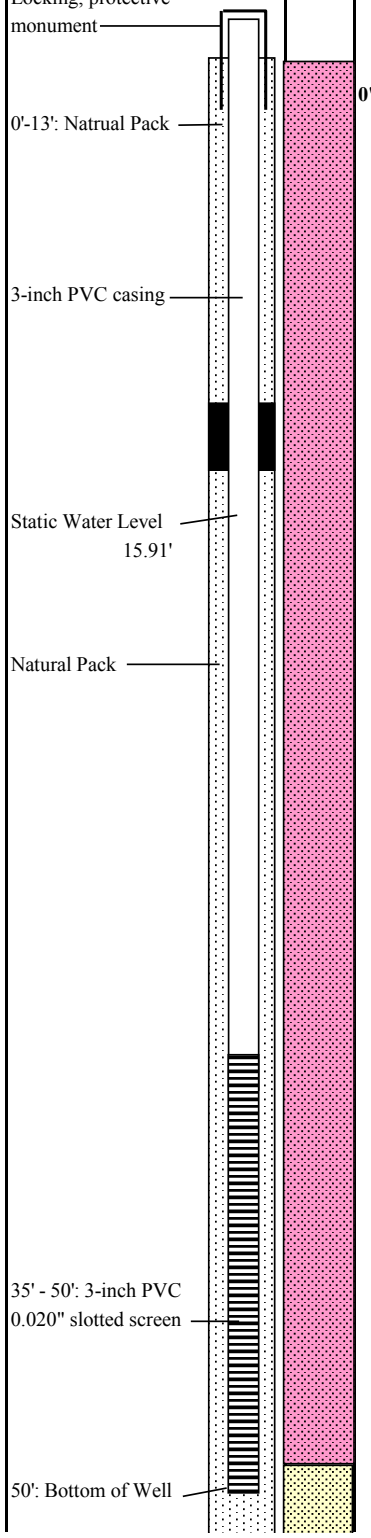
PERCENTAGES USED IN SAMPLE DESCRIPTIONS

Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1D
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: December 12-14, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 107' **Total Depth of Well:** 50'
Depth to Bedrock/Till: not intercepted
Static Water Level: 15.91' (12/20/18)
Screen Interval (Slot Size): 35' - 50' (0.020" slotted)



DEPTH (feet)	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
0 - 49'	**0' - 49': Brownish, poorly-sorted beds of fine sand, some coarse sand, trace pebbles, trace silt.**	
20	20'-22': Split Spoon: no sample return.	4-4-3-4
21		no return
30	30'-32': Split Spoon: no sample return.	11-8-10-12
31		no return
35	30'-35': Smooth drilling, formation taking drill water.	
36	35'-37': Split Spoon: no sample return.	16-12-9-9
37		no return
39	35'-40': Loosing water during drilling.	
44	44': Rough, chattery drilling.	
45	44'-46': Split Spoon: Only one pebble returned in spoon.	4-6-7-7
46		(1 pebble)
49	49'-51': Split Spoon: Brown, well sorted fine sand and silt.	5-7-9-11
50		(10 inches)

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1D
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: December 12-14, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 107' **Total Depth of Well:** 50'
Depth to Bedrock/Till: not intercepted
Static Water Level: 15.91' (12/20/18)
Screen Interval (Slot Size): 35' - 50' (0.020" slotted)

DEPTH (feet)	WELL CONSTRUCTION	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
52				
53				
54				
55			55'-57': Split Spoon: Top, 6 inches of gray dense clay.	10-11-11-14
56			Bottom gray fine sand and silt.	(10 inches)
57				
58				
59				
60			60'-62': Split Spoon: Top fine to medium sand, some coarse sand.	8-14-18-22
61			Bottom fine to coarse sand and silt.	(1 inches)
62				
63				
64				
65			65'-67': Split Spoon: Top gray fine to coarse sand.	10-14-17-20
66			Bottom gray silty fine sand.	(10 inches)
67				
68				
69				
70				
71				
72				
73				
74				
75			75'-77': Split Spoon: Only a 1-inch clump of silt returned.	8-9-13-12
76				(1 inch)
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				
99			Rolled ahead with 3-inch roller bit to try to intercept till/bedrock. No	
100			evidence of till or bedrock was observed. Drilling was generally smooth	
101			down to 107 feet. The drilling was terminated at 107 feet because only fine sand	
102			and silt were intercepted at depth. Due to the unfavorable nature	
103			sediments at depth, a determination was made to terminate the drilling rather	
104			than spending an additioanal day on drill rig time to drill deeper.	
105				
106				

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1D
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: December 12-14, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 107' **Total Depth of Well:** 50'
Depth to Bedrock/Till: not intercepted
Static Water Level: 15.91' (12/20/18)
Screen Interval (Slot Size): 35' - 50' (0.020" slotted)

DEPTH (feet)	WELL CONSTRUCTION	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
107			**107': Bottom of Boring. No till or bedrock intercepted.**	

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-1D

Generally, well-sorted beds of silt to fine sand, little medium to coarse sand, trace pebbles.

Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.

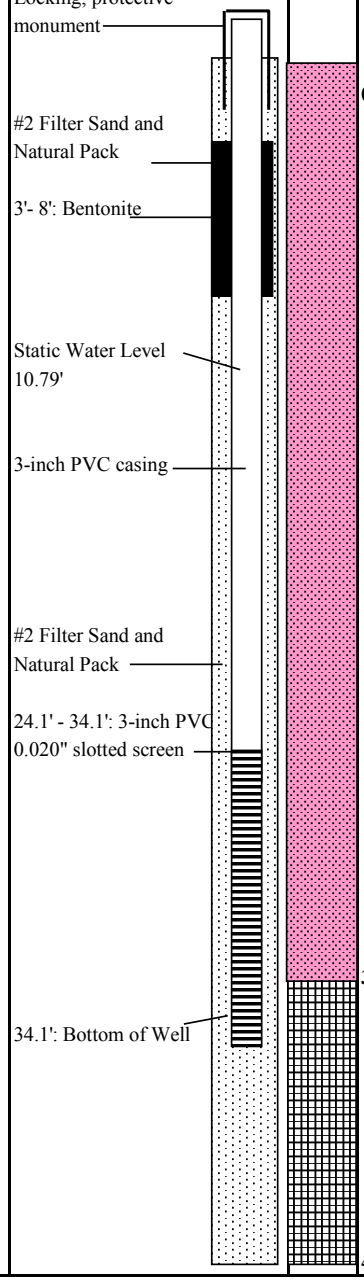
PERCENTAGES USED IN SAMPLE DESCRIPTIONS

Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1E
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: December 12, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 42' **Total Depth of Well:** 34.1'
Depth to Bedrock/Till: not intercepted / 32'
Static Water Level: 10.79' (3/21/19)
Screen Interval (Slot Size): 24.1' - 34.1' (0.020" slotted)



DEPTH (feet)	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
+2 to 19		**0' - 32': Brownish, generally, poorly-sorted beds of fine to coarse sand with pebbles to cobbles, trace silt.**	
20-21		20'-22': Split Spoon: Brownish, poorly sorted fine to coarse sand with pebbles and cobbles.	9-13-14-13 (8 inches)
22 to 29			
30-31		30'-32': Split Spoon: Top fine to coarse sand, some silt. Middle brown/black stained fine to coarse sand. Bottom silt and fine sand, clay in spoon tip.	15-15-20-14 (10 inches)
32 to 33		**32' - 42': Gray, Dense Till.**	
34		34.1': Bottom of Well	
35-37		35'-37': Split Spoon: Gray dense till.	50-0-0-0 (3 inches)
38 to 39			
40-41		40'-42': Split Spoon: Gray dense till.	46-50-0-0 (8 inches)
40		**42': Bottom of Boring. Bedrock not intercepted.**	

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-1E

Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.

Till - Tight, silty sand to boulders.

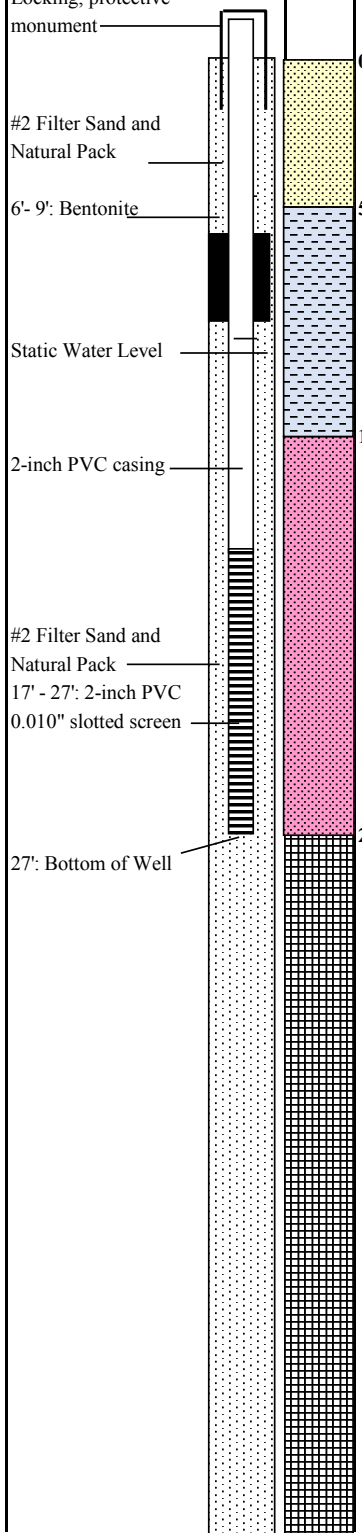
PERCENTAGES USED IN SAMPLE DESCRIPTIONS

Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1H
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Ryan Allen
Date Drilled: March 26, 2019
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 52' **Total Depth of Well:** 27'
Depth to Bedrock/Till: Not Intercepted / 27'
Static Water Level: 5.16' (4/10/19)
Screen Interval (Slot Size): 17' - 27' (0.010" slotted)



DEPTH (feet)	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
0		**0' - 5': Brownish, well-sorted beds of silt to fine sand.**	
5		**5' - 13': Gray silt and clay.**	
12		10'-12': Split Spoon: Gray silt and clay.	0.5-0.5-1-1 (3 inches)
13		**13' - 27': Brownish, generally, poorly-sorted beds of fine to coarse sand with pebbles, trace silt.**	
16		15'-17': Split Spoon: Brownish, poorly sorted fine to coarse sand, with pebbles.	8-8-10-10 (8 inches)
25		25'-27': Split Spoon: Brownish, poorly sorted fine to coarse sand, with cobbles.	50-0-0-0 (4 inches)
27		**27' - 52': Gray, Dense Till.**	
30		30'-32': Split Spoon: 3-inches layer of fine sand to coarse sand, 7-inches of gray till.	19-39-15-14 (10 inches)
40		40'-42': Split Spoon: Gray silt and clay.	30-39-83-0 (8 inches)
50		50'-52': Split Spoon: Gray, Dense Till.	52-90-0-0 (8 inches)

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1H
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Ryan Allen
Date Drilled: March 26, 2019
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 52' **Total Depth of Well:** 27'
Depth to Bedrock/Till: Not Intercepted / 27'
Static Water Level: 5.16' (4/10/19)
Screen Interval (Slot Size): 17' - 27' (0.010" slotted)

DEPTH (feet)	WELL CONSTRUCTION	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
52			**52': Bottom of Boring.**	

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-1E

Generally, well-sorted beds of silt to fine sand, little medium to coarse sand, trace pebbles.

Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.

Till - Tight, silty sand to boulders.

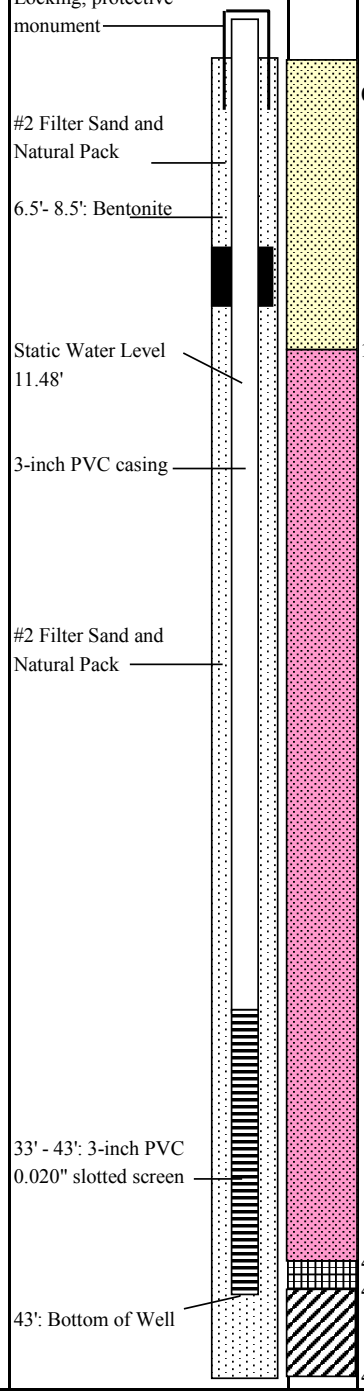
PERCENTAGES USED IN SAMPLE DESCRIPTIONS

Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1I
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Ryan Allen
Date Drilled: March 21, 2019
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 46' **Total Depth of Well:** 43'
Depth to Bedrock/Till: 43' / 42'
Static Water Level: 11.48' (3/22/19)
Screen Interval (Slot Size): 33' - 43' (0.020" slotted)



DEPTH (feet)	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
+2 to 1		
1	**0' - 10': Brownish, well-sorted beds of silt to fine sand.**	
2 to 9		
10	**10' - 42': Brownish, generally, poorly-sorted beds of fine to coarse sand with pebbles, trace silt.**	
12	10'-12': Split Spoon: Brownish, poorly sorted fine to coarse sand with pebbles.	4-6-7-7 (12 inches)
13 to 19		
20	20'-22': Split Spoon: Brownish, poorly sorted fine to medium sand, some coarse sand with pebbles.	6-5-5-7 (12 inches)
22 to 29		
30	30'-32': Split Spoon: Brownish, poorly sorted fine to medium sand, trace silt.	4-5-8-10 (12 inches)
32 to 34		
35	35'-37': Split Spoon: Brownish, poorly sorted fine to coarse sand , trace silt.	14-11-14-18 (8 inches)
37 to 39		
40	40'-42': Split Spoon: Brownish, poorly sorted fine to coarse sand, some silt.	13-32-26-38 (12 inches)
42	**42' - 43': Gray, Dense Till.**	
43	**43': Bedrock Surface.**	
44		46-50-0-0 (8 inches)
46	**46': Bottom of Boring.**	

DRAFT

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1I
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Ryan Allen
Date Drilled: March 21, 2019
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 46' **Total Depth of Well:** 43'
Depth to Bedrock/Till: 43' / 42'
Static Water Level: 11.48' (3/22/19)
Screen Interval (Slot Size): 33' - 43' (0.020" slotted)

DEPTH (feet)	WELL CONSTRUCTION	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-1E

Generally, well-sorted beds of silt to fine sand, little medium to coarse sand, trace pebbles.

Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.

Till - Tight, silty sand to boulders.

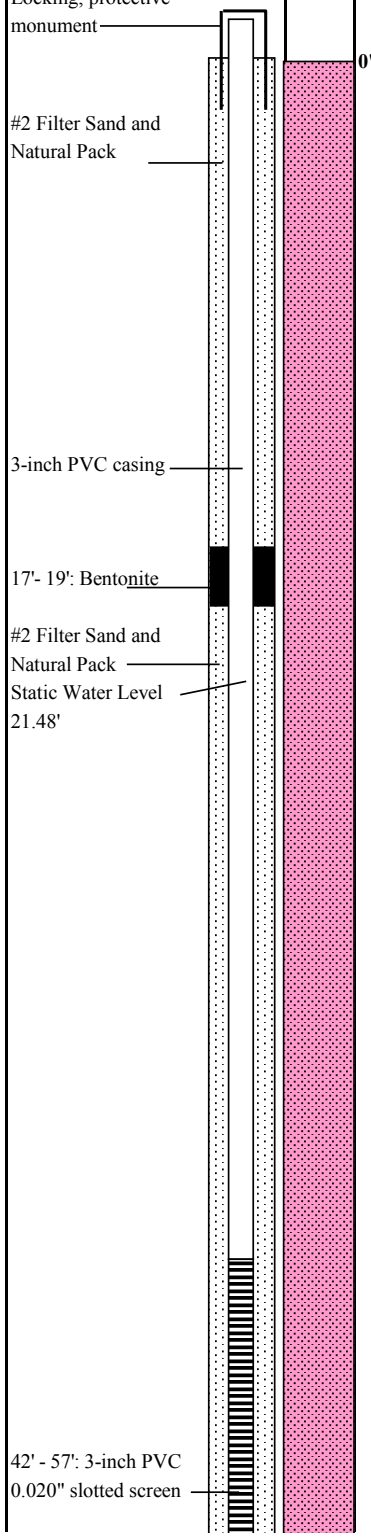
PERCENTAGES USED IN SAMPLE DESCRIPTIONS

Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1J
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Ryan Allen
Date Drilled: March 21-22, 2019
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 62' **Total Depth of Well:** 57'
Depth to Bedrock/Till: Not Intercepted / 58'
Static Water Level: 21.48' (4/10/19)
Screen Interval (Slot Size): 42' - 57' (0.020" slotted)



DEPTH (feet)	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
0	**0' - 58': Brownish, generally, poorly-sorted beds of fine to coarse sand with pebbles and cobbles, trace silt.**	
12	10'-12': Split Spoon: Brownish, poorly sorted fine to coarse sand with pebbles and cobbles, trace silt.	4-4-3-2 (12 inches)
20	20'-22': Split Spoon: Brownish, poorly sorted fine to coarse sand, pebbles, trace silt.	4-8-11-45 (12 inches)
25	25'-27': Split Spoon: Brownish, poorly sorted fine to coarse sand, with pebbles, trace silt.	17-50-0-0 (4 inches)
30	30'-32': Split Spoon: Brownish, poorly sorted fine to coarse sand, with pebbles, trace silt.	22-20-26-45 (6 inches)
35	35'-37': Split Spoon: Brownish, poorly sorted fine to coarse sand some coarse sand.	12-12-12-18 (10 inches)
40	40'-42': Split Spoon: Brownish, poorly sorted fine to coarse sand, with pebbles, trace silt.	32-41-50-0 (4 inches)
45	45'-47': Split Spoon: Brownish, poorly sorted fine to coarse sand, with pebbles, little silt.	29-42-54-42 (7 inches)
50	50'-52': Split Spoon: Brownish, poorly sorted fine to coarse sand, with pebbles, little silt.	32-38-51-56 (8 inches)

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-1J
Town of Newport - Groundwater Development Zone NNH-SG1
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Ryan Allen
Date Drilled: March 21-22, 2019
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 62' **Total Depth of Well:** 57'
Depth to Bedrock/Till: Not Intercepted / 58'
Static Water Level: 21.48' (4/10/19)
Screen Interval (Slot Size): 42' - 57' (0.020" slotted)

DEPTH (feet)	WELL CONSTRUCTION	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
52				
53				
54				
55			55'-57': Split Spoon: Brownish, poorly sorted fine to coarse sand,	61-58-44-44
56			with pebbles, little silt.	(8 inches)
57				
58	57': Bottom of Well		**58' - 62': Gray, Dense Till.**	
59			60'-62': Split Spoon: Gray, Dense Till.	70-110-0-0
60				(4 inches)
61				
62			**62': Bottom of Boring.**	

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-1E

Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.

Till - Tight, silty sand to boulders.

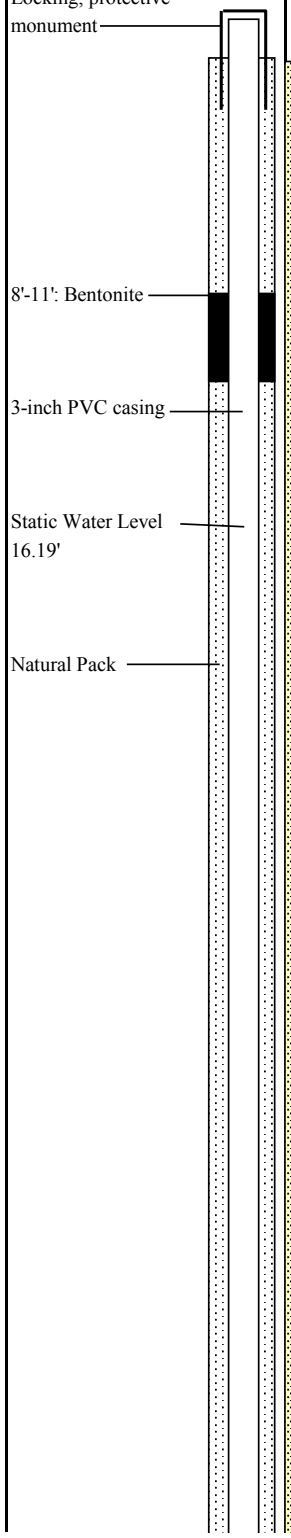
PERCENTAGES USED IN SAMPLE DESCRIPTIONS

Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-2A
Town of Newport - Groundwater Development Zone NNH-SG2
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: October 22, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 70' **Total Depth of Well:** 67.5'
Depth to Bedrock/Till: 69' / na
Static Water Level: 16.19' (10/25/18)
Screen Interval (Slot Size): 57.5' - 67.5' (0.020" slotted)



DEPTH (feet)	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
0 - 65'		0' - 65': Gray, well-sorted beds of silt to fine sand.	
40'-42'		40'-42': Split Spoon: Gray, well sorted silt and fine sand. Trace gray clay.	6-9-14-19 (14 inches)
45'-47'		45'-47': Split Spoon: Gray, well sorted silt and fine sand.	6-11-13-14 (12 inches)
50'-52'		50'-52': Split Spoon: Gray, well sorted silt and fine sand.	10-18-21-20 (10 inches)

DRAFT

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-2A
Town of Newport - Groundwater Development Zone NNH-SG2
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: October 22, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 70' **Total Depth of Well:** 67.5'
Depth to Bedrock/Till: 69' / na
Static Water Level: 16.19' (10/25/18)
Screen Interval (Slot Size): 57.5' - 67.5' (0.020" slotted)

DEPTH (feet)	WELL CONSTRUCTION	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
52				
53				
54				
55			55'-57': Split Spoon: Gray, well sorted silt and fine sand. Trace medium sand.	11-13-18-20
56				(18 inches)
57				
58				
59				
60			60'-62': Split Spoon: Gray, well sorted silt and fine sand.	5-8-6-5
61	57.5' - 67.5': 3-inch PVC			(12 inches)
62	0.020" slotted screen			
63				
64			64'-66': Split Spoon: 6" of fine to coarse white sand, pebbles, cobble fragements.	29-26-26-27
65			**65' - 66': Gray and white, poorly-sorted, sand to pebbles and cobbles, trace silt.**	(8 inches)
66				
67	67.5': Bottom of Well		**66' - 69': Gray, well-sorted beds of silt to fine sand.**	
68				
69			**69': Bedrock Surface.**	
70			**70': Bottom of Boring.**	

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-2A

Generally, well-sorted beds of silt to fine sand, little medium to coarse sand, trace pebbles.

Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.

Weathered to Competent Bedrock.

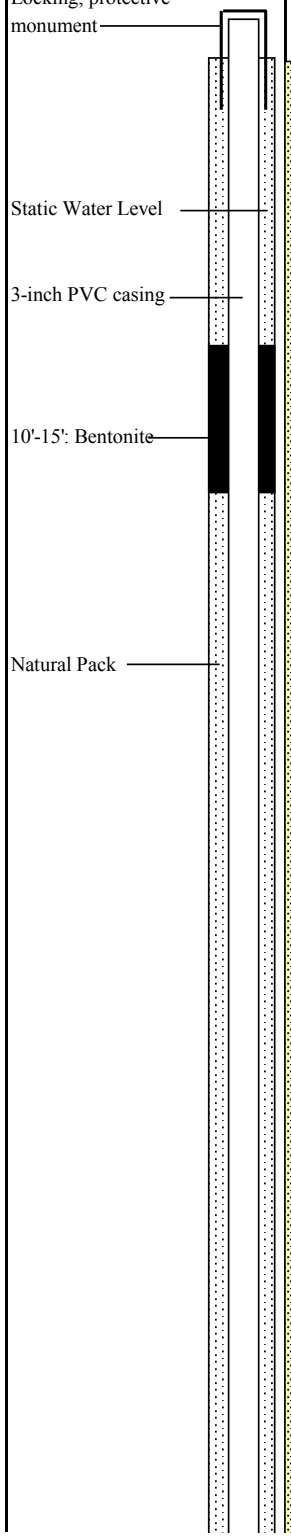
PERCENTAGES USED IN SAMPLE DESCRIPTIONS

Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-2B
Town of Newport - Groundwater Development Zone NNH-SG2
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: October 23, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 65' **Total Depth of Well:** 64.5'
Depth to Bedrock/Till: 64' / 61'
Static Water Level: 18.70' (10/25/18)
Screen Interval (Slot Size): 54.5' - 64.5' (0.020" slotted)



DEPTH (feet)	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
+2			
0			
1		0' - 61': Gray, well-sorted beds of silt to fine sand.	
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35		35'-37': Split Spoon: Gray, well sorted silt and fine sand.	6-10-13-19
36		1" gray clay layer near top of spoon.	(17 inches)
37			
38			
39			
40		40'-42': Split Spoon: Gray, well sorted silt and fine sand.	10-13-17-20
41		1/4" gray clay layer at bottom of spoon.	(14 inches)
42			
43			
44			
45		45'-47': Split Spoon: Gray, well sorted silt and fine sand.	9-12-17-24
46			(12 inches)
47			
48			
49			
50		50'-52': Split Spoon: Gray, well sorted silt and fine sand.	8-13-16-20
51			(10 inches)

HYDROGEOLOGIC LOG FOR EXPLORATORY TEST WELL NNH-2B
Town of Newport - Groundwater Development Zone NNH-SG2
Newport, New Hampshire

Project: Town of Newport, New Hampshire
Driller: S.W. Cole Explorations, LLC
Geologist: Peter J. Foster
Date Drilled: October 23, 2018
Drill Method: Four-inch Casing - Drive and Wash

Total Depth of Boring: 65' **Total Depth of Well:** 64.5'
Depth to Bedrock/Till: 64' / 61'
Static Water Level: 18.70' (10/25/18)
Screen Interval (Slot Size): 54.5' - 64.5' (0.020" slotted)

DEPTH (feet)	WELL CONSTRUCTION	DRILL LOG	SAMPLE DESCRIPTION	**Penetration Blows (Recovery)
52				
53				
54				
55			55'-57': Split Spoon: Gray, well sorted silt and fine sand.	7-10-15-50
56			Cobble fragement bottom of spoon.	(4.5 inches)
57				
58				
59				
60			60'-62': Split Spoon: Gray, well sorted silt and fine sand.	23-26-25-24
61	54.5' - 64.5': 3-inch PVC		**61' - 64': Gray, Dense Till.**	(2 inches)
62	0.020" slotted screen			
63				
64	64.5': Bottom of Well		**64': Bedrock Surface.**	
65			**65': Bottom of Boring.**	

** Penetration blows with a 140-pound hammer falling 30 inches (per 6 inches over a 2-foot interval).

GEOLOGIC LOG LEGEND FOR EXPLORATORY TEST WELL NNH-2B

Generally, well-sorted beds of silt to fine sand, little medium to coarse sand, trace pebbles.

Generally, poorly-sorted (well-graded), fine to coarse sands with pebbles to cobbles.

Till - Tight, silty sand to boulders.

Weathered to Competent Bedrock.

PERCENTAGES USED IN SAMPLE DESCRIPTIONS

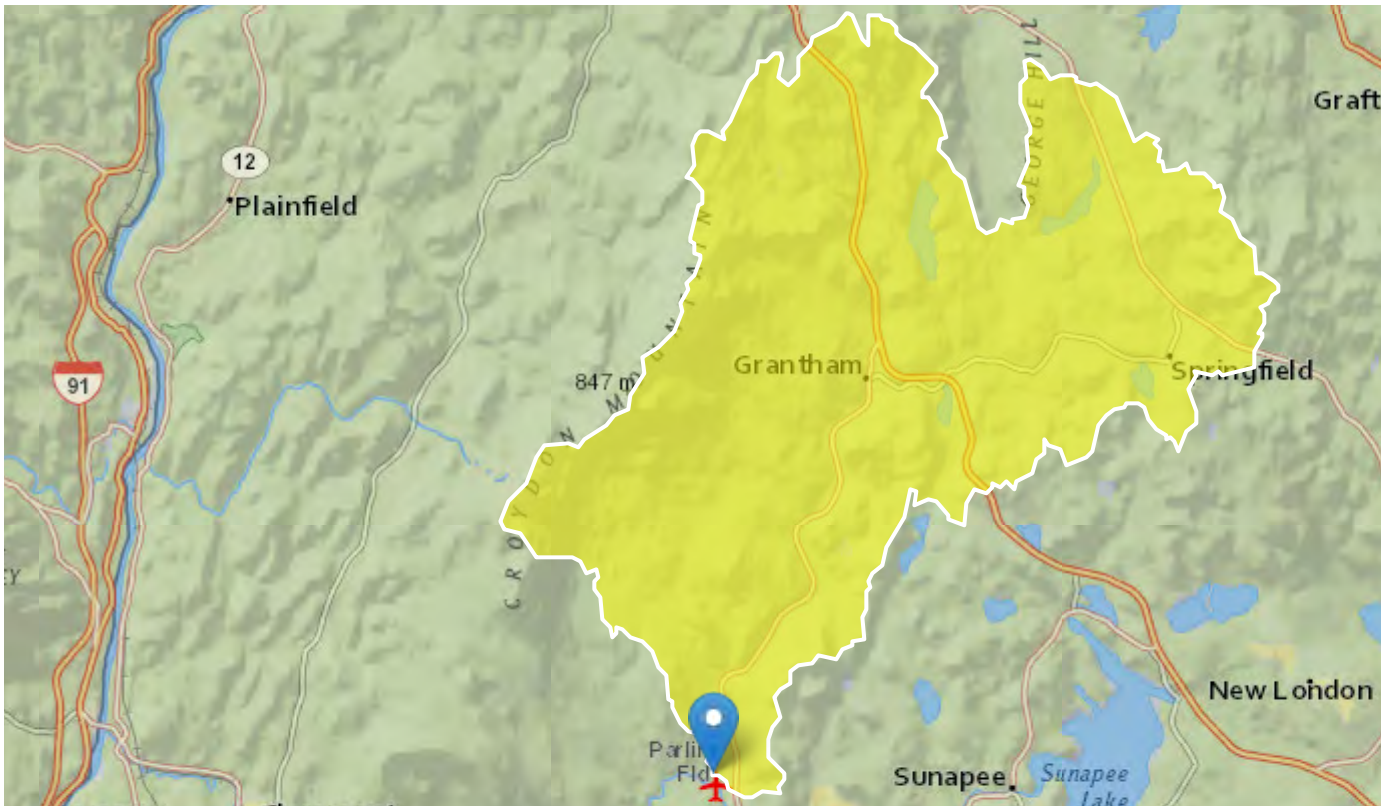
Trace = 0-10% Little = 10-20%
Some = 20-35% And = 35-50%

APPENDIX B

USGS StreamStats

StreamStats Report

Region ID: NH
Workspace ID: NH20220721175427945000
Clicked Point (Latitude, Longitude): 43.39128, -72.19063
Time: 2022-07-21 13:54:47 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
APRAVPRE	Mean April Precipitation	3.56	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	12.548	percent
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	860086.1	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	362289.3	meters

Parameter Code	Parameter Description	Value	Unit
CONIF	Percentaqe of land surface covered by coniferous forest	26.7014	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	25.2	feet per mi
DRNAREA	Area that drains to a point on a stream	81.64	square miles
ELEVMAX	Maximum basin elevation	2766.176	feet
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	5.95	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.11	percent
MINTEMP_W	Mean winter minimum air temperature over basin surface area	12.289	degrees F
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	27.957	percent
OUTLETX	Basin outlet horizontal (x) location in state plane coordinates	844965	feet
OUTLETY	Basin outlet vertical (y) location in state plane coordinates	325275	feet
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	6.69	inches
PREBC_1112	Mean annual precipitation of basin centroid for November 1 to December 31 period	7.13	inches
PRECIPCENT	Mean Annual Precip at Basin Centroid	40.2	inches
PRECIPOUT	Mean annual precip at the stream outlet (based on annual PRISM precip data in inches from 1971-2000)	38.6	inches
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	8.1	inches
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	17.1	inches
SNOFALL	Mean Annual Snowfall	80.127	inches
TEMP	Mean Annual Temperature	43.727	degrees F

Parameter Code	Parameter Description	Value	Unit
TEMP_06_10	Basinwide average temperature for June to October summer period	59.958	degrees F
WETLAND	Percentage of Wetlands	6.3146	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	81.64	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	3.56	inches	2.79	6.23
WETLAND	Percent Wetlands	6.3146	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	25.2	feet per mi	5.43	543

Peak-Flow Statistics Flow Report [Peak Flow Statewide SIR2008 5206]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	ASEp	Equiv. Yrs.
50-percent AEP flood	1610	ft^3/s	996	2600	30.1	3.2
20-percent AEP flood	2400	ft^3/s	1470	3930	31.1	4.7
10-percent AEP flood	3030	ft^3/s	1820	5050	32.3	6.2
4-percent AEP flood	3830	ft^3/s	2230	6580	34.3	8
2-percent AEP flood	4480	ft^3/s	2530	7920	36.4	9
1-percent AEP flood	5240	ft^3/s	2870	9580	38.6	9.8
0.2-percent AEP flood	7010	ft^3/s	3550	13900	44.1	11

Peak-Flow Statistics Citations

Olson, S.A.,2009, Estimation of flood discharges at selected recurrence intervals for streams in New Hampshire: U.S.Geological Survey Scientific Investigations Report

2008-5206, 57 p. (http://pubs.usgs.gov/sir/2008/5206/)

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	81.64	square miles	3.26	689
TEMP	Mean Annual Temperature	43.727	degrees F	36	48.7
PREG_06_10	Jun to Oct Gage Precipitation	17.1	inches	16.5	23.1

Low-Flow Statistics Flow Report [Low Flow Statewide]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	SE	ASEp
7 Day 2 Year Low Flow	8.5	ft^3/s	3.17	17.4	55.7	55.7
7 Day 10 Year Low Flow	4.53	ft^3/s	1.11	11.3	79.4	79.4

Low-Flow Statistics Citations

Flynn, R.H. and Tasker, G.D.,2002, Development of Regression Equations to Estimate Flow Durations and Low-Flow-Frequency Statistics in New Hampshire Streams: U.S.Geological Survey Scientific Investigations Report 02-4298, 66 p. (http://pubs.water.usgs.gov/wrir02-4298)

Flow-Duration Statistics

Flow-Duration Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	81.64	square miles	3.26	689

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
PREG_06_10	Jun to Oct Gage Precipitation	17.1	inches	16.5	23.1
TEMP	Mean Annual Temperature	43.727	degrees F	36	48.7

Flow-Duration Statistics Flow Report [Low Flow Statewide]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	SE	ASEp
60 Percent Duration	48.5	ft^3/s	35.6	64.3	18	18
70 Percent Duration	33.7	ft^3/s	23.7	46.3	20.6	20.6
80 Percent Duration	22	ft^3/s	13.6	33.5	28	28
90 Percent Duration	12.9	ft^3/s	6.71	22.2	37.5	37.5
95 Percent Duration	8.88	ft^3/s	4.11	16.5	44.1	44.1
98 Percent Duration	6.28	ft^3/s	2.43	13	54.3	54.3

Flow-Duration Statistics Citations

Flynn, R.H. and Tasker, G.D.,2002, Development of Regression Equations to Estimate Flow Durations and Low-Flow-Frequency Statistics in New Hampshire Streams: U.S.Geological Survey Scientific Investigations Report 02-4298, 66 p. (http://pubs.water.usgs.gov/wrir02-4298)

Seasonal Flow Statistics

Seasonal Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	81.64	square miles	3.26	689
CONIF	Percent Coniferous Forest	26.7014	percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	6.69	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM	12.548	percent	3.19	38.1

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
MIXFOR	Percent Mixed Forest	27.957	percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	8.1	inches	6.83	11.5
TEMP	Mean Annual Temperature	43.727	degrees F	36	48.7
TEMP_06_10	Jun to Oct Mean Basinwide Temp	59.958	degrees F	52.9	64.4
PREG_06_10	Jun to Oct Gage Precipitation	17.1	inches	16.5	23.1
ELEVMAX	Maximum Basin Elevation	2766.176	feet	260	6290

Seasonal Flow Statistics Flow Report [Low Flow Statewide]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	SE	ASEp
Jan to Mar15 60 Percent Flow	49.1	ft^3/s	34	68.2	21.2	21.2
Jan to Mar15 70 Percent Flow	41.9	ft^3/s	29.3	57.8	20.7	20.7
Jan to Mar15 80 Percent Flow	35.7	ft^3/s	26.1	47.5	18.2	18.2
Jan to Mar15 90 Percent Flow	28.5	ft^3/s	20.4	38.5	19.3	19.3
Jan to Mar15 95 Percent Flow	22.9	ft^3/s	16	31.6	20.7	20.7
Jan to Mar15 98 Percent Flow	18.6	ft^3/s	11.6	28	27.1	27.1
Jan to Mar15 7 Day 2 Year Low Flow	37.2	ft^3/s	27.7	48.5	17.2	17.2
Jan to Mar15 7 Day 10 Year Low Flow	22.2	ft^3/s	15.3	30.8	21.5	21.5
Mar16 to May 60 Percent Flow	191	ft^3/s	155	232	12.2	12.2
Mar16 to May 70 Percent Flow	151	ft^3/s	124	181	11.4	11.4
Mar16 to May 80 Percent Flow	115	ft^3/s	93.3	140	12.4	12.4
Mar16 to May 90 Percent Flow	80	ft^3/s	63.4	99.3	13.7	13.7
Mar16 to May 95 Percent Flow	58.7	ft^3/s	45.7	74	14.8	14.8
Mar16 to May 98 Percent Flow	42.5	ft^3/s	31.2	56.3	18.1	18.1
Mar16 to May 7 Day 2 Year Low Flow	53.9	ft^3/s	42.1	67.6	14.5	14.5
Mar16 to May 7 Day 10 Year Low Flow	30.6	ft^3/s	23.1	39.4	16.2	16.2
Jun to Oct 60 Percent Flow	18.4	ft^3/s	9.75	31.4	36.7	36.7

Statistic	Value	Unit	PII	Plu	SE	ASEp
Jun to Oct 70 Percent Flow	14.1	ft^3/s	7.06	25	39.9	39.9
Jun to Oct 80 Percent Flow	11.7	ft^3/s	5.4	21.9	44.5	44.5
Jun to Oct 90 Percent Flow	8.16	ft^3/s	3.38	16.3	50.7	50.7
Jun to Oct 95 Percent Flow	6.29	ft^3/s	2.34	13.4	57	57
Jun to Oct 98 Percent Flow	5.06	ft^3/s	1.75	11.2	61.1	61.1
Jun to Oct 7 Day 2 Year Low Flow	8.58	ft^3/s	3.18	17.7	55.6	55.6
Jun to Oct 7 Day 10 Year Low Flow	4.57	ft^3/s	1.15	11.2	78.5	78.5
Nov to Dec 60 Percent Flow	73.2	ft^3/s	49	105	23.3	23.3
Nov to Dec 70 Percent Flow	58.4	ft^3/s	37.3	86.4	25.9	25.9
Nov to Dec 80 Percent Flow	45.6	ft^3/s	28.2	69.1	27.8	27.8
Nov to Dec 90 Percent Flow	32	ft^3/s	18.5	50.9	31.6	31.6
Nov to Dec 95 Percent Flow	24.1	ft^3/s	12.3	41.7	38.3	38.3
Nov to Dec 98 Percent Flow	18	ft^3/s	7.39	35.6	50.6	50.6
Oct to Nov 7 Day 2 Year Low Flow	46.2	ft^3/s	30.9	65.5	23.3	23.3
Oct to Nov 7 Day 10 Year Low Flow	22.9	ft^3/s	12.1	38.3	36.6	36.6

Seasonal Flow Statistics Citations

Flynn, R.H. and Tasker, G.D.,2002, Development of Regression Equations to Estimate Flow Durations and Low-Flow-Frequency Statistics in New Hampshire Streams: U.S.Geological Survey Scientific Investigations Report 02-4298, 66 p. (http://pubs.water.usgs.gov/wrir02-4298)

Bankfull Statistics

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	81.64	square miles	0.07722	940.1535

Bankfull Statistics Parameters [New England P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	81.64	square miles	3.799224	138.999861

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	81.64	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	94.4	ft
Bieger_D_channel_depth	3.97	ft
Bieger_D_channel_cross_sectional_area	382	ft^2

Bankfull Statistics Flow Report [New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	86.7	ft
Bieger_P_channel_depth	3.62	ft
Bieger_P_channel_cross_sectional_area	327	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	58.3	ft
Bieger_USA_channel_depth	3.08	ft
Bieger_USA_channel_cross_sectional_area	184	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	94.4	ft
Bieger_D_channel_depth	3.97	ft
Bieger_D_channel_cross_sectional_area	382	ft^2
Bieger_P_channel_width	86.7	ft
Bieger_P_channel_depth	3.62	ft
Bieger_P_channel_cross_sectional_area	327	ft^2
Bieger_USA_channel_width	58.3	ft

Statistic	Value	Unit
Bieger_USA_channel_depth	3.08	ft
Bieger_USA_channel_cross_sectional_area	184	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_

Application Version: 4.10.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

APPENDIX C

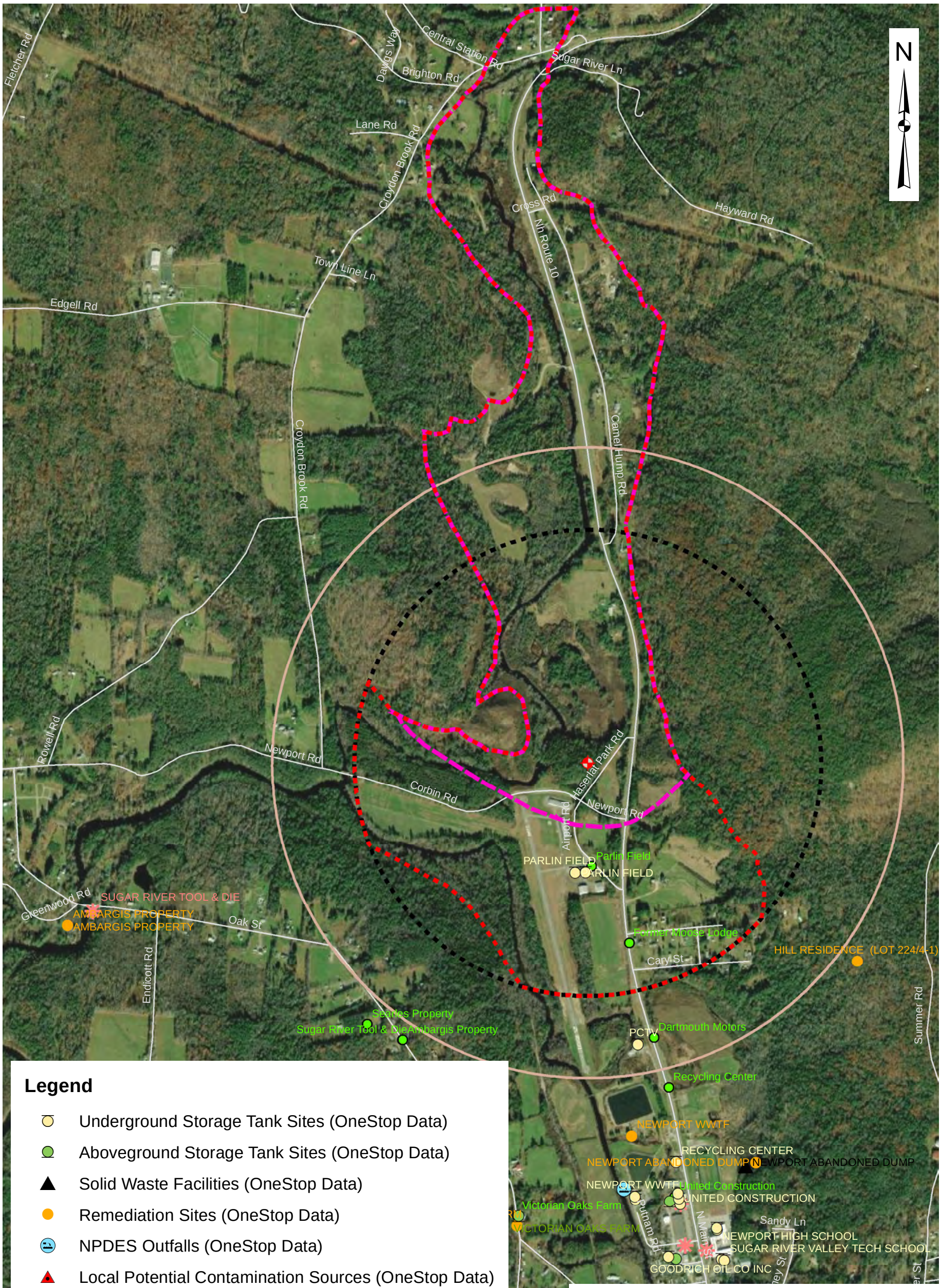
Potential Contamination Source Inventory

Table C.1: Potential Contamination Sources NHDES OneStop Geospatial Data

Facility Name	Address	Town	Site Number	Facility Type	Site	Number of Tanks
Parlin Field	8 Airport Road	Newport	199510021	Local Government	Underground Storage Tank	2 Tanks
PCTV	Route 10	Newport	198709029	Commercial	Underground Storage Tank	–

Table C.2: Potential Contamination Sources NHDES OneStop Database

Master ID	Address	Town	Name	Type	If UST or AST, Number of tanks	Status
63975	324 N Main Street	Newport	Dartmouth Motors	Underground Storage Tank	2 Tanks	Closed
17271	N Main Street	Newport	Former Moose Lodge	On-premise use facility containing fuel oil	–	–
17263	Oak Street	Newport	Ambargis Property	Hazardous Waste Project (Brownfield)	–	–
4421	300 N Main Street	Newport	Recycling Center	Hazardous Waste Generator Underground Storage Tank	3 Tanks	Inactive and closed
4416	8 Airport Road	Newport	Parlin Field	Underground Storage Tank	2 Tanks	One active and one closed
63989	330 Oak Street	Newport	Searles Property	Initial Response Spill Site	–	Closed
46750	Oak Street Ext	Newport	Sugar River Tool & Die	Hazardous Waste Generators	–	Inactive



Legend

- Underground Storage Tank Sites (OneStop Data)
- Aboveground Storage Tank Sites (OneStop Data)
- Solid Waste Facilities (OneStop Data)
- Remediation Sites (OneStop Data)
- NPDES Outfalls (OneStop Data)
- Local Potential Contamination Sources (OneStop Data)
- Hazardous Waste Generators (OneStop Data)
- NHDES Database
- Proposed North Well
- Conceptual Potential Impact Area
- Conceptual Cone of Depression (2,842-foot Radius)
- Conceptual Wellhead Protection Area
- 1,000-foot Buffer of Cone of Depression Extent

1,200 0 1,200

Scale In Feet

FIGURE C.1

TOWN OF NEWPORT, NH
NEW SOURCE APPROVAL NORTH WELL

PRELIMINARY POTENTIAL
CONTAMINAT SOURCE INVENTORY

AUGUST 2022 SCALE: NOTED

Weston & Sampson

APPENDIX D

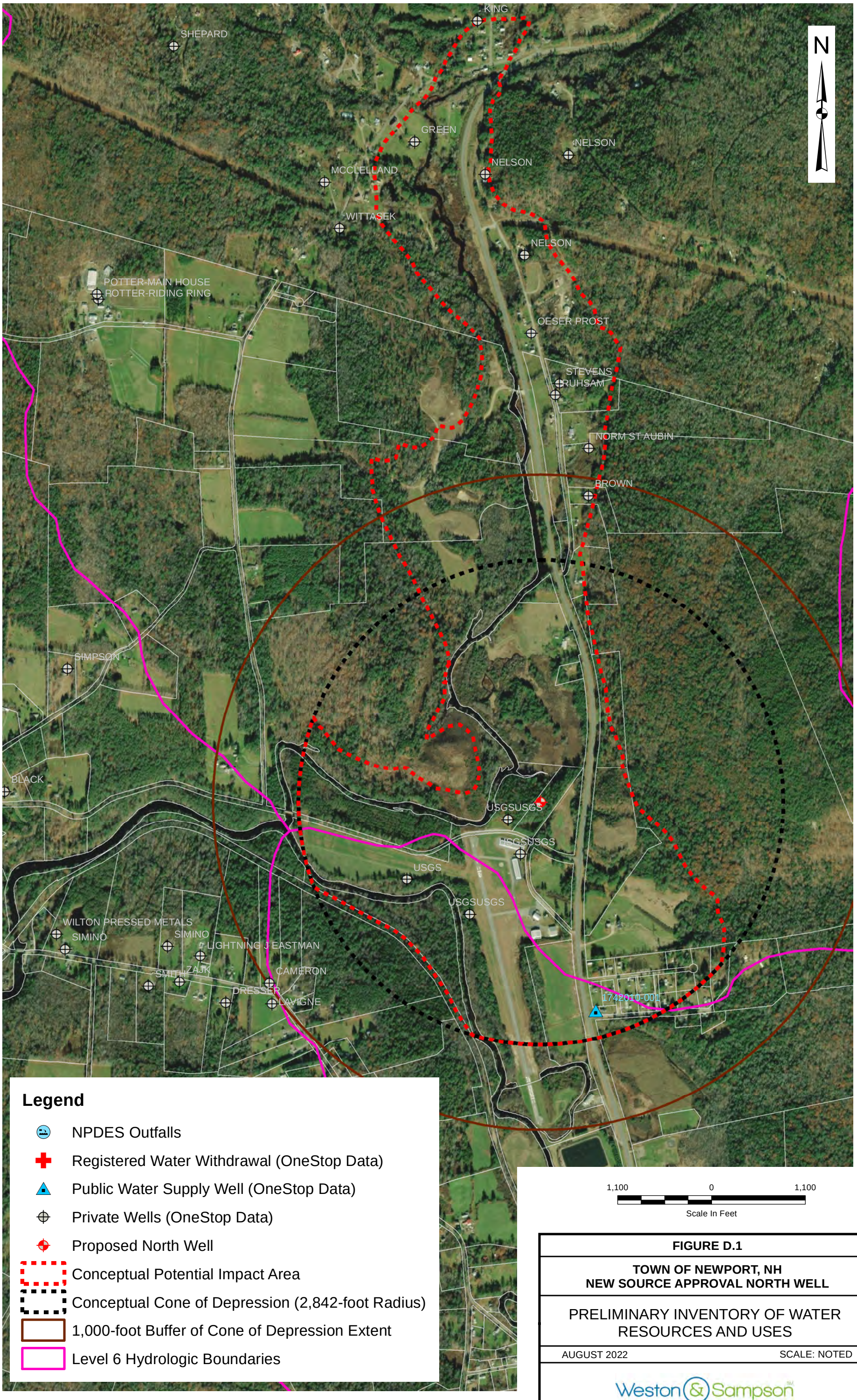
Water Resources Inventory

Table D.1: Private Wells Within Conceptual WHPA

WRB ID	Street number	Road	Town	Type	Use	Total Depth (Feet)	Yield (GPM)
177.0090	31	Camel Hump Road	Newport	Bedrock	Domestic	305	5
177.0017	NA	Camel Hump Road	Newport	Bedrock	Domestic	245	7
177.0052	NA	Corbin Road	Newport	Overburden	Test/Exploration	65	–
177.0053	NA	Airport Road	Newport	Overburden	Test/Exploration	83	–
177.0054	NA	Airport Road	Newport	Overburden	Test/Exploration	74	–
177.0056	NA	Airport Road	Newport	Overburden	Test/Exploration	83	–
177.0057	NA	Airport Road	Newport	Overburden	Test/Exploration	74	–
177.0059	NA	Airport Road	Newport	Overburden	Test/Exploration	28	–
177.0055	NA	Corbin Road	Newport	Overburden	Test/Exploration	66	–
055.0004	NA	Camel Hump Road	Croydon	Overburden	Domestic	132	20
055.0078	NA	Camel Hump Road	Croydon	Bedrock	Domestic	445	30
177.0242	NA	Camel Hump Road	Newport	Bedrock	Domestic	265	20
055.0001	NA	Croydon Tnpk Road	Croydon	Overburden	Domestic	45	5
055.0079	NA	Hayward Road	Croydon	Bedrock	Domestic	505	0.75
055.0128	121	Croydon Brook Road	Croydon	Bedrock	Domestic	400	5
055.0151	140	Croydon Brook Road	Croydon	Bedrock	Domestic	300	50

Table D.2: Public Water Supply Sources Within Conceptual WHPA

Name	Town	PWSID	System Type	System Activity	Source Type
Cary and Allen St Dev	Newport	1742010	Community System	Active	Groundwater



Legend

- NPDES Outfalls
- Registered Water Withdrawal (OneStop Data)
- Public Water Supply Well (OneStop Data)
- Private Wells (OneStop Data)
- Proposed North Well
- Conceptual Potential Impact Area
- Conceptual Cone of Depression (2,842-foot Radius)
- 1,000-foot Buffer of Cone of Depression Extent
- Level 6 Hydrologic Boundaries

FIGURE D.1

TOWN OF NEWPORT, NH
NEW SOURCE APPROVAL NORTH WELL

PRELIMINARY INVENTORY OF WATER RESOURCES AND USES

AUGUST 2022 SCALE: NOTED

Weston & Sampson

Path: P:\NH\Newport\Eng22-0626 North Well\007 GIS\Mapfiles\waterresourceinventory.mxd **User:** GetchellJ **Saved:** 7/26/2022 12:42:03 PM **Opened:** 8/8/2022 11:55:09 AM

APPENDIX E

Flood Insurance Rate Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was New Hampshire State Plane, FIPZONE 2800. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles (DOQs) produced at a scale of 1:12,000 from photography dated 1998 or later. These images were recast by the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) onto the New Hampshire State Plane coordinate system.

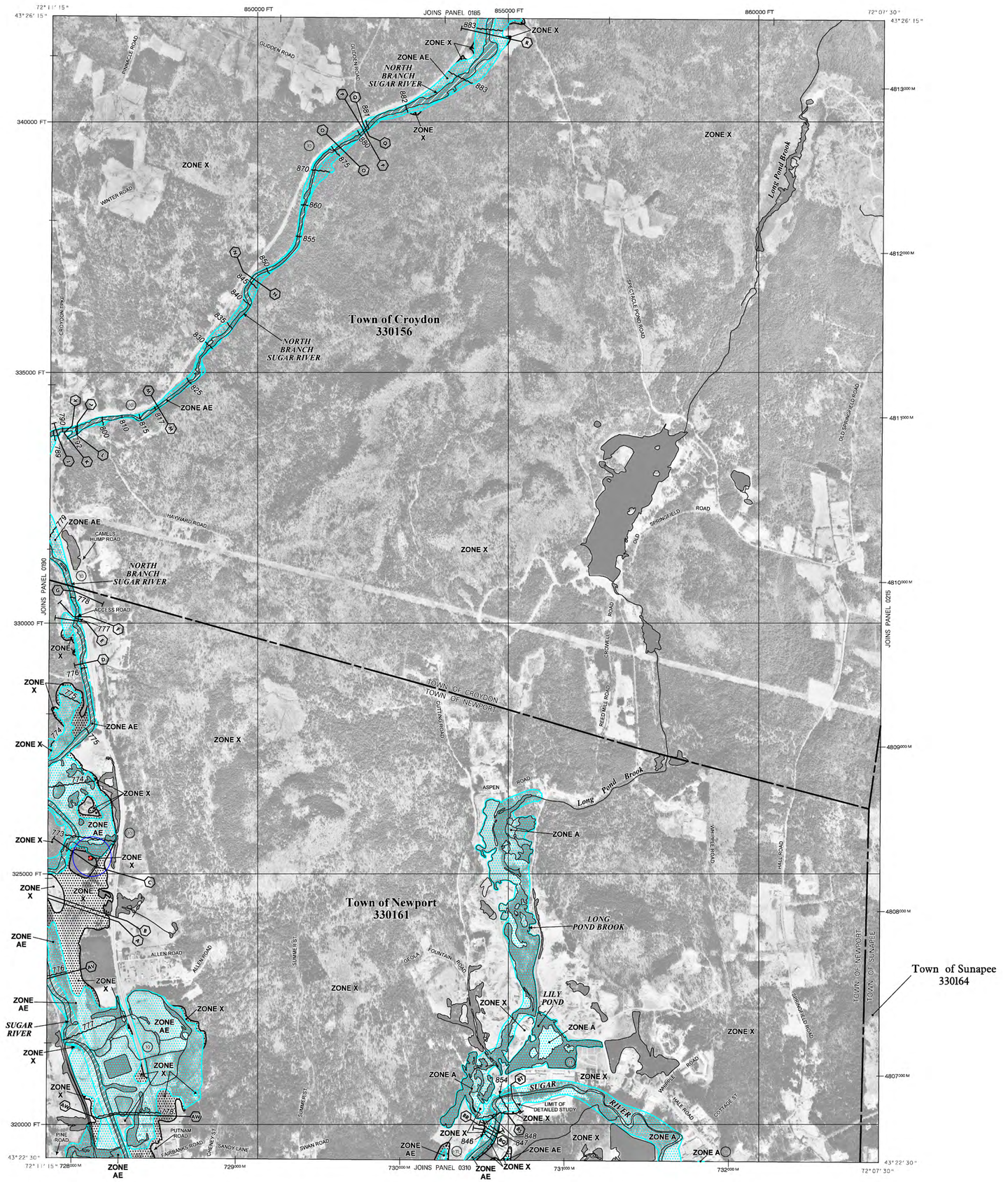
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1 % ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
97° 07' 30", 32° 22' 30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere.
4276000 M	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid values: New Hampshire State Plane coordinate system, FIPSZONE 2800, Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MAY 23, 2006

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'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0195E

FIRM
FLOOD INSURANCE RATE MAP

SULLIVAN COUNTY,
NEW HAMPSHIRE
(ALL JURISDICTIONS)

PANEL 195 OF 445

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CROYDON, TOWN OF	330156	0195	E
NEWPORT, TOWN OF	330161	0195	E
SUNAPEE, TOWN OF	330164	0195	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
33019C0195E

EFFECTIVE DATE
MAY 23, 2006

Federal Emergency Management Agency

APPENDIX F

NH Natural Heritage Bureau DataCheck Results

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

To: Jill Getchell, Weston & Sampson
100 International Drive
Suite 152
Portsmouth, NH 03801

From: NHB Review, NH Natural Heritage Bureau
Date: 8/11/2022 (valid until 08/11/2023)
Re: Review by NH Natural Heritage Bureau
Permits: MUNICIPAL POR - Newport

NHB ID: **NHB22-2535** Town: Newport Location: N/A
Description: This is for a new potential drinking water source for the Town of Newport. We are in preliminary steps looking at possible sensitive receptors near the site. We are required to complete an inventory that includes the results of the database of rare species and exemplary natural
communities maintained by the NH department of natural and cultural resources, natural heritage bureau.
cc: NHFG Review

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments **NHB: No comments at this time.**
F&G: For informational purposes.

Invertebrate Species	**State[1]**	**Federal**	**Notes**
Brook Floater (*Alasmidonta varicosa*)	E	--	Contact the NH Fish & Game Dept (see below).

Vertebrate species	**State[1]**	**Federal**	**Notes**
Wood Turtle (*Glyptemys insculpta*)	SC	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section below.

Disclaimer: 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.

IMPORTANT: NHFG Consultation

If this NHB Datacheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB Datacheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to https://wildlife.state.nh.us/wildlife/environmental-review.html. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB Datacheck results letter number and "Fis 1004 consultation request" in the subject line.**

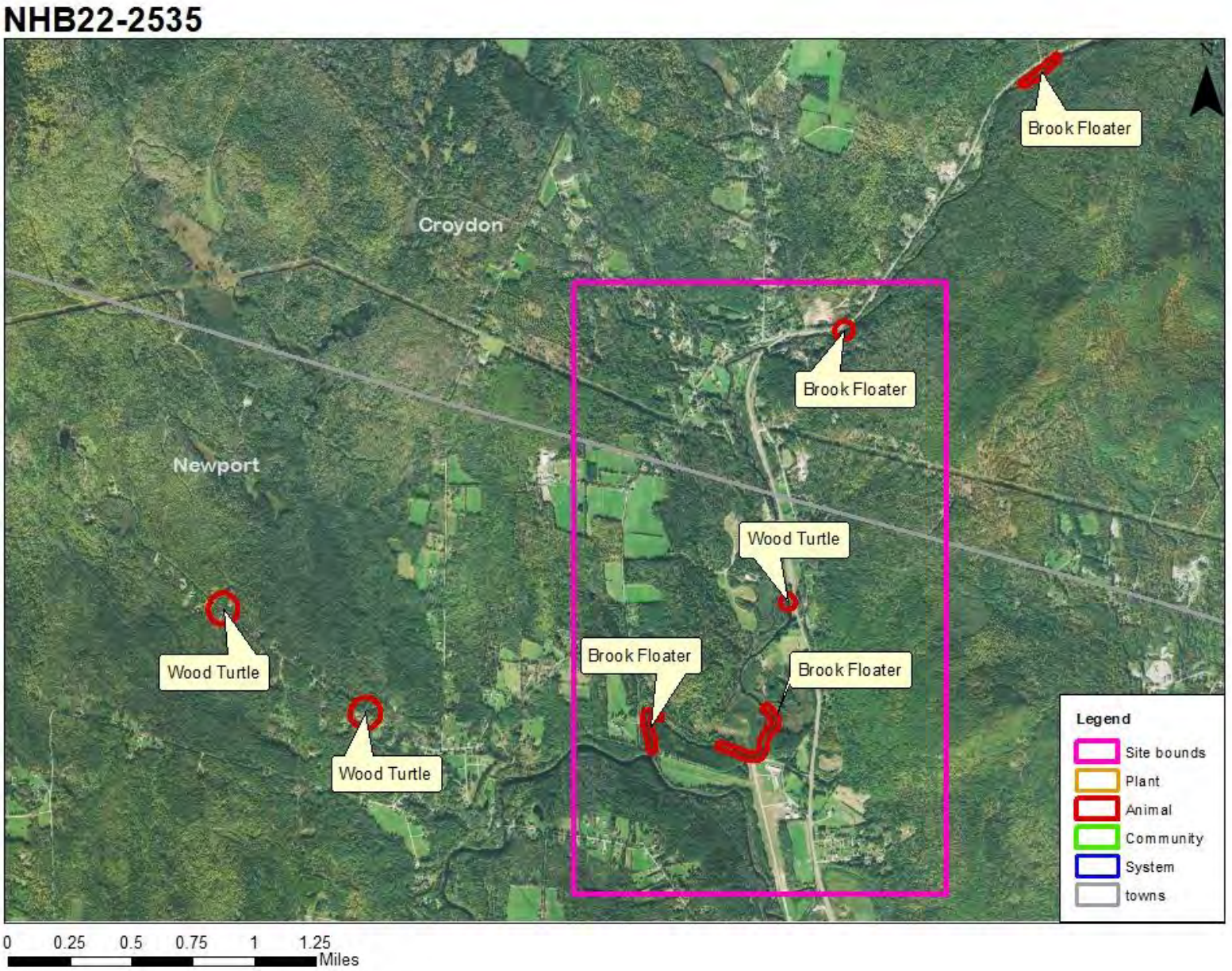
If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule)*, coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email: Kim Tuttle *kim.tuttle@wildlife.nh.gov* with a copy to NHFGreview@wildlife.nh.gov, and include the NHB Datacheck results letter number and "review request" in the email subject line.

Contact NH Fish & Game at (603) 271-0467 with questions.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

CONFIDENTIAL – NH Dept. of Environmental Services review



New Hampshire Natural Heritage Bureau - Animal Record

Brook Floater (*Alasmidonta varicosa*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Rare or uncommon
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Excellent quality, condition and landscape context ('A' on a scale of A-D).
Comments on Rank: Fairly abundant population, but habitat is intermittent.

Detailed Description: 2009: Map ID 1: 107 individuals observed. Map ID 6: 16 individuals observed. Map ID 7: 23 individuals observed. 2006: Map ID 1: Present. Map ID 2: Present. Map ID 7: Present. 1995: Croydon Flat: 41 individuals were found in 27 minutes searching by 2 people (45.5 mussels/person hour) in rectangular plot described below. 1993: Croydon Flat: At the mouth of the North Branch 46 individuals were found in 15 minutes searching by 2 people (92 mussels/person hour). Found on the west side of the North Branch just above the washed out bridge (a few hundred feet upstream from the Sugar River confluence). Also, a 6' x 94' rectangular plot was placed next to Route 10 north of Croydon (next to telephone pole with tag# "PSNH/32/32/NET& T." at this location 32 live *A. varicosa* found in 19 minutes searching by 2 people (50.5 per person-hour).

General Area: 2009: Map ID 1: Suba mix of sand, gravel, cobble, and boulder. Flow rates generally slow (0.1-0.3 m/s). Depth up to six feet (deepest at the bend in the river) but an average of 2-3 feet, becoming shallower and sandier upstream of the bend in the river. Channel is 90-120 feet wide. Map ID 6: Substrate is mainly coarse sand, gravel, cobble, and boulder toward the downstream end, then gradually becomes more sandy toward the upstream end. There is some detritus and silt in the backwater at the head of the pool. Depth is 1-3 feet with a deeper pool at the head of the pool. Flow is variable. Banks are rocky. Map ID 7: Substrate in the impoundment is a mix of silt, sand, gravel, and rock. Gradient changes abruptly at the old bridge and the downstream section consists of a fast-flowing riffle/run, then a fairly wide and deep scour pool, followed by a second channel constriction with very strong flows and an armored rocky substrate. 1995: Croydon Flat: Cobble/sand substrate with *Elliptio complanata*, *Strophitis undulatus*.

General Comments: --
Management Comments: --

Location

Survey Site Name: Sugar River, North Branch
Managed By:

County: Sullivan
Town(s): Newport
Size: 19.3 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2009: Map ID 1: Approximately 1,000 foot (300 meter) reach starting at the Corbin Covered Bridge and extending upstream beyond the sharp bend in the river. Map ID 6: Very close to Route 10 a short ways downstream of Barton Road (Glidden Road). Map ID 7: 650 foot (200 meter) reach centered on the old metal bridge structure located across from Barton Road (Glidden Road). 1995: Croydon Flat: North Branch of the Sugar River. Occurs infrequently from south of Spectacle Pond to the mouth of the North Branch in Newport. Largest concentration is in North Branch just above confluence with the Sugar River on the west side of the North Branch.

Dates documented

First reported: 1993-08-20 Last reported: 2009-07-21

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Rare or uncommon
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank: --

Detailed Description: 2006: Area 11712: 1 adult male seen.
General Area: --
General Comments: --
Management Comments: --

Location

Survey Site Name: Sugar River, North Branch
Managed By:

County: Sullivan
Town(s): Newport
Size: 1.9 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Sugar River, North Branch.

Dates documented

First reported:	2006-08-31	Last reported:	2006-08-31

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Rare or uncommon
State:	Special Concern	State:	Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2009: Area 12282: 1 observed; Area 12416: 1 observed and collected; later released.
General Area: --
General Comments: --
Management Comments: --

Location

Survey Site Name: Cornish Turnpike
Managed By:

County: Sullivan
Town(s): Newport
Size: 15.4 acres
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2009: Area 12282, Area 12416: Cornish Turnpike northwest of North Newport.

Dates documented

First reported: 2009-06-10 Last reported: 2009-06-11

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

APPENDIX G

Water Quality Results

Informational Water Quality Report

Watercheck w/PO

National Testing Laboratories, Ltd.
Quality Water Analysis
6571 Wilson Mills Rd
Cleveland, Ohio 44143
1-800-458-3330

Client:
EGGI

Ordered By:
Emery & Garrett Groundwater Investigations, LLC 56 Main Street Meredith, NH 03253 ATTN: Emery & Garrett Groundwater Inc.

Sample Number: 892276

Location:	NNH-1D
Type of Water:	Well Water
Collection Date and Time:	12/18/2018 3:10 PM
Received Date and Time:	12/20/2018 11:00 AM
Date Completed:	1/7/2019

Metals Filtered

Definition and Legend

This informational water quality report compares the actual test result to national standards as defined in the EPA's Primary and Secondary Drinking Water Regulations.

Primary Standards:	Are expressed as the maximum contaminant level (MCL) which is the highest level of contaminant that is allowed in drinking water. MCLs are enforceable standards.
Secondary standards:	Are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor,or color) in drinking water. Individual states may choose to adopt them as enforceable standards.
Action levels:	Are defined in treatment techniques which are required processes intended to reduce the level of a contaminant in drinking water.
mg/L (ppm):	Unless otherwise indicated, results and standards are expressed as an amount in milligrams per liter or parts per million.
Minimum Detection Level (MDL):	The lowest level that the laboratory can detect a contaminant.
ND:	The contaminant was not detected above the minimum detection level.
NA:	The contaminant was not analyzed.


The contaminant was not detected in the sample above the minimum detection level.


The contaminant was detected at or above the minimum detection level, but not above the referenced standard.


The contaminant was detected above the standard, which is not an EPA enforceable MCL.


The contaminant was detected above the EPA enforceable MCL.


These results may be invalid.

Status	Contaminant	Results	Units	National Standards		Min. Detection Level
			Microbiologicals			
	Total Coliform by P/A	No bacteria sample was submitted.				
			Inorganic Analytes - Metals			
✓	Aluminum	ND	mg/L	0.2	EPA Secondary	0.1
✓	Arsenic	ND	mg/L	0.010	EPA Primary	0.005
✓	Barium	ND	mg/L	2	EPA Primary	0.30
✓	Cadmium	ND	mg/L	0.005	EPA Primary	0.002
●	Calcium	11.9	mg/L	--		2.0
✓	Chromium	ND	mg/L	0.1	EPA Primary	0.010
✓	Copper	ND	mg/L	1.3	EPA Action Level	0.004
●	Iron	0.031	mg/L	0.3	EPA Secondary	0.020
✓	Lead	ND	mg/L	0.015	EPA Action Level	0.002
●	Lithium	0.002	mg/L	--		0.001
●	Magnesium	2.27	mg/L	--		0.10
▲	Manganese	0.106	mg/L	0.05	EPA Secondary	0.004
✓	Mercury	ND	mg/L	0.002	EPA Primary	0.001
✓	Nickel	ND	mg/L	--		0.020
●	Potassium	2.3	mg/L	--		1.0
✓	Selenium	ND	mg/L	0.05	EPA Primary	0.020
●	Silica	14.3	mg/L	--		0.1
✓	Silver	ND	mg/L	0.100	EPA Secondary	0.002
●	Sodium	17	mg/L	--		1
●	Strontium	0.071	mg/L	--		0.001
✓	Uranium	ND	mg/L	0.030	EPA Primary	0.001
●	Zinc	0.061	mg/L	5	EPA Secondary	0.004
			Physical Factors			
✓	Alkalinity (Total as CaCO3)	ND	mg/L	--		20
●	Hardness	39	mg/L	100	NTL Internal	10

Status	Contaminant	Results	Units	National Standards		Min. Detection Level
▲	pH	5.8	pH Units	6.5 to 8.5	EPA Secondary	
●	Total Dissolved Solids	82	mg/L	500	EPA Secondary	20
●	Turbidity	0.8	NTU	1.0	EPA Action Level	0.1
	Inorganic Analytes - Other					
✓	Bromide	ND	mg/L	--		0.5
●	Chloride	28.0	mg/L	250	EPA Secondary	5.0
✓	Fluoride	ND	mg/L	4.0	EPA Primary	0.5
✓	Nitrate as N	ND	mg/L	10	EPA Primary	0.5
✓	Nitrite as N	ND	mg/L	1	EPA Primary	0.5
✓	Ortho Phosphate	ND	mg/L	--		2.0
●	Sulfate	6.3	mg/L	250	EPA Secondary	5.0
	Organic Analytes - Trihalomethanes					
✓	Bromodichloromethane	ND	mg/L	--		0.002
✓	Bromoform	ND	mg/L	--		0.004
✓	Chloroform	ND	mg/L	--		0.002
✓	Dibromochloromethane	ND	mg/L	--		0.004
✓	Total THMs	ND	mg/L	0.080	EPA Primary	0.002
	Organic Analytes - Volatiles					
✓	1,1,1,2-Tetrachloroethane	ND	mg/L	--		0.002
✓	1,1,1-Trichloroethane	ND	mg/L	0.2	EPA Primary	0.001
✓	1,1,2,2-Tetrachloroethane	ND	mg/L	--		0.002
✓	1,1,2-Trichloroethane	ND	mg/L	0.005	EPA Primary	0.002
✓	1,1-Dichloroethane	ND	mg/L	--		0.002
✓	1,1-Dichloroethene	ND	mg/L	0.007	EPA Primary	0.001
✓	1,1-Dichloropropene	ND	mg/L	--		0.002
✓	1,2,3-Trichlorobenzene	ND	mg/L	--		0.002
✓	1,2,3-Trichloropropane	ND	mg/L	--		0.002
✓	1,2,4-Trichlorobenzene	ND	mg/L	0.07	EPA Primary	0.002

Status	Contaminant	Results	Units	National Standards		Min. Detection Level
✓	1,2-Dichlorobenzene	ND	mg/L	0.6	EPA Primary	0.001
✓	1,2-Dichloroethane	ND	mg/L	0.005	EPA Primary	0.001
✓	1,2-Dichloropropane	ND	mg/L	0.005	EPA Primary	0.002
✓	1,3-Dichlorobenzene	ND	mg/L	--		0.001
✓	1,3-Dichloropropane	ND	mg/L	--		0.002
✓	1,4-Dichlorobenzene	ND	mg/L	0.075	EPA Primary	0.001
✓	2,2-Dichloropropane	ND	mg/L	--		0.002
✓	2-Chlorotoluene	ND	mg/L	--		0.001
✓	4-Chlorotoluene	ND	mg/L	--		0.001
✓	Acetone	ND	mg/L	--		0.01
✓	Benzene	ND	mg/L	0.005	EPA Primary	0.001
✓	Bromobenzene	ND	mg/L	--		0.002
✓	Bromomethane	ND	mg/L	--		0.002
✓	Carbon Tetrachloride	ND	mg/L	0.005	EPA Primary	0.001
✓	Chlorobenzene	ND	mg/L	0.1	EPA Primary	0.001
✓	Chloroethane	ND	mg/L	--		0.002
✓	Chloromethane	ND	mg/L	--		0.002
✓	cis-1,2-Dichloroethene	ND	mg/L	0.07	EPA Primary	0.002
✓	cis-1,3-Dichloropropene	ND	mg/L	--		0.002
✓	DBCP	ND	mg/L	--		0.001
✓	Dibromomethane	ND	mg/L	--		0.002
✓	Dichlorodifluoromethane	ND	mg/L	--		0.002
✓	Dichloromethane	ND	mg/L	0.005	EPA Primary	0.002
✓	EDB	ND	mg/L	--		0.001
✓	Ethylbenzene	ND	mg/L	0.7	EPA Primary	0.001
✓	Methyl Tert Butyl Ether	ND	mg/L	--		0.004
✓	Methyl-Ethyl Ketone	ND	mg/L	--		0.01
✓	Styrene	ND	mg/L	0.1	EPA Primary	0.001

Status	Contaminant	Results	Units	National Standards		Min. Detection Level
✓	Tetrachloroethene	ND	mg/L	0.005	EPA Primary	0.002
✓	Tetrahydrofuran	ND	mg/L	--		0.01
✓	Toluene	ND	mg/L	1	EPA Primary	0.001
✓	trans-1,2-Dichloroethene	ND	mg/L	0.1	EPA Primary	0.002
✓	trans-1,3-Dichloropropene	ND	mg/L	--		0.002
✓	Trichloroethene	ND	mg/L	0.005	EPA Primary	0.001
✓	Trichlorofluoromethane	ND	mg/L	--		0.002
✓	Vinyl Chloride	ND	mg/L	0.002	EPA Primary	0.001
✓	Xylenes (Total)	ND	mg/L	10	EPA Primary	0.001
	Organic Analytes - Others					
✓	2,4-D	ND	mg/L	0.07	EPA Primary	0.010
✓	Alachlor	ND	mg/L	0.002	EPA Primary	0.001
✓	Aldrin	ND	mg/L	--		0.002
✓	Atrazine	ND	mg/L	0.003	EPA Primary	0.002
✓	Chlordane	ND	mg/L	0.002	EPA Primary	0.001
✓	Dichloran	ND	mg/L	--		0.002
✓	Dieldrin	ND	mg/L	--		0.001
✓	Endrin	ND	mg/L	0.002	EPA Primary	0.0001
✓	Heptachlor	ND	mg/L	0.0004	EPA Primary	0.0004
✓	Heptachlor Epoxide	ND	mg/L	0.0002	EPA Primary	0.0001
✓	Hexachlorobenzene	ND	mg/L	0.001	EPA Primary	0.0005
✓	Hexachlorocyclopentadiene	ND	mg/L	0.05	EPA Primary	0.001
✓	Lindane	ND	mg/L	0.0002	EPA Primary	0.0002
✓	Methoxychlor	ND	mg/L	0.04	EPA Primary	0.002
✓	Pentachloronitrobenzene	ND	mg/L	--		0.002
✓	Silvex 2,4,5-TP	ND	mg/L	0.05	EPA Primary	0.005
✓	Simazine	ND	mg/L	0.004	EPA Primary	0.002
✓	Total PCBs	ND	mg/L	0.0005	EPA Primary	0.0005

Status	Contaminant	Results	Units	National Standards		Min. Detection Level
✓	Toxaphene	ND	mg/L	0.003	EPA Primary	0.001
✓	Trifluralin	ND	mg/L	--		0.002

We certify that the analyses performed for this report are accurate, and that the laboratory tests were conducted by methods approved by the U.S. Environmental Protection Agency or variations of these EPA methods.

These test results are intended to be used for informational purposes only and may not be used for regulatory compliance.

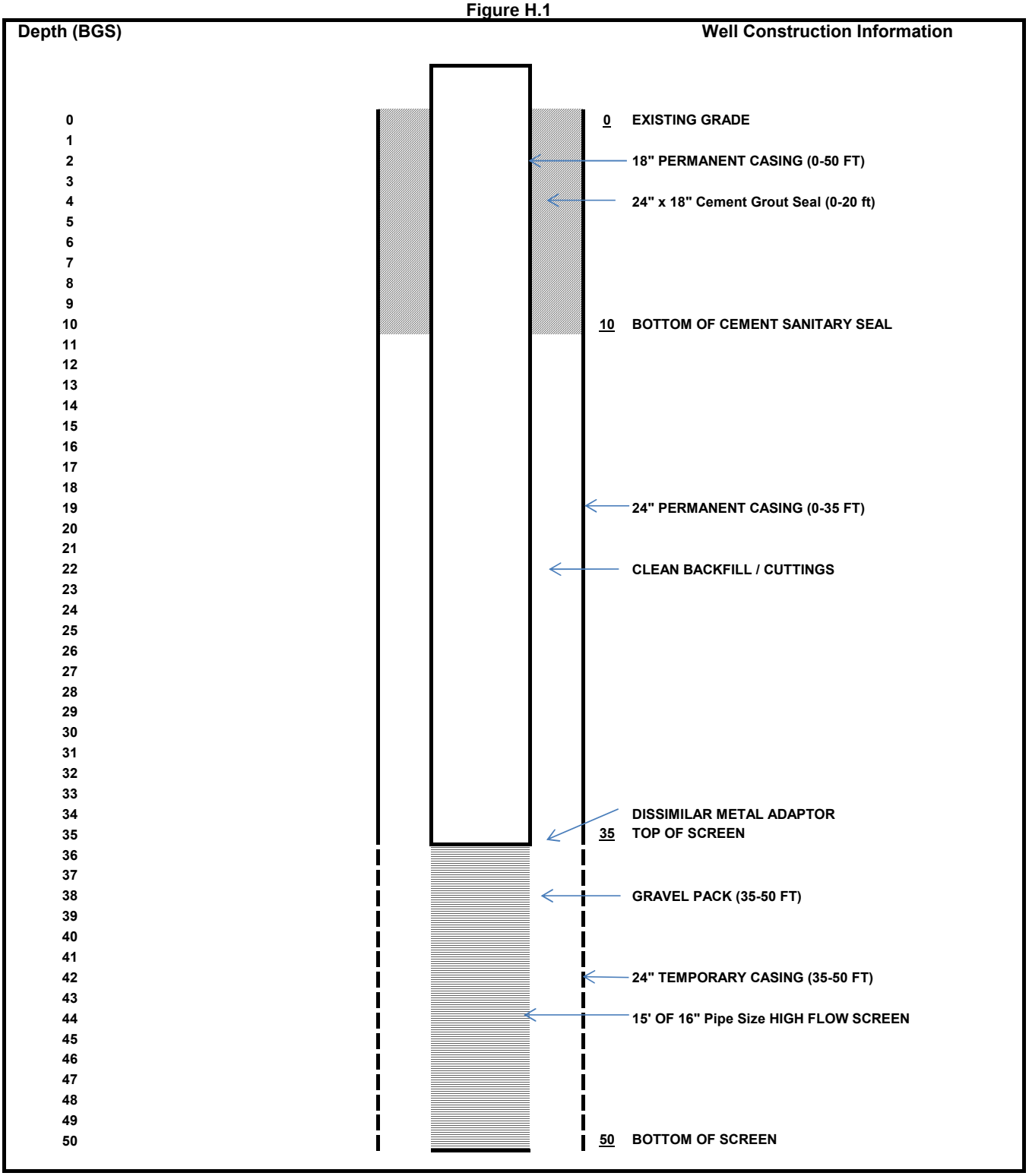
National Testing Laboratories, Ltd.

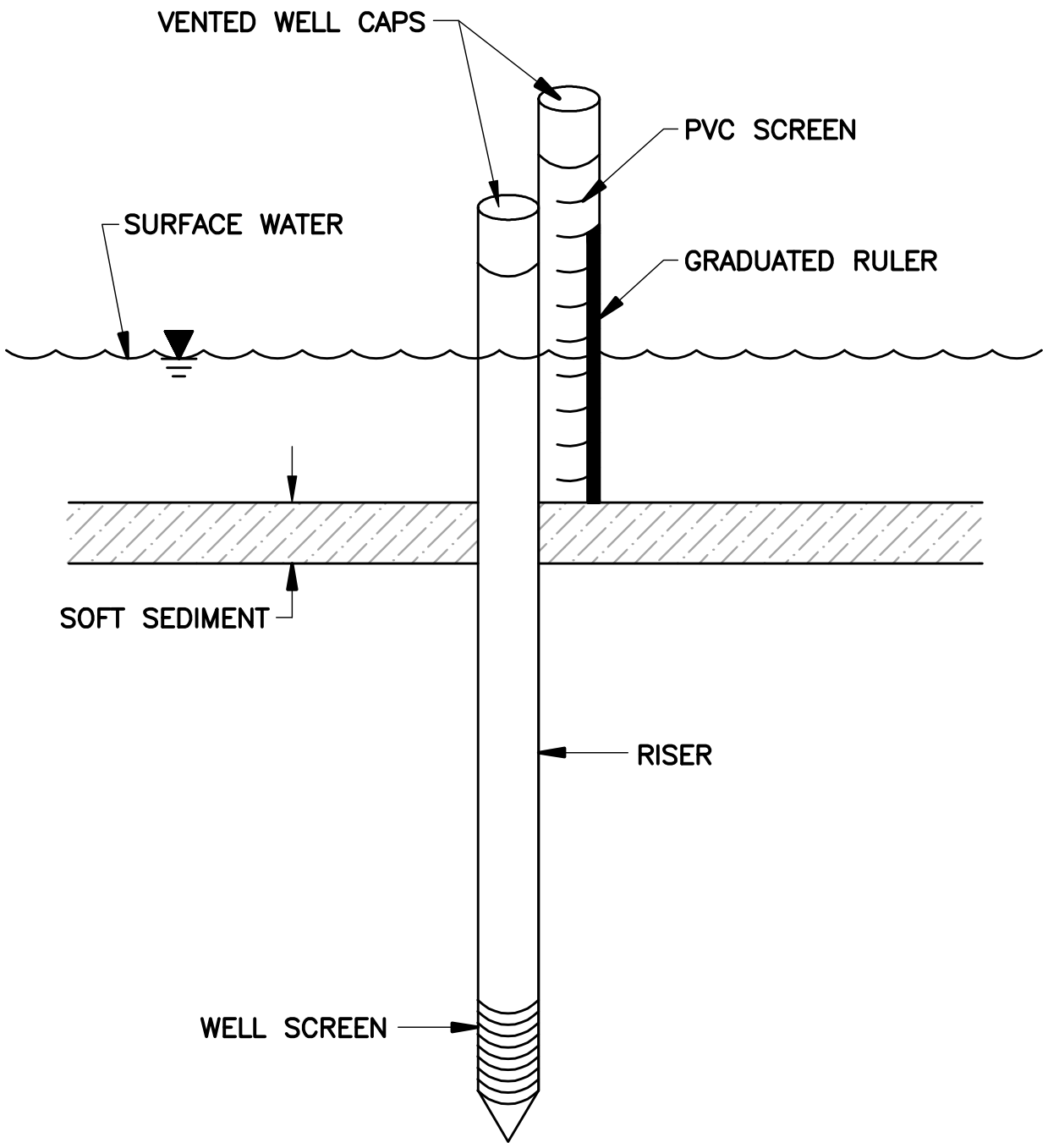
NATIONAL TESTING LABORATORIES, LTD

APPENDIX H

Well and Piezometer/Staff Gauge Design

Town of Newport, New Hampshire
Proposed North Well Construction Schematic
Figure H.1





PIEZOMETER/STAFF GAUGE DETAIL

NOT TO SCALE

Figure H.2

APPENDIX I

Water Well Questionnaire

(SAMPLE)
WATER WELL QUESTIONNAIRE

[THE APPLICANT] has filed an application for a Large Groundwater Withdrawal Permit with the New Hampshire Department of Environmental Services (NHDES). We are in the process of identifying private well water users in the vicinity of the proposed withdrawal. In order to obtain this information **[THE APPLICANT]** is requesting that you, as a private well owner fill out the following questionnaire **to the best of your knowledge**. Your well installer or real estate agent may be able to help you find the information for this questionnaire. If available, please provide a copy of the well driller's log.

Name_____ Telephone No _____

Address _____ Tax Map _____ Lot No _____

Is your well for domestic use only? YES or NO. If NO, what are your non-domestic uses and what quantity of water is used each day? _____

What year did you purchase home? _____ Number of residents in the house? _____

Well Driller Well Type (bedrock, dug, driven point)_____ Well Driller_____

Date Installed _____ Well Depth _____ft Well Diameter_____ Inches Casing Depth _____ft

Estimated Yield (gallons per minute)_____ Estimated Water Depth ____ft Pump Size _____HP

Pump Depth_____ft Pump Age_____yrs Estimated Depth to Bedrock _____ft

Do you have more than one (1) well on the property? YES or NO. If so, what type of well_____

_____

List any water treatment equipment_____

_____

Describe any water shortage problems with the well; when and why_____

_____

Describe any water quality problems; when and why_____

_____

Describe the most recent maintenance performed on your well or pump _____

_____

May **[THE APPLICANT]** use your well to monitor water levels during the pumping test? YES or NO

If yes, the monitoring will be preceded by water quality testing in conformance with NHDES sanitary practice guidelines (see enclosed fact sheet). If no, **[THE APPLICANT]** would appreciate collecting a water sample from your well and have it tested for iron, manganese, arsenic, temperature, and specific conductance. This sampling and testing will assist in the development of baseline water quality data for the area near the proposed withdrawal. This will be valuable information for the long term monitoring of ground water quality.

Additional comments or known problems with your well_____

_____

Signature: _____ Date:_____

Your participation in the questionnaire is not mandatory. Those wishing to participate should return the completed form in the enclosed self-addressed stamped envelope to **[APPLICANT NAME, ADDRESS, FAX AND PHONE NUMBER]** by **[DEADLINE]**. A copy of this completed questionnaire will be sent to **[NHDES HYDROGEOLOGIST]** of NHDES. If you have questions, contact **[THE APPLICANT]** at **[PHONE NUMBER]**or **[NHDES HYDROGEOLOGIST]** at **[NHDES HYDROGEOLOGIST'S PHONE] or [NHDES HYDROGEOLOGIST'S E-MAIL].**