November 3, 2026

Red Barn Property LLC
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RE: Proposed Bedrock Water Supply Well
210 Portsmouth Ave, Stratham
Hydrogeologic Review of Potential Effects on Barker Farm Irrigation Pond

Mr. Sheehan,

Edgewater Strategies, LLC (Edgewater) has reviewed the proposed water supply for the residential development at 210 Portsmouth Avenue in Stratham, New Hampshire, to assess their potential effects of groundwater withdrawals from the property on nearby surface water systems. This review considers concerns raised by Timothy Stone, P.G., and West Environmental in September 2026, along with available groundwater, geologic, and local well data. The purpose of this report is to evaluate the likelihood that the proposed groundwater withdrawals will adversely affect the pond or surrounding wetlands.

As part of this work Edgewater has reviewed the following sources of information:

- Beals Associates, PLLC, Design Review Site Plan, 210 Portsmouth Avenue, dated October 2025, with revision date of November 3, 2026.
- Timothy Stone, PG, Initial Geohydrologic Assessment of the Proposed Development at 210 Portsmouth Avenue on the Barker Farm Irrigation Pond, September 16, 2026.
- West Environmental, Inc., Wetland Preliminary Assessment Report, 210 Portsmouth Avenue, September 14, 2026.
- NH Geological Survey (NHGS). Water Well Inventory, online GIS layer, October 2026.
- USDA Natural Resources Conservation Service (NRCS). Web Soil Survey.
- Local Bedrock Geology and Surficial Geology Maps.
- NH Department of Environmental Services Subsurface Design Rules and Drinking Water Rules.

Proposed Groundwater Withdrawals

The proposed development includes an existing home with two units which includes a two bedroom and a three-bedroom apartment, along with seven two-bedroom units and one one-bedroom unit through four duplexes proposed to be served by one bedrock water supply well. This equates to 10 connections and 24 persons. Persons are defined as 1.5 persons in a studio or one-bedroom unit and 2.5 persons in a two-or more-bedroom unit (NH DES . Based on 20 total bedrooms and a book value design flow of 150 gallons per day (gpd) per bedroom for the two-plus bedroom units and 225 gpd for the one-bedroom unit (NH DES Subsurface Septic Design Flows), the estimated demand is 3,075 gpd. However, based on typical residential water use of 100 -125 gpd per unit per day Edgewater anticipates actual demand closer to 1,200 gpd.

The proposed water supply does not meet the definition of a community public water system under RSA 485:1-a. The well will be subject to applicable New Hampshire Water Well Board construction requirements and subsurface wastewater disposal setbacks and construction standards. Well yields must be sufficient to meet anticipated residential demands while allowing adequate recovery between pumping periods.

The development is proposing to supply all the water from one well located in the eastern portion of the property. A 3,075 gpd design flow only requires a well that yields just over 2 gpm (3,075 / 1,440 minutes per day). However, the intent is not to pump a well continuously. The goal is to drill a well with a reported yield of 5 gpm or more and utilize storage tanks and booster pumps to provide peak demand water use. As noted later in this letter report, the local well database indicates that the bedrock aquifer is high yielding and it is likely the proposed well will yield greater than 5gpm.

Irrigation is not proposed for the development. Groundwater withdrawals at the property will not be used for in-ground irrigation systems.

Groundwater Flow in Shallow Deposits vs. Bedrock

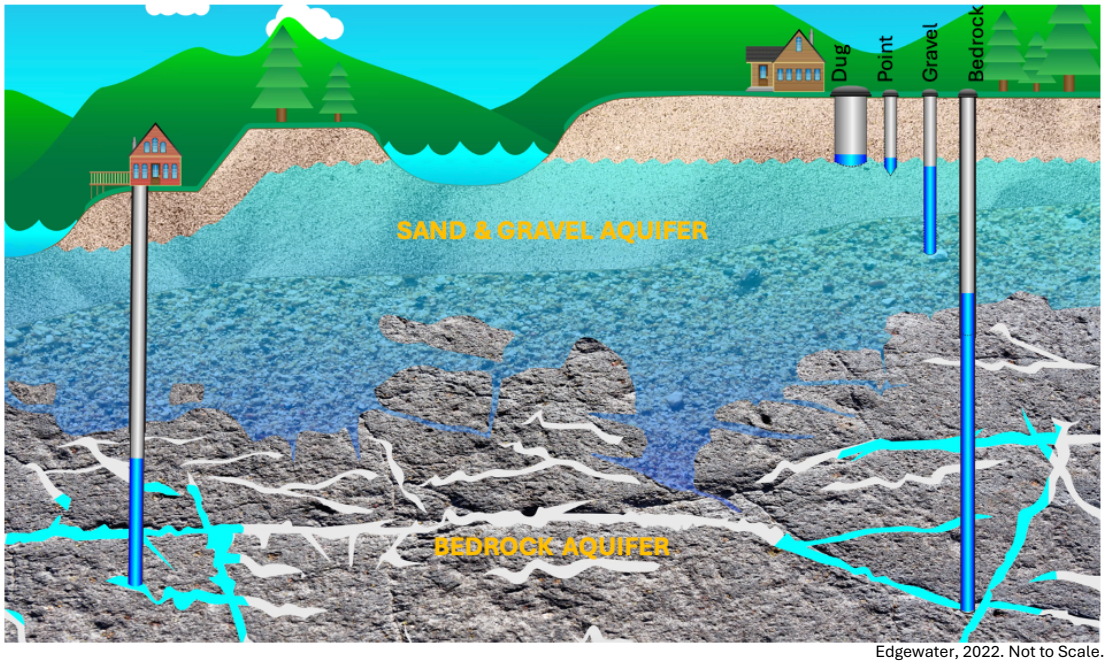
The Site Plan identifies an 11.12-acre parcel (Tax Map 21, Lot 81) planned for residential development. The Barker Farm pond and wetland system lies north of the proposed development. Stone (2026) hypothesizes that regional shallow groundwater moves generally toward the south-southwest, toward Lot 81 and Jewell Hill Brook. Groundwater in the shallow unconsolidated deposits (overburden) above bedrock generally follows topography and local topography supports this theory. The Barker Farm irrigation pond is upgradient of the site and proposed bedrock well.

Shallow groundwater within unconsolidated deposits generally follows local topography and is influenced by precipitation, surface water, and the hydraulic properties of overburden materials. Groundwater exchange between the overburden and underlying bedrock depends on the permeability of these materials and the hydraulic gradients between the two aquifers.

Unlike shallow groundwater, bedrock groundwater moves primarily through interconnected fractures within otherwise relatively low-permeability rock. The depth, orientation, and connectivity of these fractures can vary substantially, resulting in different well yields and water levels even between closely spaced wells. Consequently, groundwater withdrawals from deeper bedrock fractures do not necessarily influence the shallow water table or nearby surface waters.

Bedrock wells are constructed with solid casing extending into competent bedrock to prevent direct entry of shallow groundwater. Water Well Board (NH We 100-1000) rules require a minimum of 10 feet of casing installed into competent bedrock. Additional grouted casing can further isolate shallow bedrock fractures and reduce the potential hydraulic interaction with the overburden aquifer. Installing extra grouted casing is required for all public water supply wells and required when well setbacks can not be met. **Figure A** below helps depict the different aquifers.

FIGURE A: Types of Wells and Aquifers



Edgewater, 2022. Not to Scale.

Local Well Data

Figure 1 depicts the location of some existing wells near the project site. Only wells in the state's Geological Survey's database that are georeferenced are shown in the Figure. This data base has been compiled since 1984 when drillers were first required to submit well drilling information. Many older wells only have road names and not house numbers, GPS coordinates or Tax Map and Lot. Therefore, it is not possible to map all wells in the area. Edgewater reviewed and compiled the available georeferenced local well data to make general statements regarding the local bedrock aquifer. **Table 1** attached and **Table A** below presents data from 23 reported wells that are located within 3,000 feet of the site. All wells shown on the Figure and in the Table are bedrock wells.

TABLE A: Water Well Data within 3,000 feet

	Total Depth (feet)	Depth to Bedrock (feet)	Depth of Casing (feet)	Well Yield (gpm)	Static Water Level (feet)	Overburden Materials
Average	380	94	125	30	57	18 of 23 wells note Clay or Till
Maximum	620	152	240	100	122	
Minimum	180	10	30	2	3	

The 23 georeferenced bedrock wells within 3,000 feet of the site average 380 feet deep, with reported yields averaging 30 gpm and ranging from 2 to 100 gpm. Clay or till was reported in 18 wells, indicating that lower-permeability overburden materials are common in the surrounding area. These records suggest a generally productive bedrock aquifer, although the actual yield and hydraulic characteristics of the proposed well will not be known until drilling.

Stone (2026) identified relatively shallow bedrock near the site, consistent with Edgewater's review of the closest wells showing depths to bedrock generally less than 20 feet. This indicates that depth to bedrock conditions range from shallower near the site to thicker overburden deposits documented elsewhere within the broader study area.

Surficial geology is shown on **Figure 2**. This figure is adapted from the NH Geological Survey Surficial Geology of the Newmarket Quadrangle to depict just the area of interest. The overburden deposits are identified as the Presumpscot Formation which is a mix of sand to clay and till layers in variable thicknesses. Stone (2026) describes mapped gravelly fine sandy loam upslope of the pond, with less well-drained mapped soils in the downstream wetlands and on portions of Lot 81. Edgewater has not reviewed test pit logs or delineated the NRCS soil map units for the site.

Edgewater recommends installing a minimum of 80 feet of grouted casing or extending grouted casing at least 20 feet into competent bedrock, whichever is deeper. This construction approach will isolate shallow groundwater and upper bedrock fractures, provide additional protection from potential contamination, and reduce the potential for pumping to influence the shallow groundwater system.

Barker Farm Irrigation Pond

The Stone (2026) and West (2026) review was based on a site plan that showed three proposed wells, two of which were located within 150 feet of an irrigation pond and wetlands on the Barker Farm Property. The water supply design has since changed to utilize just one well further from this irrigation pond. Nevertheless, Edgewater has reviewed the new well location’s potential impact on the surface water system at Barker Farm.

The Barker Farm irrigation pond’s water balance and hydraulic relationship with the underlying bedrock aquifer have not been established. This pond may receive water from precipitation, surface runoff, shallow groundwater, and potentially groundwater discharge from bedrock fractures. However, the relative contributions of these sources, whether the pond is lined, whether the far artificially fills it from another source, and the magnitude and timing of irrigation withdrawals are unknown. It was reported to Edgewater that this is a manmade pond and not naturally fed from an incoming stream. It is likely, given the highly productive bedrock aquifer, the assumed thinner overburden deposits near the pond, higher bedrock static water levels near the pond, and no clear surface water inflow, that the pond is recharge by upward flow from the bedrock (spring fed).

West (2026) reports that the pond and adjoining wetlands are hydraulically connected during high-water conditions. While this supports a connection between the pond and shallow wetland system, it does not establish that groundwater withdrawals from deeper bedrock fractures will influence pond levels. Any influence would depend on the hydraulic connection between these systems and the magnitude of pumping relative to natural pond fluctuations and the magnitude of existing irrigation withdrawals.

The magnitude of irrigation withdrawals is unknown. The Barker Farm is not listed as a registered water user with the NH Department of Environmental Services. If the Farm uses more than 20,000 gpd, it is required to report water use data.

Water Budget and Groundwater Availability

Stone (2026) presents a preliminary water budget comparing estimated groundwater recharge from approximately 3.7 acres with a proposed withdrawal of 3,000 gpd. While water budgets provides useful context, performing a water budget on a limited area of 3.7 acres and assuming all recharge to the pond and underlying overburden is from precipitation only is not hydraulically representative. An adequate water budget needs to consider existing groundwater withdrawals, irrigation use, surface water inflows and outflows, seasonal groundwater storage, and the return of domestic wastewater to the shallow groundwater system through onsite septic systems. These components have not been quantified in the Stone (2026) report, and the available information is insufficient which resulted in a skewed analysis. Fractured bedrock groundwater systems may receive recharge and groundwater inflow from areas extending well beyond individual property boundaries. A minimum extent to run a water budget is typically 1,000-foot radius from a particular location. For an adequate water budget Barker From would need to provide information on the size, depth, operating level during irrigation, and total withdrawals from the pond along with other water use and ground water withdrawals at the Farm.

Given the proposed bedrock withdrawals is relatively small and the reported high productivity of nearby bedrock wells, Edgewater expects sufficient groundwater to be available to support the development. The water levels in the Barker Farm irrigation pond depends withdrawals from the pond, evapotranspiration, and whether the recharge is from underlying bedrock, artificial filling and/or precipitation. Recharge estimates cannot be limited to the development parcel.

Subsurface Disposal Systems

Stone (2026) raises concerns that the two proposed septic systems serving Buildings 2, 3, and 4, located approximately 50 feet from the southern property boundary, could result in nitrate concentrations exceeding the New Hampshire drinking water standard of 10 mg/L beyond the property boundary. Stone suggests that advanced wastewater treatment may be appropriate.

The proposed septic systems of concern will have an individual design flow of less than 1,000 gallons per day (gpd). Under Env-Wq 1008.06, these systems are not subject to the additional nitrate setbacks applicable to larger systems, provided the required separation distances are maintained. The two systems are sufficiently separated to be evaluated independently rather than as a single larger system.

All proposed subsurface disposal systems will be designed and permitted in accordance with New Hampshire's Env-Wq 1000 regulations and applicable local requirements, including demonstrating applicable soils, septic system setbacks, nitrate loading provisions, and protective well radii. Edgewater recommends the development follow any regulatory basis for requiring advanced wastewater treatment as NH DES sees fit.

Hydrogeologic Review Findings

Stone (2026) and West (2026) raised concerns regarding the potential for groundwater withdrawals from the bedrock aquifer to affect the Barker Farm irrigation pond and associated wetlands. These statements were made when bedrock wells were proposed 150 feet from the pond. Only one well is proposed further from the pond. While a valid concern to review, available information does not provide evidence that the bedrock withdrawals would result in measurable influence on nearby surface waters or wetlands complex.

Available local well records document generally productive bedrock groundwater conditions, with an average reported yield of approximately 30 gpm. The proposed development has a book value design water demand of 3,075 gpd, with actual residential use anticipated to be closer to 1,200 gpd. While shallow groundwater and the underlying bedrock aquifer may be hydraulically connected, the extent of this connection is unknown and if the overburden recharges the bedrock or vice versa. The proposed well is located 450 feet from the pond of concern. The proposed well will be installed with at least 80 feet of grouted casing to isolate shallow groundwater and upper bedrock fractures, further reducing the potential for impacts to/from nearby surface waters and land use activities.

Based on the available information, it is Edgewater's professional opinion that the proposed bedrock groundwater withdrawals are unlikely to adversely affect the Barker Farm irrigation pond or associated wetlands and that there is likely sufficient water within the bedrock aquifer to support the development. This conclusion is supported by the relatively small anticipated water demand, reported high productivity of the surrounding bedrock aquifer, and proposed well construction measures. Although site-specific hydraulic conditions have not been fully characterized, the available evidence does not support a conclusion that the proposed withdrawals will significantly deplete or dewater the irrigation pond.

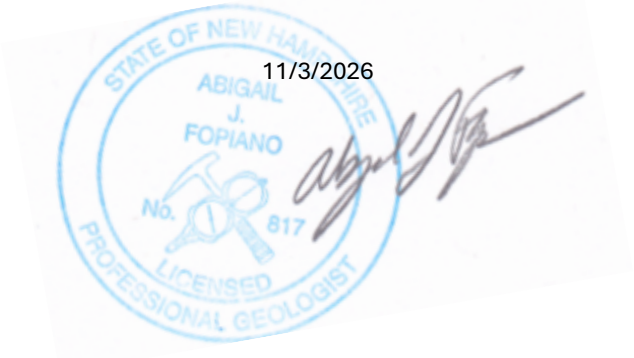
Limitations

This assessment is based on available published information, local well records, consultant reports, and general hydrogeologic principles. Site-specific pumping tests, fracture mapping, water-level monitoring, and irrigation pond operating records were not available for review. Accordingly, the conclusions represent Edgewater's professional interpretation of the available information and do not guarantee well yields, hydraulic separation, or the absence of environmental impacts. Evaluation of wetland boundaries and regulatory buffers is outside the scope of this assessment.

Thank you for this opportunity. If you have any questions, please do not hesitate to reach out to me at (603) 630-1971 or abby@edgewaternh.com.

Sincerely,

11/3/2026



Abby Thompson Fopiano, P.G.
Hydrogeologist and Owner
Edgewater Strategies, LLC

Table 1
Local Bedrock Well Construction Data
3,000 feet from 210 Portsmouth Ave, Stratham

Well Report ID	Address		Year Installed	Total Depth (feet)	Depth to Bedrock (feet)	Depth of Casing (feet)	Well Tield (gpm)	Static Water Level (feet)	Overburden Materials
*225.1149	2	ROBIN GLEN ROAD	2015	620	14	60	2	20	TILL
*225.1369	219	PORTSMOUTH AVE	2025	300	18	40	15		GRAVEL
*225.1155	223	PORTSMOUTH AVE	2016	305	18	40	50	3	SANDGRAVEL
*225.1236	21	SWAMSCOTT RD.	2019	180	10	30	30	6	SAND
*225.1315	3	ASPEN LN	2016	220	40	53	50		SAND, CLAY/SILT
225.1304	1	POINT OF ROCKS TER	2013	380	132	150	50	38	TILL, TILL
225.1306	4	POINT OF ROCKS TER	2014	400	143	160	50	90	TILL
225.1307	4	POINT OF ROCKS TER	2014	400	142	160	40	70	CLAY/SILT
225.1301	13	POINT OF ROCKS TER	2013	420	134	152	9	90	TILL, TILL
225.1300	17	POINT OF ROCKS TER	2013	420	122	140		45	TILL, TILL
225.1303	6	POINT OF ROCKS TER	2013	420	130	150			CLAY/SILT
225.1106		None provided	2011	360	112	135	25	18	SANDGRAVELCLAY/SILT, TILL
225.1297	19	POINT OF ROCKS TER	2014	420	124	140		100	TILL
225.1305	8	POINT OF ROCKS TER	2014	300	116	140	40	80	CLAY/SILT
225.1295	16	POINT OF ROCKS TER	2014	500	85	100	7	100	TILLCLAY/SILT
225.1298	18	POINT OF ROCKS TER	2013	360	130	150	100	40	CLAY/SILT
225.1302	10	POINT OF ROCKS TER	2012	380	132	150	18	85	
225.1299	12	POINT OF ROCKS TER	2013	420	124	140	20	42	TILL, TILL
225.1072	15	TANSY AVE	2007	300	20	40	15	15	
225.1296	20	POINT OF ROCKS TER	2014	420	152	170	8	122	TILL
225.1321	22	POINT OF ROCKS TER	2015	500	142	177		85	TILL
225.1294	27	SCAMMAN RD	2012	300	104	125	25	78	CLAY/SILT
225.1271	15	JACK RABBIT LANE	2021	420	25	81	20	10	TILL
			Average	**380**	**94**	**117**	**30**	**57**	
			Maximum	**620**	**152**	**177**	**100**	**122**	
			Minimum	**180**	**10**	**30**	**2**	**3**	

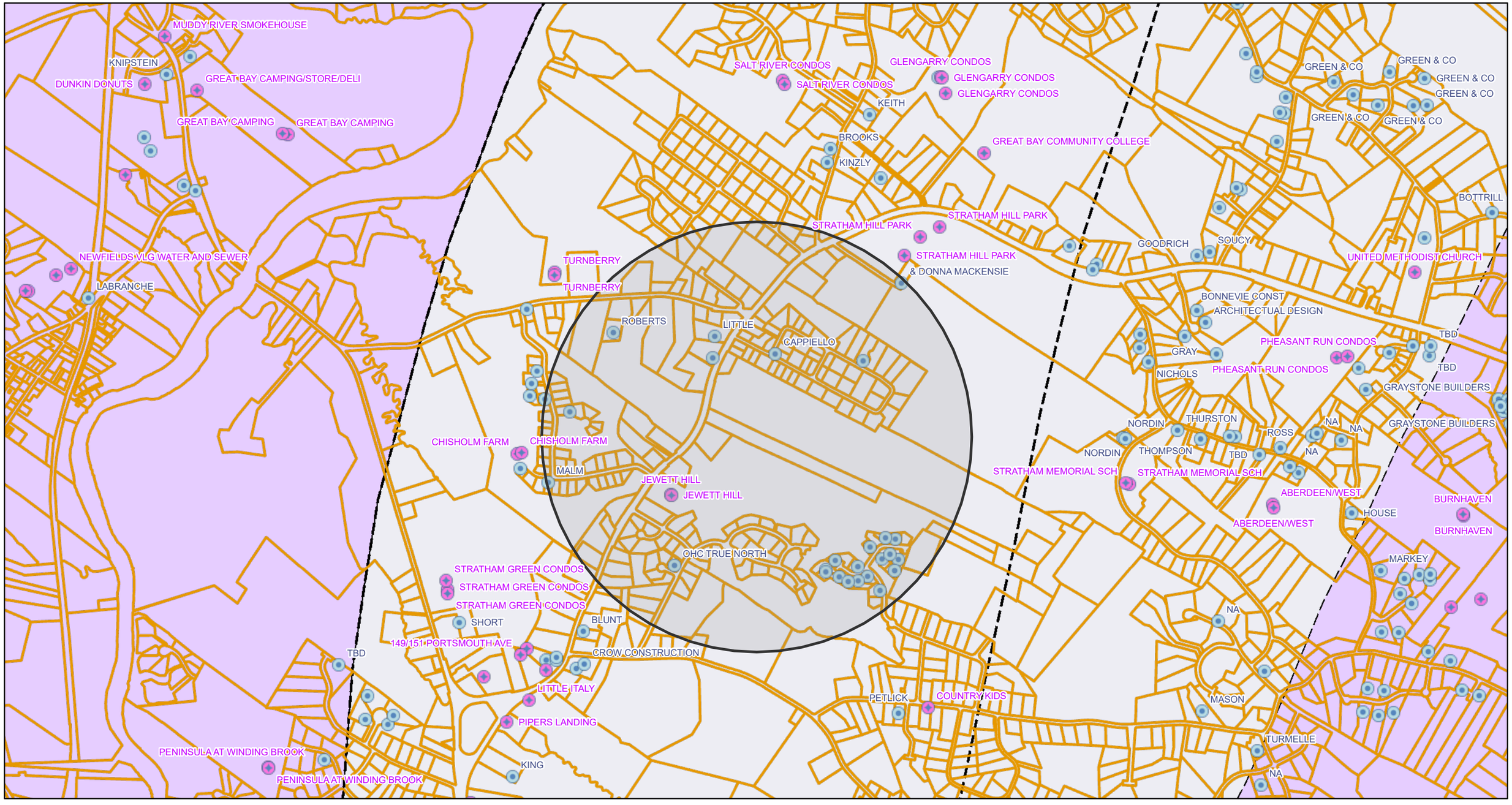
Notes:

Data obtained from NHGS Database, Oct. 2026

Depths are feet from ground surface

* = wells closest to the site

Figure 1: Local Wells and Bedrock Geology



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- Public Water Supply Wells
- Water Well Inventory
- Parcels

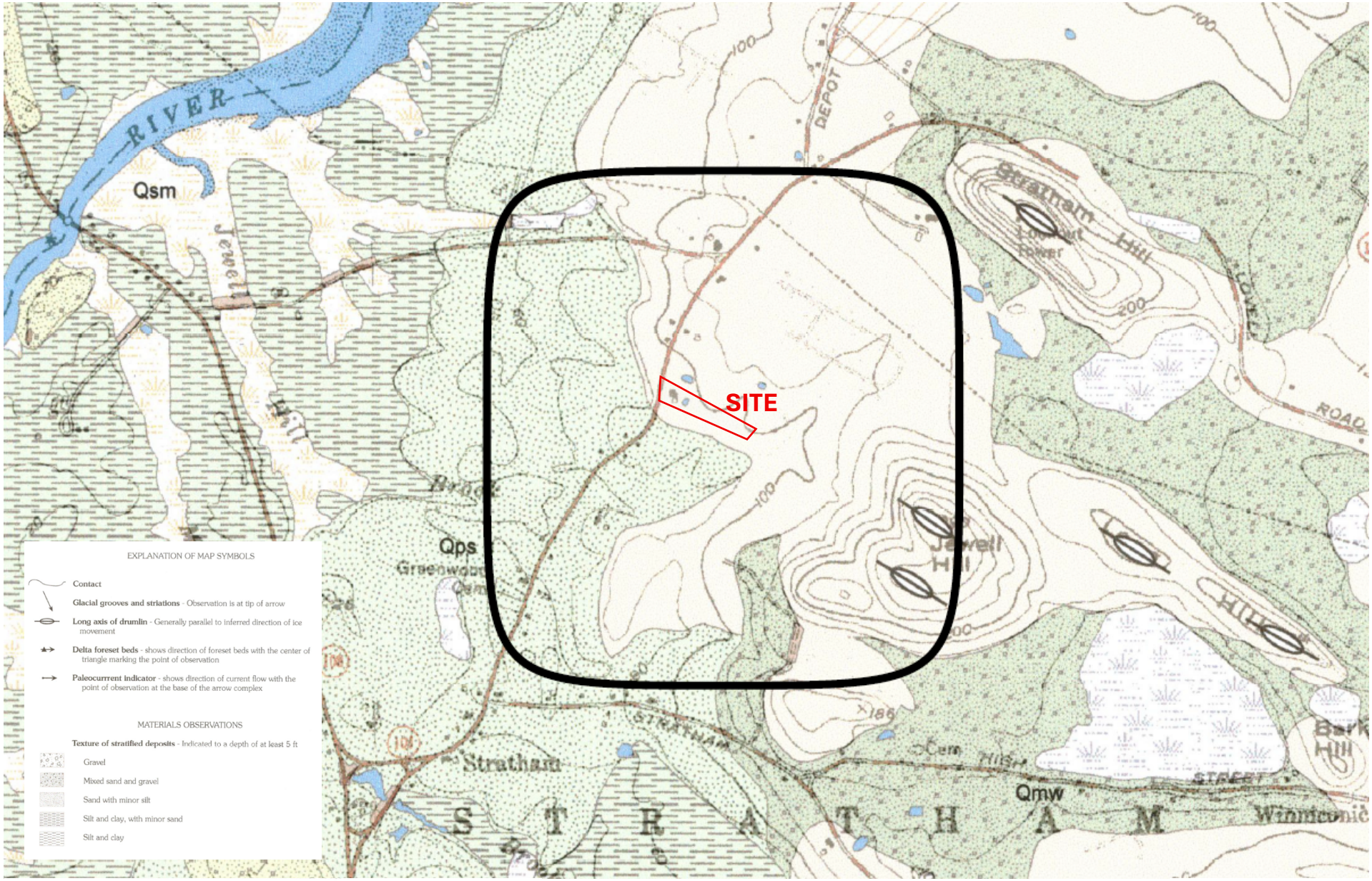
USA-NH_NHGS_24k_Contacts
- contact, approximately located

USA-NH_NHGS_24k_Faults
- fault, approximately located

USA-NH_NHGS_24k_Lithology
- Metamorphic rock
- Phyllite

0 0.2 0.4 0.8 mi
0 0.3 0.6 1.2 km

This dataset is maintained by the New Hampshire Department of Environmental Services (NHDES), specifically the Water Supply Engineering Bureau. Initial data collection was performed by NUS Corporation for the U.S. Environmental Protection Agency, Region 1.



Qp | Qps | Qpc

Presumpscot formation (Pleistocene) - Sandy facies (Qps): Fine to coarse sand, locally contains small pebbles; may contain thin beds of silt and clayey silt. As much as 10 ft thick. Generally intertounges seaward, and in places downward, with the silt-clay facies (Qpc) of the Presumpscot Formation. Qps deposits are coarser near and intertounge with deltaic deposits. Silt-clay facies (Qpc): Clayey silt to silty clay, locally with silt and fine sand beds. As much as 75 ft thick, but highly variable in thickness. Unconformably overlies older surficial deposits such as stratified glacial sand and gravel and till (Qt). Shoreward, may coarsen upward into gravelly near shore deposits (Qmwd)

FIGURE 2: Surficial Geology

Adapted From:

SURFICIAL GEOLOGIC MAP OF THE NEWMARKET QUADRANGLE, ROCKINGHAM and STRAFFORD COUNTIES, NEW HAMPSHIRE

By David Franzi, Chad Wittkop, and Carl Koteff

Surficial Geologic Map Open-File Series No. NH-07-XX

Funding for the digitization and preparation of this map was provided by the NewHampshire Department of Transportation, the U.S. Geological Survey STATEMAP program cooperative agreement number 04HQAG0064, and by the New Hampshire Geological Survey, NH Department of Environmental Services

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