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April 14, 2023
NHDES Wetland Bureau
Jessica Schulz
PO Box 95, 29 Hazen Drive
Concord, NH 03302-0095

RE: Standard Dredge and Fill Wetlands Permit Application (RSA 482-A)
NHDES File Number: 2022-03478
Subject Property: Barrett Hill Rd, Wilton, Tax Map #A, Lot #44-1

Dear Jessica,

Per your request for more information dated February 21, 2023 please see clarification below and attached.

1- In accordance with Env-Wt 306.06(a) and (b), the applicant must notify abutters prior to filing an application. As required by RSA 482-A:3, 1(d)(1), please provide proof of receipt that the abutter at Lot A-38-1 has been notified.

Abutter notifications were made based upon the Town of Wilton Tax Maps and abutter records available on the Town of Wilton website. Notification of Robert and Shannon Silva of Tax Map Parcel A-38-1 was completed following the issuance of this RFMI. Robert and Shannon Silva refused delivery of certified mailing on three separate occasions. This certified mail receipt accompanies this response.

As proof the abutter property owner of Tax Map Parcel Lot A Map 38-1 has been notified and is aware of the project, we reference the extensive communications submitted by Mr. Silva to NH DES Wetlands Bureau, NH DES Subsurface Bureau, NH DES Alteration of Terrain Bureau, NH Fish and Game Non-Game program, US EPA, US Army Corps of Engineers, NH Division of Historical Resources, and NH Division of Forest and Lands in regards to this project. It is unknown why Mr. and Mrs. Silva refused delivery of materials related to this project given his active involvement and interest in the permitting process.

Persuant to 306.06 (a), the abutter has been notified of the project. Per Env-Wt 306.06(b) and RSA 482-A:3,1(d)(1) the extensive correspondence documented between Mr. Silva and the multiple state and federal agencies should also serve as proof of receipt for abutter notification.

2- A desktop review of the project site indicates that a watercourse may be present at or near the proposed wetland crossing site, as depicted by the watershed drainage area layer on the NHDES Wetlands Permit Planning Tool as well as USGS StreamStats. Per Env-Wt 306.05(a) and Env-Wt 311.06(b), to determine the appropriate impact classification and approval criteria of the project, please verify the resource classification type and submit additional photographs

supporting this determination. If one or more streams are proposed to be impacted (e.g., an intermittent stream as defined in Env-Wt 103.21):

a. Indicate the location of jurisdictional areas delineated on revised project plans in accordance with Env-Wt 311.05(a)(13) and Env-Wt 406, including the ordinary high water line (OHW).
b. Determine the size of the watershed and stream tier, and illustrate watershed boundaries on a topographic map in accordance with Env-Wt 903.03(a).
c. Revise the impact areas on page 5 of the Standard Permit Application to reflect the length of impact to watercourse(s) in accordance with Env-Wt 407.03(c).
d. Provide photographs of the stream; dated, labeled, and printed in accordance with Env-Wt 311.06(b).
e. Address the applicable design criteria and application requirements of Env-Wt 900.
    - Note that the proposed crossing will need to accommodate flows pursuant to the applicable design storm (either 50-year or 100-year depending on stream tier), so documentation beyond what was already provided (relevant to a 25-year design storm) will be required.
    - If work may be done while water is flowing, please include a dewatering/water bypass plan as required by Env-Wt 903.04(d).

All jurisdictional wetland areas have been delineated and are shown on the multiple plans submitted to NHDES. An approximation of the ordinary high-water mark has been added to the plan set per NHDES request. Watershed boundaries have been shown on the initial NH DES submittal. Portions of the watershed boundary was reviewed by Aries Engineering as part of a third-party review requested by the Town of Wilton. The watershed is less than 200 acres, which under Env-Wt 900 rules is a Tier 1 crossing. Photographs of the proposed impact area/wetland crossing were provided with the initial submittal. Additional photos are provided below:

December 8, 2022: Proposed crossing looking north.

December 8, 2022: Proposed crossing looking south.

January 18, 2023: Proposed wetland crossing looking southwest.

January 18, 2023: Proposed wetland crossing looking west.

January 18, 2023: Proposed wetland crossing looking east.

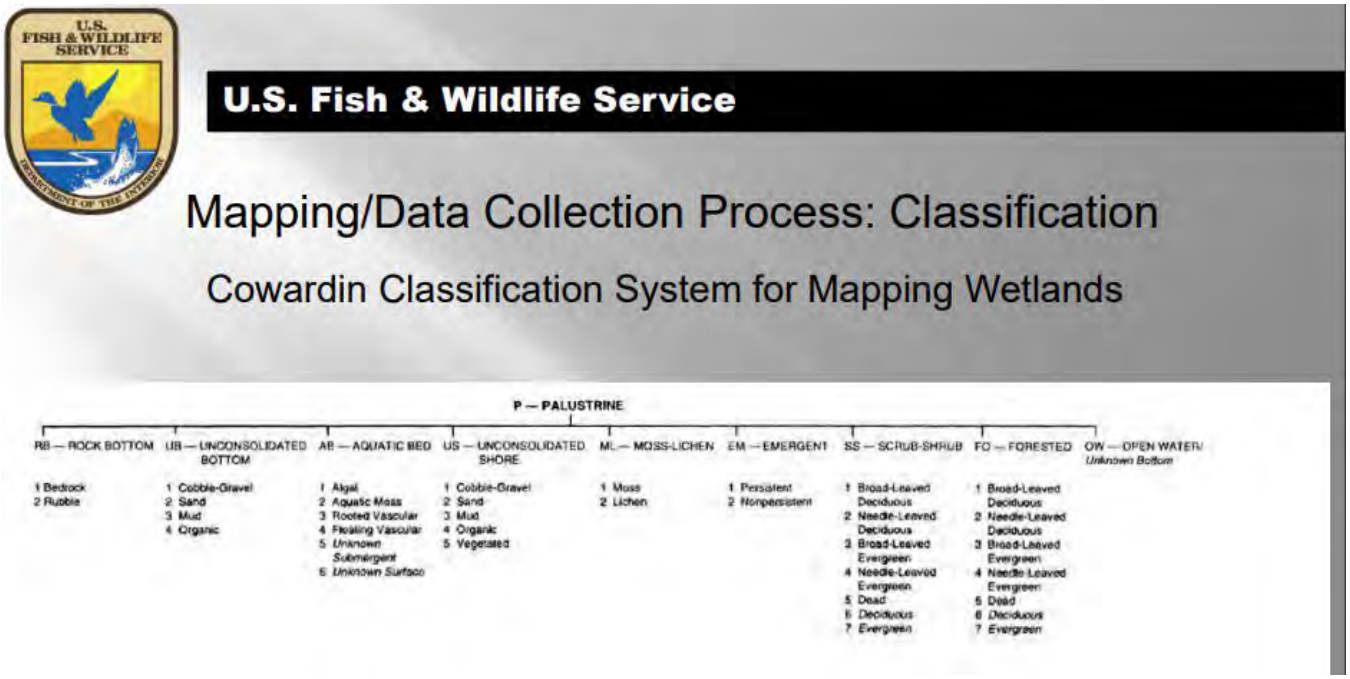
All Env-Wt 900 design criteria and application requirements have been addressed on a separate document which accompanies this response.

3- Please revise the classification of the palustrine wetland area in the southwest part of the parcel currently labeled as "POW – palustrine open water" using the federal classification method in accordance with Env-Wt 406.06(a).

Per Env-Wt 406.06(a) the wetlands have been classified under "Classification of Wetlands and Deepwater Habitats of the United States, Cowardin et al. 1979". The classification of Palustrine, Open Water is used to indicate unknown bottom in lieu of "Rock Bottom", "Unconsolidated Bottom" or "Aquatic Bed".

Palustrine Open Water is a classification under the Cowardin system and is recognized by the US Army Corps of Engineers and US Fish and Wildlife Service. Below is a page from the USFWS (https://www.ctic.org/files/Wetlands_Mapping_Classification_JDick.pdf).

The USACE Cowardin Code, description, and name: POW-PALUSTRINE, OPEN WATER (https://www.spa.usace.army.mil/Portals/16/docs/civilworks/regulatory/Bulk%20Upload/Bulk%20Data%20Cowardin.pdf)



Based upon additional field work conducted and observations of the wetland in question, the classification has been updated to Palustrine, Unconsolidated Bottom, Permanently flooded (PUBH).

4- Please remove the permitting note on the plan that says "THIS PLAN IS FOR NHDES WETLAND PERMITTING PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION OR ANY OTHER PURPOSE." In accordance with Env-Wt 307.16, all work on the project shall be done in accordance with the approved plans.

There are additional engineering plans associated with this driveway design and wetland crossing. The intent of this note is to ensure the Wetland Permit Plan is not used independently for construction of the driveway, including the wetland crossing. Additional

information is required to properly construct the driveway. The Wetland Permit Plan shows proposed wetland impacts based upon the engineered driveway design and wetland crossing. The construction of the driveway is to be completed in accordance with the stamped engineering plans. The submitted Wetland Permit Plan shows all impacts and design features relative to wetland permitting as they are shown on the engineering plans. Should any changes to the engineered driveway design be required, an amended Wetland Permit Plan and application shall be submitted to NH DES.

5- NHDES Wetlands Bureau is in receipt of several comments expressing concern that the wetlands delineation may not identify all jurisdictional areas present on the subject property. NHDES field inspection on February 16, 2023 included observations of these areas though did not include full data collection to verify the delineation. In accordance with Env-Wt 406.01 and the federal wetland delineation method, please provide paired US Army Corps of Engineers (USACE) data sheets for the upland and wetland boundaries from at least the following two locations:

a. The area between the isolated wetland northwest of the proposed impact area and the larger wetland complex that includes the impact area; and
b. The area in the northwest corner of the property where the wetland enters the site from the property to the north.

Please include a location map showing where each plot was sampled for the USACE data sheets and provide data sheets from any additional plots that may have been sampled to support the delineation across the site.

The comments received by NH DES are not made by qualified professionals. All jurisdictional wetlands on site have been delineated and mapped accordingly. Per the request of the Town of Wilton Planning Board, a third party review of the wetland delineation was conducted by Aries Engineering. The third-party review report accompanies this response letter. Aries Engineering identified three areas recommended to be reviewed as potential wetlands. All three areas have been reviewed and addressed.

Area 1 as shown on Figure 2 is a topographic low point in the overall surrounding topography of approximately 30'x30' located against the stone wall on the northern property line. Rainwater infiltrates into the well-drained soil within and around Area 1 and based on numerous site visits throughout every season we have observed that there is no sustained surface water for more than 2 weeks during the growing season or dominance of hydric soils or hydric vegetation within Area 1. In accordance with US Army Corp of Engineers 1987 Manual for Wetland Delineation, the subject area must meet at least the 3 criteria to be classified as Jurisdictional Wetlands, 1) a dominance of Hydric Soil, 2) a dominance of Hydrophytic Vegetation and 3) sustained Hydrology present long enough to create the other 2.

The area in question, Area 1, does not meet the necessary criteria to be classified as Jurisdictional Wetland. The requirement for the 3 criteria has come about over many years and renditions of the USACE delineation manual. One of the primary reasons for needing at least the mentioned 3 criteria are due to the many factors, environmental conditions and seasonal variations that exist on any given landscape. It is possible, and understandable for someone to observe ponded or flowing water during seasonal spring snow melt a storm event or and make the incorrect assumption that the area must be a "Wetland"; frequently this is simply not the case and the reason why Federal and State wetland regulations require 3 parameters and not simply the presence of water. Currently in New Hampshire, wetlands

delineation is required to be conducted by a NH Certified Wetland Scientist in an effort to ensure that environmental professionals have the experience and knowledge to evaluate environmental conditions accurately to the best extent possible in accordance with Federal and State regulations.

Area 2 as shown on Figure 2 was reviewed multiple times during site walks with Planning Board, Zoning Board as well as NHDES Wetlands Bureau. The area has been logged and is an area of one of the timber harvest roads that was travelled many times by heavy equipment. Foresters and loggers make every effort to avoid any wetlands areas and as such typically travel around wetlands areas; it is not uncommon for there to be areas with higher water tables within the soil the closer one gets to the wetland boundaries. The conditions present in Area 2 is similar to Area 1 in the fact that it does not contain the 3 parameters required to be classified as a Jurisdictional Wetland. Travel by timber harvest equipment may have disturbed soil, stones and vegetation along the skid trail that appears to have temporarily altered soil surface conditions that may include areas of temporary ponding and seasonally high water table. Wetland delineation and survey location was conducted prior to timber harvest activities in natural and undisturbed conditions and Area 2 does not exhibit the criteria necessary to be classified as a Jurisdictional Wetland.

Area 3 as shown on Figure 2 is adjacent to Area 2 and was also reviewed multiple times during site walks with Planning Board, Zoning Board as well as NHDES Wetlands Bureau. The area in question is located in the middle of one of the main skid trails utilized during the timber harvest. The area is not Jurisdictional Wetland but is a shallow swale within the overall topography and may concentrate storm-water run-off during spring melt and storm events; as such the logging company utilized best management practices (BMP) for minimizing erosion and environmental impact by laying down small trees and branches within the swale (sometimes referred to as a corduroy crossing) to minimized soil impact by harvesting equipment and allow for storm-water to pass through and under the branches to minimize potential soil erosion source. The logging company again followed BMPs by removing the woody branches that were placed in the area after the timber harvest was completed to restore natural conditions to the best extent practicable. The land surface in this area has not been re-graded; the residual wooden debris is over 2-3 ft thick in places and branches on either side of the swale center have not been removed as they are typically allowed to degrade in place to allow for the replacement of organic material into the soil and environment which is the recommended and environmentally responsible practice for timber harvest activities. These same conditions exist at the proposed wetland crossing location. It is possible that snow cover at the time of Aries inspection may have obscured the natural grade and site conditions, however, all the wetland areas on the property, including Area 3 have had extensive multiple reviews pre and post timber harvest activities and through every season by multiple Certified Wetland Scientists. In our professional opinion, the wetland delineation conducted is accurate and appropriate and does not require additional wetland delineation.

The wetland delineation was conducted in accordance with the US Army Corps of Engineers 1987 Wetlands Delineation Manual Y-87-1, Regional Supplement for Northeast and Northcentral Region, and Field Indicators for Hydric Soils in New England. Per the US Army Corps of Engineers Part IV, Subsection D, the wetland delineation was conducted using the Level 2 Routine Approach. The routine approach is used in a vast majority of jurisdictional determinations. The routine approach uses primarily qualitative procedures. If a decision is

made to use a routine determination procedure, comprehensive determination procedures will not be employed.

Per Army Corps of Engineers, comprehensive determinations should seldom be necessary and are only be used when the project area is very complex and/or when the determination requires rigorous documentation. The wetlands delineated, specifically in the proposed wetland crossing area, are objectively not complex. This is a very straightforward and standard delineation. The Town of Wilton has requested third-party review of the wetlands, which was completed by Aries Engineering. No discrepancies were documented by the third-party review. Figures 1 and 14 from the Y-87-1 manual have been included to document the routine approach for wetland delineation.

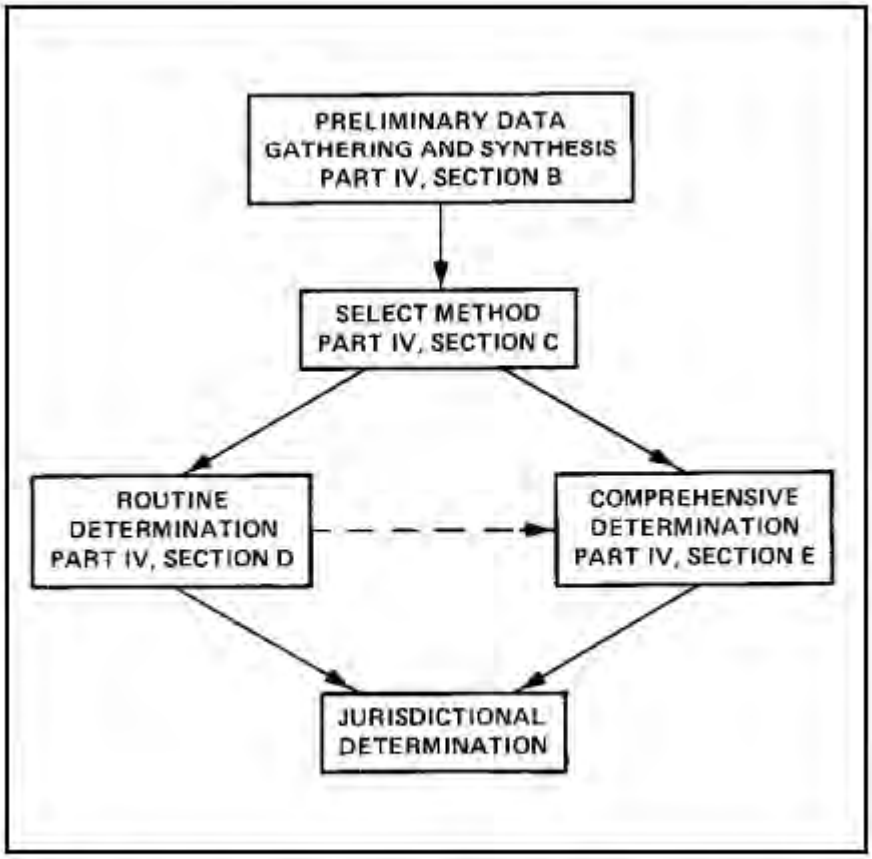


Figure 1. General schematic diagram of activities leading to a wetland/non-wetland determination

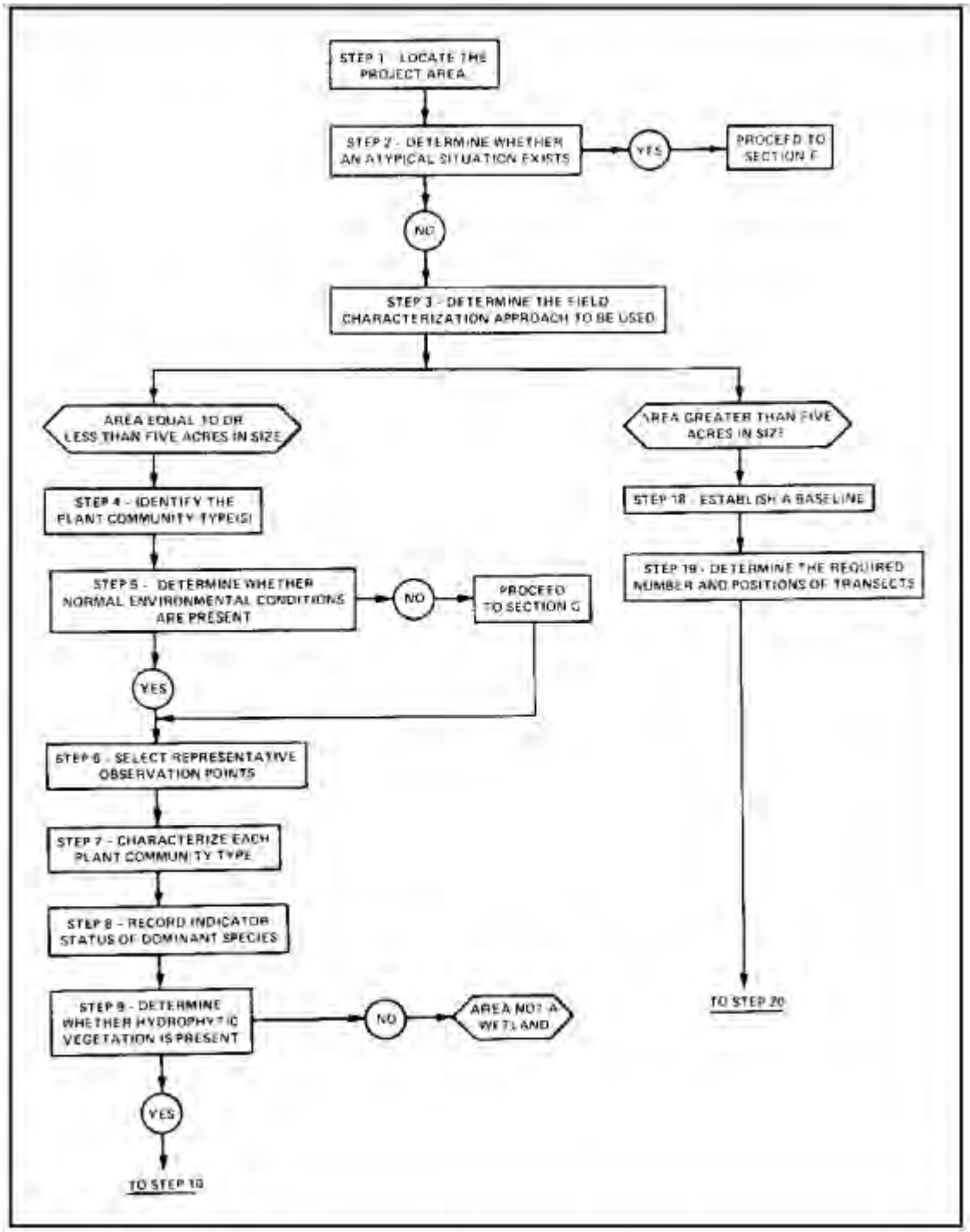


Figure 14. Flowchart of steps involved in making a routine wetland determination when an onsite visit is necessary (Continued)

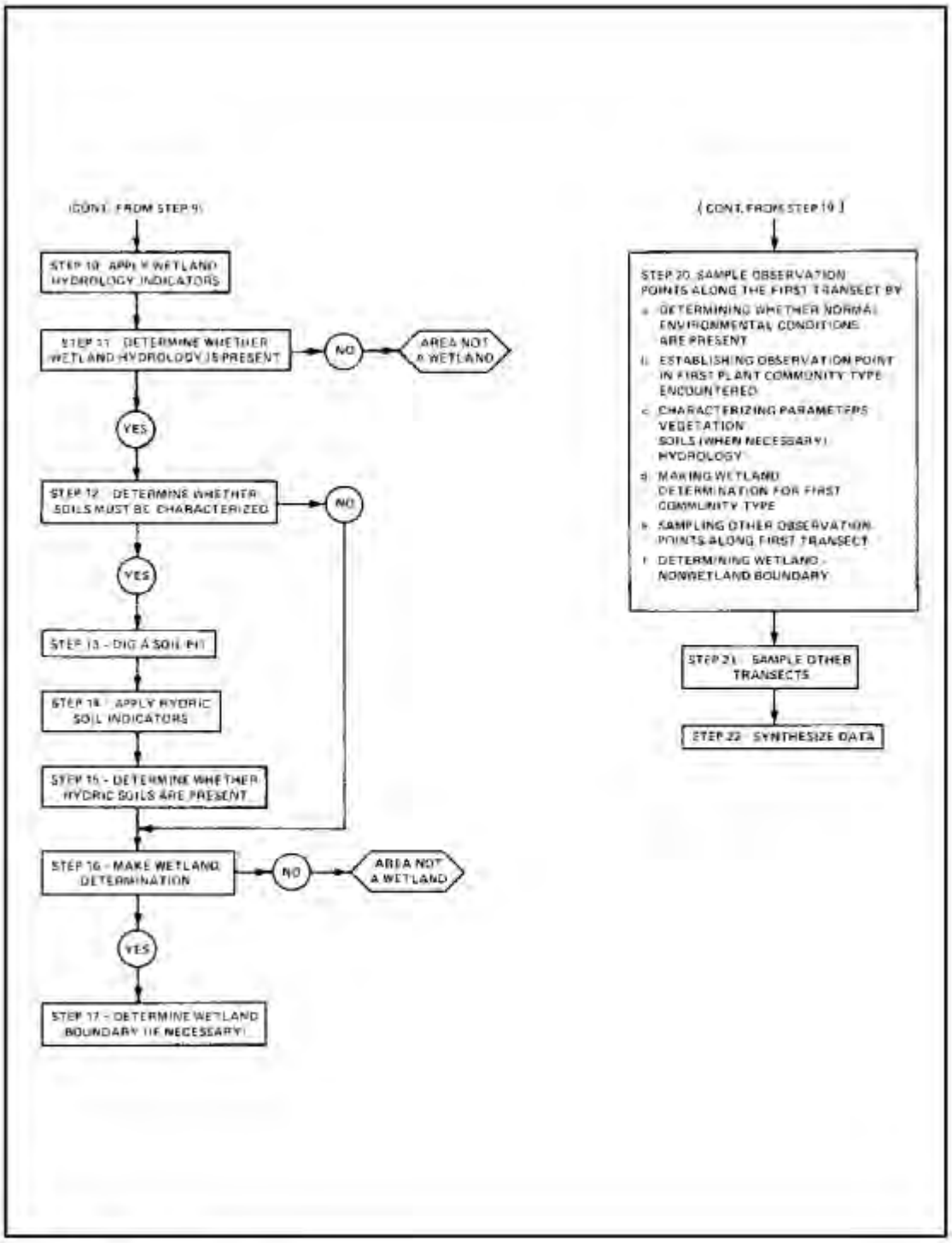


Figure 14. (Concluded)

Given the time of year, providing accurate data plots with herbaceous cover percentages is simply not feasible. The requested data plots would not provide any meaningful data, as the proposed crossing is at the narrowest wetland location on site and the wetland boundary at

this location is not in dispute. This is the only area of proposed wetland impacts on site. No additional wetland impacts are considered as part of this project. Per Env-Wt 311.05(b)(6)b plans depicting wetland boundaries submitted with an application for a standard permit shall include "US Army Corps of Engineers data sheets, if disturbed conditions exist." No disturbed wetland areas exist on site to the best of our knowledge, nor has any substantive documentation of disturbed wetlands on site been provided.

The three areas identified by third party review have been thoroughly addressed, both during the site walk conducted with NH DES Wetlands Bureau personnel, the response to the third party review presented to the Town of Wilton, and within the body of this letter.

6- Please verify whether the site was assessed for the presence of vernal pools, per Env-Wt 406.01(d). Please provide completed vernal pool documentation forms for any documented vernal pools. Confirmation as a vernal pool could impact NH Fish and Game Department (NHF&G) recommendations and federal agency review. If a vernal pool is confirmed, please initiate coordination with the US Army Corps of Engineers (USACE) by providing completed Vernal Pool Characterization Forms, to the USACE, attn. Lindsey Lefebvre (mail to: Lindsey.E.Lefebvre@usace.army.mil). Forms must be completed for each vernal pool for both pre- and post-construction conditions. The form is in Appendix L of the USACE New England District Compensatory Mitigation SOP. Impacts within vernal pool envelopes may require federal mitigation, which would be specified in the NHDES Wetlands Permit.

A vernal pool survey is not appropriate as the proposed impact area has been verified by NH DES personnel as an area of channelized flow connecting two palustrine forested wetlands. Beyond the channelized flow and other characteristics of this wetland which do not indicate vernal pool suitability, this area does not maintain water for a long enough duration in the spring to function as a viable vernal pool.

Although there are no proposed impacts of any kind anywhere near the vicinity of a vernal pool, in the interest of moving the permitting process along, a vernal pool assessment was conducted by Christopher A. Guida, CWS on April 14, 2023. Only one wetland area was confirmed as a vernal pool. This area has been shown on the revised Wetland Permit Plan, Sheet WT-1. Wood frog eggs were observed in the pool. Dip netting did not reveal the presence of any other indicator species. Other facultative species, such as Peudarcris crucifer and Limnephilidae/Phryganeidae were observed in the general area but not in the documented vernal pool or surrounding wetlands which were also investigated. A vernal pool characterization form accompanies this response.

It is important to note that the proposed wetland crossing and building area is on the same proposed lot as the vernal pool. The proposed crossing is 645 linear feet away. The proposed building area is approximately 500 linear feet away. The long shared/common driveway will allow for the maximum distance between the vernal pool and proposed building area. The wetland crossing proposed under this application is at the narrowest section of wetlands, with the most substantial avoidance and minimization of wetland impacts practicable. Should this wetland application not be approved, the proposed residential development of Lot 7 will be along Barrett Hill Road on the western portion of the lot, significantly closer to the documented vernal pool. This area which meets all building setback requirements can be seen on the Site Overview inset included on revised Sheet WT-1.

7- In accordance with RSA 482-A:11, II and Env-Wt 313.01(a)(5)b., please provide additional information to demonstrate that the proposed work will not result in any observable change in offsite water levels or flows.
   a. A full HydroCAD output from the stormwater report provided with the original submittal (including the source(s) of data used for model inputs) and a map depicting the catchment areas modeled relative to the areas delineated and the proposed crossing would be helpful.
   b. The NHDES Wetlands Bureau is in receipt of a public comment expressing concern about the potential redirection of stormwater flows in the northwest portion of the subject parcel onto the abutting property directly to the north due to the proposed driveway configuration. The plans submitted indicate a drainage swale to be installed along the north edge of the driveway, but it appears to be interrupted by a vegetated visibility screen before it reaches the catchment area/basin ("IB-1"). Please address this specific concern by verifying the continuity and capacity of this proposed drainage swale and ensuring that stormwater north of the driveway will not be directed offsite.

The full HydroCAD report, as part of the entire Storm Water Management Report, was provided to NH DES via e-mail on February 14, 2023 per NH DES request. The Storm Water Management Report was revised on January 26, 2023. This revised report has also been provided to the Town of Wilton. An additional HydroCAD analysis including the 50-year storm calculation for the proposed wetland crossing area is provided with this response.

Public concerns regarding drainage are not relevant to the wetland crossing located over 550-ft from infiltration basin 1 (IB-1). There are no jurisdictional wetland impacts proposed in the northwest portion of the subject parcel. These concerns are not germane to the subject wetland permit application but have been addressed by peer engineering review and response.

8- NHDES has been informed of recent logging activity on the subject parcel which may have resulted in impacts to jurisdictional areas for access. Please verify whether any jurisdictional impacts from recent forestry activities have occurred and, if so:
   a. Calculate the impact areas and add to total project impacts;
   b. Provide documentation regarding the permitting history of these impacts;
   c. For any unpermitted impacts, provide the information required by Env-Wt 311.12, including a plan for restoration or request for impacts to be retained; and
   d. Show these impacts on revised project plans, clearly symbolized to indicate that they are existing/after-the-fact impacts, whether they are permanent or temporary, and which areas are proposed to be retained or restored, in accordance with Env-Wt 311.05(a)(18) and Env-Wt 311.12(a).

Previous timber harvesting was done in accordance with all state regulations. Swamp mats were used where required. No ruts were made within jurisdictional wetlands. No stumps were mechanically removed from any jurisdictional wetlands to the best of our knowledge.

On February 22, 2022, Richard Kahn of 52 Barrett Hill Road filed a complaint with State of New Hampshire Forest Protection Bureau. Mr. Dawson Gay, Code Enforcement Officer for the Town of Wilton contacted the Forest Protection Bureau with additional abutter complaints regarding forestry operations on the subject lot. On March 3, 2022, Investigating Ranger Adrian Reyes of the Forest Protection Bureau conducted a site inspection in response to the several filed complaints. Ranger Reyes walked the timber harvest area. During his inspection he did not locate any violations of NH forestry or wetland laws. Per Ranger Reyes,

logging operations had complied with best management practices published by the UNH Cooperative Extension. This report accompanies this letter.

9- The NHDES Wetlands Bureau is in receipt of multiple public comments expressing concern relative to the proposed project. Please see the documentation attached and address all items that pertain to the jurisdiction of RSA 482-A.

In our professional opinion, the public comments received are not relevant to the jurisdiction of RSA 482-A; however, our interpretation of RSA-482A may differ from the opinions of NH DES Wetland Bureau personnel. It should be noted some of the comments received, such as the Conservation Commission requesting the property be treated as conservation property even though it is not, would constitute an illegal taking.

Should NH DES Wetland Bureau find specific concerns raised in these public comments are relevant to the wetland permit application, we will gladly address those questions directed through NH DES in a thorough and timely manner.

On March 13, 2023, the Wilton Conservation Commission issued another letter to the Wilton Planning Board following their March 7, 2023 meeting. This letter has been included with this response for your reference. We certainly agree with the sentiment expressed by the Wilton Conservation Commission that Conservation Commissions and land use consultants should work as a partnership in protecting natural resources. It is important that while protecting natural resources, the rights of the property owner are respected, and all parties involved are operating in good faith. Below is a comprehensive and objective response to the March 13, 2023, Town of Wilton Conservation Commission letter:

Upon discussion and field review with NH DES personnel, it was agreed to treat the proposed wetland impacts as affecting a watercourse, which has additional requirements under Env-Wt 900. The additional requirements have been addressed and are included with this response letter. Based upon our discussions with NH DES Wetlands Bureau, it appears a source of the confusion relates to the removal of minimum lengths of channelized flow under Env-Wt 900 as part of the latest revision to New Hampshire Wetland Rules. Despite the absence of 4-ft banks, the proposed impacts have been revised to meet all Env-Wt 900 rules.

Wetland delineations are based upon three criteria: hydric soils, hydrophytic vegetation, and evidence of hydrology. Drainage calculations are done based upon watershed size, catchment areas, soil conditions and multiple other factors. Neither drainage calculations nor wetland delineations are impacted based on whether the region is in a drought or not. Scientific documentation was provided to NHDES to ensure the Conservation Commissions concerns were completely addressed in an impartial and objective manner. At no point was the commission accused of lying regarding the height of stream banks or duration of a drought; the intent throughout this permitting process has been to accurately and professionally reflect site conditions based on quantifiable, verified data and standard best management practices. If mistakes or inaccuracies have been identified through this review process, we certainly want to correct those as soon as possible so a fair and objective review of the application may be conducted. Ultimately, we hope this can be a professional and respectful review process resulting in an approved application balancing the rights of the property owner with respect for the natural communities and in accordance with the applicable regulatory requirements of the Town of Wilton and State of New Hampshire.

It is unclear what discrepancy the Commission is referring to regarding the southeastern section of the property. The National Wetlands Inventory (NWI) is a GIS-based tool provided by US Fish and Wildlife Services. This tool is not to be used as a substitute for a field-based delineation by a Certified Wetland Scientist (CWS). The wetlands shown on the NWI plan are significantly smaller than the areas delineated and verified on the plans submitted to NH DES and the Town of Wilton. US Fish and Wildlife lists Data limitations, Exclusions, and Precautions regarding the NWI data set, which is listed on the IPaC report. Given the ongoing confusion concerning limitations of digital toolkits, it would be helpful to restate these terms:

Data limitations
The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries.

Exclusions - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

By policy, the Service also excludes certain types of "farmed wetlands" as may be defined by the Food Security Act or that do not coincide with the Cowardin et al. definition. Contact the Service's Regional Wetland Coordinator for additional information on what types of farmed wetlands are included on wetland maps.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

The US Fish and Wildlife IPaC Resource list is automatically generated list of species and other resources such as critical habitat under the USFW jurisdiction that are known or expected to be on the project area referenced. It is important to note that the wetlands on site were accurately delineated; no wetlands were "missed." The accuracy of the wetland

delineation has been supported by independent third-party review per Town of Wilton request and during a site inspection conducted with Fieldstone and NH DES.

The Northern Long-eared Bat and the Small Whorled Pogonia were both listed on the IPaC resource list. Fieldstone has coordinated with US Army Corps of Engineers to ensure the project proceeds in a fashion as to not jeopardize the continued existence of a threatened or endangered species, a species proposed for listing as threatened or endangered, or designated or proposed critical habitat.

On March 13, 2023, Fieldstone reached out to the Natural Heritage Bureau to confirm vernal pool mapping and reporting requirements. Maddie Severance, Assistant Ecological Information Specialist with New Hampshire Natural Heritage Bureau, confirmed Natural Heritage Bureau DOES NOT require the mapping of vernal pools. A copy of this correspondence has been included with this response. Hopefully, this will help address the misunderstanding by the Wilton Conservation Commission regarding NHB requirements on this project as well as others they may review in the future.

On March 9, 2023 Fieldstone was made aware of an alleged non-recorded Spotted Turtle occurrence in the area of Barrett Hill Road in Wilton. This was a surprise and not at all typical of standard wetland permit review process. It is most unexpected to hear of a documented turtle occurrence at the beginning of March with a foot of snow on the ground. Multiple Natural Heritage Bureau data checks have been done as part of this project. No threatened or endangered species, nor exemplary natural communities, have ever been recorded within the project area. The most recent NHB DataCheck was conducted on March 28, 2023, and resulted in no current recorded occurrences for sensitive species near this project area. New Hampshire Natural Heritage Bureau data checks are valid for one year from the date of issuance.

The alleged Spotted Turtle occurrence was reported by a resident of 36 Barrett Hill Road. The process of reporting the Spotted Turtle occurrence was initiated by an abutter residing at 105 Barrett Hill Road. It was asked if the presence of vernal pools could influence the actions or requirements from NHB in relation to this project. Upon being informed NHB does not have authority over vernal pools, it was then stated a neighbor had pictures of what appeared to be a Spotted Turtle. New Hampshire Fish and Game has withheld information related to the spotted turtle observance from Fieldstone Land Consultants and the applicant despite multiple requests, however, the abutters submitted material to the town's public record which did include the photograph of a spotted turtle submitted to NHFG for vouchering. Barrett Hill Road is a Class V dirt road for the entirety of this parcel's frontage; however, the spotted turtle was clearly photographed on asphalt. There is no visual evidence included in the photograph to support where this observation occurred. As a matter of professionalism and accuracy, we trust additional information has been provided to NHFG and more substantive records are required than a simple nondescript photograph from an aggrieved abutter.

Per NH Fish and Game's own records, this would be the first spotted turtle occurrence in the town of Wilton, going back to 1937 when the State of New Hampshire officially began recording occurrences of spotted turtles. NHFG records of all towns with documented spotted turtle observations is included with this response. It would stand to reason the first documented occurrence of a spotted turtle in the town of Wilton would be pursued by NHFG as a priority to accurately reflect the documented inventory of threatened and endangered species in the State. Given the alleged multiple attempts to submit documentation of the spotted turtle occurrence, one would anticipate other means of submittal, either through mail or e-mail, would be pursued, or a follow-up phone call would be made to NHFG at a minimum. Based upon the highly active involvement of the abutters during this over yearlong permitting process, both at the state and local level, it would seem three discrete documented occurrences of a Spotted Turtle would be relevant material to address as part of concerns to the natural community and wildlife populations, yet it has been over a year into the permitting process before this observation has been brought up.

Timber harvesting operations were conducted in accordance with Best Management Practices. Swamp mats were employed where required at wetland crossings. No rutting or stump removal has been observed in any of the on site wetlands. No restoration of logged areas is proposed as part of the scope of this project. Ranger Adrian Reyes responded to complaints regarding logging on the subject site. He conducted a site inspection on March 3, 2022 and issued a report documenting his findings on April 6, 2022. Per Ranger Reyes, the logging operation had complied with best management practices for forestry published

by UNH Cooperative Extension and no forestry or wetland laws were violated. The Wilton Conservation Commission is fully aware of this inspection report and its findings.

There has been no substantive critique of the wetland delineation by a certified professional. Wilton Conservation Commission has yet to document any incorrectly mapped wetlands based upon the three criteria: hydric soils, hydrophytic vegetation, and hydrology. These are the professional and legal criteria for mapping wetlands in the State of New Hampshire and under the US Army Corps of Engineers 1987 manual. It is impossible to address Wilton Conservation Commission concerns that wetlands were incorrectly mapped when they have been unable to provide the most basic information supporting their concerns. NHDES field inspection on February 16, 2023 included observations of the alleged areas not included in the wetland delineations. To our knowledge, at no point during this project review has NH DES indicated the wetland boundaries have been incorrectly mapped. Aries Engineering did conduct a third-party review of the wetland delineation as requested by Wilton Conservation Commission. Three areas were highlighted for additional review; however, Aries has never made the statement that wetlands were incorrectly mapped. These areas have been thoroughly addressed by Fieldstone as part of the response to the Aries review letter and included in this response. The wetland areas as shown on the Wetland Permit Plan, and all other plans submitted to Town of Wilton and NHDES accurately reflect the wetland boundaries and associated local setbacks.

Local ordinances regarding lot sizing or restrictions within the Watershed Protection District are a local issue and not relevant to wetland permitting through NH DES. There have been no documented discrepancies in measurement of wetland boundaries or pertinent setbacks. As previously stated, drought conditions do not impact wetland boundary delineations. It is also worth noting the drought severity insisted upon by the Conservation Commission has already been corrected with "20 years of data".

10- In accordance with Env-Wt 311.06(j), if the applicant is seeking to be covered by the state general permits, provide a statement of whether comments have been received from any federal agency and, if so, how the applicant has addressed the comments.

In response to abutter phone calls regarding the project, US Army Corps of Engineers have requested information regarding the wetland application. Fish and Wildlife IPaC review indicated the wetland impact area may be suitable habitat for the Small Whorled Pogonia. A response was provided to USACE explaining why the proposed impact area is not a suitable habitat for the species of concern.

11- Please be advised that any future projects with jurisdictional impacts on the subject parcel may be considered in the aggregate in accordance with RSA 482-A:11, V.

The project proposes 769 square feet of permanent impact to jurisdictional wetlands for the construction of a driveway crossing to access the buildable portion of a proposed 18.951-acre lot. This would qualify as a minimum impact permit if it were not associated with the residential subdivision. Once the subdivision is complete, should an additional permit application be submitted within 5 years of the issuance of the subject wetland crossing permit, the impacts will be considered in the aggregate.

We will be mailing the hard copy set of revised plans via USPS as well; Please let me know if additional information is required for approval.

Sincerely,

Kenneth Robinson, CWS
Certified Wetland Scientist

FIELDSTONE LAND CONSULTANTS, PLLC
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MILFORD, NH 03055

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Robert + Shannon Silva
105 Barrett Hill Rd
Wilton, NH 03086

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Env-Wt 903.04 Information Required for All Stream Crossing Standard Permit Applications

(A) On the USGS map or updated data based on LiDAR required by Env-Wt 311.06, the following:

(1) The approximate boundaries of the contributing watershed;

(2) The size of the contributing watershed; and

(3) Identification of the stream tier based on watershed size;

The USGS StreamStats calculates the watershed size as 0.05 square miles, or 32 acres. It should be noted that this value is below minimum parameter limit for drainage area calculations, however, this information is sufficient to document the stream tier. The approximate watershed boundaries are shown on the StreamStats report. Under Env-Wt 900 rules, this is a Tier 1 crossing based on a watershed size of less than 200 acres.

(B) Plans showing the following:

(1) The scale, a north arrow, and at least 3 cross-sections outside of the construction disturbance area that are representative of the stream system away from the area of direct influence by the crossing;

(2) Clearing limits showing all proposed work areas;

(3) For both the existing structure, if any, and the proposed structure, the following:

a. Location;

b. Type;

c. Dimensions; and

d. Inlet and outlet invert elevations;

(4) The extent of channel excavation and filling;

(5) Road locations, including road edges, centerline, and boundaries of the right-of-way;

(6) Proposed channel work including bank erosion control features, grade control, and channel linings; and

(7) For the proposed structure, cross-sections showing the water surface elevation resulting from the applicable design storm, with bed material and backfill zones;

Revised plans have been submitted along with the NH DES RFMI response. The proposed wetland crossing is shown at 1"=20' scale, while a site overview inlay is shown at 1"=200' scale. Three cross sections have been shown, however, selecting locations for these cross sections was limited as the period of observable continuous channelized flow is less than 100 linear feet.

(C) Existing crossing metrics, including:

(1) Existing riparian zone, including the extent and type of existing vegetation surrounding or in the stream bank; and

(2) Existing tailwater control, including its location and materials, and pool configuration;

There is limited to no vegetation in the so-called riparian zone as the area is predominately a palustrine forested wetlands with mixed hardwoods and established hemlocks. Many of the larger trees were

removed during recent logging operations. Crossing was proposed in the narrowest area of wetlands as to reduce total wetland impacts. Based upon this narrowing and site topography, areas of channelized flow were observed in the proposed wetland crossing and NH DES has requested Env-Wt 900 rules be addressed. There is no existing tailwater control in place.

(D) The dewatering system, as follows:

(1) Estimates of the maximum flow anticipated during construction, including any summer storm estimates;

(2) The hydraulic calculation for the bypass pipe or channel size, length, and gradient;

(3) Location, height, and width of the diversion dam;

(4) Sump locations, including estimate of necessary flow and sump capacity;

(5) Backwater prevention method; and

(6) Sediment treatment plan with methods, release point, and extent;

Project is proposed to be conducted during no-flow conditions given minor work required for the installation of the culvert which can be completed in one 8-hour workday. Given the nature of the wetlands, flow is generally limited to periods of peak flow following storm events and snowmelt in the spring. Installation of a temporary dewatering system would result in greater impacts than what is proposed as part of the crossing. Work will cease if any storm event interrupts project and work will resume upon no flow conditions.

(E) Erosion and pollution controls, as follows:

(1) Any additional methods of controlling erosion;

(2) A soil stabilization plan, including but not limited to where to cover stockpiles and place straw bales; and

(3) Pollution control methods for pumps, fuel stations, and equipment storage;

The plan proposes installation of silt fence along the limits of work in areas of delineated wetlands. Stone check dams have been proposed at regular intervals along the proposed driveway swale. All disturbed non-paved areas shall be loamed and seeded immediately upon being constructed. Vehicle refueling and equipment storage is to be conducted outside of the proposed impact area at the staging area located near the entrance to the property and in accordance with EPA SWPPP requirements.

(F) The number and location of footings, if any, and the following for each:

(1) Estimate of bearing capacity;

(2) Dimensions of each footing; and

(3) Footing depth;

Footings are not proposed with this crossing.

(G) A narrative explaining why the cross-sections identified pursuant to (b)(7), above, are representative;

The cross-sections are the only locations possible to depict representative areas of the discontinuous channelized flow within very short linear sections.

(H) The design features used to improve aquatic organism passage and the expected distance, in linear feet, of downstream and upstream improvement for aquatic organism passage or fish passage;

Project proposes embedding a 36" culvert 12" in order to establish a natural substrate to facilitate aquatic organism passage, where applicable. Based upon the ephemeral and intermittent nature of the wetlands to be crossed, aquatic organism passage is anticipated to be minimal due to extended seasonal dry periods.

(I) The hydraulic capacity of the proposed crossing, in terms of flood frequency event, and of the existing crossing, if any; and

The proposed crossing has been designed to meet the 50-year storm requirements. The 50-year culvert HydroCAD report has been submitted to document inflow/outflow volumes associated with the proposed crossing.

(J) The following channel information at the crossing and for the reference reach:

(1) The classification of the stream using the Rosgen classification system as described in Applied River Morphology by Dave Rosgen, 1996, available as noted in Appendix B, at the crossing and upstream and downstream of the crossing;
(2) Bankfull width;
(3) Bankfull depth;
(4) Entrenchment ratio;
(5) Sinuosity; and
(6) Flood-prone width.

The best fit classification according to the Rosgen Classification system is A5a+. The edges of channelized flow are approximately 12-to-18" which would bankfull width for a stream. The depth of channelized flow in these areas less than 12". Calculating he entrenchment ratio is not appropriate for the subject wetlands, however, to meet the requirements of Env-Wt 900 the calculation is provided as follows:

[(d/dbkf)/(Q/Qbkf)]
[(12"/98")/(3.87 CFS/20.9 CFS)
(.122) / (.185)
ER = 0.7

The sinuosity is 1.1. The flood prone width is 8.2'

February 27, 2023
File No. 2023-016

Alec MacMartin, Chairperson
Town of Wilton Planning Board
Town Hall - 42 Main Street
PO Box 83, Wilton, NH 03086
aajjmac@tds.net

Re: Engineering Review
Proposed 7-Lot Subdivision
Tax Lot A-44-1
Wilton, New Hampshire

Dear Mr. MacMartin:

On behalf of the Town of Wilton Planning Board, Aries Engineering, LLC (Aries) prepared this letter report to describe our engineering review of available subdivision plans and the drainage report for a 7-Lot Subdivision, proposed by San-Ken Homes, Inc. (Applicant) of New Ipswich, New Hampshire, for an approximate 45-acre +/- parcel identified as Tax Lot A-44-1 (site property) and located on Barrett Hill Road in Wilton, New Hampshire. A site locus plan is depicted on Figure 1.

The findings and conclusions presented herein are not scientific certainties, but rather our professional opinions concerning our evaluation of information and data submitted by others. Aries anticipates variations in actual site conditions beyond those interpreted, and would have to re-evaluate the report conclusions and recommendations if additional site data are made available. Aries conducted this report in general accordance with accepted consulting practices. Aries makes no warranty, either expressed or implied.

OBJECTIVE

As requested by the Planning Board, Aries' objective was to conduct an engineering review of the site subdivision plans and drainage report to provide general comments regarding compliance with Town of Wilton Subdivision Regulations and specific comments regarding the following engineering review elements, including:

1. Wetland delineations and reports of inaccurately mapped wetlands;
2. Engineering and drainage along the common driveway;
3. Adequacy of the proposed buffers on the West and North sides of the proposed subdivision;
4. Stormwater management measures;

5. Impact of traffic and roadway maintenance as it relates to the proposed driveways cuts along Barrett Hill Road;
6. Delineation of the aquifer onsite;
7. Impact upon wildlife and wildlife corridors; and
8. Off-site impacts from on-site disturbance related to the proposed construction activity.

SITE DOCUMENTS AND MAPS

In preparing this report, Aries reviewed the following documents and data:

1. A "*Subdivision Plan*", prepared by Fieldstone Land Consultants, PLLC (Fieldstone), of Milford, New Hampshire, revised January 9, 2023;
2. A "*Driveway Plan & Profiles*", prepared by Fieldstone, revised January 27, 2023;
3. A "*Topographic & Soils Plan*", prepared by Fieldstone, revised January 27, 2023;
4. A "*Post-Development Drainage Area Plan 2*", prepared by Fieldstone, revised January 27, 2023;
5. "*Wilton, New Hampshire Land Use Laws, 2022 Zoning Ordinance*", amended March 10, 2022.
6. "*Wilton, New Hampshire Land Use Laws, Subdivision Regulations, Section B*", amended December 1, 2021.
7. "*Wilton, New Hampshire Land Use Laws, Driveway Regulations, Section G*", amended December 1, 2021.
8. "*Wilton, New Hampshire Land Use Laws, Stormwater Management and Erosion Control Regulations, Section H*", adopted June 19, 2013 (2013 Stormwater Regulations).
9. The New Hampshire Natural Heritage Bureau (NHB) DataCheck Tool (DCT) report (NHB22-3772), dated 12/6/2022 and provided by Fieldstone;
10. The New Hampshire Fish and Game Wildlife Action Plan (WAP), updated in 2020;
11. Geographic Information System (GIS) data provided by New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT), which is maintained by University of New Hampshire and the NH Office of Strategic Initiatives.

In this report, the above-referenced individual plans prepared by Fieldstone are collectively referred to as "site plans".

SITE WALK

On February 14, 2023, Aries conducted a self-guided site walk to observe site conditions and field locate site plan features such as wetland boundaries, proposed lot lines, proposed stormwater management practices and the proposed common driveway.

During the site walk, Aries used a hand-held global positioning system (GPS) device to display site-area topography and site plan features. Aries' site walk included walking the frontage of Lot A-44-1 along Barrett Hill Road, walking the approximate centerline of the proposed common driveway, and observing wetland boundaries in the approximate northern and central portion of the site property.

At the time of the site walk, the site conditions were generally sunny and above freezing and allowed for assessment of site wetland areas and surface water features due to approximately four inches or less of snow cover at the time of the site walk.

WETLANDS DELINEATION

The Applicant has avoided wetland impacts by generally locating building pockets for the proposed development at distance from the mapped wetland areas. Wetland flags were observed across the site, which were generally consistent with the margins of the mapped wetlands, based on our field observations. However, Aries did not independently survey the locations of observed wetland flagging to confirm the accuracy of the mapped wetlands, which was beyond the scope of our services.

On the site plans, a 50-foot setback is provided for the Wetland Conservation Overlay District, which is comprised of all wetlands and water bodies located wholly or partially within the Town. Similarly, a 150-foot setback is shown from all wetlands located within the Town Watershed Protection District. Aries notes that the site plans generally depict the applicable buffers, with the following exception: the 150-foot Watershed Protection District buffer located on proposed Lot 6. See attached Figure 2. Aries recommends the Applicant review the site plans to confirm this buffer location.

During the site walk, Aries observed possible unmapped wetland soils in the following areas and as shown on Figure 2:

1. Area 1 consists of a low-lying area located along the northern site boundary.
2. Area 2 is an area of tree cutting near the woods road that is located in the west-central portion of the property. Aries observe wetlands flagging around the majority of the delineated wetland areas that appeared to be mapped appropriately. However, the northern wetland boundary flagging had been removed in an area of tree cutting. Aries was unable to confirm the boundary of these wetlands, which appeared to differ in the field from the boundary depicted on the site plans.
3. Area 3 includes an apparent channelize drainage swale located approximately 100 feet north of the flagged first order, intermittent stream crossing located between stations (Sta.) 11+00 and Sta. 12+00. along the proposed common driveway. The land surface in this area appears to have been regraded in the vicinity of the proposed driveway. Aries observed a drainage swale crossing the graded area with limited surface water flowing from apparent wetland areas located west of the proposed driveway toward delineated wetland areas downslope to the east. This area appears to receive runoff from the isolated wetland area generally located on

the eastern portion of proposed Lot 4. An arrow shown on the site plans in this area depicts a downslope flow of surface water from the isolated wetland area toward this area. This area requires additional wetland delineation.

Aries also inspected the wetland area located along the northern property boundary where a prior wetland survey had been conducted by Fieldstone for the northerly abutting property owner. See attached Figure 2. Aries observed in this area surface water flowing south onto the site property in the area of the site property's flagged wetlands, which were consistent with the mapped wetlands on the site plans. Aries also observed surface water flow to the east along the northern side of the stone wall boundary on the abutting property, which appeared to be consistent with the mapped off-site wetland areas. The observed wetland areas on both the site and northerly abutting property appeared to be consistent with the wetland mapping.

COMMON DRIVEWAY DESIGN REVIEW

Proposed Common Driveway

Attached Figure 3 depicts the proposed common driveway, which travels steeply downslope from Barrett Hill Road at grades up to 10%. The driveway is located in proximity to abutting residences and is anticipated to provide greater intensity of use than is normally associated with single-family residential development. Shielding and buffers that limit disturbance to off-site properties are recommended to be deployed between existing and proposed land uses. At a minimum, stockade fencing should be installed along the northern property boundary to limit light glare and noise from the proposed common driveway.

Review of the site plans show the gravel driveway width to be 20 feet wide starting at the intersection of Barrett Hill Road, but decreasing to 12 feet in width at approximately Sta. 10+00. A 20-foot-wide bypass lane is located at Sta. 12+00 to facilitate passage of wide vehicles in the narrower portion of the driveway that provides access to Lot 7. The change of the driveway width to 12 feet creates less impervious surface and is sufficient to provide access to a single-family residence.

Aries recommends moving the proposed cistern so that the turnout and access are provided directly from Barrett Hill Road to avoid the potential for congestion at the entrance of the common driveway.

The approximate 20-foot-wide gravel driveway appears to provide adequate width to support emergency vehicles in winter. The elevated nature of drive will allow for keeping snow banks off the driveway.

Alternative Common Driveway

As an alternative to the proposed common driveway, Aries recommends relocating the common driveway to the central portion of the proposed subdivision in the area of an

existing woods road. Attached Figure 4 depicts a concept plan of the proposed alternative driveway.

The currently proposed driveway length is approximately 1,440 feet long and leaves Barrett Hill Road at an approximate elevation of 772 feet with proposed grades up to 10%. As an alternative, the relocated driveway would be approximately 1,290 feet long and leave Barrett Hill Road at an approximate elevation of 734 feet.

Reduction of the starting elevation of the proposed driveway from approximately 772 feet to 734 feet (or by approximately 38 feet) is anticipated to reduce the proposed driveway grades from up to 10% to approximate 8% or less, which should improve access to the back lots. Additionally, reduction of the overall driveway length from approximately 1,440 feet to 1,290 feet (or by approximately 150) should also reduce the total area of disturbance and the area of impervious surfaces associated with the proposed driveway.

The recommended alternative layout travels approximately 740 feet downslope from Barrett Hill Road at an approximate 6.8% grade to an intersection point at an approximate elevation of 684 feet, where two driveway legs travel north and south. The northern alternative driveway leg travels an approximate distance of 330 feet across Lot 3 uphill onto Lot 2 at an approximate grade of 8.1% to the terminus at an approximate elevation of 711 feet. Conversely, the southern alternative driveway leg travels an approximate distance of 220 feet downhill and then uphill onto Lot 7 at an average approximate grade of 1% to the terminus at an approximate elevation of 682 feet. Both driveway legs extend onto Lots 2 and 7 an approximate distance of 50 feet. Aries recommends reducing travel width for both driveway legs to 12 feet with similar approximate 75-foot-long by 20-foot-wide bypass lanes located near the middle of each leg to reduce the overall driveway design impervious area.

It is anticipated that these aforementioned changes would reduce the overall disturbance area of the proposed driveway and stormwater management infrastructure to less than 100,000 square feet (s.f), such that an NHDES Alteration of Terrain (AoT) Permit would not be required for the development.

ADEQUACY OF THE PROPOSED BUFFERS

Wetlands Conservation District

The Wetlands Conservation District (WCD) comprises all wetlands and water bodies located wholly or partially within the Town of Wilton.

Aries notes that the Zoning Ordinance requires that a Special Exceptions (SE) may be granted by the Zoning Board of Adjustment (ZBA) for the uses within the WCD. Aries understands that the Applicant received a SE for the proposed driveway to pass through the site WCD for the proposed wetland crossing at approximately Sta. 13+00 on the proposed driveway. A separate SE may be required if additional WCD crossings are required.

2013 Stormwater Management and Erosion Control Regulations

According to the 2013 Stormwater Regulations, the regulations apply to any land disturbance located within a "critical area", which is generally defined as: surface waters and poorly or very poorly drained soils and their respective 75-foot and 50-foot buffers; wetland areas and their respective buffers; steep slopes with grades exceeding 15%; setbacks from the Town Watershed and Aquifer Protection Districts; and disturbance areas greater than one acre. Based on these criteria, the site subdivision is subject to the requirement of the 2013 Stormwater Regulations.

As provided in Section 7.3.7, existing surface waters, including wetlands, shall be protected with a 50-foot vegetative buffer. Recent tree cutting on the site appears to have occurred generally up to the limits of the flagged wetland areas, with the exception of certain, previously described areas. And, while forested wetland areas have generally not been disturbed, the 50-foot vegetative buffer around these wetlands have generally been disturbed and require replanting and stabilization with native plants and grasses[1]. Aries recommends that a replanting plan be provided as a condition the subdivision approval that specifies the replanting areas and the type and density of plantings.

Subdivision Regulations

Section 2.0.7 defines a "buffer" as, "an area within a property or site, generally adjacent to and parallel with the property line, either consisting of natural existing vegetation or created by the use of trees, shrubs, fences and/or berms, designed to limit continuously the view of and/or sound from the site to adjacent sites, properties or roads". Aries notes that the Planning Board has the ability to define and require additional buffers in areas of anticipated impact or intensive use.

DRAINAGE REPORT AND STORMWATER MANAGEMENT MEASURES

Aries provides the following comments and recommendations regarding the site Drainage Plan. Aries conducted our review of the site Drainage Plan with respect to the Town's June 19, 2013 Stormwater Management and Erosion Control Regulations (2013 Stormwater Ordinance), which was the current regulation at the time of the Applicant's subdivision plan submittal.

1. The Drainage Plan narrative indicates a common driveway length of 990 feet. The provided plans indicate driveway is approximately 1,440 +/- feet based on the depicted station labels for the driveway centerline.
2. Calculations provided in the peak flow summary table provide incorrect percentages for the percent change of peak flow for catchment OP3, which should indicate a 3% reduction, not a 97% reduction.

[1] Native Plant List for New Hampshire, Maine and Vermont, PlantNative, https://plantnative.org/rpl-nen.htm or UNH Cooperative Extension Office, Merrimack County.

3. The Drainage Plan model uses HydroCAD® Stormwater Modeling software to model a 25-year, 24-hour storm event. According to Section 7.2.7 of the 2013 Stormwater Ordinance, stormwater treatment practices for stormwater water ponds and stormwater wetlands are to be designed to convey a 50-year, 24-hour storm event. Other infiltration practices and filtering practices are to be designed to convey a 10-year, 24-hour storm event.
4. The drainage plan reports only peak flow rates in cubic feet per second (cfs), but does not report the total volume of runoff in acre-feet (af) as required in the 2013 stormwater management ordinance. As required in the 2013 Stormwater Ordinance, the post-development total runoff volume is not to exceed 90% to 110% of the pre-development runoff volume for the 10-year, 25-year and 50-year, 24-hour storm events. Review of the Drainage Plan HydroCAD® Model output indicated compliance with the 2013 Stormwater Ordinance for the 25-year, 24-hour storm event, in which the model predicts: a pre-development total runoff volume of 0.117 af for catchment OP1; 0.189 af for catchment OP2 and 6.234 af for catchment for OP3; and a post-development runoff volume of 0.117 af in catchment OP1; 0.093 af in catchment OP2 and 6.091 af for catchment for OP3. These post-construction runoff volumes are less than the pre-construction runoff volumes. Therefore, they comply with the 2013 stormwater ordinance. The stormwater modeling should be expanded to include the 10-year and 50-year, 24-hour stormwater events.
5. In the HydroCAD® model, the woods are listed as in good condition (with an associated runoff curve number (CN) = 55) in both pre-and post-development scenarios. However, these assumptions may not be accurate for the post-development scenario based on my observation of the property being heavily cut. The model should consider the current woods condition as poor (CN = 65), which would result in a higher post-development runoff coefficient number and provide increased stormwater runoff volumes and rates in the model.
6. Based on the HydroCAD® model results, the proposed stormwater detention/infiltration ponds appear to be adequately sized to manage stormwater flows during a 25-year, 24-hour storm. Aries recommends that modeling be performed to assess the stormwater pond designs for the 50-year, 24-hour storm events, as well.
7. According the site Drainage Plan, “The terrain alteration associated with the common drive and the access to Lot 7 is 96,000± Sq. Ft. The amount of impervious area (pavement & buildings) proposed for this project is approximately 1.00 acre.” Aries notes that the application form stated the proposed disturbance is 95,000 s.f.
8. Aries used GIS software to calculate the proposed disturbance area associated with common driveway, which was estimated to be approximately 111,220 +/- .s.f. This value exceeds the threshold for the NHDES AoT permitting requirement. Attached Figure 4 depicts the assessed disturbance area.
9. Additionally, as part of the pre-development land clearing at the site, approximately 32,320 +/- s.f. of land had been disturbed along the western frontage of proposed

Lots 5 and 6. Attached Figure 5 depicts the pre-development land clearing disturbance area, which is based on the treeline depicted on the site plans.

10. Proposed Driveway terminates with a hammerhead turnaround that is located on a bedrock outcrop. Based upon field inspection of the proposed driveway centerline, the proposed hammerhead and driveway do not appear to be constructable without blasting or import of a significant volume of fill. Aries recommends relocating the terminus of the driveway on Lot 7 away from the bedrock outcrop.
11. Volume calculation for fill and cuts are not provided in the application as required under Section 6.3 (j.) of the Subdivision Regulations.
12. Stormwater detention/infiltration pond practices used a conservative saturated hydraulic conductivity (Ksat) value of 1 inch/hour to represent infiltration of stormwater in the proposed detention ponds. Site soils in the vicinity of the proposed infiltration practices are listed as the Monadnock fine sandy loam (15 to 35 percent slopes, very stony), which are report to be well drained. Estimated Ksat of the site soils are indicated to be high or very high in the substratum, at the depth that the infiltration practice would be installed.
13. The Storm Water Management Report does not provide an inspection schedule for the stormwater and erosion control practices to be employed during construction of the subdivision. A weekly inspection schedule and an inspection requirement after every 0.25-inch or greater rainfall event are provided in the Erosion Control Notes on the Erosion Controls Detail Plan. This inspection schedule and the Erosion Controls Detail Plan should be provided in the Storm Water Management Report.

IMPACT OF TRAFFIC AND ROADWAY MAINTENANCE

During Aries' site walk, Aries noted that the cartway of Barrett Hill Road, or that portion of the right-of-way designated for vehicular use, measured between 15 feet and 18 feet wide along the frontage of the site property. Scaling of the stonewalls depicted on the site plans suggest the right-of-way (ROW) is approximately 33 feet wide, which suggests a 2-rod layout for the road. Because of the varied terrain along the road, certain portions of the road bed are incised by approximate 6 feet or more.

According to Town officials, Barrett Road is a designated as a scenic road under RSA 231:157. Scenic Road designation requires the state and/or the municipality to obtain written permission of the planning board prior to any repair, maintenance, reconstruction or paving work on the road if such work requires damage or removal of trees, or the removal or destruction of stone walls. As such, the scenic designation limits the Town's ability to widen Barrett Hill Road.

Aries recommends that a study be conducted to evaluate methods and cost of road upgrades necessary to support the additional use proposed for Barrett Hill Road. The Planning Board should assess a portion of these road upgrade costs to Applicant as part of an exaction fee that represents their fair share of the increase use of the road.

DELINEATION OF THE SITE AQUIFER

Aries' previously assessed site geology as part of our June 28, 2022 Watershed District Boundary Location Services Report, which concluded the following:

In general, site overburden deposits, comprised glacial till, and bedrock formations reported for the site vicinity are anticipated to be of low permeability and not likely to be considered significant aquifers.

Aries anticipates that the proposed single-family residential development on lots larger than 2 acres should be able to install bedrock water supply wells that have a reasonable probability of suppling sufficient water to a single-family residence. Because the proposed development anticipates construction of 7 single-family residential house lots, which are to be individually serviced by on-site domestic water supply wells and on-site individual sewage disposal systems (ISDS), Aries anticipates that the addition of the seven additional domestic water wells will have a negligible impact to site-vicinity water supply wells, as each ISDS will return a significant volume of water to the subsurface and because site soils are predominantly comprised of hydrologic soil group (HSG) B soils, which are reported[2] to have moderate infiltration rates when thoroughly wetted, which will allow for significant local recharge of precipitation in and around the site property.

From 1994 to 2002, the USGS, in cooperation with NHDES, investigated the yields of wells in New Hampshire's bedrock aquifer[3] (NH Bedrock-Yield Probability Study). Attached Figure 6 depicts the NH Bedrock-Yield Probability Study findings, which predict an 8% to 15% probability of drilling a high yielding (greater than 40 gpm) bedrock well in the proposed development area on the site property.

IMPACT UPON WILDLIFE AND WILDLIFE CORRIDORS

Aries obtained a copy of the NH Natural Heritage Bureau (NHB) DataCheck Tool (DCT) report prepared for Fieldstone as part of their wetland permit application for the proposed site wetland/stream crossing. The NHB report provides a listing of known locations of rare species and natural communities, including those listed as "Threatened" or "Endangered" by either the state of New Hampshire or the federal government.

According to the NHB report, rare species and natural communities were not identified for the site property or nearby area. NHB notes that no record in their database does not mean that a sensitive species is not present, just that one has not been identified nearby. An on-site survey would be necessary to assess species and communities present.

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[2] Hydrologic Soil Groups, Chapter 7, National Engineering Handbook, May 2007, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service.

[3] Moore, R.B., Schwarz G.E., Clark, S.F., Jr., Walsh, G.J., and Degnan, J.R., 2002, *Factors Related to Well Yield in the Fractured-Bedrock Aquifer of New Hampshire,* U.S. Geological Survey Professional Paper 1660.

Regarding the site development, it is anticipated that conversion of the undeveloped, forested property to a dispersed residential use will cause fragmentation of the wildlife habitat. Aries understands that Wilton provides for Cluster Development under Section C of their Land Use Laws that would allow a higher density of housing with the intent of conserving larger, unfragmented natural area as "open space". This option has not been pursued by the Applicant, but could potentially result in a greater number of residential units constructed on the property.

Review of the New Hampshire NH Fish and Game Wildlife (NHFG) Action Plan (WAP), updated in 2020, indicates that the majority of the site property is ranked as a "supporting landscape", while the eastern portion of proposed Lot 2 is ranked as "Highest Ranked Habitat in Region". Attached Figure 7 depicts an overlay of the NHFG WAP for the subdivision area.

Aries notes that the site property is bisected by a significant wetland complex that extends from the northern property boundary to the southern property boundary and that the Applicant has attempted to distance the proposed building pockets from the site wetland areas. The proposed site development is generally located to the west of the existing wetland complex, with the exception of the proposed Lot 7 building pocket. Aries recommends that a building pocket of approximately 2 +/- acres be delineated for Lot 7 in the vicinity of well and septic depicted on the site plans, and that the remainder of Lot 7 be placed in a conservation easement. Because this lot is greater than 10 acres, the created parcel should be eligible for "Current Use" status, which should provide a property tax savings to a future buyer.

The created conservation easement area, combined with the isolated eastern portions of proposed Lots 2 and 3 and the site wetland complex and associated wetland buffers, are anticipated to remain generally undeveloped and should provide unfragmented habitat for wildlife across an approximate 29.7 acre +/- area in the eastern and southern portion of the site property as depicted on attached Figure 8. This "conservation area" represents approximately 66% of the total 45 acre +/- site property and meets the minimum 40% common open space requirement of the Town's Cluster Development Regulations. In effect, the proposed subdivision layout is consistent with the Cluster Development Regulations intent of, "promot[ing] the conservation of the natural environment, preservation of wetlands and wildlife habitat, and the development of community uses in harmony with the natural features of the land."

OFF-SITE IMPACTS FROM ON-SITE DISTURBANCE RELATED TO THE PROPOSED CONSTRUCTION ACTIVITY

Aries anticipates that off-site disturbances from the proposed development will be predominantly related to the increased construction vehicle traffic on Barrett Hill Road and increased, but temporary, noise related to site construction work.

As noted above, Aries recommends that a study be conducted to evaluate the methods and cost of upgrading Barrett Hill Road. It is anticipated that disturbance related to the

road upgrades will be short-term, while the recommended road upgrades will be to the benefit of all abutters and users of Barrett Hill Road.

Regarding noise related to on-site construction work, Aries notes the Town Zoning Ordinance allows for noise related to "customary equipment used during daytime construction of permitted structures" between the hours of 7 am and 7 pm on weekdays and Saturday. Aries recommends that the Planning Board establish hours of operation for construction and site development that is consistent with the Town Zoning Ordinance requirements for noise under Section 4.10 - Performance Standards.

Please contact me at (603) 228-0008 if you have any questions regarding this finding.

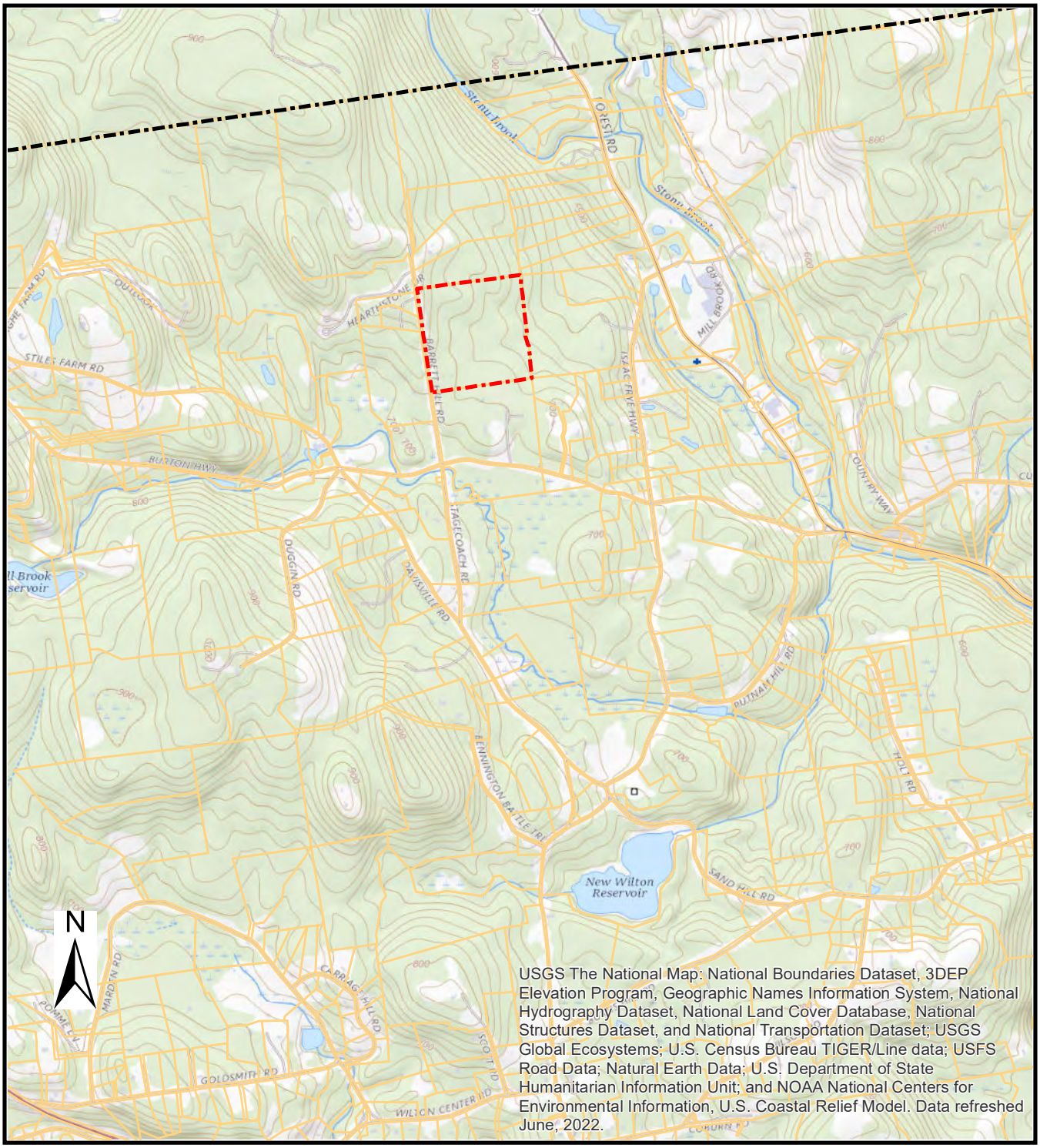
Sincerely,
Aries Engineering, LLC

George C. Holt, P.G.
Principal Hydrogeologist

Kathryn A. Ward, P.E.
Principal Engineer

GCH:pj

Attachments: Figure 1 – Site Locus Plan
Figure 2 – Wetland Plan
Figure 3 – Proposed Disturbance Area Plan
Figure 4 – Alternative Driveway Concept Plan
Figure 5 – Existing Disturbance Area Plan
Figure 6 – NH Bedrock-Yield Probability Study
Figure 7 – NH Fish and Game Wildlife Action Plan
Figure 8 – Conservation Area Concept Plan



Legend

- Site Boundary
- WIlton Town Boundary
- Wilton NH Tax Parcels

Aries Project # 2023-016
File # 2023-016(1)02.23.mxd

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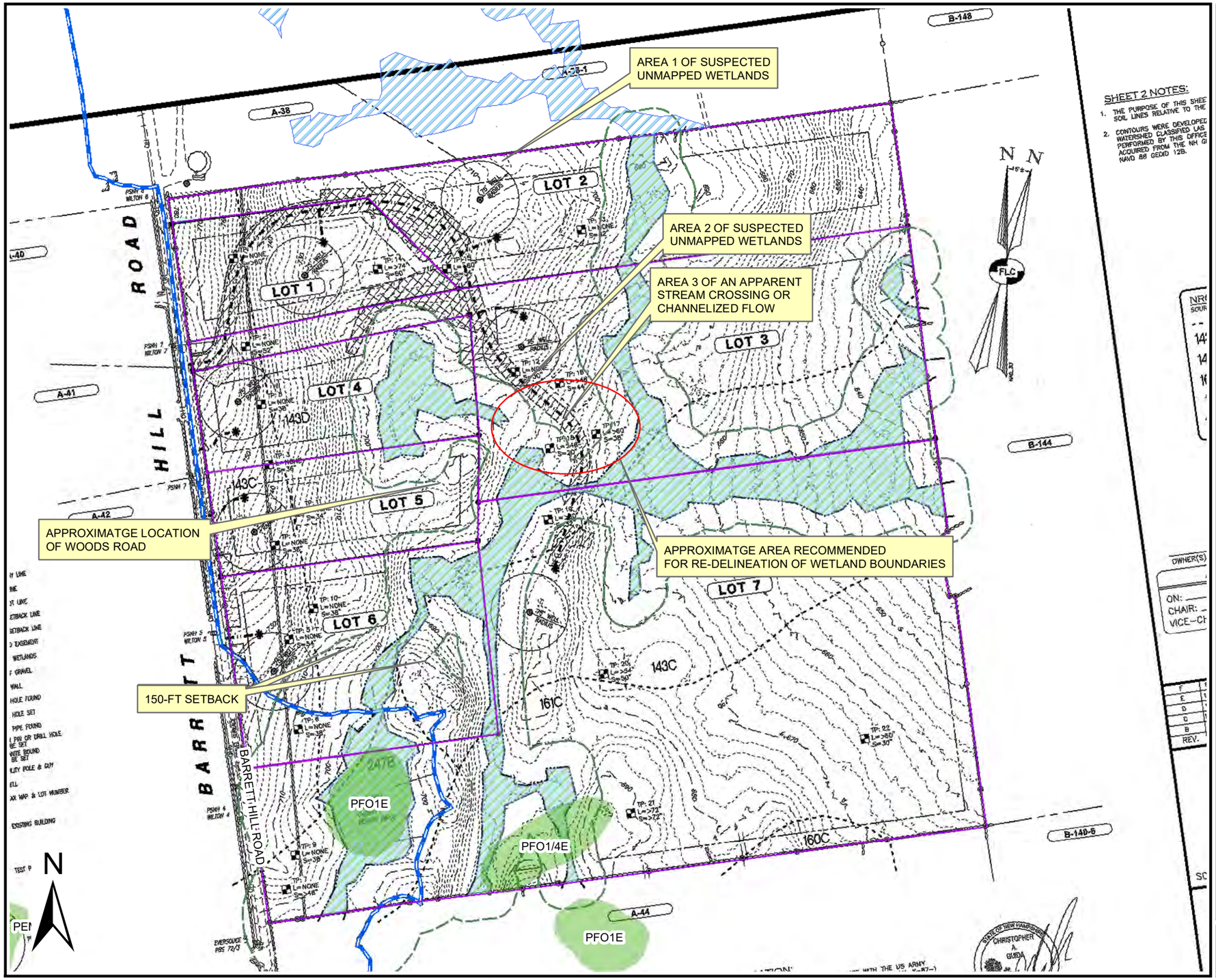
TECHNICAL ASSISTANCE SERVICES
LOT A-44-1
WILTON, NEW HAMPSHIRE

SITE LOCUS PLAN

FEBRUARY 2023 FIGURE 1



NOTES:

1. Plan prepared from: an overlay of a "Topographic & Soil Plan", prepared by Fieldstone Land Consultants, PLLC, dated 1/27/23; and Geographic Information System (GIS) data and basemaps provided by the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) maintained by the University of New Hampshire and the NH Office of Strategic Initiatives.

2. Site boundary and building locations are based on an overlay of the site features on GIS data. Therefore, all site features are approximately located.

3. This plan is not to be used for survey, building or boundary purposes.

Legend

- National Wetland Inventory WebMapper Wetlands
- Off-Site Wetlands
- 50-Foot Wetland Buffer
- Wilton_Town_Boundary
- Proposed Lots
- Wetlands
- Delineated Watershed District Boundary

Aries Project # 2023-016
File # 2023-016(2)02.23.MXD

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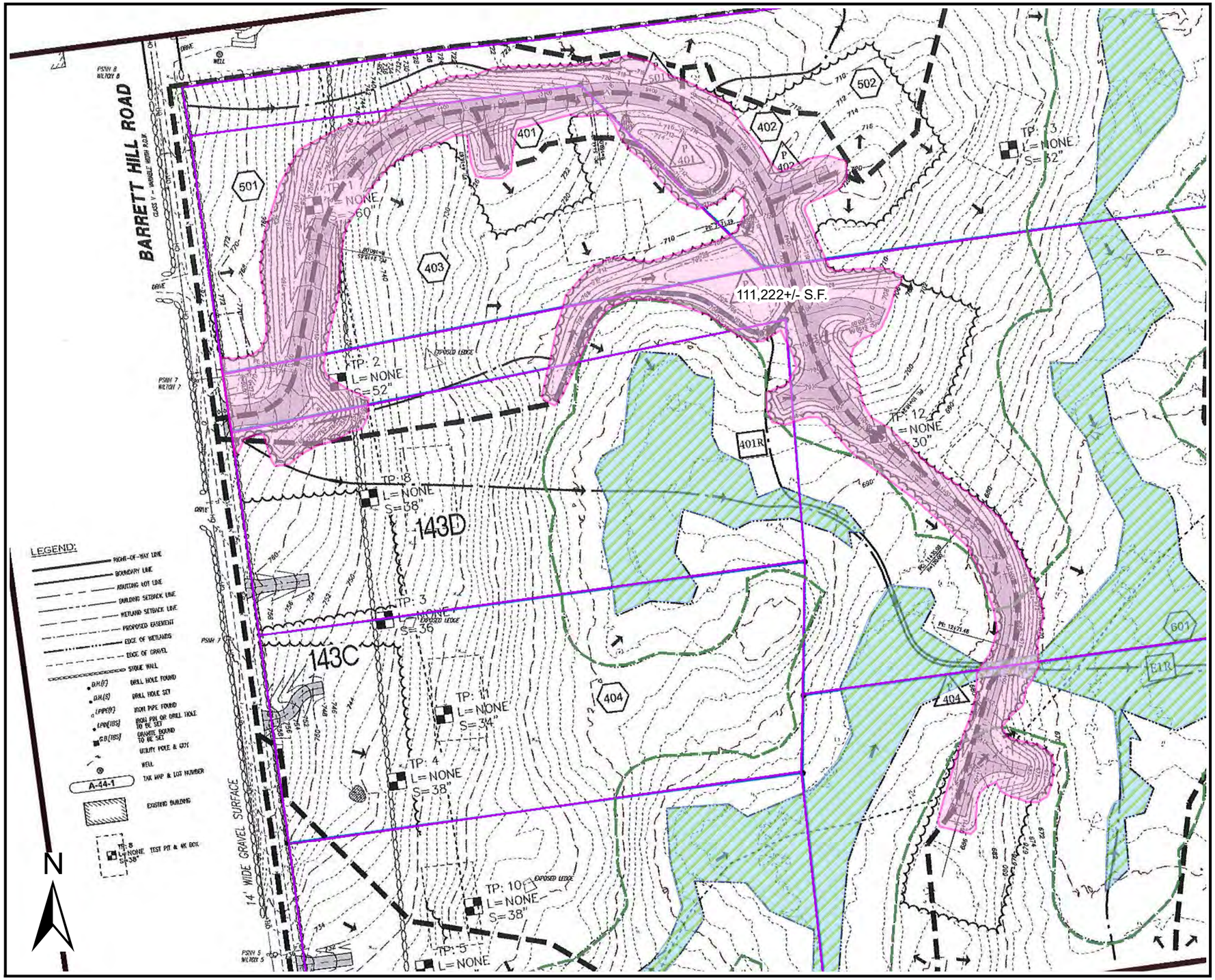
WILTON, NEW HAMPSHIRE

WETLAND PLAN

FERUARY 2023 FIGURE 2



NOTES:

1. Plan prepared from: an overlay of a "Post-Development Drainage Area Plan 2", prepared by Fieldstone Land Consultants, PLLC, dated 1/27/23; and Geographic Information System (GIS) data and basemaps provided by the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) maintained by the University of New Hampshire and the NH Office of Strategic Initiatives.

2. Site boundary and building locations are based on an overlay of the site features on GIS data. Therefore, all site features are approximately located.

3. This plan is not to be used for survey, building or boundary purposes.

Aries Project # 2023-016
File # 2023-016(3)02.23.MXD

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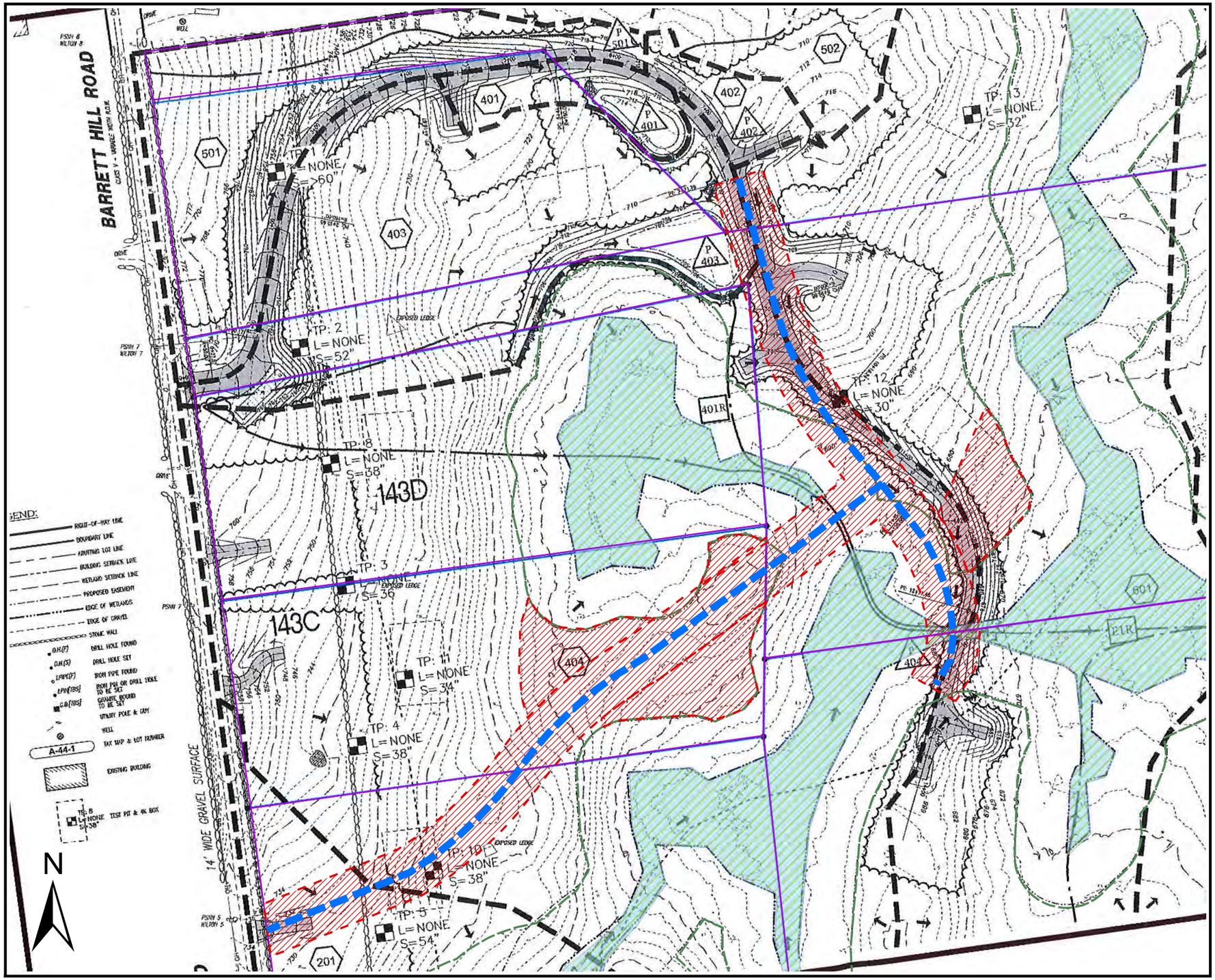
TECHNICAL ASSISTANCE SERVICES
LOT A-44-1
WILTON, NEW HAMPSHIRE

PROPOSED DISTURBANCE AREA PLAN

FERUARY 2023 FIGURE 3



NOTES:

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2. Site boundary and building locations are based on an overlay of the site features on GIS data. Therefore, all site features are approximately located.

3. This plan is not to be used for survey, building or boundary purposes.

Legend

- Alternative Driveway Centerline
- Approximate Alternative Driveway Disturbance Area
- 50-Foot Wetland Buffer
- Proposed Lots
- Wetlands

0 50 100 200 300 400 Feet

Aries Project # 2023-016
File # 2023-016(4)02.23.MXD

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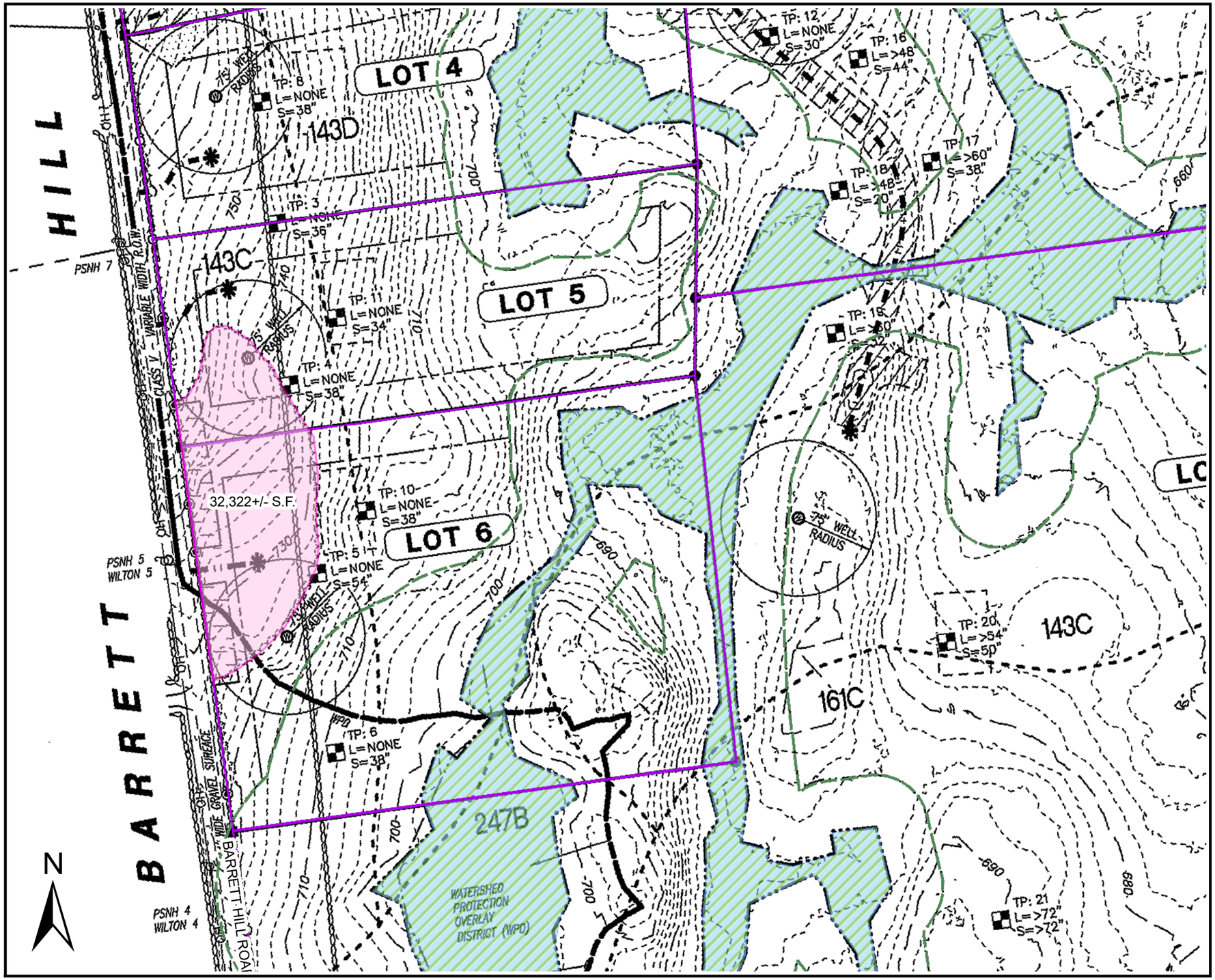
LOT A-44-1
WILTON, NEW HAMPSHIRE

ALTERNATIVE DRIVEWAY CONCEPT PLAN

FERUARY 2023 FIGURE 4



NOTES:

1. Plan prepared from: an overlay of a "Topographic & Soil Plan", prepared by Fieldstone Land Consultants, PLLC, dated 1/27/23; and Geographic Information System (GIS) data and basemaps provided by the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) maintained by the University of New Hampshire and the NH Office of Strategic Initiatives.

2. Site boundary and building locations are based on an overlay of the site features on GIS data. Therefore, all site features are approximately located.

3. This plan is not to be used for survey, building or boundary purposes.

Legend

- Existing Disturbance Area
- 50-Foot Wetland Buffer
- Proposed Lots
- Wetlands

0 50 100 200 300 400 Feet

Aries Project # 2023-016
File # 2023-016(5)02.23.MXD

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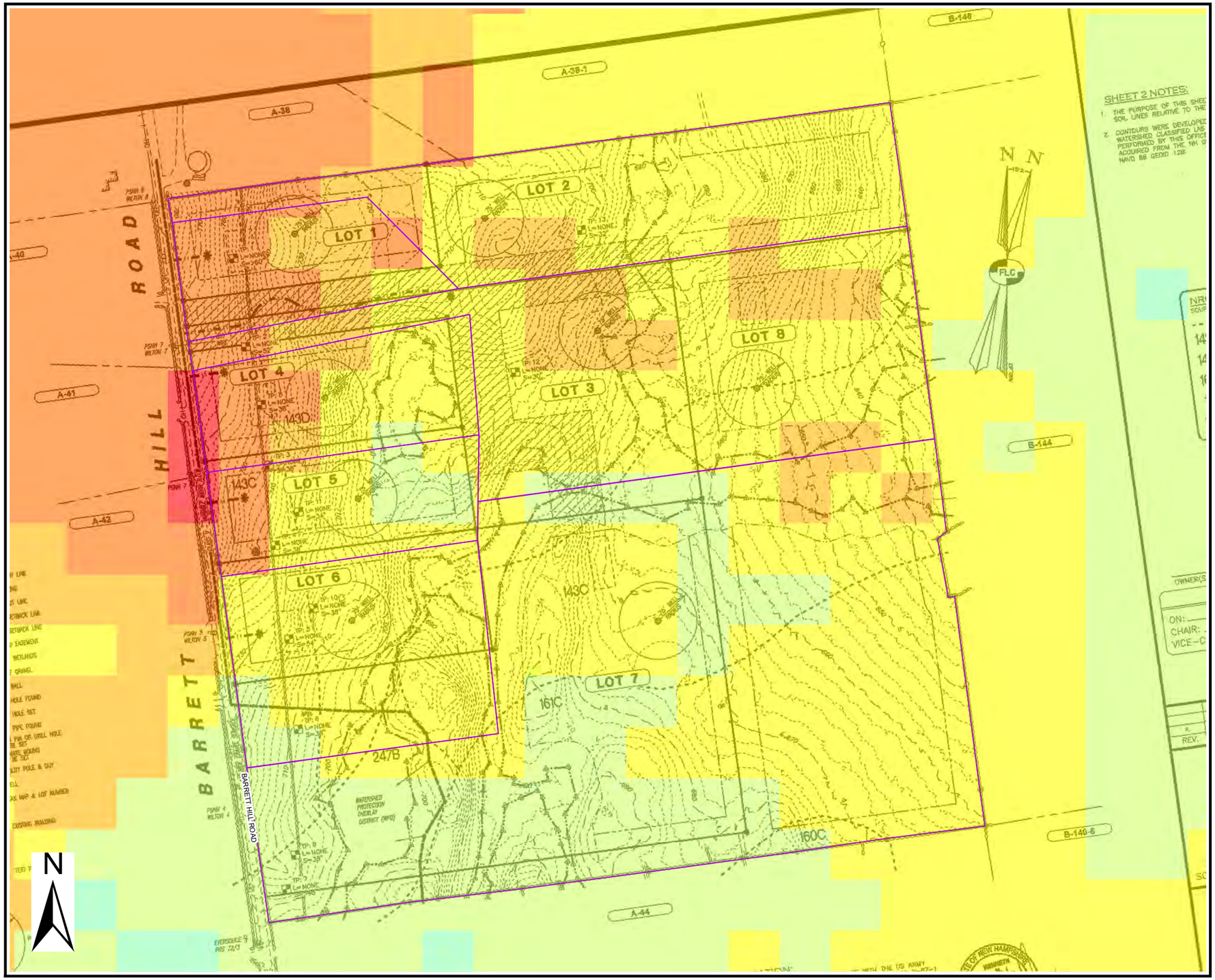
LOT A-44-1
WILTON, NEW HAMPSHIRE

EXISTING DISTURBANCE AREA PLAN

FERUARY 2023 FIGURE 5



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2. Site boundary and building locations are based on an overlay of the site features on GIS data. Therefore, all site features are approximately located.

3. This plan is not to be used for survey, building or boundary purposes.

Legend

- Proposed Lots
- Less than or equal to 6%
- 6.1% to 8%
- 8.1% to 10%
- 10.1% to 12%
- 12.1% to 15%
- 15.1% to 18%
- 18.1% to 20%
- 20.1% to 25%
- 25.1% to 30%
- Greater than 30%
- Not determined

0 100 200 400 600 800 Feet

Aries Project # 2023-016
File # 2023-016(6)02.23.MXD

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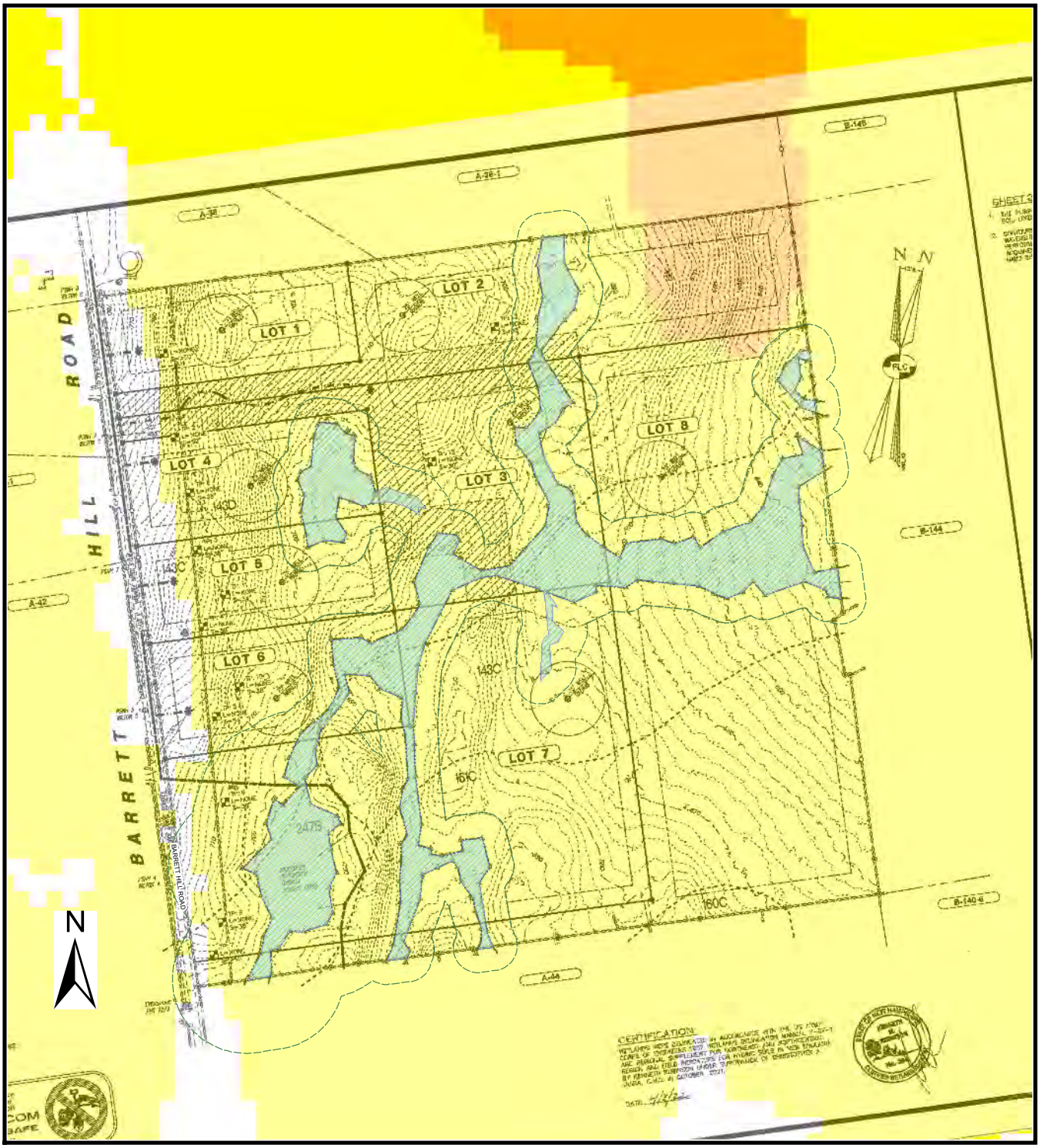
NH BEDROCK-YIELD PROBABILITY PLAN

FERUARY 2023 FIGURE 6



Legend

NH Wildlife Action Plan 2020 - Highest Ranked Wildlife Habitat

- 1 Highest Ranked Habitat in NH
- 2 Highest Ranked Habitat in Region
- 3 Supporting Landscape

300 150 0 300 600

Feet

Aries Project # 2023-016
File # 2023-016(7)02.22.mxd

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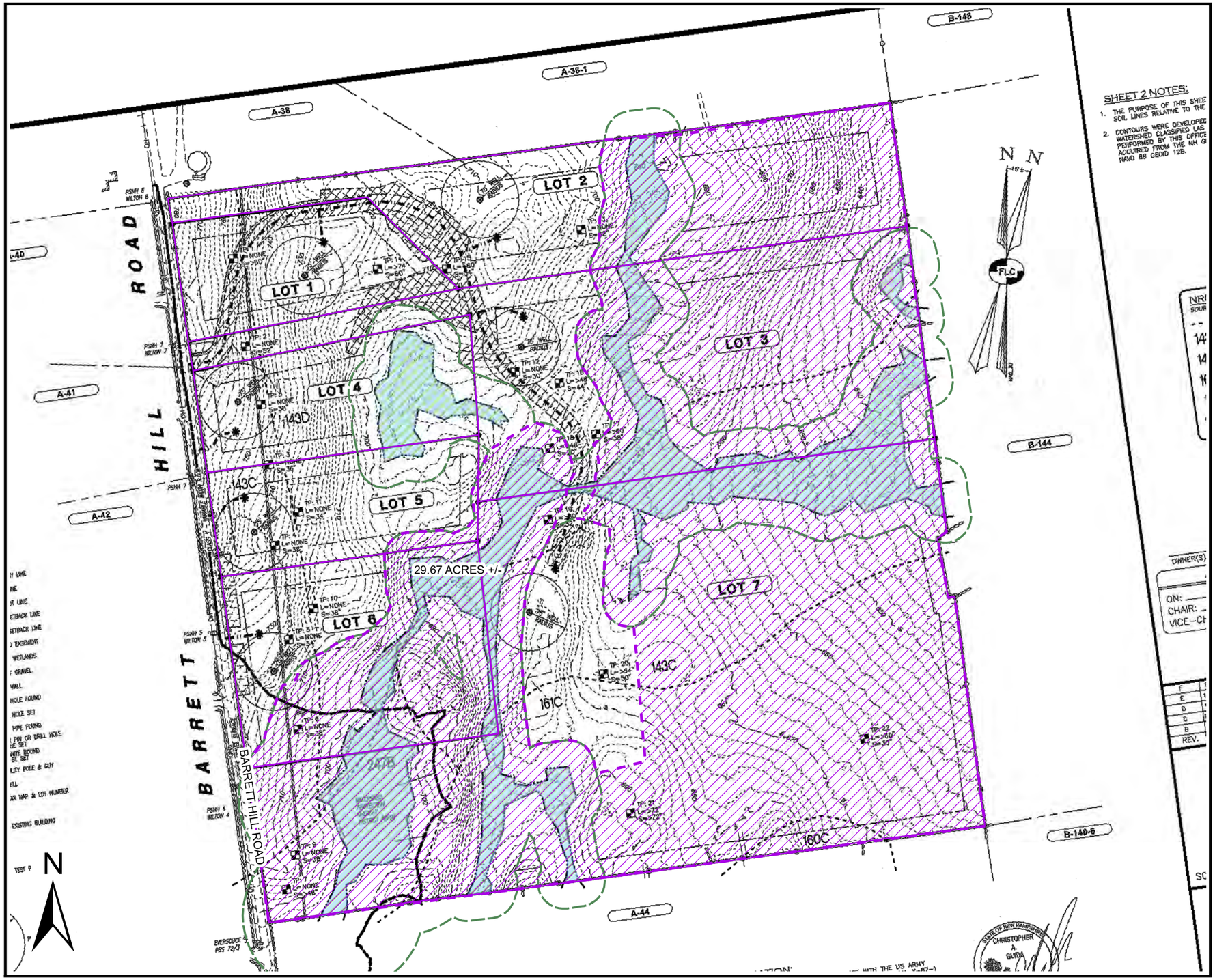
WILTON, NEW HAMPSHIRE

NHFG 2020 WILDLIFE ACTOIN PLAN

FEBRUARY 2023 FIGURE 7



NOTES:

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2. Site boundary and building locations are based on an overlay of the site features on GIS data. Therefore, all site features are approximately located.

3. This plan is not to be used for survey, building or boundary purposes.

Legend

- Conceptual Openspace Area
- 50-Foot Wetland Buffer
- Proposed Lots
- Wetlands

Aries Project # 2023-016
File # 2023-016(8)02.23.MXD

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TECHNICAL ASSISTANCE SERVICES
LOT A-44-1
WILTON, NEW HAMPSHIRE

OPENSPACE AREA CONCEPT PLAN

FERUARY 2023 FIGURE 8

Storm Water Management Report

TAX MAP A, LOT 44-1

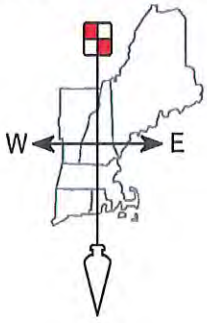
(RESIDENTIAL SUBDIVISION)

Project Location:
Tax Map A, Lot 44-1
Barrett Hill Road
Wilton, NH

Prepared for:
San-Ken Homes, LLC
586 Turnpike Road
New Ipswich, NH 03071

Date: November 9, 2022
Revised: January 27, 2023

Surveying ⌖ Engineering ⌖ Land Planning ⌖ Permitting ⌖ Septic Designs



FIELDSTONE
LAND CONSULTANTS, PLLC

206 Elm Street, Milford NH 03055
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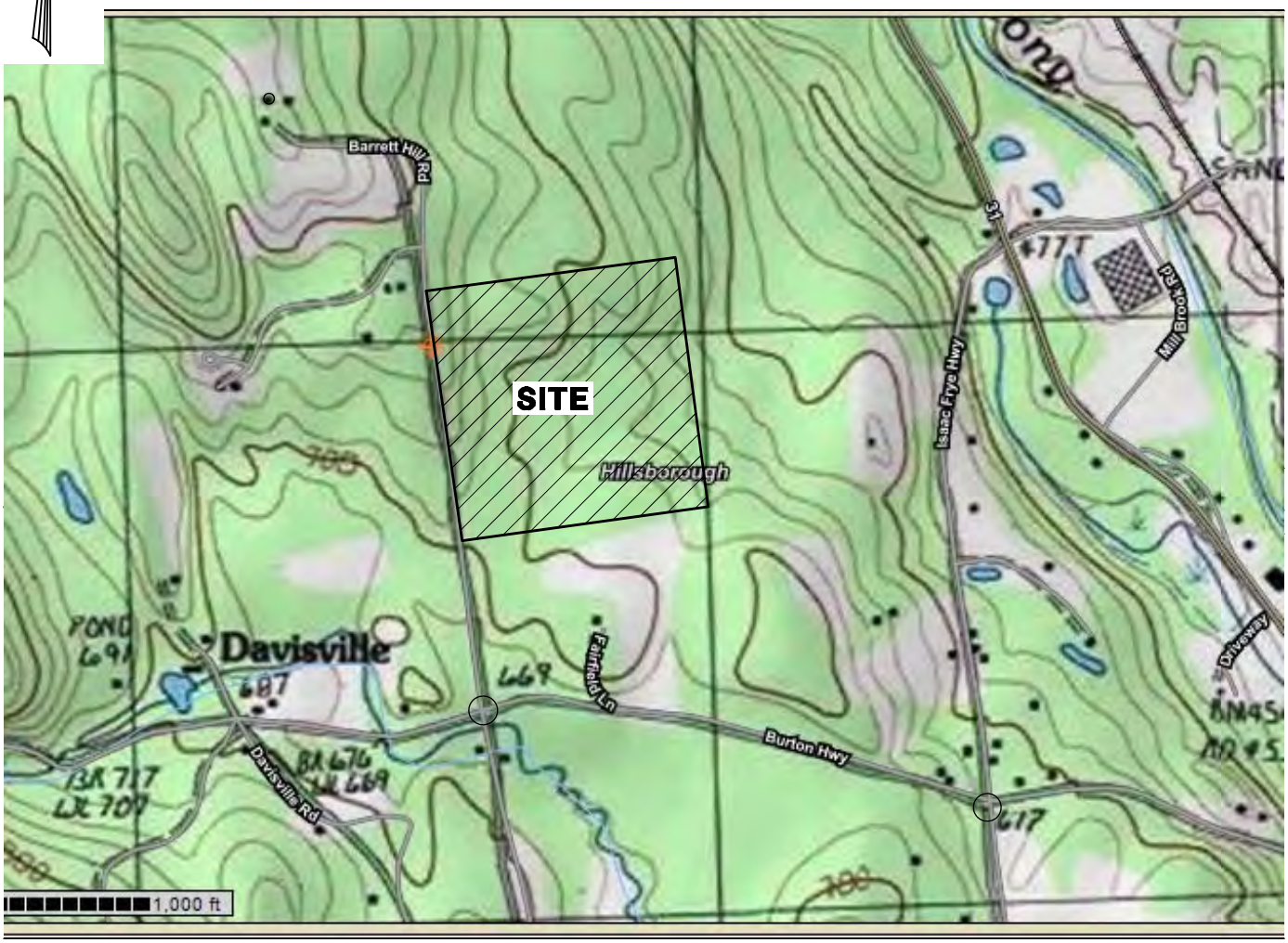
www.FieldstoneLandConsultants.com

Index



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USGS LOCUS PLAN

SAN-KEN HOMES, INC.

TAX MAP A, LOT 44-1

WILTON, NEW HAMPSHIRE

SCALE: 1" = 1,000' NOVEMBER 10, 2022

FILE: 3029DP01.dwg	PROJ. NO. 3029.01	SHEET NO. 1 OF 1

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Land Planning ⌖ Septic Designs
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STORM WATER MANAGEMENT REPORT
TAX MAP A, LOT 44-1
WILTON, NEW HAMPSHIRE

Prepared for:
San-Ken Homes, Inc.

January 27, 2023

I) INTRODUCTION

The following are storm water drainage calculations for a proposed single-family residential subdivision in Wilton, NH. The land is being developed under the Town of Wilton's Subdivision Regulations. The 45± acre parcel is currently undeveloped and is surrounded by single family residential development. The applicant is proposing to subdivide the existing 45.423-acre parcel into 7 single family lots. Three of the proposed lots will have access directly off of Barrett Hill Road and the remaining 4 lots will be accessed by a 990-foot common drive. The common drive will be 16 feet wide with 2-foot shoulders for a total width of 20 feet. The proposed common drive will terminate in a hammerhead turnaround. The terrain alteration associated with the common drive and the access to Lot 7 is 96,000± Sq.Ft. The amount of impervious area (pavement & buildings) proposed for this project is approximately 1.00 acre.

The purpose of this report is to analyze the qualitative and quantitative impacts of the proposed development. The objective of the proposed stormwater management system for this project is to mitigate any increases resulting from the proposed development and to meet the drainage guidelines set forth in the Town of Wilton Subdivision Regulations.

II) SITE DESCRIPTION (EXISTING)

The subject property consists of 45.423 acres of land fronting on the east side of Barrett Hill Road. A subdivision of the parcel was previously approved in 2006. The parcel is bordered by single family residential development. The subject parcel is located in the Town of Wilton's General Residence & Agricultural District and has frontage on Barrett Hill Road. The parcel is primarily wooded with some cleared areas along Barrett Hill Road. Barrett Hill Road runs along a ridge in the vicinity of the property and the entire property is moderately sloped away from the road in an easterly direction. The area of the proposed development consists primarily of Monadnock Sandy Loam and Tunbridge-Lyman-Monadnock complex which are well-drained soils with a Hydrologic Soil Group (HSG) "B' rating that are suitable for infiltration BMP's. The south/southeast portion of the parcel consists of Lyman-Tunbridge Rock Outcrop soils, which, though they're well drained soils are HSG D soils. There is also a small amount of Lyme find sandy loam which is a poorly-drained, HSG "D" soil. The presence of these soil types has been confirmed by field examination. The existing wetlands on-site have been mapped and are shown on the plans. A wetland crossing is proposed to access Lot 7.

III) METHODOLOGY

The quantity of runoff and the conveyance of that flow through the site are determined using the software package HydroCAD r 10.0 by HydroCAD Software Solutions, LLC. HydroCAD is a computer aided design program for modeling storm water hydrology based on the Soil Conservation Service (SCS) TR-20 method combined with standard hydraulics calculations used to model detention basins and culverts.

Stormwater management systems and erosion control outlet protection aprons (riprap aprons) are designed in accordance with the methodology for the "Best Management Practices" (BMP's), as outlined in the New Hampshire Storm Water Manual, Volume 2.

IV) DRAINAGE DESIGN

In accordance with the Town of Wilton, the twenty-five (25) year frequency storm event has been evaluated. This design storm has been analyzed to compare the pre and post-development peak flow rates for the site (see attached comparison tables).

Pre-Development Drainage Conditions:

As can be seen on the Pre-Development Drainage Area Plans, the site is situated on the top of an eastern slope. There is a small portion of the property (E1S) that flows to the south and the northern portion flows to the north (E5S) and subsequently drains back onto the subject parcel. There is a ridge south of the property and a portion of the abutting property to the south drains onto the subject parcel. A portion of the abutting parcel to the north also drains onto the subject parcel but is downstream of the proposed wetland crossing so it was not included in the analysis. There are two existing low areas where runoff collects before spilling over toward the proposed wetland crossing. The flow to these areas subcatchments associated with these areas are E2S and E3S and the ponded areas are identified as E1p and E2P in the attached analysis. Three wetland areas converge in the middle of the property in the vicinity of the proposed wetland crossing. The flow to this convergence is modeled in subcatchment E4S. This wetland continues in an easterly direction (Reach E1S) to a point where it converges with the flow from the north of the property the flow to this convergence is modeled in subcatchment E6S. The wetland continues to the eastern boundary (Reach E2S) where it continues in and easterly direction toward Stony Brook and the Souhegan River. Finally, Subcatchment E7S consists the remaining, eastern portion of the property. There are three observation points in the analysis and the consist of the stormwater runoff to the south (OP1), north (OP2) and east (OP3).

Post-Development Drainage Conditions:

As can be seen on the Post-Development Drainage Area Plans, the areas draining to observation point are relatively close to the predevelopment condition. There are a number of additional subcatchments in the post-development condition in the area of the proposed development but the overall drainage patterns are the same. Though there is a significant number of wetlands on

the property there is only one wetland crossing proposed for access to Lot 7. Though the flow to OP1 drains back onto the property, the proposed design maintains the pre-development flow at his location. This is accomplished by routing the runoff from the driveway culvert that drains to a small infiltration basin (IB1) is proposed near Station 6+00 of the common driveway. This basin outlets to a second, larger infiltration basin (IB2) proposed on the inside of the driveway at Station 8+00±. These infiltration basins mitigate the increase in runoff resulting from the proposed common driveway.

V) SUMMARY

The intent of the stormwater management system for this project is to address the qualitative and quantitative aspects of the stormwater runoff so that there are no downstream adverse impacts created by the project. To mitigate the resulting increases in runoff volume and peak rates due to the development of Lot A-44-1 this project proposes two infiltration basins to mitigate the increase in runoff resulting from the proposed development. The net result is that proposed driveway will receive qualitative treatment and that due to the detention capabilities of the basins there will be no increase in the peak rates of runoff leaving the site.

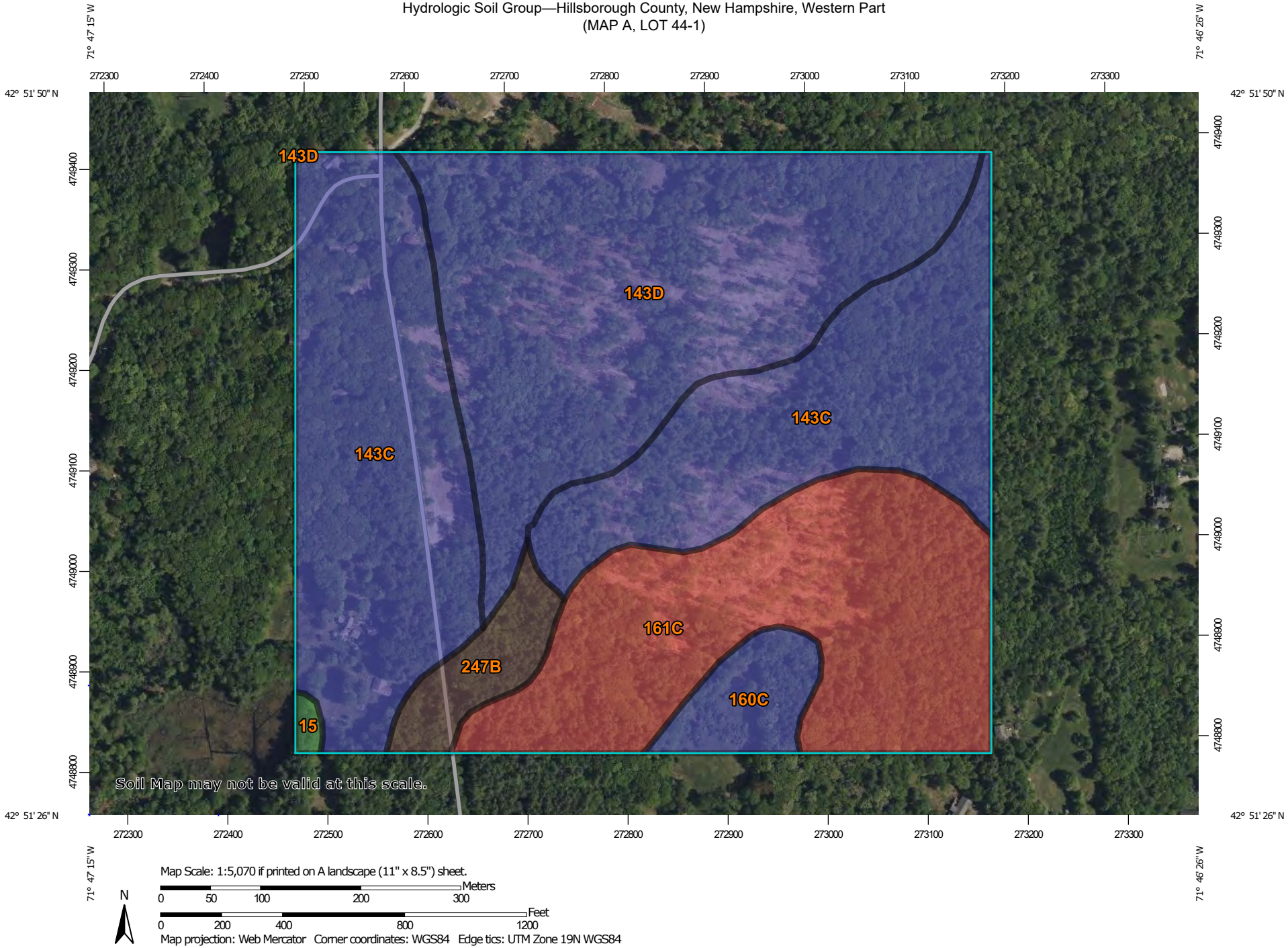
The stormwater management design for this project therefore complies with the stormwater standards set forth in the Town of Wilton's Subdivision Review Regulations and the NHDES Alteration of Terrain regulations.

The following tables are a summary of the attached calculations and show a comparison of the peak flow rates at the outlet point for the site. The values presented are based on pre- and post-development conditions.

Table 1: Peak Flow Rate Discharge to Observation Points

OBSERVATION POINT	PRE-DEV. RUNOFF (CFS)	POST-DEV. RUNOFF (CFS)	CHANGE (CFS)	CHANGE (%) (CFS)
OP1	0.49	0.49	-	0
OP2	2.07	1.04	-1.03	50%
OP3	43.51	42.14	-1.37	97%

Hydrologic Soil Group—Hillsborough County, New Hampshire, Western Part
(MAP A, LOT 44-1)



Map Scale: 1:5,070 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hillsborough County, New Hampshire, Western Part
Survey Area Data: Version 24, Sep 12, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
15	Searsport muck	A/D	0.4	0.3%
143C	Monadnock fine sandy loam, 8 to 15 percent slopes, very stony	B	40.2	39.0%
143D	Monadnock fine sandy loam, 15 to 35 percent slopes, very stony	B	32.3	31.3%
160C	Tunbridge-Lyman-Monadnock complex, stony, 8 to 15 perce nt slopes	B	3.5	3.4%
161C	Lyman-Tunbridge-Rock outcrop complex, 3 to 15 percent slopes	D	23.4	22.7%
247B	Lyme fine sandy loam, 0 to 8 percent slopes, very stony	B/D	3.4	3.3%
Totals for Area of Interest			**103.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

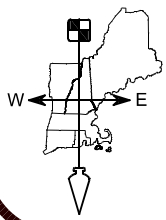
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

N

Surveying ⌖ Engineering ⌖ Land Planning ⌖ Permitting ⌖ Septic Designs



FIELDSTONE
LAND CONSULTANTS, PLLC

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AERIAL LOCUS PLAN

SAN-KEN HOMES, INC.

TAX MAP A, LOT 44-1

WILTON, NEW HAMPSHIRE

SCALE: 1" = 1,000' NOVEMBER 10, 2022

FILE: 3092DP01.dwg	PROJ. NO. 3092.01	SHEET NO. 1 OF 1

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.749 degrees West
Latitude	42.833 degrees North
Elevation	0 feet
Date/Time	Wed, 04 Nov 2020 16:46:44 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.69	0.87	1.09	**1yr**	0.75	1.01	1.26	1.57	1.97	2.48	2.75	**1yr**	2.20	2.65	3.04	3.81	4.38	**1yr**
2yr	0.33	0.51	0.64	0.84	1.06	1.33	**2yr**	0.92	1.21	1.54	1.92	2.39	2.98	3.34	**2yr**	2.64	3.21	3.73	4.46	5.07	**2yr**
5yr	0.40	0.62	0.77	1.03	1.32	1.68	**5yr**	1.14	1.51	1.94	2.43	3.01	3.74	4.26	**5yr**	3.31	4.09	4.73	5.59	6.24	**5yr**
10yr	0.44	0.70	0.88	1.20	1.56	2.00	**10yr**	1.35	1.79	2.32	2.90	3.60	4.44	5.12	**10yr**	3.93	4.92	5.67	6.63	7.31	**10yr**
25yr	0.53	0.84	1.06	1.47	1.94	2.51	**25yr**	1.68	2.24	2.92	3.66	4.54	5.57	6.54	**25yr**	4.93	6.29	7.21	8.31	9.00	**25yr**
50yr	0.59	0.95	1.21	1.70	2.30	3.00	**50yr**	1.99	2.66	3.50	4.39	5.42	6.62	7.88	**50yr**	5.86	7.57	8.65	9.87	10.55	**50yr**
100yr	0.68	1.10	1.41	2.00	2.73	3.57	**100yr**	2.35	3.15	4.18	5.23	6.45	7.87	9.49	**100yr**	6.96	9.13	10.37	11.73	12.36	**100yr**
200yr	0.77	1.26	1.63	2.34	3.23	4.25	**200yr**	2.79	3.74	4.99	6.25	7.70	9.36	11.45	**200yr**	8.28	11.01	12.45	13.94	14.50	**200yr**
500yr	0.92	1.52	1.98	2.88	4.04	5.36	**500yr**	3.49	4.70	6.30	7.91	9.72	11.78	14.70	**500yr**	10.43	14.13	15.85	17.52	17.91	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.20	0.31	0.38	0.51	0.63	0.78	**1yr**	0.55	0.77	1.02	1.36	1.68	2.18	2.45	**1yr**	1.93	2.36	2.52	3.48	3.94	**1yr**
2yr	0.32	0.49	0.61	0.82	1.01	1.19	**2yr**	0.88	1.17	1.35	1.75	2.25	2.89	3.25	**2yr**	2.56	3.12	3.60	4.33	4.94	**2yr**
5yr	0.36	0.55	0.68	0.94	1.19	1.40	**5yr**	1.03	1.37	1.62	2.10	2.68	3.44	3.95	**5yr**	3.05	3.80	4.34	5.16	5.83	**5yr**
10yr	0.39	0.60	0.74	1.04	1.34	1.57	**10yr**	1.16	1.53	1.76	2.38	3.03	3.98	4.60	**10yr**	3.52	4.42	5.01	5.89	6.62	**10yr**
25yr	0.44	0.67	0.84	1.19	1.57	1.82	**25yr**	1.36	1.78	2.04	2.84	3.55	4.66	5.64	**25yr**	4.13	5.42	6.06	7.01	7.82	**25yr**
50yr	0.48	0.72	0.90	1.29	1.74	2.05	**50yr**	1.50	2.00	2.29	3.24	4.00	5.32	6.60	**50yr**	4.71	6.35	7.00	8.00	8.88	**50yr**
100yr	0.51	0.77	0.96	1.39	1.91	2.30	**100yr**	1.65	2.25	2.57	3.20	4.53	6.07	7.75	**100yr**	5.37	7.45	8.10	9.13	10.08	**100yr**
200yr	0.55	0.83	1.05	1.52	2.11	2.59	**200yr**	1.82	2.53	2.86	3.57	5.16	6.92	9.12	**200yr**	6.13	8.77	9.37	10.41	11.45	**200yr**
500yr	0.61	0.91	1.17	1.69	2.41	3.04	**500yr**	2.08	2.97	3.35	4.12	6.14	8.26	11.36	**500yr**	7.31	10.93	11.40	12.38	13.57	**500yr**

Upper Confidence Limits

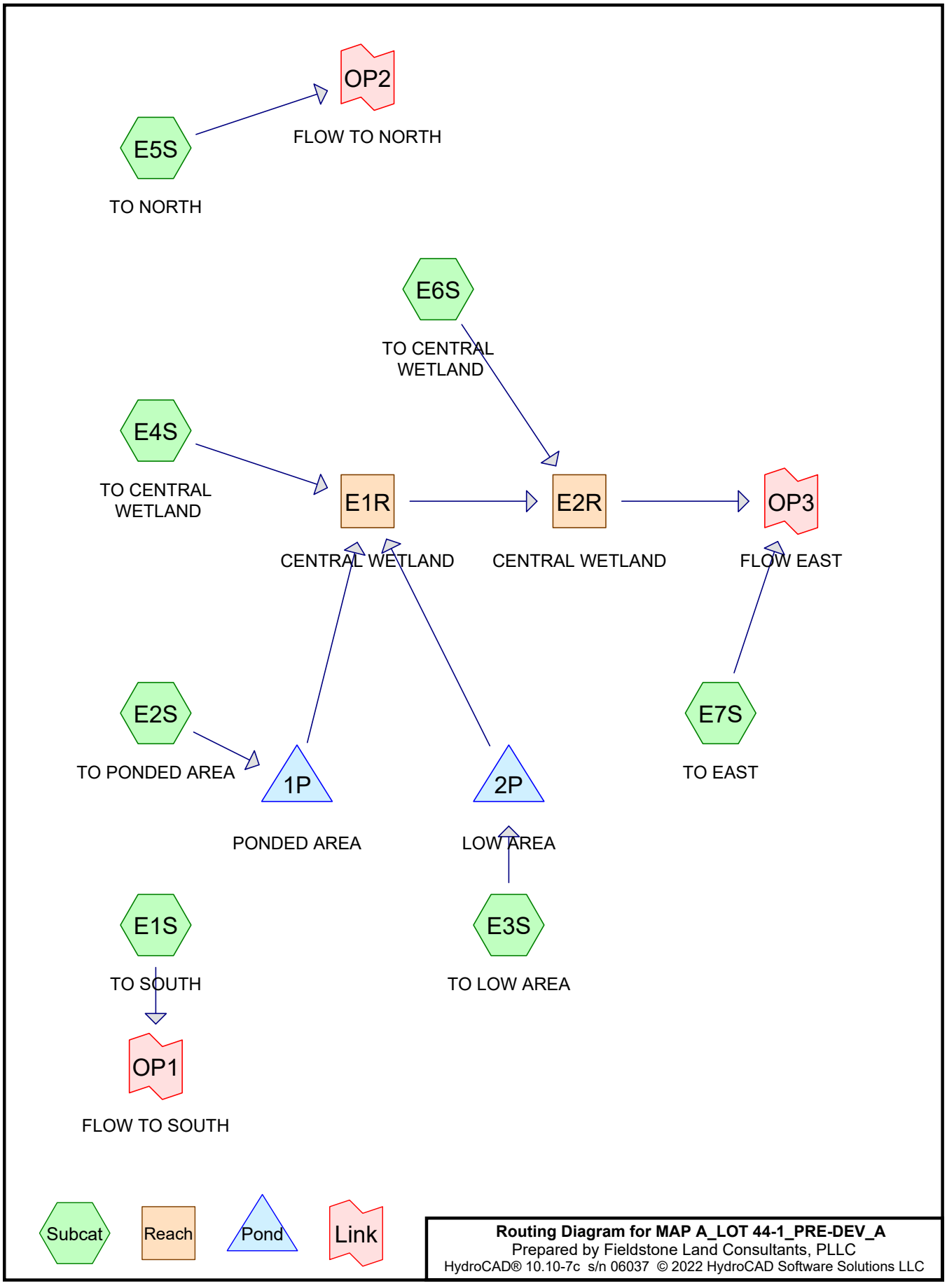
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.32	0.49	0.60	0.80	0.98	1.17	**1yr**	0.85	1.15	1.29	1.69	2.10	2.67	2.98	**1yr**	2.36	2.87	3.31	4.26	4.86	**1yr**
2yr	0.36	0.56	0.68	0.93	1.14	1.32	**2yr**	0.99	1.29	1.48	1.91	2.45	3.10	3.46	**2yr**	2.75	3.33	3.87	4.62	5.23	**2yr**
5yr	0.44	0.67	0.83	1.14	1.45	1.69	**5yr**	1.25	1.65	1.87	2.37	2.96	4.05	4.58	**5yr**	3.59	4.41	5.15	6.01	6.69	**5yr**
10yr	0.51	0.79	0.98	1.37	1.77	2.07	**10yr**	1.53	2.02	2.33	2.83	3.50	4.94	5.68	**10yr**	4.37	5.46	6.39	7.35	8.07	**10yr**
25yr	0.65	0.99	1.23	1.76	2.32	2.70	**25yr**	2.00	2.64	3.02	3.57	4.34	6.51	7.51	**25yr**	5.76	7.22	8.51	9.61	10.34	**25yr**
50yr	0.78	1.19	1.48	2.12	2.86	3.31	**50yr**	2.46	3.24	3.69	4.26	5.11	7.99	9.29	**50yr**	7.07	8.94	10.57	11.78	12.48	**50yr**
100yr	0.93	1.41	1.77	2.56	3.50	4.07	**100yr**	3.02	3.97	4.50	5.73	6.02	9.82	11.49	**100yr**	8.69	11.05	13.12	14.44	15.07	**100yr**
200yr	1.12	1.69	2.14	3.09	4.32	4.98	**200yr**	3.72	4.87	5.48	6.97	7.10	12.06	14.19	**200yr**	10.68	13.65	16.28	17.74	18.21	**200yr**
500yr	1.44	2.14	2.76	4.00	5.69	6.48	**500yr**	4.91	6.34	7.13	9.06	8.80	15.83	18.77	**500yr**	14.01	18.04	21.67	23.28	23.41	**500yr**

Powered by ACIS Northeast Regional Climate Center

Section 1.1

Existing Conditions

25 Year Storm Full Summary



Routing Diagram for MAP A_LOT 44-1_PRE-DEV_A
Prepared by Fieldstone Land Consultants, PLLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.196	61	>75% Grass cover, Good, HSG B (E1S, E2S, E4S, E5S)
0.020	80	>75% Grass cover, Good, HSG D (E1S)
0.411	48	Brush, Good, HSG B (E4S, E5S, E6S)
0.207	96	Gravel surface, HSG B (E1S, E2S, E4S, E5S)
0.018	96	Gravel surface, HSG D (E1S)
32.897	55	Woods, Good, HSG B (E1S, E2S, E3S, E4S, E5S, E6S, E7S)
13.788	77	Woods, Good, HSG D (E1S, E2S, E3S, E6S, E7S)
48.535	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
34.710	HSG B	E1S, E2S, E3S, E4S, E5S, E6S, E7S
0.000	HSG C	
13.825	HSG D	E1S, E2S, E3S, E6S, E7S
0.000	Other	
48.535		**TOTAL AREA**

Time span=5.00-27.00 hrs, dt=0.05 hrs, 441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1S: TO SOUTH Runoff Area=19,130 sf 0.00% Impervious Runoff Depth=3.20"
Flow Length=110' Tc=8.9 min CN=78 Runoff=1.46 cfs 0.117 af

Subcatchment E2S: TO PONDED AREA Runoff Area=192,800 sf 0.00% Impervious Runoff Depth=2.04"
Flow Length=240' Tc=8.8 min CN=65 Runoff=9.13 cfs 0.754 af

Subcatchment E3S: TO LOW AREA Runoff Area=204,710 sf 0.00% Impervious Runoff Depth=3.01"
Flow Length=400' Tc=13.6 min CN=76 Runoff=12.93 cfs 1.180 af

Subcatchment E4S: TO CENTRAL Runoff Area=520,320 sf 0.00% Impervious Runoff Depth=1.35"
Flow Length=940' Tc=12.8 min CN=56 Runoff=13.04 cfs 1.342 af

Subcatchment E5S: TO NORTH Runoff Area=77,230 sf 0.00% Impervious Runoff Depth=1.28"
Flow Length=330' Tc=8.0 min CN=55 Runoff=2.07 cfs 0.189 af

Subcatchment E6S: TO CENTRAL Runoff Area=332,480 sf 0.00% Impervious Runoff Depth=1.35"
Flow Length=680' Tc=16.4 min CN=56 Runoff=7.61 cfs 0.858 af

Subcatchment E7S: TO EAST Runoff Area=767,520 sf 0.00% Impervious Runoff Depth=1.96"
Flow Length=1,060' Tc=26.2 min CN=64 Runoff=23.28 cfs 2.881 af

Reach E1R: CENTRAL WETLAND Avg. Flow Depth=0.39' Max Vel=2.23 fps Inflow=14.58 cfs 2.498 af
n=0.070 L=300.0' S=0.0667 '/' Capacity=111.42 cfs Outflow=14.49 cfs 2.497 af

Reach E2R: CENTRAL WETLAND Avg. Flow Depth=0.48' Max Vel=2.35 fps Inflow=20.86 cfs 3.355 af
n=0.070 L=565.0' S=0.0566 '/' Capacity=102.70 cfs Outflow=20.65 cfs 3.353 af

Pond 1P: PONDED AREA Peak Elev=697.06' Storage=36,988 cf Inflow=9.13 cfs 0.754 af
Outflow=0.66 cfs 0.327 af

Pond 2P: LOW AREA Peak Elev=683.23' Storage=20,898 cf Inflow=12.93 cfs 1.180 af
Outflow=5.98 cfs 0.828 af

Link OP1: FLOW TO SOUTH Inflow=1.46 cfs 0.117 af
Primary=1.46 cfs 0.117 af

Link OP2: FLOW TO NORTH Inflow=2.07 cfs 0.189 af
Primary=2.07 cfs 0.189 af

Link OP3: FLOW EAST Inflow=43.53 cfs 6.234 af
Primary=43.53 cfs 6.234 af

Total Runoff Area = 48.535 ac Runoff Volume = 7.320 af Average Runoff Depth = 1.81"
100.00% Pervious = 48.535 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1S: TO SOUTH

Runoff = 1.46 cfs @ 12.13 hrs, Volume= 0.117 af, Depth= 3.20"
Routed to Link OP1 : FLOW TO SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
770	96	Gravel surface, HSG D
1,550	96	Gravel surface, HSG B
1,540	61	>75% Grass cover, Good, HSG B
850	80	>75% Grass cover, Good, HSG D
340	55	Woods, Good, HSG B
14,080	77	Woods, Good, HSG D
19,130	78	Weighted Average
19,130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	60	0.1200	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
8.9	110	Total			

Summary for Subcatchment E2S: TO PONDED AREA

Runoff = 9.13 cfs @ 12.14 hrs, Volume= 0.754 af, Depth= 2.04"
Routed to Pond 1P : PONDED AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
3,750	96	Gravel surface, HSG B
24,600	61	>75% Grass cover, Good, HSG B
94,830	55	Woods, Good, HSG B
69,620	77	Woods, Good, HSG D
192,800	65	Weighted Average
192,800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	60	0.1300	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
1.8	180	0.1100	1.66		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
8.8	240	Total			

Summary for Subcatchment E3S: TO LOW AREA

Runoff = 12.93 cfs @ 12.19 hrs, Volume= 1.180 af, Depth= 3.01"
Routed to Pond 2P : LOW AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
10,880	55	Woods, Good, HSG B
193,830	77	Woods, Good, HSG D
204,710	76	Weighted Average
204,710		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	80	0.0800	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
2.0	150	0.0600	1.22		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	170	0.0400	3.23	43.01	**Parabolic Channel, C-D** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.070 Sluggish weedy reaches w/pools
13.6	400	Total			

Summary for Subcatchment E4S: TO CENTRAL WETLAND

Runoff = 13.04 cfs @ 12.21 hrs, Volume= 1.342 af, Depth= 1.35"
Routed to Reach E1R : CENTRAL WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
3,080	96	Gravel surface, HSG B
25,240	61	>75% Grass cover, Good, HSG B
490,000	55	Woods, Good, HSG B
2,000	48	Brush, Good, HSG B
520,320	56	Weighted Average
520,320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	60	0.1300	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
3.6	430	0.1600	2.00		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
2.2	450	0.0440	3.38	45.11	**Parabolic Channel, C-D** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.070 Sluggish weedy reaches w/pools

12.8 940 Total

Summary for Subcatchment E5S: TO NORTH

Runoff = 2.07 cfs @ 12.14 hrs, Volume= 0.189 af, Depth= 1.28"
Routed to Link OP2 : FLOW TO NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
630	96	Gravel surface, HSG B
700	61	>75% Grass cover, Good, HSG B
70,000	55	Woods, Good, HSG B
5,900	48	Brush, Good, HSG B
77,230	55	Weighted Average
77,230		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	60	0.2000	0.17		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
2.1	270	0.1800	2.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
8.0	330	Total			

Summary for Subcatchment E6S: TO CENTRAL WETLAND

Runoff = 7.61 cfs @ 12.26 hrs, Volume= 0.858 af, Depth= 1.35"
Routed to Reach E2R : CENTRAL WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
21,770	77	Woods, Good, HSG D
300,710	55	Woods, Good, HSG B
10,000	48	Brush, Good, HSG B
332,480	56	Weighted Average
332,480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	80	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
4.7	280	0.0400	1.00		**Shallow Concentrated Flow, B*C** Woodland Kv= 5.0 fps
1.9	320	0.0313	2.85	38.05	**Parabolic Channel, C-D** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.070 Sluggish weedy reaches w/pools

16.4 680 Total

Summary for Subcatchment E7S: TO EAST

Runoff = 23.28 cfs @ 12.39 hrs, Volume= 2.881 af, Depth= 1.96"
Routed to Link OP3 : FLOW EAST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
301,290	77	Woods, Good, HSG D
466,230	55	Woods, Good, HSG B
767,520	64	Weighted Average
767,520		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	80	0.0600	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
14.2	980	0.0530	1.15		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
26.2	1,060	Total			

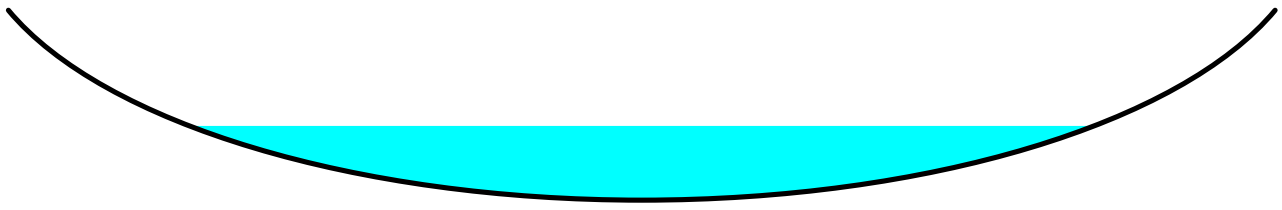
Summary for Reach E1R: CENTRAL WETLAND

Inflow Area = 21.070 ac, 0.00% Impervious, Inflow Depth > 1.42" for 25 Year Storm event
Inflow = 14.58 cfs @ 12.38 hrs, Volume= 2.498 af
Outflow = 14.49 cfs @ 12.44 hrs, Volume= 2.497 af, Atten= 1%, Lag= 3.7 min
Routed to Reach E2R : CENTRAL WETLAND

Routing by Stor-Ind+Trans method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.23 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 4.8 min

Peak Storage= 1,951 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 24.99'
Bank-Full Depth= 1.00' Flow Area= 26.7 sf, Capacity= 111.42 cfs

40.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 300.0' Slope= 0.0667 '/'
Inlet Invert= 680.00', Outlet Invert= 660.00'



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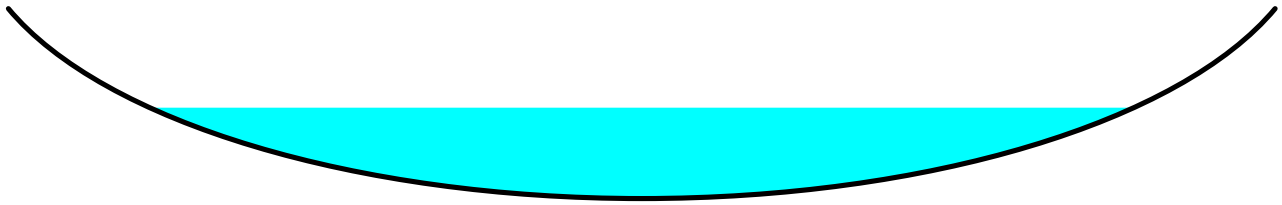
Summary for Reach E2R: CENTRAL WETLAND

Inflow Area = 28.703 ac, 0.00% Impervious, Inflow Depth > 1.40" for 25 Year Storm event
Inflow = 20.86 cfs @ 12.34 hrs, Volume= 3.355 af
Outflow = 20.65 cfs @ 12.48 hrs, Volume= 3.353 af, Atten= 1%, Lag= 8.2 min
Routed to Link OP3 : FLOW EAST

Routing by Stor-Ind+Trans method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.35 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 8.8 min

Peak Storage= 4,968 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.48' , Surface Width= 27.63'
Bank-Full Depth= 1.00' Flow Area= 26.7 sf, Capacity= 102.70 cfs

40.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 565.0' Slope= 0.0566 '/'
Inlet Invert= 660.00', Outlet Invert= 628.00'



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Summary for Pond 1P: PONDED AREA

Inflow Area = 4.426 ac, 0.00% Impervious, Inflow Depth = 2.04" for 25 Year Storm event
Inflow = 9.13 cfs @ 12.14 hrs, Volume= 0.754 af
Outflow = 0.66 cfs @ 14.80 hrs, Volume= 0.327 af, Atten= 93%, Lag= 159.6 min
Primary = 0.66 cfs @ 14.80 hrs, Volume= 0.327 af
Routed to Reach E1R : CENTRAL WETLAND

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Starting Elev= 696.50' Surf.Area= 34,800 sf Storage= 16,338 cf
Peak Elev= 697.06' @ 14.80 hrs Surf.Area= 39,523 sf Storage= 36,988 cf (20,651 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 218.4 min (1,075.4 - 857.0)

Volume	Invert	Avail.Storage	Storage Description
#1	696.00'	78,100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
696.00	30,550	0	0
698.00	47,550	78,100	78,100

Device	Routing	Invert	Outlet Devices
#1	Primary	697.00'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.65 cfs @ 14.80 hrs HW=697.06' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.65 cfs @ 0.59 fps)

Summary for Pond 2P: LOW AREA

Inflow Area = 4.699 ac, 0.00% Impervious, Inflow Depth = 3.01" for 25 Year Storm event
Inflow = 12.93 cfs @ 12.19 hrs, Volume= 1.180 af
Outflow = 5.98 cfs @ 12.51 hrs, Volume= 0.828 af, Atten= 54%, Lag= 19.0 min
Primary = 5.98 cfs @ 12.51 hrs, Volume= 0.828 af
Routed to Reach E1R : CENTRAL WETLAND

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 683.23' @ 12.51 hrs Surf.Area= 25,942 sf Storage= 20,898 cf

Plug-Flow detention time= 178.0 min calculated for 0.828 af (70% of inflow)
Center-of-Mass det. time= 81.7 min (916.1 - 834.4)

Volume	Invert	Avail.Storage	Storage Description
#1	682.00'	45,140 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
682.00	8,000	0	0
684.00	37,140	45,140	45,140

Device	Routing	Invert	Outlet Devices
#1	Primary	683.00'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.96 cfs @ 12.51 hrs HW=683.23' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 5.96 cfs @ 1.29 fps)

Summary for Link OP1: FLOW TO SOUTH

Inflow Area = 0.439 ac, 0.00% Impervious, Inflow Depth = 3.20" for 25 Year Storm event
Inflow = 1.46 cfs @ 12.13 hrs, Volume= 0.117 af
Primary = 1.46 cfs @ 12.13 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs

Summary for Link OP2: FLOW TO NORTH

Inflow Area = 1.773 ac, 0.00% Impervious, Inflow Depth = 1.28" for 25 Year Storm event
Inflow = 2.07 cfs @ 12.14 hrs, Volume= 0.189 af
Primary = 2.07 cfs @ 12.14 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs

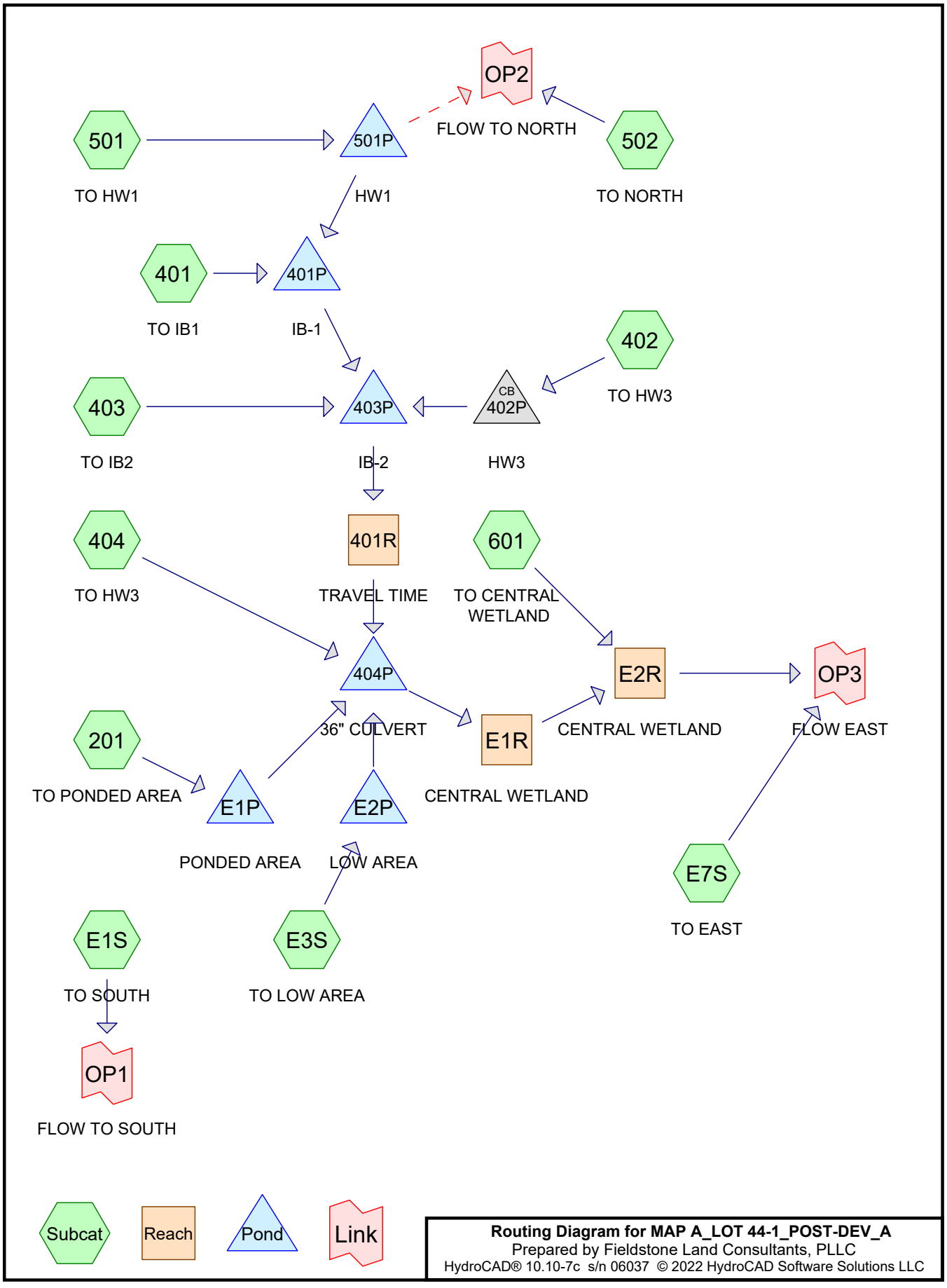
Summary for Link OP3: FLOW EAST

Inflow Area = 46.323 ac, 0.00% Impervious, Inflow Depth > 1.61" for 25 Year Storm event
Inflow = 43.53 cfs @ 12.42 hrs, Volume= 6.234 af
Primary = 43.53 cfs @ 12.42 hrs, Volume= 6.234 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs

Section 2.1

Proposed Conditions
25 Year Storm Full Summary



Routing Diagram for MAP A_LOT 44-1_POST-DEV_A
Prepared by Fieldstone Land Consultants, PLLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.057	61	>75% Grass cover, Good, HSG B (201, 401, 402, 403, 404, 501, 502, 601, E1S)
0.020	80	>75% Grass cover, Good, HSG D (E1S)
0.119	48	Brush, Good, HSG B (403, 404, 601)
0.207	96	Gravel surface, HSG B (201, 403, 404, 501, E1S)
0.018	96	Gravel surface, HSG D (E1S)
0.749	98	Paved parking, HSG B (401, 402, 403, 404, 501, 601)
0.031	98	Roofs, HSG B (402)
0.028	98	Unconnected pavement, HSG B (201)
0.284	98	Unconnected roofs, HSG B (201, 401, 403, 404, 502, 601)
28.235	55	Woods, Good, HSG B (201, 403, 404, 501, 502, 601, E1S, E3S, E7S)
13.788	77	Woods, Good, HSG D (201, 601, E1S, E3S, E7S)
48.535	**63**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
34.710	HSG B	201, 401, 402, 403, 404, 501, 502, 601, E1S, E3S, E7S
0.000	HSG C	
13.825	HSG D	201, 601, E1S, E3S, E7S
0.000	Other	
48.535		**TOTAL AREA**

Time span=5.00-27.00 hrs, dt=0.05 hrs, 441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 201: TO PONDED AREA Runoff Area=190,820 sf 1.68% Impervious Runoff Depth=2.04"
Flow Length=240' Tc=8.8 min CN=65 Runoff=9.03 cfs 0.746 af

Subcatchment 401: TO IB1 Runoff Area=12,290 sf 28.89% Impervious Runoff Depth=2.47"
Tc=6.0 min UI Adjusted CN=70 Runoff=0.79 cfs 0.058 af

Subcatchment 402: TO HW3 Runoff Area=9,740 sf 35.32% Impervious Runoff Depth=2.83"
Tc=6.0 min CN=74 Runoff=0.73 cfs 0.053 af

Subcatchment 403: TO IB2 Runoff Area=99,130 sf 8.24% Impervious Runoff Depth=1.65"
Flow Length=940' Tc=12.8 min CN=60 Runoff=3.22 cfs 0.312 af

Subcatchment 404: TO HW3 Runoff Area=394,160 sf 3.07% Impervious Runoff Depth=1.42"
Flow Length=880' Tc=12.5 min CN=57 Runoff=10.68 cfs 1.072 af

Subcatchment 501: TO HW1 Runoff Area=59,560 sf 10.75% Impervious Runoff Depth=1.96"
Flow Length=410' Tc=9.3 min CN=64 Runoff=2.66 cfs 0.224 af

Subcatchment 502: TO NORTH Runoff Area=32,540 sf 2.03% Impervious Runoff Depth=1.50"
Flow Length=180' Tc=9.3 min CN=58 Runoff=1.04 cfs 0.093 af

Subcatchment 601: TO CENTRAL Runoff Area=324,580 sf 3.09% Impervious Runoff Depth=1.50"
Flow Length=680' Tc=16.4 min CN=58 Runoff=8.52 cfs 0.928 af

Subcatchment E1S: TO SOUTH Runoff Area=19,130 sf 0.00% Impervious Runoff Depth=3.20"
Flow Length=110' Tc=8.9 min CN=78 Runoff=1.46 cfs 0.117 af

Subcatchment E3S: TO LOW AREA Runoff Area=204,710 sf 0.00% Impervious Runoff Depth=3.01"
Flow Length=400' Tc=13.6 min CN=76 Runoff=12.93 cfs 1.180 af

Subcatchment E7S: TO EAST Runoff Area=767,520 sf 0.00% Impervious Runoff Depth=1.96"
Flow Length=1,060' Tc=26.2 min CN=64 Runoff=23.28 cfs 2.881 af

Reach 401R: TRAVEL TIME Avg. Flow Depth=0.10' Max Vel=1.30 fps Inflow=0.30 cfs 0.064 af
n=0.050 L=400.0' S=0.0725 '/' Capacity=10.19 cfs Outflow=0.30 cfs 0.064 af

Reach E1R: CENTRAL WETLAND Avg. Flow Depth=0.39' Max Vel=1.96 fps Inflow=12.62 cfs 2.284 af
n=0.070 L=230.0' S=0.0522 '/' Capacity=98.57 cfs Outflow=12.54 cfs 2.283 af

Reach E2R: CENTRAL WETLAND Avg. Flow Depth=0.46' Max Vel=2.30 fps Inflow=19.34 cfs 3.211 af
n=0.070 L=565.0' S=0.0566 '/' Capacity=102.70 cfs Outflow=19.19 cfs 3.210 af

Pond 401P: IB-1 Peak Elev=714.17' Storage=5,030 cf Inflow=2.95 cfs 0.286 af
Discarded=0.07 cfs 0.095 af Primary=0.72 cfs 0.104 af Outflow=0.79 cfs 0.199 af

Pond 402P: HW3 Peak Elev=709.61' Inflow=0.73 cfs 0.053 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0100 '/' Outflow=0.73 cfs 0.053 af

Pond 403P: IB-2 Peak Elev=707.10' Storage=11,769 cf Inflow=3.69 cfs 0.469 af
Discarded=0.17 cfs 0.211 af Primary=0.30 cfs 0.064 af Outflow=0.48 cfs 0.275 af

Pond 404P: 36" CULVERT Peak Elev=678.22' Storage=58 cf Inflow=12.63 cfs 2.284 af
Outflow=12.62 cfs 2.284 af

Pond 501P: HW1 Peak Elev=716.99' Storage=1,004 cf Inflow=2.66 cfs 0.224 af
Primary=2.40 cfs 0.228 af Secondary=0.00 cfs 0.000 af Outflow=2.40 cfs 0.228 af

Pond E1P: PONDED AREA Peak Elev=697.05' Storage=36,948 cf Inflow=9.03 cfs 0.746 af
Outflow=0.64 cfs 0.319 af

Pond E2P: LOW AREA Peak Elev=683.23' Storage=20,898 cf Inflow=12.93 cfs 1.180 af
Outflow=5.98 cfs 0.828 af

Link OP1: FLOW TO SOUTH Inflow=1.46 cfs 0.117 af
Primary=1.46 cfs 0.117 af

Link OP2: FLOW TO NORTH Inflow=1.04 cfs 0.093 af
Primary=1.04 cfs 0.093 af

Link OP3: FLOW EAST Inflow=42.14 cfs 6.091 af
Primary=42.14 cfs 6.091 af

Total Runoff Area = 48.535 ac Runoff Volume = 7.663 af Average Runoff Depth = 1.89"
97.75% Pervious = 47.443 ac 2.25% Impervious = 1.092 ac

Summary for Subcatchment 201: TO PONDED AREA

Runoff = 9.03 cfs @ 12.14 hrs, Volume= 0.746 af, Depth= 2.04"
Routed to Pond E1P : PONDED AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
2,930	96	Gravel surface, HSG B
1,200	98	Unconnected pavement, HSG B
2,000	98	Unconnected roofs, HSG B
35,570	61	>75% Grass cover, Good, HSG B
79,500	55	Woods, Good, HSG B
69,620	77	Woods, Good, HSG D
190,820	65	Weighted Average
187,620		98.32% Pervious Area
3,200		1.68% Impervious Area
3,200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	60	0.1300	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
1.8	180	0.1100	1.66		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
8.8	240	Total			

Summary for Subcatchment 401: TO IB1

Runoff = 0.79 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 2.47"
Routed to Pond 401P : IB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Adj	Description
900	98		Unconnected roofs, HSG B
2,650	98		Paved parking, HSG B
8,740	61		>75% Grass cover, Good, HSG B
12,290	72	70	Weighted Average, UI Adjusted
8,740			71.11% Pervious Area
3,550			28.89% Impervious Area
900			25.35% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 402: TO HW3

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 2.83"
Routed to Pond 402P : HW3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
2,100	98	Paved parking, HSG B
1,340	98	Roofs, HSG B
6,300	61	>75% Grass cover, Good, HSG B
9,740	74	Weighted Average
6,300		64.68% Pervious Area
3,440		35.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 403: TO IB2

Runoff = 3.22 cfs @ 12.20 hrs, Volume= 0.312 af, Depth= 1.65"
Routed to Pond 403P : IB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
160	96	Gravel surface, HSG B
7,170	98	Paved parking, HSG B
1,000	98	Unconnected roofs, HSG B
26,000	61	>75% Grass cover, Good, HSG B
63,000	55	Woods, Good, HSG B
1,800	48	Brush, Good, HSG B
99,130	60	Weighted Average
90,960		91.76% Pervious Area
8,170		8.24% Impervious Area
1,000		12.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	60	0.1300	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
3.6	430	0.1600	2.00		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
2.2	450	0.0440	3.38	45.11	**Parabolic Channel, C-D** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.070 Sluggish weedy reaches w/pools
12.8	940	Total			

Summary for Subcatchment 404: TO HW3

Runoff = 10.68 cfs @ 12.20 hrs, Volume= 1.072 af, Depth= 1.42"
Routed to Pond 404P : 36" CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
1,980	96	Gravel surface, HSG B
8,100	98	Paved parking, HSG B
4,000	98	Unconnected roofs, HSG B
64,200	61	>75% Grass cover, Good, HSG B
315,000	55	Woods, Good, HSG B
880	48	Brush, Good, HSG B
394,160	57	Weighted Average
382,060		96.93% Pervious Area
12,100		3.07% Impervious Area
4,000		33.06% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	60	0.1300	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
3.6	430	0.1600	2.00		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.9	390	0.0440	3.38	45.11	**Parabolic Channel, C-D** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.070 Sluggish weedy reaches w/pools
12.5	880	Total			

Summary for Subcatchment 501: TO HW1

Runoff = 2.66 cfs @ 12.14 hrs, Volume= 0.224 af, Depth= 1.96"
Routed to Pond 501P : HW1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
2,380	96	Gravel surface, HSG B
6,400	98	Paved parking, HSG B
24,500	61	>75% Grass cover, Good, HSG B
26,280	55	Woods, Good, HSG B
59,560	64	Weighted Average
53,160		89.25% Pervious Area
6,400		10.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	60	0.2000	0.17		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
3.1	220	0.2300	1.20		**Shallow Concentrated Flow, B-C** Forest w/Heavy Litter Kv= 2.5 fps
0.3	130	0.0300	7.10	85.20	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.00' Z= 3.0 '/' Top.W=12.00' n= 0.035 High grass
9.3	410	Total			

Summary for Subcatchment 502: TO NORTH

Runoff = 1.04 cfs @ 12.15 hrs, Volume= 0.093 af, Depth= 1.50"
Routed to Link OP2 : FLOW TO NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
660	98	Unconnected roofs, HSG B
13,180	61	>75% Grass cover, Good, HSG B
18,700	55	Woods, Good, HSG B
32,540	58	Weighted Average
31,880		97.97% Pervious Area
660		2.03% Impervious Area
660		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	60	0.1000	0.13		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
1.5	120	0.0670	1.29		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
9.3	180	Total			

Summary for Subcatchment 601: TO CENTRAL WETLAND

Runoff = 8.52 cfs @ 12.26 hrs, Volume= 0.928 af, Depth= 1.50"
Routed to Reach E2R : CENTRAL WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
6,220	98	Paved parking, HSG B
3,820	98	Unconnected roofs, HSG B
40,270	61	>75% Grass cover, Good, HSG B
21,770	77	Woods, Good, HSG D
250,000	55	Woods, Good, HSG B
2,500	48	Brush, Good, HSG B
324,580	58	Weighted Average
314,540		96.91% Pervious Area
10,040		3.09% Impervious Area
3,820		38.05% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	80	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
4.7	280	0.0400	1.00		**Shallow Concentrated Flow, B*C** Woodland Kv= 5.0 fps
1.9	320	0.0313	2.85	38.05	**Parabolic Channel, C-D** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.070 Sluggish weedy reaches w/pools
16.4	680	Total			

Summary for Subcatchment E1S: TO SOUTH

Runoff = 1.46 cfs @ 12.13 hrs, Volume= 0.117 af, Depth= 3.20"
Routed to Link OP1 : FLOW TO SOUTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
770	96	Gravel surface, HSG D
1,550	96	Gravel surface, HSG B
1,540	61	>75% Grass cover, Good, HSG B
850	80	>75% Grass cover, Good, HSG D
340	55	Woods, Good, HSG B
14,080	77	Woods, Good, HSG D
19,130	78	Weighted Average
19,130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	60	0.1200	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
8.9	110	Total			

Summary for Subcatchment E3S: TO LOW AREA

Runoff = 12.93 cfs @ 12.19 hrs, Volume= 1.180 af, Depth= 3.01"
Routed to Pond E2P : LOW AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
10,880	55	Woods, Good, HSG B
193,830	77	Woods, Good, HSG D
204,710	76	Weighted Average
204,710		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	80	0.0800	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
2.0	150	0.0600	1.22		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	170	0.0400	3.23	43.01	**Parabolic Channel, C-D** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.070 Sluggish weedy reaches w/pools
13.6	400	Total			

Summary for Subcatchment E7S: TO EAST

Runoff = 23.28 cfs @ 12.39 hrs, Volume= 2.881 af, Depth= 1.96"
Routed to Link OP3 : FLOW EAST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Storm Rainfall=5.57"

Area (sf)	CN	Description
301,290	77	Woods, Good, HSG D
466,230	55	Woods, Good, HSG B
767,520	64	Weighted Average
767,520		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	80	0.0600	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.98"
14.2	980	0.0530	1.15		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
26.2	1,060	Total			

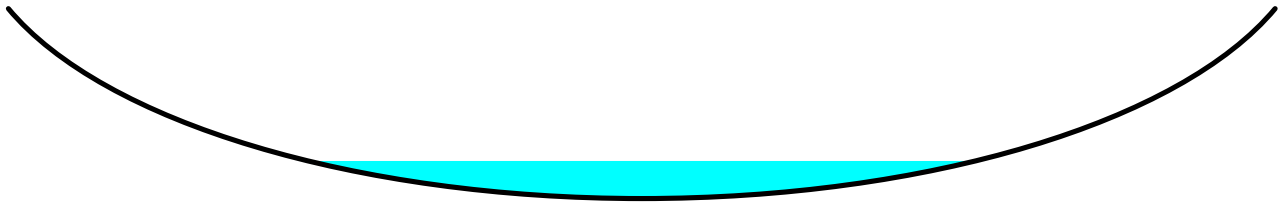
Summary for Reach 401R: TRAVEL TIME

Inflow Area = 4.149 ac, 11.93% Impervious, Inflow Depth = 0.19" for 25 Year Storm event
Inflow = 0.30 cfs @ 15.19 hrs, Volume= 0.064 af
Outflow = 0.30 cfs @ 15.34 hrs, Volume= 0.064 af, Atten= 0%, Lag= 9.0 min
Routed to Pond 404P : 36" CULVERT

Routing by Stor-Ind+Trans method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.30 fps, Min. Travel Time= 5.1 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 9.6 min

Peak Storage= 93 cf @ 15.25 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 3.55'
Bank-Full Depth= 0.50' Flow Area= 2.7 sf, Capacity= 10.19 cfs

8.00' x 0.50' deep Parabolic Channel, n= 0.050 Mountain streams w/large boulders
Length= 400.0' Slope= 0.0725 '/'
Inlet Invert= 707.00', Outlet Invert= 678.00'



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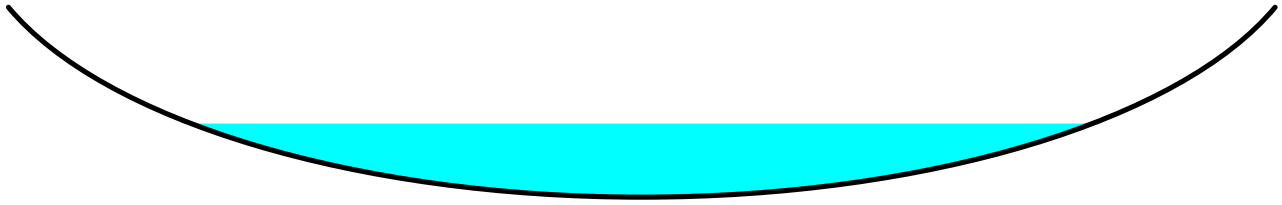
Summary for Reach E1R: CENTRAL WETLAND

Inflow Area = 22.278 ac, 3.80% Impervious, Inflow Depth > 1.23" for 25 Year Storm event
Inflow = 12.62 cfs @ 12.40 hrs, Volume= 2.284 af
Outflow = 12.54 cfs @ 12.46 hrs, Volume= 2.283 af, Atten= 1%, Lag= 3.3 min
Routed to Reach E2R : CENTRAL WETLAND

Routing by Stor-Ind+Trans method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.96 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 4.1 min

Peak Storage= 1,474 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 24.87'
Bank-Full Depth= 1.00' Flow Area= 26.7 sf, Capacity= 98.57 cfs

40.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 230.0' Slope= 0.0522 '/'
Inlet Invert= 672.00', Outlet Invert= 660.00'



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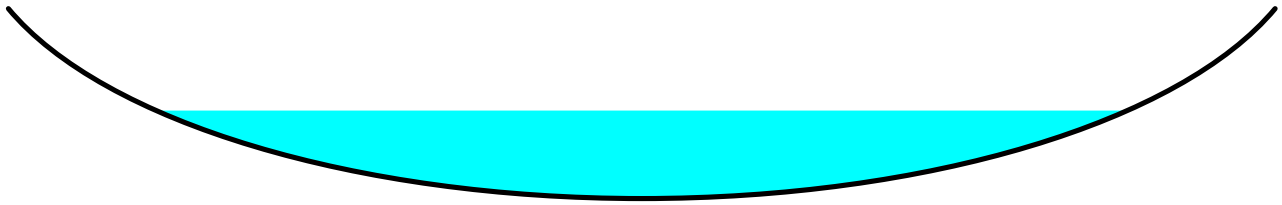
Summary for Reach E2R: CENTRAL WETLAND

Inflow Area = 29.729 ac, 3.62% Impervious, Inflow Depth > 1.30" for 25 Year Storm event
Inflow = 19.34 cfs @ 12.33 hrs, Volume= 3.211 af
Outflow = 19.19 cfs @ 12.48 hrs, Volume= 3.210 af, Atten= 1%, Lag= 8.8 min
Routed to Link OP3 : FLOW EAST

Routing by Stor-Ind+Trans method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.30 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 9.0 min

Peak Storage= 4,720 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.46' , Surface Width= 27.17'
Bank-Full Depth= 1.00' Flow Area= 26.7 sf, Capacity= 102.70 cfs

40.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 565.0' Slope= 0.0566 '/'
Inlet Invert= 660.00', Outlet Invert= 628.00'



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Summary for Pond 401P: IB-1

Inflow Area = 1.649 ac, 13.85% Impervious, Inflow Depth > 2.08" for 25 Year Storm event
Inflow = 2.95 cfs @ 12.17 hrs, Volume= 0.286 af
Outflow = 0.79 cfs @ 12.68 hrs, Volume= 0.199 af, Atten= 73%, Lag= 30.5 min
Discarded = 0.07 cfs @ 12.68 hrs, Volume= 0.095 af
Primary = 0.72 cfs @ 12.68 hrs, Volume= 0.104 af
Routed to Pond 403P : IB-2

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 714.17' @ 12.68 hrs Surf.Area= 3,138 sf Storage= 5,030 cf

Plug-Flow detention time= 241.2 min calculated for 0.198 af (69% of inflow)
Center-of-Mass det. time= 130.0 min (983.6 - 853.5)

Volume	Invert	Avail.Storage	Storage Description
#1	712.00'	7,900 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
712.00	1,500	0	0
714.00	3,000	4,500	4,500
715.00	3,800	3,400	7,900

Device	Routing	Invert	Outlet Devices
#1	Discarded	712.00'	**1.000 in/hr Exfiltration over Surface area**
#2	Primary	714.00'	**4.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.07 cfs @ 12.68 hrs HW=714.17' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.71 cfs @ 12.68 hrs HW=714.17' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 0.71 cfs @ 1.03 fps)

Summary for Pond 402P: HW3

Inflow Area = 0.224 ac, 35.32% Impervious, Inflow Depth = 2.83" for 25 Year Storm event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.053 af
Outflow = 0.73 cfs @ 12.09 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min
Primary = 0.73 cfs @ 12.09 hrs, Volume= 0.053 af
Routed to Pond 403P : IB-2

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 709.61' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	709.20'	**15.0" Round Culvert**
			L= 40.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 709.20' / 708.80' S= 0.0100 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.71 cfs @ 12.09 hrs HW=709.61' (Free Discharge)
1=Culvert (Barrel Controls 0.71 cfs @ 3.06 fps)

Summary for Pond 403P: IB-2

Inflow Area = 4.149 ac, 11.93% Impervious, Inflow Depth = 1.36" for 25 Year Storm event
Inflow = 3.69 cfs @ 12.18 hrs, Volume= 0.469 af
Outflow = 0.48 cfs @ 15.19 hrs, Volume= 0.275 af, Atten= 87%, Lag= 180.6 min
Discarded = 0.17 cfs @ 15.19 hrs, Volume= 0.211 af
Primary = 0.30 cfs @ 15.19 hrs, Volume= 0.064 af
Routed to Reach 401R : TRAVEL TIME

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 707.10' @ 15.19 hrs Surf.Area= 7,504 sf Storage= 11,769 cf

Plug-Flow detention time= 355.4 min calculated for 0.275 af (59% of inflow)
Center-of-Mass det. time= 242.0 min (1,110.7 - 868.6)

Volume	Invert	Avail.Storage	Storage Description
#1	705.00'	19,320 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
705.00	3,940	0	0
706.00	5,420	4,680	4,680
708.00	9,220	14,640	19,320

Device	Routing	Invert	Outlet Devices
#1	Discarded	705.00'	**1.000 in/hr Exfiltration over Surface area**
#2	Primary	707.00'	**4.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.17 cfs @ 15.19 hrs HW=707.10' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.30 cfs @ 15.19 hrs HW=707.10' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 0.78 fps)

Summary for Pond 404P: 36" CULVERT

Inflow Area = 22.278 ac, 3.80% Impervious, Inflow Depth > 1.23" for 25 Year Storm event
Inflow = 12.63 cfs @ 12.40 hrs, Volume= 2.284 af
Outflow = 12.62 cfs @ 12.40 hrs, Volume= 2.284 af, Atten= 0%, Lag= 0.3 min
Primary = 12.62 cfs @ 12.40 hrs, Volume= 2.284 af
Routed to Reach E1R : CENTRAL WETLAND

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 678.22' @ 12.40 hrs Surf.Area= 252 sf Storage= 58 cf

Plug-Flow detention time= 0.0 min calculated for 2.279 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (924.7 - 924.7)

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	37,415 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
677.00	0	0	0
678.00	50	25	25
680.00	1,920	1,970	1,995
682.00	33,500	35,420	37,415

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	**36.0" Round Culvert w/ 12.0" inside fill** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.00' / 672.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 5.01 sf

#2	Primary	680.50'	**20.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=12.62 cfs @ 12.40 hrs HW=678.22' (Free Discharge)
↑**1=Culvert** (Inlet Controls 12.62 cfs @ 3.57 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 501P: HW1

Inflow Area = 1.367 ac, 10.75% Impervious, Inflow Depth = 1.96" for 25 Year Storm event
Inflow = 2.66 cfs @ 12.14 hrs, Volume= 0.224 af
Outflow = 2.40 cfs @ 12.20 hrs, Volume= 0.228 af, Atten= 10%, Lag= 3.3 min
Primary = 2.40 cfs @ 12.20 hrs, Volume= 0.228 af
Routed to Pond 401P : IB-1
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Link OP2 : FLOW TO NORTH

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Starting Elev= 716.50' Surf.Area= 670 sf Storage= 593 cf
Peak Elev= 716.99' @ 12.20 hrs Surf.Area= 996 sf Storage= 1,004 cf (412 cf above start)

Plug-Flow detention time= 36.7 min calculated for 0.214 af (96% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	714.00'	1,560 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
714.00	0	0	0
716.00	340	340	340
717.00	1,000	670	1,010
717.50	1,200	550	1,560

Device	Routing	Invert	Outlet Devices
#1	Primary	716.20'	**15.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 716.20' / 715.70' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	717.00'	**3.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=2.40 cfs @ 12.20 hrs HW=716.99' (Free Discharge)
↑**1=Culvert** (Barrel Controls 2.40 cfs @ 4.16 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=716.50' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond E1P: PONDED AREA

Inflow Area = 4.381 ac, 1.68% Impervious, Inflow Depth = 2.04" for 25 Year Storm event
Inflow = 9.03 cfs @ 12.14 hrs, Volume= 0.746 af
Outflow = 0.64 cfs @ 14.86 hrs, Volume= 0.319 af, Atten= 93%, Lag= 163.3 min
Primary = 0.64 cfs @ 14.86 hrs, Volume= 0.319 af
Routed to Pond 404P : 36" CULVERT

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Starting Elev= 696.50' Surf.Area= 34,800 sf Storage= 16,338 cf
Peak Elev= 697.05' @ 14.86 hrs Surf.Area= 39,515 sf Storage= 36,948 cf (20,611 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 221.8 min (1,078.8 - 857.0)

Volume	Invert	Avail.Storage	Storage Description
#1	696.00'	78,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
696.00	30,550	0	0
698.00	47,550	78,100	78,100

Device	Routing	Invert	Outlet Devices
#1	Primary	697.00'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.64 cfs @ 14.86 hrs HW=697.05' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.64 cfs @ 0.58 fps)

Summary for Pond E2P: LOW AREA

Inflow Area = 4.699 ac, 0.00% Impervious, Inflow Depth = 3.01" for 25 Year Storm event
Inflow = 12.93 cfs @ 12.19 hrs, Volume= 1.180 af
Outflow = 5.98 cfs @ 12.51 hrs, Volume= 0.828 af, Atten= 54%, Lag= 19.0 min
Primary = 5.98 cfs @ 12.51 hrs, Volume= 0.828 af
Routed to Pond 404P : 36" CULVERT

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 683.23' @ 12.51 hrs Surf.Area= 25,942 sf Storage= 20,898 cf

Plug-Flow detention time= 178.0 min calculated for 0.828 af (70% of inflow)
Center-of-Mass det. time= 81.7 min (916.1 - 834.4)

Volume	Invert	Avail.Storage	Storage Description
#1	682.00'	45,140 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
682.00	8,000	0	0
684.00	37,140	45,140	45,140

Device	Routing	Invert	Outlet Devices
#1	Primary	683.00'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.96 cfs @ 12.51 hrs HW=683.23' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 5.96 cfs @ 1.29 fps)

Summary for Link OP1: FLOW TO SOUTH

Inflow Area = 0.439 ac, 0.00% Impervious, Inflow Depth = 3.20" for 25 Year Storm event
Inflow = 1.46 cfs @ 12.13 hrs, Volume= 0.117 af
Primary = 1.46 cfs @ 12.13 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs

Summary for Link OP2: FLOW TO NORTH

Inflow Area = 0.747 ac, 2.03% Impervious, Inflow Depth = 1.50" for 25 Year Storm event
Inflow = 1.04 cfs @ 12.15 hrs, Volume= 0.093 af
Primary = 1.04 cfs @ 12.15 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs

Summary for Link OP3: FLOW EAST

Inflow Area = 47.349 ac, 2.27% Impervious, Inflow Depth > 1.54" for 25 Year Storm event
Inflow = 42.14 cfs @ 12.42 hrs, Volume= 6.091 af
Primary = 42.14 cfs @ 12.42 hrs, Volume= 6.091 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs

Section 3.1

Rip Rap Apron Design

FIELDSTONE
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Map A, Lot 44-1

RIPRAP APRON DESIGN

Project:	3029.01
File:	3029.01_Riprap.xls
Date:	11/09/22
Design Eng:	NRC
Revised:	1/27/23
Revised By:	NRC

This spreadsheet is based on the Dec. 2008 "New Hampshire Stormwater Management Manual, Volume 2, Post-Construction Best Management Practices: Selection And Design"

Nomenclature:
L = length of the apron (ft)
D_0 = max. inside width of outlet pipe or channel (ft)
Q = outlet discharge (cfs)
TW = tailwater depth (ft)
W_{in} = width of the apron at culvert outlet (ft)
W_{out} = width of the apron at the end of apron (ft)
D_{50} = median stone diameter (inches)

DESIGN CRITERIA

Design Storm: 25 Year

Riprap Apron Length:
$L=1.8Q/D_0^{1.5}+7D_0$ (when $TW<D_0/2$)
$L=3.0Q/D_0^{1.5}+7D_0$ (when $TW>D_0/2$)

Riprap Apron Width @ Culvert Outlet:
$W_{in}=3D_0$
Riprap Apron Width @ End of Apron (no defined channel):
$W_{out}=3D_0+L_a$ (when $TW<D_0/2$)
$W_{out}=3D_0+0.4L_a$ (when $TW>D_0/2$)
Riprap Apron Width @ End of Apron (defined channel):
$W_{out}>D_0$, Structural lining shall extend a min. of 1Ft. above the TW elevation but no lower than 2/3 the vertical conduit dimension above the conduit.

Riprap Diameter:
$D_{50}=[0.02Q^{1.3}/(TW*D_0)]*12$
50% of stone by weight should be smaller than D_{50}. The largest stone size in the mixture shall be 1.5 times D_{50}.

				OUTLET APRON DESIGN				
Location (STRUCT.)	Q (CFS)	D_0 (FT.)	TW (FT.)	L_a (FT.)	Width (FT) W_{in}	W_{out}	D_{50} (Dia. - INCHES)	Thickness (INCHES)
HW 2	2.4	1.3	0.3	12	4	16	4	12
HW 4	0.7	1.3	0.3	10	4	14	4	12

Section 3.2

Test Pit Data

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Kenneth M. Robinson
No. 1896
Department of Environmental Services

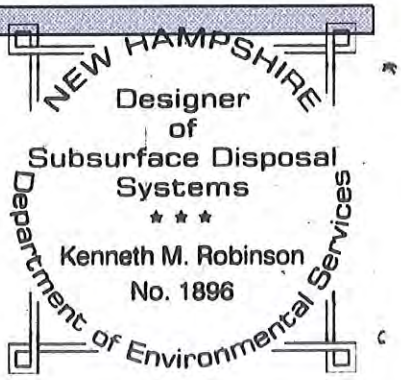
TEST PIT DATA
SANKEN HOMES, LLC
BARRETT HILL ROAD
WILTON, NH

12/30/21
Test Pit #1
0-3"- 10YR 3/3 Dark brown loam, granular, friable
3-28" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones
28-60" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = 40"**

12/30/21
Test Pit #2
0-12"- 10YR 3/3 Dark brown loam, granular, friable
12-43" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones
43-54" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = 52" (perched) **Observed Water = None** **Ledge/Boulders = None** **Roots = 48"**

12/30/21
Test Pit #3
0-3"- 10YR 3/3 Dark brown loam, granular, friable
3-19" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones
19-56" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = 36" **Observed Water = None** **Ledge/Boulders = None** **Roots = 38"**

12/30/21
Test Pit #4
0-6"- 10YR 3/3 Dark brown loam, granular, friable
6-28" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones
28-60" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = 38" **Observed Water = None** **Ledge/Boulders = None** **Roots = 44"**



12/30/21
Test Pit #5
0-3"- 10YR 3/3 Dark brown loam, granular, friable
3-28" - 10YR 5/8 Yellowish brown boulder fine sandy loam, granular, friable.
28-60" - 2.5Y 6/4 Light olive brown gravelly fine sandy loam, granular, friable.
ESHWT = 54" **Observed Water = None** **Ledge/Boulders = None** **Roots = 48"**

12/30/21
Test Pit #6
0-6"- 10YR 3/3 Dark brown loam, granular, friable
6-38" - 10YR 5/8 Yellowish brown boulder fine sandy loam, granular, friable.
38-60" - 2.5Y 6/4 Light olive brown gravelly fine sandy loam, granular, friable.
ESHWT = 38" **Observed Water = None** **Ledge/Boulders = None** **Roots = 42"**

12/30/21
Test Pit #7
0-6"- 10YR 3/3 Dark brown loam, granular, friable. Very bouldery.
6-48" - 10YR 5/8 Yellowish brown boulder fine sandy loam, granular, friable. Very bouldery.
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = 48"**

2/7/22
Test Pit #8
0-6"- 10YR 3/3 Dark brown loam, granular, friable
6-36" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones.
36-66" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = 38" **Observed Water = None** **Ledge/Boulders = None** **Roots = 38"**

2/7/22
Test Pit #9
0-5"- 10YR 3/3 Dark brown loam, granular, friable
5-36" – 10YR 5/8 Fine sandy loam, granular, friable. Few stones.
36-72" - 2.5Y 6/4 Light olive brown loamy fine sand, massive, friable
ESHWT = 38" **Observed Water = None** **Ledge/Boulders = None** **Roots = 40"**

2/7/22
Test Pit #10
0-4"- 10YR 3/3 Dark brown loam, granular, friable
4-36" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones.
36-60" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = 38" **Observed Water = None** **Ledge/Boulders = None** **Roots = 40"**

2/7/22
Test Pit #11
0-4"- 10YR 3/3 Dark brown loam, granular, friable
4-32" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones.
32-60" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = 34" **Observed Water = None** **Ledge/Boulders = None** **Roots = 38"**

2/7/22
Test Pit #12
0-4"- 10YR 3/3 Dark brown loam, granular, friable
4-24" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones.
24-60" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = 30" **Observed Water = None** **Ledge/Boulders = None** **Roots = 34"**

2/7/22
Test Pit #13
0-4"- 10YR 3/3 Dark brown loam, granular, friable
6-30" - 7.5Y 4/4 Brown fine sandy loam, granular, friable. Few stones.
30-50" - 2.5Y 5/6 Light yellow brown fine sandy loam, granular, friable. Stony.
ESHWT = 32" **Observed Water = None** **Ledge/Boulders = None** **Roots = 34"**

Test Pits were logged by:

Kenneth Robinson, CWS
NH Licensed Designer #1896

NEW HAMPSHIRE
Designer
of
Subsurface Disposal
Systems
* * *
Kenneth M. Robinson
No. 1896
Department of Environmental Services

Section 3.3

Inspection & Maintenance Manual

S a n - K e n H o m e s , I n c .
Map a, Lot 44-1, Wilton, New Hampshire
Storm Water Management System
Inspection and Maintenance Manual

Introduction

The operation and maintenance of a storm water management system and its individual components is as critical to system performance as the design. Without proper maintenance, best management practices (BMPs) are likely to become functionally impaired. Proper operation and maintenance will ensure that the storm water system and individual BMPs will remain effective at removing pollutants as designed and meeting New Hampshire's water quality objectives. Proper maintenance will:

- Maintain the peak rate of storm water treated over the long term;
- Sustain the pollutant removal efficiency of the BMP;
- Reduce the risk of re-suspending sediment and other pollutants captured by the BMP;
- Prevent structural deterioration of the BMP and minimize the need for expensive repairs;
- Decrease the potential for failure of the BMP.

The NH Department of Environmental Services Alteration of Terrain (AoT) regulations (Env-Wq 1500) require the long term maintenance of storm water practices, and stipulate the establishment of a mechanism to provide for ongoing inspections and maintenance.

In accordance with Env-Wq 1507.07 Long-Term Maintenance the mechanism for providing long-term maintenance practices for this development are as follows:

Responsible Maintenance Party:

Owner: San-Ken Homes, Inc.
586 Turnpike Road
New Ipswich, NH 03071
603-878-2856

Report Information:

- San-Ken Homes, Inc. will be responsible for implementing the required reporting, inspection, and maintenance activities identified in the I & M manual until such time that the Home Owners Association (HOA) is established and assumes responsibility of site maintenance activities.
- San-Ken Homes, Inc. will maintain all record keeping required by the I & M manual until such time as. Any transfer of responsibility for I & M activities or transfer in ownership shall be documented to the Town of Wilton and NHDES in writing.
- Inspection and maintenance reports shall be completed after each inspection. Copies of the report forms to be completed by the inspector are attached at the end of this manual, including:
    - Inspection checklist to be used during each inspection;

- Inspection and maintenance logs to document each inspection and maintenance activity;

- This document is to be used in conjunction with the Map D, Lot 99 Subdivision Plans.

Maintenance Recommendations for Best Management Practices:

The following recommendations are to be used as a guide for the inspection and maintenance of the permanent erosion and sediment control measures.

Stormwater Management Basin

- Basins should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Inspect, repair and remove debris from headwalls, end sections and riprap aprons.
- Remove woody vegetation from the Stormwater Management Basin with periodic mowing of embankments.
- Inspection and repair of embankments and spillways as required.
- Remove accumulated sediment from basin bottom and crushed stone as necessary.
- Dispose of sediments and other wastes in conformance with applicable local, state and federal regulations.
- If an infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration basin.

Drainage Ditches

- Inspect annually for sediment accumulation, debris, and signs of erosion within the channel.
- Remove debris upon inspection and mow annually to control woody vegetation within the ditch.
- Remove sediment when accumulation exceeds 33% of channel depth.
- Repair any erosion and re-grade or replace stone material as warranted by inspection

Stone Berm Level Spreaders

- Inspect the at least once annually for accumulation of sediment and debris and for signs of erosion within the approach channel, spreader channel or down-slope of the spreader.
- Remove debris whenever observed during inspection.
- Remove sediment when accumulation exceeds 25% of spreader channel depth (4.5” for 18” channel depth and 6” for 24” channel depth).

- Mow annually to control woody vegetation within the spreader.
- Repair any erosion and re-grade or replace stone berm material, as warranted by inspection.
- Reconstruct the spreader if down-slope channelization indicates that the spreader is not level or that discharge has become concentrated and corrections cannot be made through minor re-grading.

Treatment Swales

- Inspect the annually for accumulation of sediment and debris and for signs of erosion vegetation loss, and presence of invasive species.
- Perform periodic mowing; frequency depends on location and type of grass. Grass shall not be cut less than four (4) inches to maintain water quality flow depth.
- Remove debris and accumulated sediment whenever observed during inspection.
- Repair any eroded areas, remove invasive species and dead vegetation, and reseed with applicable grass mix as warranted by inspection.

Outlet Protection - Riprap Aprons

- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- Remove debris from apron area.

Inspection Checklist /Maintenance Logs

The inspection checklist and maintenance logs following this report shall be used as a guide for the inspection reporting for this project.

Inspection Checklist

- ☐ Drainage Ditches
- ☐ Stone Berm Level Spreaders
- ☐ Riprap Aprons at Headwall Outlets
- ☐ Outlet Structures
- ☐ Riprap Spillways
- ☐ Headwall Inlets

Inspection and Maintenance Log					
	BMP	**Inspection Date**	**Inspected By**	**Maintenance Required?**	**Maintenance Performed**
1				❑Yes ❑No	
2				❑Yes ❑No	
3				❑Yes ❑No	
4				❑Yes ❑No	
5				❑Yes ❑No	
6				❑Yes ❑No	
7				❑Yes ❑No	
8				❑Yes ❑No	
9				❑Yes ❑No	

Deicing Log					
Air Temp.	**Weather Conditions**	**Date of Application**	**Type of Deicer Used**	**Amount of Deicer Used**	**Deicer Applied By**

Section 3.4

Drainage Area Plans

DRAINAGE AREA PLAN FEATURES

- HYDROLOGIC PATH
- WATERSHED BOUNDARY
- DIRECTION OF FLOW
- E2S — SUBCATCHMENT
- E2R — REACH
- E2P — POND OR PIPE
- OP1 — OBSERVATION POINT

GRAPHIC SCALES

100' 50' 0 100' 200' 300'

IMPERIAL: 1"=100'

REV.	DATE	DESCRIPTION	C/O	DR	CK
–	–	–	–	–	–

PRE-DEVELOPMENT DRAINAGE AREA PLAN

TAX MAP A LOT 44-1
(BARRETT HILL ROAD)
WILTON, NEW HAMPSHIRE

PREPARED FOR AND LAND OF:

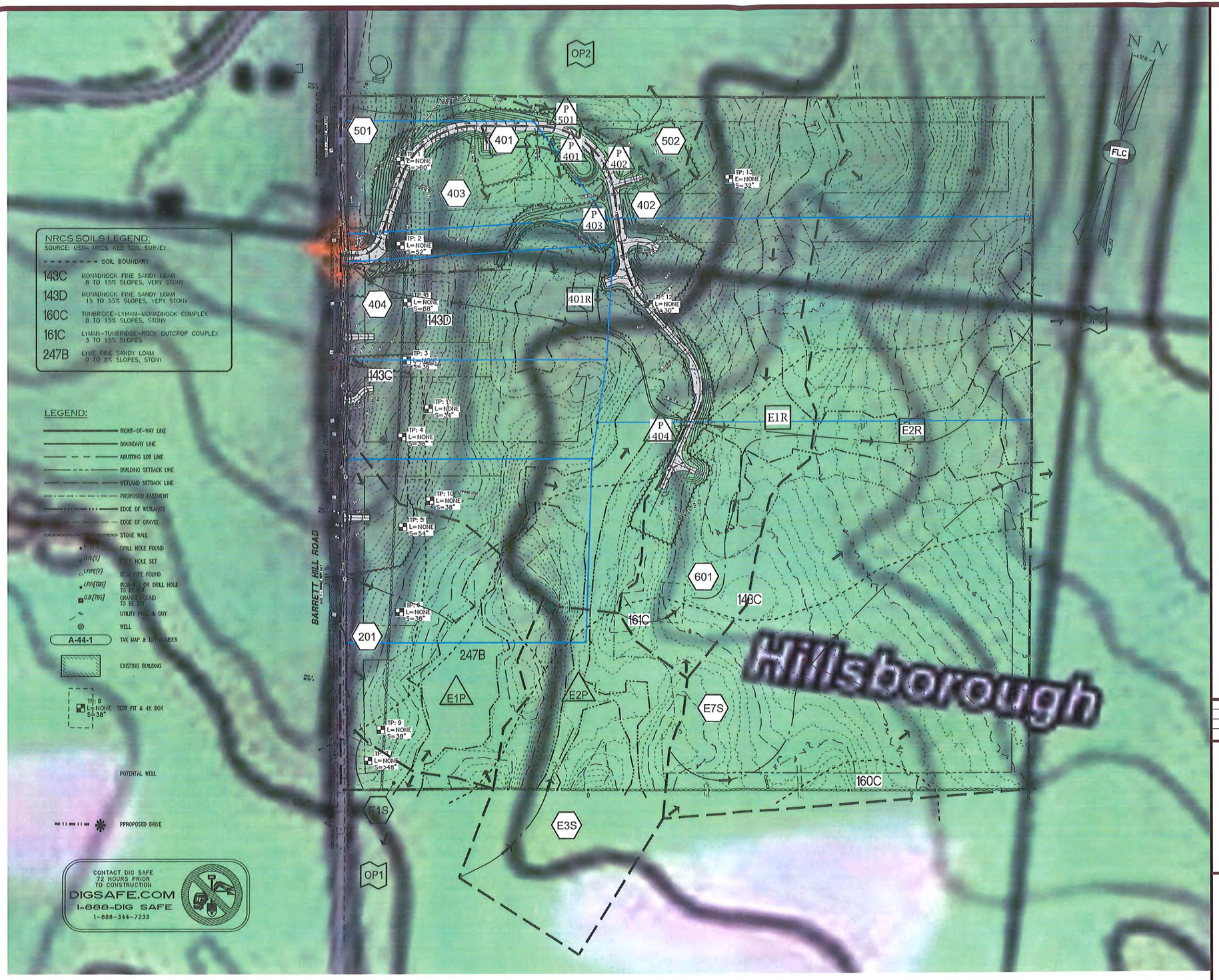
SAN-KEN HOMES, INC.
586 TURNPIKE ROAD - NEW IPSWICH NH 03071

SCALE: 1" = 100' NOVEMBER 3, 2022

Surveying ◆ Engineering ◆ Land Planning ◆ Permitting ◆ Septic Designs

FIELDSTONE LAND CONSULTANTS, PLLC

206 Elm Street, Milford, NH 03055
Phone: (603) 672-5456 Fax: (603) 413-5456
www.FieldstoneLandConsultants.com



DRAINAGE AREA PLAN FEATURES

- HYDROLOGIC PATH
- WATERSHED BOUNDARY
- DIRECTION OF FLOW
- 1S SUBCATCHMENT
- 1R REACH
- 1P POND OR PIPE
- OP1 OBSERVATION POINT

GRAPHIC SCALES

100' 50' 0 100' 200' 300'

IMPERIAL: 1"=100'

REV.	DATE	DESCRIPTION	C/O	DR	CK
B	01/27/23	ADD CROSS CULVERT, RELOCATE IB-1	WPB	NRC	CEB
A	12/12/22	DRIVEWAY ALIGNMENT	WPB	NRC	CEB

POST-DEVELOPMENT DRAINAGE AREA PLAN 1

TAX MAP A LOT 44-1
(BARRETT HILL ROAD)
WILTON, NEW HAMPSHIRE

PREPARED FOR AND LAND OF:

SAN-KEN HOMES, INC.
586 TURNPIKE ROAD - NEW IPSWICH NH 03071

SCALE: 1" = 100' NOVEMBER 3, 2022

Surveying ❖ Engineering ❖ Land Planning ❖ Permitting ❖ Septic Designs

FIELDSTONE LAND CONSULTANTS, PLLC

206 Elm Street, Milford, NH 03055
Phone: (603) 672-5456 Fax: (603) 413-5456
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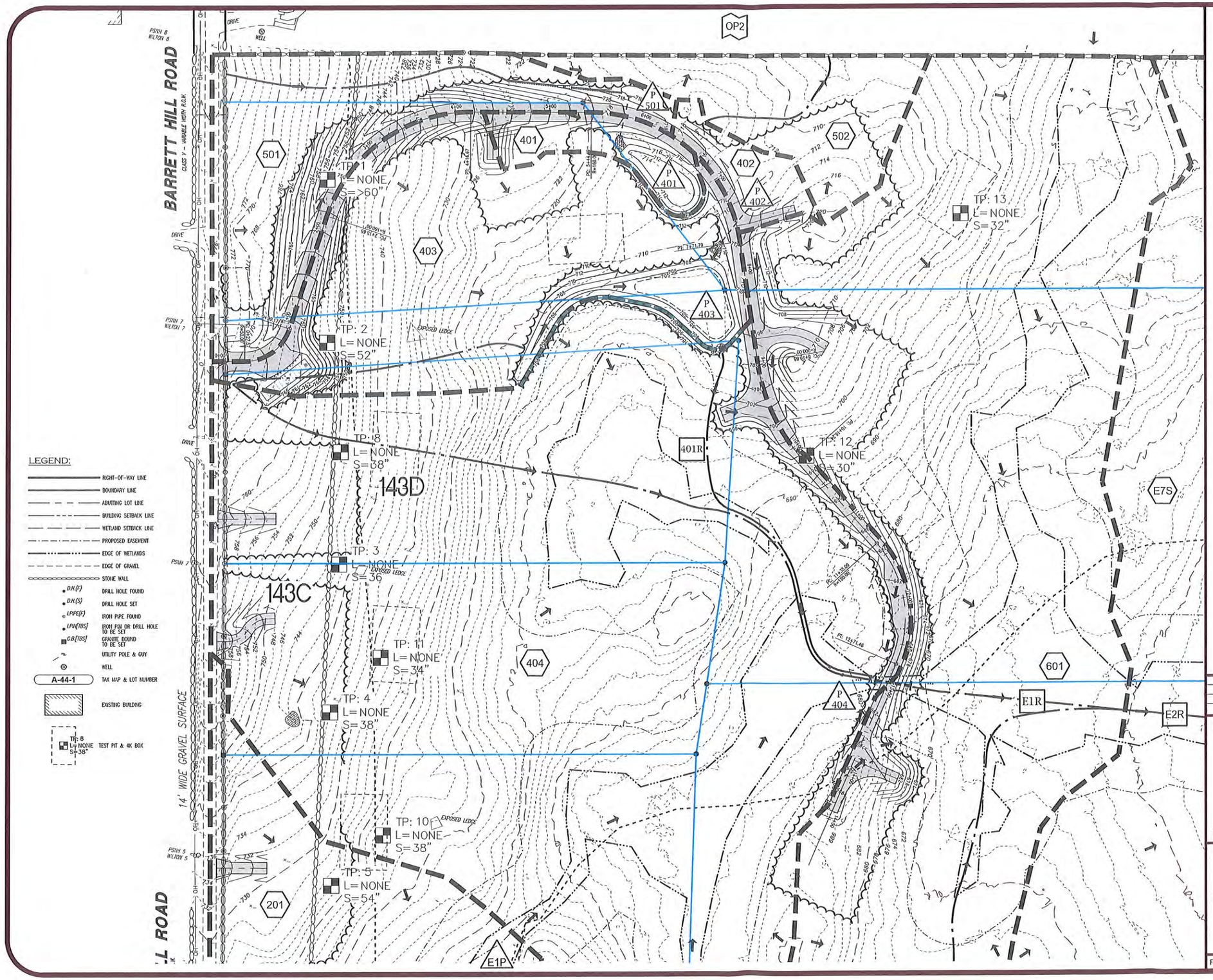


DRAINAGE AREA PLAN FEATURES

- HYDROLOGIC PATH
- WATERSHED BOUNDARY
- DIRECTION OF FLOW
- 1S SUBCATCHMENT
- 1R REACH
- 1P POND OR PIPE
- OP1 OBSERVATION POINT

NRCS SOILS LEGEND:
SOURCE: USDA NRCS WEB SOIL SURVEY

SOIL BOUNDARY

143C	MONADNOCK FINE SANDY LOAM 8 TO 15% SLOPES, VERY STONY
143D	MONADNOCK FINE SANDY LOAM 15 TO 35% SLOPES, VERY STONY
160C	TUNBRIDGE-LYMAN-MONADNOCK COMPLEX 8 TO 15% SLOPES, STONY
161C	LYMAN-TUNBRIDGE-ROCK OUTCROP COMPLEX 3 TO 15% SLOPES
247B	LYME FINE SANDY LOAM 0 TO 8% SLOPES, STONY

GRAPHIC SCALES
50' 25' 0 50' 100' 150'
IMPERIAL: 1"=50'

REV.	DATE	DESCRIPTION	C/O	DR	CK
B	01/27/23	ADD CROSS CULVERT, RELOCATE IB-1	WPB	NRC	CEB
A	12/12/22	DRIVEWAY ALIGNMENT	WPB	NRC	CEB

POST-DEVELOPMENT DRAINAGE AREA PLAN 2
TAX MAP A LOT 44-1
(BARRETT HILL ROAD)
WILTON, NEW HAMPSHIRE

PREPARED FOR AND LAND OF:
SAN-KEN HOMES, INC.
586 TURNPIKE ROAD - NEW IPSWICH NH 03071

SCALE: 1" = 50' NOVEMBER 3, 2022

Surveying ◆ Engineering ◆ Land Planning ◆ Permitting ◆ Septic Designs
FIELDSTONE LAND CONSULTANTS, PLLC
206 Elm Street, Milford, NH 03055
Phone: (603) 672-5456 Fax: (603) 413-5456
www.FieldstoneLandConsultants.com

Summary for Pond 404P: 36" CULVERT

Inflow Area = 22.278 ac, 3.80% Impervious, Inflow Depth > 1.95" for 50 Year Storm event
Inflow = 22.69 cfs @ 12.28 hrs, Volume= 3.624 af
Outflow = 22.68 cfs @ 12.30 hrs, Volume= 3.624 af, Atten= 0%, Lag= 1.3 min
Primary = 22.68 cfs @ 12.30 hrs, Volume= 3.624 af
Routed to Reach E1R : CENTRAL WETLAND

Routing by Stor-Ind method, Time Span= 5.00-27.00 hrs, dt= 0.05 hrs
Peak Elev= 678.86' @ 12.30 hrs Surf.Area= 858 sf Storage= 418 cf

Plug-Flow detention time= 0.1 min calculated for 3.624 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (898.8 - 898.8)

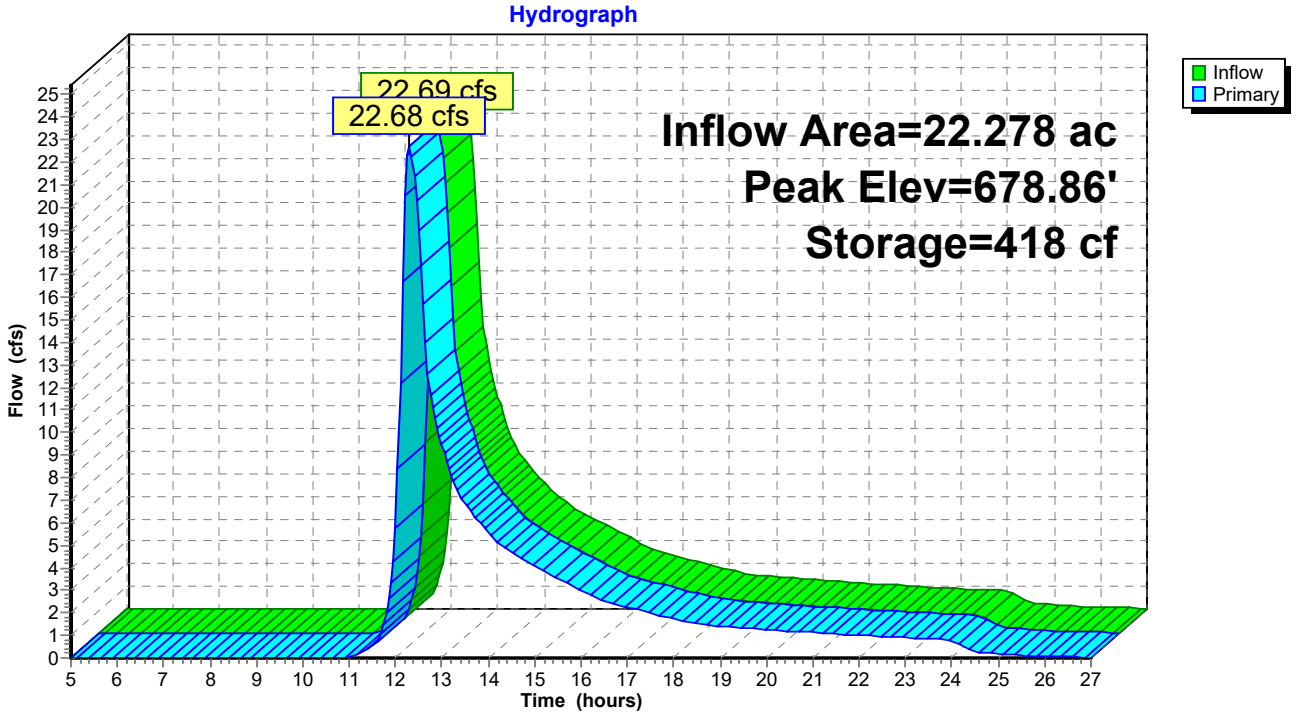
Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	37,415 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
677.00	0	0	0
678.00	50	25	25
680.00	1,920	1,970	1,995
682.00	33,500	35,420	37,415

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	**36.0" Round Culvert w/ 12.0" inside fill** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.00' / 672.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 5.01 sf
#2	Primary	680.50'	**20.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

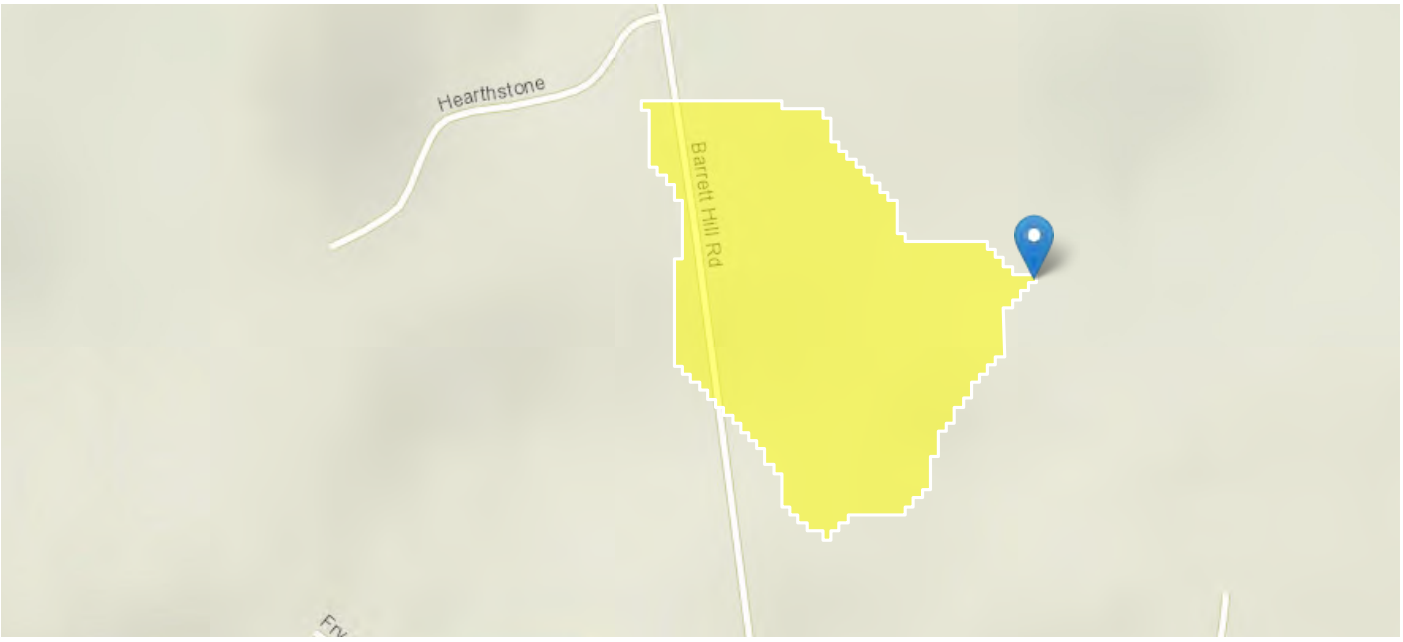
Primary OutFlow Max=22.66 cfs @ 12.30 hrs HW=678.86' (Free Discharge)
1=Culvert (Inlet Controls 22.66 cfs @ 4.63 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 404P: 36" CULVERT



StreamStats Report

Region ID: NH
Workspace ID: NH20230321214956725000
Clicked Point (Latitude, Longitude): 42.86054, -71.77901
Time: 2023-03-21 17:50:15 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
APRAVPRE	Mean April Precipitation	4.193	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	7.524	percent
CONIF	Percentaqe of land surface covered by coniferous forest	16.3811	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	234	feet per mi
DRNAREA	Area that drains to a point on a stream	0.05	square miles
ELEVMAX	Maximum basin elevation	781.521	feet
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	51.8849	percent
PREBC0103	Mean annual precipitation of basin centroid for January 1 to March 15 winter period	8.62	inches
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	9.4	inches
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	17.8	inches
TEMP	Mean Annual Temperature	45.32	degrees F

Parameter Code	Parameter Description	Value	Unit
TEMP_06_10	Basinwide average temperature for June to October summer period	61.011	degrees F
WETLAND	Percentage of Wetlands	0	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	0.05	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	4.193	inches	2.79	6.23
WETLAND	Percent Wetlands	0	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	234	feet per mi	5.43	543

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

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

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

Statistic	Value	Unit
50-percent AEP flood	3.87	ft^3/s
20-percent AEP flood	7.54	ft^3/s
10-percent AEP flood	11	ft^3/s
4-percent AEP flood	16.2	ft^3/s
2-percent AEP flood	20.9	ft^3/s
1-percent AEP flood	26.7	ft^3/s
0.2-percent AEP flood	42.5	ft^3/s

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/)

Bankfull Statistics

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.05	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	0.05	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	0.05	square miles	0.07722	59927.7393

Bankfull Statistics Disclaimers [Appalachian Highlands D Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	4.38	ft
Bieger_D_channel_depth	0.474	ft
Bieger_D_channel_cross_sectional_area	2.09	ft^2

Bankfull Statistics Disclaimers [New England P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	10.9	ft
Bieger_P_channel_depth	0.712	ft
Bieger_P_channel_cross_sectional_area	7.51	ft^2

Bankfull Statistics Disclaimers [USA Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	4.31	ft
Bieger_USA_channel_depth	0.637	ft
Bieger_USA_channel_cross_sectional_area	3.39	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	4.38	ft
Bieger_D_channel_depth	0.474	ft

Statistic	Value	Unit
Bieger_D_channel_cross_sectional_area	2.09	ft^2
Bieger_P_channel_width	10.9	ft
Bieger_P_channel_depth	0.712	ft
Bieger_P_channel_cross_sectional_area	7.51	ft^2
Bieger_USA_channel_width	4.31	ft
Bieger_USA_channel_depth	0.637	ft
Bieger_USA_channel_cross_sectional_area	3.39	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_campaign=PDFCoverPages

Seasonal Flow Statistics

Seasonal Flow Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.05	square miles	3.26	689
CONIF	Percent Coniferous Forest	16.3811	percent	3.07	56.2
PREBC0103	Jan to Mar Basin Centroid Precip	8.62	inches	5.79	15.1
BSLDEM30M	Mean Basin Slope from 30m DEM	7.524	percent	3.19	38.1
MIXFOR	Percent Mixed Forest	51.8849	percent	6.21	46.1
PREG_03_05	Mar to May Gage Precipitation	9.4	inches	6.83	11.5
TEMP	Mean Annual Temperature	45.32	degrees F	36	48.7
TEMP_06_10	Jun to Oct Mean Basinwide Temp	61.011	degrees F	52.9	64.4
PREG_06_10	Jun to Oct Gage Precipitation	17.8	inches	16.5	23.1
ELEVMAX	Maximum Basin Elevation	781.521	feet	260	6290

Seasonal Flow Statistics Disclaimers [Low Flow Statewide]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Seasonal Flow Statistics Flow Report [Low Flow Statewide]

Statistic	Value	Unit
Jan to Mar15 60 Percent Flow	0.0304	ft^3/s
Jan to Mar15 70 Percent Flow	0.0249	ft^3/s
Jan to Mar15 80 Percent Flow	0.022	ft^3/s
Jan to Mar15 90 Percent Flow	0.0154	ft^3/s
Jan to Mar15 95 Percent Flow	0.0121	ft^3/s
Jan to Mar15 98 Percent Flow	0.0101	ft^3/s

Statistic	Value	Unit
Jan to Mar15 7 Day 2 Year Low Flow	0.0211	ft^3/s
Jan to Mar15 7 Day 10 Year Low Flow	0.0103	ft^3/s
Mar16 to May 60 Percent Flow	0.0908	ft^3/s
Mar16 to May 70 Percent Flow	0.0713	ft^3/s
Mar16 to May 80 Percent Flow	0.0521	ft^3/s
Mar16 to May 90 Percent Flow	0.0374	ft^3/s
Mar16 to May 95 Percent Flow	0.0276	ft^3/s
Mar16 to May 98 Percent Flow	0.0182	ft^3/s
Mar16 to May 7 Day 2 Year Low Flow	0.0295	ft^3/s
Mar16 to May 7 Day 10 Year Low Flow	0.0149	ft^3/s
Jun to Oct 60 Percent Flow	0.00307	ft^3/s
Jun to Oct 70 Percent Flow	0.00205	ft^3/s
Jun to Oct 80 Percent Flow	0.00139	ft^3/s
Jun to Oct 90 Percent Flow	0.000748	ft^3/s
Jun to Oct 95 Percent Flow	0.000417	ft^3/s
Jun to Oct 98 Percent Flow	0.000381	ft^3/s
Jun to Oct 7 Day 2 Year Low Flow	0.000916	ft^3/s
Jun to Oct 7 Day 10 Year Low Flow	0.000166	ft^3/s
Nov to Dec 60 Percent Flow	0.0499	ft^3/s
Nov to Dec 70 Percent Flow	0.0359	ft^3/s
Nov to Dec 80 Percent Flow	0.0261	ft^3/s
Nov to Dec 90 Percent Flow	0.0153	ft^3/s
Nov to Dec 95 Percent Flow	0.00838	ft^3/s
Nov to Dec 98 Percent Flow	0.00419	ft^3/s
Oct to Nov 7 Day 2 Year Low Flow	0.0244	ft^3/s
Oct to Nov 7 Day 10 Year Low Flow	0.00802	ft^3/s

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)

Government.

Application Version: 4.13.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

STATE OF NEW HAMPSHIRE
Forest Protection Bureau
INVESTIGATION REPORT

Case #:	FL - 22 - 020	Intent to Cut #: 21-485-11

LOCATION OF INCIDENT

Town:	Wilton	Map/Lot:	A / 44-1
Location / Address	Barrett Hill Road	Latitude:	N ° . '
		Longitude:	W ° . '

INDIVIDUALS INVOLVED

Suspect #1:	D.H. Hardwick & Sons		DOB: / /
License #:		Home Phone #:	( ) -
Cell Phone #:	( ) -	Work Phone #:	( ) - Ext.
Company:			
Email:			
Address:	PO Box 430, Antrim NH		
Physical Address (if different):			

Complainant:	Richard Kahn		DOB: / /
License #:		Home Phone #:	( ) -
Cell Phone #:	[redacted]	Work Phone #:	( ) - Ext.
Company:			
Email:			
Address:	52 Barrett Hill Road, Wilton NH		
Physical Address (if different):			

Victim:			DOB: / /
License #:		Home Phone #:	( ) -
Cell Phone #:	( ) -	Work Phone #:	( ) - Ext.
Email:			
Address:			
Physical Address (if different):			

Landowner:	Kenneth Letonen		DOB: / /
License #:		Home Phone #:	[redacted]
Cell Phone #:	( ) -	Work Phone #:	( ) - Ext.
Email:			
Address:	586 Turnpike Road, New Ipswich NH		
Physical Address (if different):			

Witness #1:			DOB: / /
License #:		Home Phone #:	( ) -
Cell Phone #:	( ) -	Work Phone #:	( ) - Ext.
Email:			
Address:			
Physical Address (if different):			

☐ List of Additional Individuals Involved is Attached

STATE OF NEW HAMPSHIRE
Forest Protection Bureau
INVESTIGATION REPORT

ENFORCEMENT ACTION

Viol. #	RSA	Photos Taken	Warning	Slash Notice	C&D	Admin. Summ.	Viol. Summ.	Misd. Summ	Fel.	Inv.	Case Number
1		☐	☐	☐	☐	☐	☐	☐	☐	☐	FL- -
2		☐	☐	☐	☐	☐	☐	☐	☐	☐	FL- -
Landowner has been Notified											☐

NARRATIVE

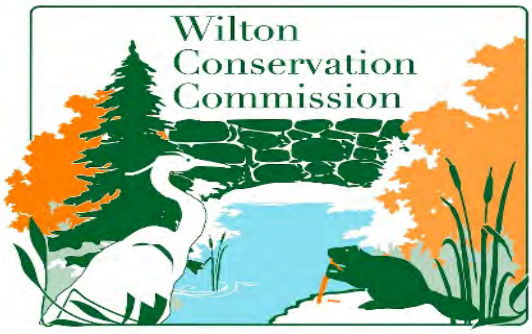
On 2/22/22 I was notified by HQ that an individual by the name of Richard Kahn called in regards to a timber harvest on Barret Hill Road in Wilton NH. I later determined that to be Richard Kahn of 52 Barrett Hill Road, Wilton NH. I called the number provided for Mr. Kahn and left a voicemail.

On 2/28/22 I was contacted by Dawson Gay, Code Enforcement Officer for Wilton NH. Mr. Gay informed me that the town had received some complaints from neighbors regarding the timber harvest on Barrett Hill Road in Wilton NH. He informed me the primary concerns were regarding possible damage to wetlands.

On 3/3/22 I located the timber harvest on Barrett Hill Road, Wilton NH. Upon arrival I noted a group of individuals observing the timber harvest from the road. After a brief conversation with a member of D. H. Hardwick and Sons, the logging company conducting the timber harvest, I walked up the road to speak with the group of individuals on the road. The group identified themselves as neighboring property owners. One of the individuals identified himself as Richard Kahn and stated that he had called me. The group expressed concerns about the timber harvest including concerns about over cutting along the road, wetland issues, and plans to subdivide the property. After a short discussion I then proceeded to walk the timber harvest. During my inspection I did not locate any violations of NH forestry or wetland laws. I noted that the logging operation had complied with best management pratices for forestry published by UNH Cooperative Extension.

Following my inspection I stopped at the town office and relayed my findings to several town officials including Mr. Gay and the Town Administrator, Nick Germain.

Investigating Ranger (print):	Adrian Reyes	Date:	4/6/22
Signature:			



Letter to Wilton Planning Board
Barrett Hill Case
March 13, 2023

The Conservation Commissioners met on March 7, 2023 and reviewed the current documentation and response from Fieldstone, as well as numerous emails and advice from state and federal agencies. The following concerns were discussed and as your advisors on natural resource protection, we agreed there is new and concerning evidence that the Planning Board needs to carefully review and consider in this case.

1) **Fieldstone's comments about stream banks and drought.** We view Conservation Commissions and organizations like Fieldstone to be partners in protecting our natural resources. So we were disappointed in the accusations made by Fieldstone that we were "lying" in our statements about the height of stream banks and the duration of drought. Based on our site walk, we saw clearly defined banks on either side of the stream that was the subject of a wetland crossing. Fieldstone even refers to "riparian borders," which only exist as part of a river or stream. Even if these banks aren't 4 feet in all locations, they clearly exist and define that area as a stream. Photos do not accurately represent this feature. As for the period of drought, Fieldstone has submitted 20 years of data without ever stating a specific drought period. It's extremely difficult to get this specific in one area of one town. However, the point of our statement was that all the wetland delineation surveying and mapping was conducted during the driest months of a very dry period, which is not the ideal way to assess development impacts to a Protected Watershed District. It should be noted that this past summer Wilton enacted a water restriction for the first time in its history, due to record low levels of water in the Souhegan River.
2) According to the National Wetlands Inventory (NWI), the southeastern section of the property has not been correctly mapped. The IPAC Resource List Report needs to be rerun due to missed wetlands on the southern border. The National Heritage Bureau (NHB) requires verbal pools to be mapped as well. Fieldstone needs to supply to the town/WCC/PB the information that they submitted to the NHB for vernal pools. These areas need to be avoided and protected during any construction sequence and in perpetuity.

3) In 2019 a documented sighting of a spotted turtle, a threatened species, was logged on Barrett Hill Road. At the time of the Heritage Bureau submission, that sighting had been reviewed but not entered in the database. That has since been corrected. We again recommend a full wildlife inventory be conducted before any construction permits are granted.
4) We recommend an inspection confirming that all wetland crossings were included as impacted areas during logging, and that appropriate measures have been taken to ensure they have been restored.
5) WCC, abutters, NHDES and the Aries peer review have all indicated that wetlands are incorrectly mapped. They need to be remapped by a third party so that vernal pools can be identified and wetland borders can be correctly measured and setbacks established. Ordinances already require six acres, high and dry, be the standard lot size if any portion of a parcel is within the Watershed Protection District. Given the sensitivity of this area and the discrepancies in measurements, mapping data, drought severity, etc., we advise the strictest setback requirements apply to all lots in this development.
6) We request a signed copy of the required submission for the historical review.
7) Aries is calling for replanting wetland borders since the logging was not done in accordance with logging ordinances incidental to a development plan.

In summary, the Conservation Commission recommends a full and detailed review of the numerous inconsistencies between plans and permit applications submitted to the town and the state, before any decisions are made or permits issued.

Respectfully Submitted,

Jennifer S Beck

Wilton Conservation Commission

From: DNCR: NHB Review
To: kmrobinson fieldstonelandconsultants.com
Subject: RE: Vernal Pool Requirements
Date: Monday, March 13, 2023 2:42:08 PM

Hi Ken,

Thank you for your question. I am NHBs Assistant Ecological Information Specialist, I assist with environmental reviews and can provide you with some information that should hopefully clear things up.

NHB does not require the mapping of vernal pools. You are correct that when filling out the project information on the DataCheck Tool you are able to select "Don't Know" as an answer to "Are there vernal pools on the property". The answer to this question is used for internal purposes by NHFG because it can help them determine if a nearby rare species may occur on the property. NHB does not use the answer to this question in our reviews because it does not pertain to rare plants or exemplary natural communities.

NHFG has a formal review process where they request specific information about proposed projects in order to complete a thorough review. During this process is when the applicant may need to provide the location of vernal pools as one of the requirements of the consultation process. This process only occurs if you receive a DataCheck Letter with flagged wildlife species and NHFG leaves a comment indicating consultation must occur.

Hope this helps, let me know if you have any other questions.

Best,

Maddie Severance (she/her/hers)
Assistant Ecological Information Specialist
New Hampshire Natural Heritage Bureau (NHB)
Division of Forests & Lands
NH Dept. of Natural & Cultural Resources
172 Pembroke Rd
Concord, NH 03301
(603)-271-0687 (office)

NHB DataCheck Tool

From: kmrobinson fieldstonelandconsultants.com <kmrobinson@fieldstonelandconsultants.com>
Sent: Monday, March 13, 2023 2:02 PM
To: DNCR: NHB Review <nhbreview@dncr.nh.gov>
Subject: Vernal Pool Requirements

Good afternoon Ashley,

I have a client asking about NHB requirements as far as vernal pool delineation is concerned. It was my understanding based upon the autofill form for the NHB request that this was not a requirement, as “Don’t Know” is a listed response for “Are there Vernal Pools on the property”?

The local Conservation Commission has informed him NHB requires vernal pools to be mapped. Both myself and our client want to make sure we are meeting all the legal obligations for this project.

Is it required for all vernal pools to be mapped?

Thank you,

Ken Robinson, C.W.S.
Certified Wetland Scientist

FIELDSTONE
LAND CONSULTANTS, PLLC
Surveying • Engineering • Environmental

Milford Office: 206 Elm Street - Milford NH 03055
Keene Office: 45 Roxbury Street - Keene NH 03431
Tel: 603.672.5456 - Fax: 603.413.5456
KMRobinson@FieldstoneLandConsultants.com
www.FieldstoneLandConsultants.com

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: KEN ROBINSON
206 ELM STREET
MILFORD, NH 03055

From: NH Natural Heritage Bureau

Date: 12/6/2022 (This letter is valid through 12/6/2023)

Re: Review by NH Natural Heritage Bureau of request dated 12/6/2022

Permit Type: Wetland Standard Dredge & Fill - Minor

NHB ID: NHB22-3772

Applicant: KEN ROBINSON

Location: wilton
Tax Map: A, Tax Lot: 44-1
Address: Barrett Hill Road

Proj. Description: Wetland crossing to access rear portion of lot for residential development

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

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

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

MAP OF PROJECT BOUNDARIES FOR: NHB22-3772

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

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: KEN ROBINSON
206 ELM STREET
MILFORD, NH 03055

From: NH Natural Heritage Bureau

Date: 3/10/2023 (This letter is valid through 3/10/2024)

Re: Review by NH Natural Heritage Bureau of request dated 3/10/2023

Permit Type: Wetland Standard Dredge & Fill - Minor

NHB ID: NHB23-0776

Applicant: KEN ROBINSON

Location: Wilton
Tax Map: 44, Tax Lot: 1
Address: Barrett Hill Road

Proj. Description: wetland crossing for driveway

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

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

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

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

MAP OF PROJECT BOUNDARIES FOR: NHB23-0776

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

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: KEN ROBINSON
206 ELM STREET
MILFORD, NH 03055

From: NH Natural Heritage Bureau

Date: 3/16/2023 (This letter is valid through 3/16/2024)

Re: Review by NH Natural Heritage Bureau of request dated 3/16/2023

Permit Type: Wetland Standard Dredge & Fill - Minor

NHB ID: NHB23-0842

Applicant: KEN ROBINSON

Location: wilton
Tax Map: a, Tax Lot: 44-1
Address: Barrett Hill Road

Proj. Description: Driveway construction as part of 7 lot subdivision

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

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

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

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

MAP OF PROJECT BOUNDARIES FOR: NHB23-0842

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

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: KEN ROBINSON
206 ELM STREET
MILFORD, NH 03055

From: NH Natural Heritage Bureau

Date: 3/28/2023 (This letter is valid through 3/28/2024)

Re: Review by NH Natural Heritage Bureau of request dated 3/28/2023

Permit Types: Wetland Standard Dredge & Fill - Minimum
Wilton

NHB ID: NHB23-0966

Applicant: KEN ROBINSON

Location: Wilton
Tax Map: A, Tax Lot: 44-1
Address: Barrett Hill Road

Proj. Description: Less than 1000 SF of impact for a residential driveway crossing as part of a seven lot subdivision

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

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

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

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

MAP OF PROJECT BOUNDARIES FOR: NHB23-0966

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

Records in New Hampshire of SPOTTED TURTLE

Current (1998 to 2021)

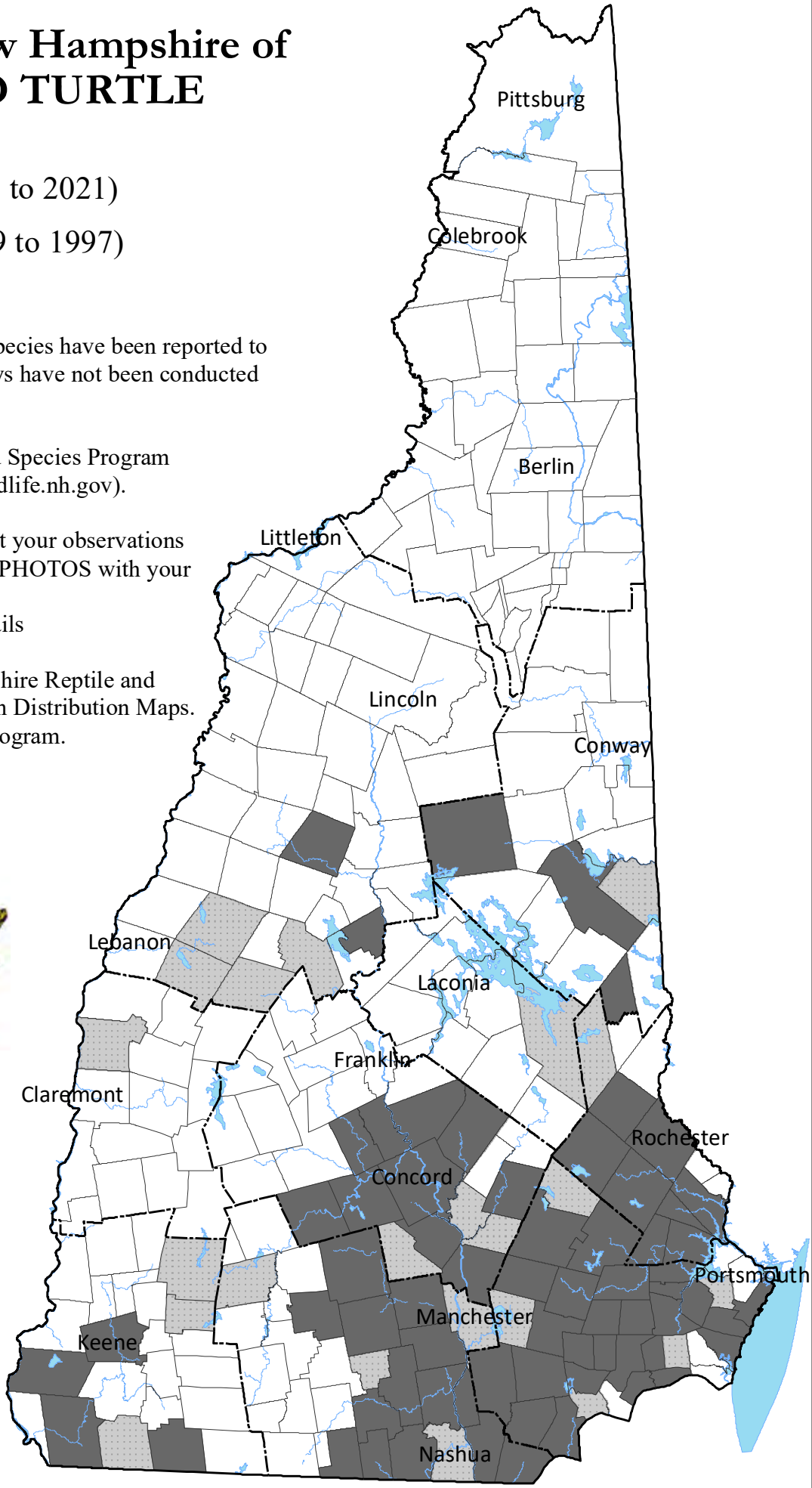
Historic (1939 to 1997)

Distribution maps represent where species have been reported to NH Fish & Game. Systematic surveys have not been conducted for most species.

Contact the Nongame & Endangered Species Program for more information (RAARP@wildlife.nh.gov).

HELP FILL IN THE GAPS! Report your observations to NH Fish & Game. Please submit PHOTOS with your observations whenever possible.
See: www.wildnh.com for more details

Cite as: 'RAARP 2021. New Hampshire Reptile and Amphibian Reporting Program Town Distribution Maps. Nongame & Endangered Wildlife Program. NH Fish & Game Department.'



Please mail the completed form and required material to:

New Hampshire Division of Historical Resources
State Historic Preservation Office
Attention: Review & Compliance
19 Pillsbury Street, Concord, NH 03301-3570

RECEIVED MAR 13 2023

DHR Use Only	
R&C #	14792
Log In Date	3/13/23
Response Date	4/3/23
Sent Date	4/6/23

Request for Project Review by the New Hampshire Division of Historical Resources

☒ This is a new submittal
☐ This is additional information relating to DHR Review & Compliance (R&C) #:

GENERAL PROJECT INFORMATION

Project Title San-Ken Homes, Inc

Project Location Barrett Hill Road

City/Town Wilton Tax Map A Lot # 44-1

NH State Plane - Feet Geographic Coordinates: Easting 953608 Northing 131567
(See RPR Instructions and R&C FAQs for guidance.)

Lead Federal Agency and Contact *(if applicable)* US ACOE
(Agency providing funds, licenses, or permits)
Permit Type and Permit or Job Reference #

State Agency and Contact *(if applicable)* NH DES - Wetlands Bureau

Permit Type and Permit or Job Reference # Dredge & Fill

APPLICANT INFORMATION

Applicant Name San-Ken Homes LLC

Mailing Address 586 Turnpike Road Phone Number

City New Ipswich State NH Zip 03071 Email

CONTACT PERSON TO RECEIVE RESPONSE

Name/Company Ken Robinson / Fieldstone Land Consultants, PLLC

Mailing Address 206 Elm Street Phone Number 6036725456

City Milford State NH Zip 03055 Email KMRobinson@FieldstoneLandConsultants.com

This form is updated periodically. Please download the current form at www.nh.gov/nhdhr/review. *Please refer to the Request for Project Review Instructions for direction on completing this form.* Submit one copy of this project review form for each project for which review is requested. Please include a self-addressed stamped envelope. Project submissions will not be accepted via facsimile or e-mail. This form is required. Review request form must be complete for review to begin. Incomplete forms will be sent back to the applicant without comment. Please be aware that this form may only initiate consultation. For some projects, additional information will be needed to complete the Section 106 review. All items and supporting documentation submitted with a review request, including photographs and publications, will be retained by the DHR as part of its review records. Items to be kept confidential should be clearly identified. For questions regarding the DHR review process and the DHR's role in it, please visit our website at: www.nh.gov/nhdhr/review or contact the R&C Specialist at marika.s.labash@dncr.nh.gov or 603.271.3558.

PROJECTS CANNOT BE PROCESSED WITHOUT THIS INFORMATION

Project Boundaries and Description

- ☒ Attach the Project Mapping ***using EMMIT or relevant portion of a 7.5' USGS Map.*** *(See RPR Instructions and R&C FAQs for guidance.)*
- ☒ Attach a detailed narrative description of the proposed project.
- ☒ Attach a site plan. The site plan should include the project boundaries and areas of proposed excavation.
- ☒ Attach photos of the project area (overview of project location and area adjacent to project location, and specific areas of proposed impacts and disturbances.) *(Informative photo captions are requested.)*
- ☒ A DHR records search must be conducted to identify properties within or adjacent to the project area. Provide records search results via EMMIT or in **Table 1**. *(Blank table forms are available on the DHR website.)* Please note, using EMMIT Guest View for an RPR records search does not provide the necessary information needed for DHR review.
  EMMIT or in-house records search conducted on 12/12/22.

Architecture

Are there any buildings, structures (bridges, walls, culverts, etc.) objects, districts or landscapes within the project area? ☐ Yes ☒ No
If no, skip to Archaeology section. If yes, submit all of the following information:

Approximate age(s):

- ☐ Photographs of ***each*** resource or streetscape located within the project area, with captions, along with a mapped photo key. (Digital photographs are accepted. All photographs must be clear, crisp and focused.)
- ☐ If the project involves rehabilitation, demolition, additions, or alterations to existing buildings or structures, provide additional photographs showing detailed project work locations. (i.e. Detail photo of windows if window replacement is proposed.)

Archaeology

Does the proposed undertaking involve ground-disturbing activity? ☒ Yes ☐ No
If yes, submit all of the following information:

- ☒ Description of current and previous land use and disturbances. Project to impact raw land
- ☒ Available information concerning known or suspected archaeological resources within the project area (such as cellar holes, wells, foundations, dams, etc.)

Please note that for many projects an architectural and/or archaeological survey or other additional information may be needed to complete the Section 106 process.

DHR Comment/Finding Recommendation *This Space for Division of Historical Resources Use Only*

☐ Insufficient information to initiate review. ☐ Additional information is needed in order to complete review.

☐ No Potential to cause Effects ☑ No Historic Properties Affected ☐ No Adverse Effect ☐ Adverse Effect

Comments: SHOULD ADDITIONAL FEDERAL PERMITS BE REQUIRED (EPA), FURTHER DHR CONSULTATION WILL BE NECESSARY.

If plans change or resources are discovered in the course of this project, you must contact the Division of Historical Resources as required by federal law and regulation.

Authorized Signature: Noemi Muller, DSHPO Date: 4/3/23

US Army Corps of Engineers - New England District
DRAFT Vernal Pool Characterization Form

Project File # 3029.01 Project Name Barrett Hill Rd Subdivision Pool ID PVP #4
Observer Christopher A. Guida, CWS Phone or E-mail CAGuida@Fieldstonelandconsultants.com
Landowner/Applicant San Ken Homes Phone or E-mail
Address 586 Turnpike Rd City New Ipswich State NH Zip 03071
Location of vernal pool: City/State Wilton, NH
Survey date(s) 4/14/23
Longitude/Latitude (in decimal degrees) -71.782 42.859

A. VERNAL POOL CHARACTERISTICS (fill in all information known):

1. Landscape setting (check all that apply):

☐ Upland depression (4 pts; if this is also in a floodplain, use 2 pts)
☑ Pool part of wildlife corridor (4 pts)
☐ Pool part of a pool complex (within 1000 feet of one or more other vernal pools) (NA)
☑ Pool within larger wetland system (4 pts; if this is also in a floodplain, use 2 pts)
☐ Other:_____(variable pts)

2. Vernal pool condition:

Describe any recent modifications to the pool and associated landscape: outlet to culvert under Roadway

3. Parent material:

☐ Glacial fluvial ("outwash")
☑ Loose till
☐ Peat
☐ Dense till
☐ Alluvium
☐ Coastal marine sediments

4. Aquatic resource type that best applies to this pool (choose dominant):

☑ Forested wetland (4 pts)
☐ Herbaceous wetland (4 pts)
☐ Floodplain (overflow/oxbow) (3 pts)
☑ Shrub wetland (4 pts)
☑ Open water (2 pts)
☑ Other: Scrub Shrub Open Water/Palustrine (variable points)
☐ Peatland (acidic fen or bog) (4 pts)
☐ Intermittent stream reach (2 pts)

5. Pool canopy cover (%): _____

6. Predominant substrate:

☑ Mineral soil
☐ Organic matter (peat/muck) Depth _____ Sampling location (e.g., deepest zone, edge, etc.)_____

7. Pool size:

a. Approximate dimensions of pool (at maximum capacity; include units): Length 150 Width 100
Area: 12,000 SF±

b. Maximum depth at deepest point at time of survey (include units): 1-Ft

8. Hydrology:

a. Estimated hydroperiod (unless actual, observed hydroperiod value(s) is(are) known, use the presence of these example indicator species to best predict the expected hydroperiod of the pool):

☐ Dries between early March and early July (e.g., *Thelypteris palustris, Carex stricta, Impatiens capensis, Ilex verticillata*) (6 pts)
☐ Dries between early July and early September (e.g., *Sagittaria latifolia, Scirpus cyperinus, Dulichium arund., Cephalanthus occ.*) (8 pts)
☐ Dries between early September and early November (e.g., *Eleocharis palustris, Glyceria cana., Utricularia* spp., *Decodon vert.*) (8 pts)
☑ Dries between early November and late December, or intermittently exposed (e.g., *Nuphar* spp., *Potamogeton* spp.) (2 pts)

b. Inlet/outlet (pick one):

☐ No inlet/outlet (8 pts)
☑ Permanent inlet or outlet (channel with well-defined banks and permanent flow) (2 pts)
☐ Temporary inlet/outlet (6 pts)

9. Water quality:

☑ Clear
☐ High turbidity
☐ High algae content
☐ Tannic

14 **TOTAL for Pool Characteristics (out of 28 max.)**

Pool ID PVP #4

B. VERNAL POOL ENVELOPE (100 ft) AND CRITICAL HABITAT AREA (100-750 ft) CHARACTERISTICS (fill in all information known):

1. Landuse type and approximate percentage within the 100-ft vernal pool envelope:

☑ Forested 75 % (16 pts) ☐ Open (e.g., meadow, agriculture, golf course) _____ % (4 pts)

☑ Shrub 25 % (10 pts) ☐ Developed _____ % (0 pts)

2. Landuse type and approximate percentage within the 100 - 750-ft vernal pool critical terrestrial habitat:

☑ Forested 75 % (16 pts) ☐ Open (e.g., agriculture, golf course) _____ % (4 pts)

☑ Shrub 10 % (10 pts) ☑ Developed 15 % (0 pts)

☑ Are there one or more barriers to vernal pool fauna movement within the envelope and/or critical terrestrial habitat? If so, check here and see directions for explanation of how to incorporate this information.

Based on: ☑ Field estimate ☐ GIS ☐ Aerial photo estimate

27.5 **TOTAL for Pool Envelope and Critical Terrestrial Habitat Area (out of 32 max.)**

C. SPECIES PRESENT IN VERNAL POOL

INDICATOR SPECIES	DATE	EGG MASSES (#)	TADPOLES/LARVAE
Wood Frog (*Lithobates sylvaticus*)	4/14/23	10	none observed
Spotted Salamander (*Ambystoma maculatum*)			
Blue-spotted Salamander (*Ambystoma laterale*)			
Jefferson's Salamander (*Ambystoma jeffersonianum*)			
Marbled Salamander (*Ambystoma opacum*)			
Fairy Shrimp (*Eubranchipus* spp.)		**PRESENT/ABSENT**	**ABUNDANCE:**
OTHER SPECIES	**DATE**	**PRESENCE/ABSENCE**	**FEW/COMMON/MANY**
Facultative Species (e.g., Spring Peeper (*Pseudacris crucifer*), Gray Tree Frog (*Hyla versicolor*), Caddisflies (Limnephilidae, Phryganeidae), American Toad (*Anaxyrus americanus*), Eastern Spadefoot Toad (*Scaphiopus holbrookii*), Fowler's Toad (*Anaxyrus fowleri*), Fingernail Clams (Sphaeriidae, Pisidiidae))(list):	4/14/23	observed in general area, not associated with any wetlands or vernal pools evaluated.	
Rare Species (list):			
Predator Species (e.g., Bullfrog/Green frog tadpoles, Fish) (list): None observed			
Other species (e.g., Ducks, Turtles, etc.)(list): No Turtles or Ducks observed			

Presence of Indicator Species ☑ Yes ☐ No

SUMMARY:

14 **TOTAL for Pool Characteristics** 27.5 **TOTAL for Pool Envelope and Critical Terrestrial Habitat Area**

Other comments (append photographs, additional notes, sketch of pool and surrounding landscape):

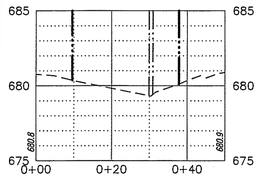
CERTIFICATION:

WETLANDS WERE DELINEATED IN ACCORDANCE WITH THE US ARMY CORPS OF ENGINEERS 1987 WETLANDS DELINEATION MANUAL Y-87-1 AND REGIONAL SUPPLEMENT FOR NORTHEAST AND NORTHCENTRAL REGION AND FIELD INDICATORS FOR HYDRIC SOILS IN NEW ENGLAND, BY CHRISTOPHER A. GUIDA, C.W.S. IN OCTOBER, 2021 & AUGUST, 2022.

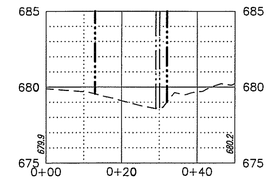
DATE: 4/14/23

STATE OF NEW HAMPSHIRE
CHRISTOPHER A. GUIDA
No. 093
CERTIFIED WETLAND SCIENTIST

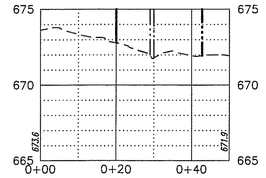
AA-AA' TRANSECT

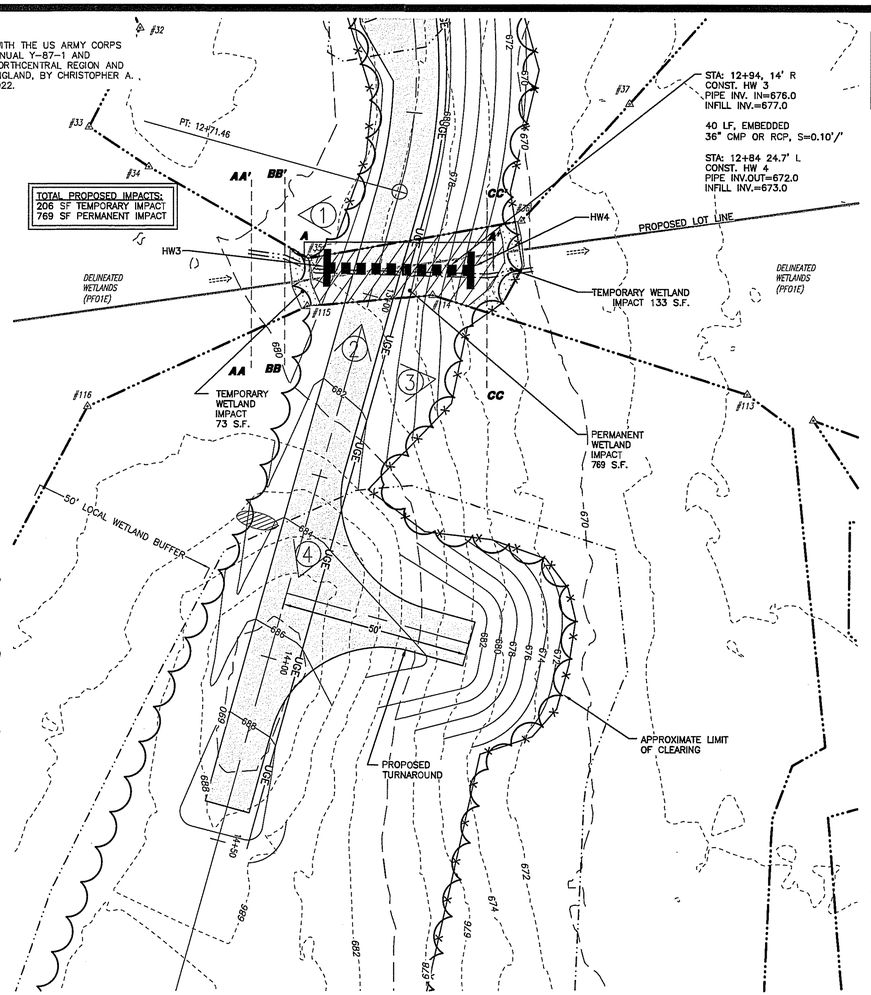


BB-BB' TRANSECT

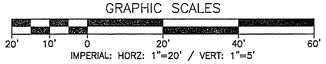


CC-CC' TRANSECT





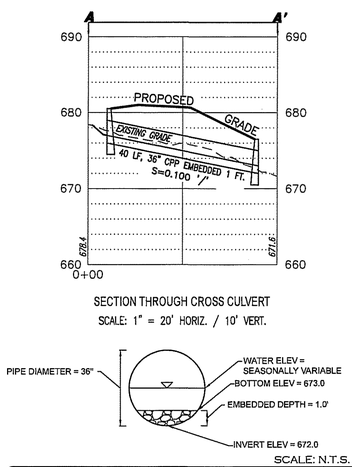
GRAPHIC SCALES



IMPERIAL: HORZ: 1"=20' / VERT: 1"=5'

1. ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REQUIREMENTS AND SPECIFICATIONS OF THE TOWN OF WILTON.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THESE PLANS AND SHALL VERIFY THAT ALL THE INFORMATION SHOWN HEREON IS CONSISTENT, COMPLETE, ACCURATE, AND CAN BE CONSTRUCTED PRIOR TO AND/OR DURING CONSTRUCTION. THE DESIGN ENGINEER, SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES, ERRORS, OMISSIONS, OR EXISTING UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION SO THAT REMEDIAL ACTION MAY BE TAKEN BEFORE PROCEEDING WITH THE WORK.
3. THE CONTRACTOR SHALL CONTACT "DIGSAFE" 72 HOURS PRIOR TO THE START OF CONSTRUCTION (1-800-255-4977 IN NH).
4. COMPLIANCE WITH ALL APPLICABLE REGULATIONS AND SPECIAL CONDITIONS OF WILTON AGENCIES, SUCH AS THE PLANNING BOARD, ZONING BOARD, CONSERVATION COMMISSION, AND OTHERS, IS MANDATORY AND IS THE RESPONSIBILITY OF THE OWNER.
5. ANY ALTERATION OF THIS DESIGN OR CHANGE DURING CONSTRUCTION MAY REQUIRE APPROVAL OF VARIOUS TOWN/CITY BOARDS OR AGENCIES AND SHALL BE DISCUSSED WITH THE OWNER AND FIELDSTONE LAND CONSULTANTS, PLLC PRIOR TO CONSTRUCTION.
6. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE APPROPRIATE TOWN DEPARTMENTS PRIOR TO CONSTRUCTION TO ARRANGE FOR NECESSARY INSPECTIONS.
7. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ACCURATE AS-BUILT INFORMATION OF ALL WORK, ESPECIALLY UNDERGROUND CONSTRUCTION OF UTILITY LINES, SERVICES, CONNECTIONS, ETC. AND APPROPRIATE TIES TO ABOVE GROUND PERMANENT STRUCTURES, FIELD SURVEY COORDINATES, OR SOME OTHER METHOD OF ESTABLISHING THE AS-BUILT CONDITION OF ALL CONSTRUCTION.
8. THE CONTRACTOR AND OWNER ARE RESPONSIBLE FOR OBSERVING AND MANAGING THE PROJECT PER RSA 430:53 AND AGR 3800 REGARDING INVASIVE SPECIES (PLANTS AND INSECTS). NO INVASIVE SPECIES PLANT OR INSECT SHALL BE INTRODUCED ONTO THE SITE.

GENERAL CONSTRUCTION NOTES | 1 | WT-1



SECTION THROUGH CROSS CULVERT

SCALE: 1" = 20' HORIZ. / 10' VERT.

SCALE: N.T.S.

EMBEDDED CULVERT | 2 | WT-1

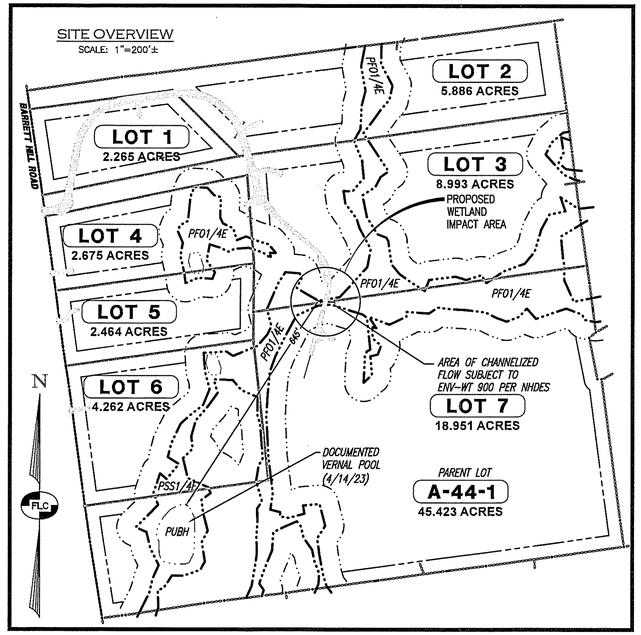
PERMITTING NOTE:

THIS PLAN IS FOR NHDES WETLAND PERMITTING PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION OR ANY OTHER PURPOSE. SHOULD WETLAND IMPACTS CHANGE DUE TO REVISIONS TO THE ENGINEERING PLAN AND PROFILE OR ANY OTHER REASON, AN AMENDMENT WILL BE REQUIRED WITH NH DES WETLANDS BUREAU.

CONTACT DIG SAFE 72 HOURS PRIOR TO CONSTRUCTION
DIGSAFE.COM
OR DIAL 811
CALL 811 - KNOW WHAT'S BELOW

SITE OVERVIEW

SCALE: 1"=200'±



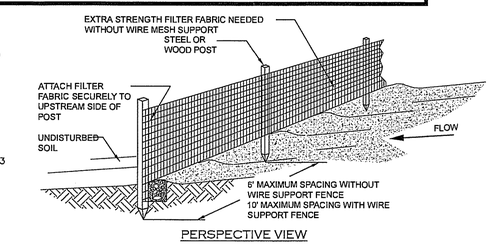
WETLAND NOTE:

PFO1/4E: PALUSTRINE FORESTED BROAD-LEAVED DECIDUOUS/NEEDLE-LEAVED EVERGREEN SEASONALLY FLOODED/SATURATED
PSS1/4F: PALUSTRINE SCRUB-SHRUB BROAD-LEAVED DECIDUOUS/NEEDLE-LEAVED EVERGREEN SEMIPERMANENTLY FLOODED
PUBH: PALUSTRINE UNCONSOLIDATED BOTTOM, PERMANENTLY FLOODED

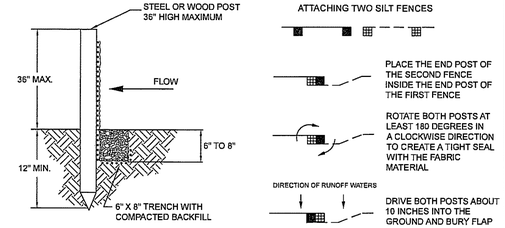
VERNAL POOL SURVEY CONDUCTED BY CHRISTOPHER A. GUIDA, CWS ON APRIL 14, 2023

1. ALL WORK IS TO BE CONDUCTED DURING LOW FLOW CONDITIONS.
2. INSTALL STONE CHECK DAMS AND SILTATION CONTROL DEVICES IN LOCATIONS SHOWN ON PLANS. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATION.
3. INSTALL STABILIZED CONSTRUCTION ENTRANCE(S).
4. CUT AND CLEAR TREES; DISPOSE OF DEBRIS. STUMPS ARE TO BE GROUND ON-SITE AND TAILINGS USED FOR EROSION CONTROL.
5. REMOVE TOPSOIL AND STOCKPILE AWAY FROM ANY WETLAND. STABILIZE STOCKPILE IMMEDIATELY BY SEEDING. PLACE SILT FENCE AROUND THE DOWN SLOPE SIDE OF EARTH STOCKPILES.
6. ROUGH GRADE DRIVEWAY - INSTALL CROSS CULVERTS, CONSTRUCT DRAINAGE SWALES DURING INITIAL PORTION OF CONSTRUCTION. STABILIZE IMMEDIATELY PER THE CONSTRUCTION AND EROSION CONTROL DETAILS. DO NOT DIRECT STORM WATER RUNOFF TO THESE STRUCTURES UNTIL A HEALTHY VEGETATIVE COVER IS ESTABLISHED.
7. CONSTRUCT ROAD AND INSTALL DRAINAGE PIPES AND STRUCTURES. ALL CUT AND FILL SLOPES SHALL BE STABILIZED UPON COMPLETION OF ROUGH GRADING PER THE THE EROSION CONTROL NOTES.
8. PLACE STONE CHECK DAMS AROUND INLETS AROUND ALL STRUCTURES UNTIL ROAD IS PAVED AND ALL NON-PAVED DISTURBED AREAS HAVE A HEALTHY VEGETATIVE COVER.
9. INSPECT AND MAINTAIN EROSION CONTROL MEASURES ON A WEEKLY BASIS AND AFTER EVERY 0.5" OR GREATER RAINFALL.
10. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, CULVERTS, DITCHES, SILTATION FENCES, SEDIMENT TRAPS, ETC. MULCH AND SEED AS REQUIRED.
11. FINISH GRADING TO PREPARE FOR LOAMING. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 72 HOURS AFTER FINAL GRADING.
12. PERMANENT SEEDING SHALL BE PERFORMED UPON COMPLETION OF DRIVEWAY CONSTRUCTION.
13. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
14. TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED WHEN ALL DISTURBED AREAS HAVE BEEN STABILIZED.
15. ALL STRUCTURES SHALL BE CLEANED OF SEDIMENTS ONCE CONSTRUCTION IS COMPLETE.

CONSTRUCTION SEQUENCE NOTES | 3 | WT-1



PERSPECTIVE VIEW



SECTION VIEW

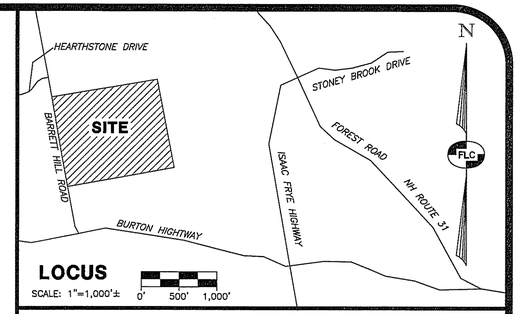
NOTES:

1. SILT FENCES SHOULD NOT BE USED ACROSS STREAMS, CHANNELS, SWALES, DITCHES OR OTHER DRAINAGE WAYS.
2. SILT FENCE SHOULD BE INSTALLED FOLLOWING THE CONTOUR OF THE LAND AS CLOSELY AS POSSIBLE AND THE ENDS OF THE SILT FENCE SHOULD BE FLARED UPSLOPE.
3. IF THE SITE CONDITIONS INCLUDE FROZEN GROUND, LEDGE OR THE PRESENCE OF HEAVY ROOTS THE BASE OF THE FABRIC SHOULD BE EMBEDDED WITH A MINIMUM THICKNESS OF 8 INCHES OF 3/4-INCH STONE.
4. SILT FENCES PLACED AT THE TOE OF SLOPES SHOULD BE INSTALLED AT LEAST 6 FEET FROM THE TOE TO ALLOW SPACE FOR SHALLOW PONDING AND ACCESS FOR MAINTENANCE.
5. THE MAXIMUM SLOPE ABOVE THE FENCE SHOULD BE 2:1 AND THE MAXIMUM LENGTH OF SLOPE ABOVE THE FENCE SHOULD BE 100 FEET.
6. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE TO SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
7. SILT FENCES SHOULD BE REMOVED WHEN THE UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED.

ATTACHING TWO SILT FENCES

SCALE: N.T.S.

SILT FENCE | 4 | WT-1



LOCUS

SCALE: 1"=1,000'± 0' 500' 1,000'

LEGEND:

EXISTING FEATURES:	PROPOSED FEATURES:
RIGHT-OF-WAY LINE	PROPOSED CULVERT WITH HEADWALL
BOUNDARY LINE	PROPOSED LOT LINE
ABUTTING LOT LINE	PROPOSED DRIVEWAY
BUILDING SETBACK LINE	EROSION CONTROL / SILT FENCE
-300- 10' CONTOUR INTERVAL	CHECK DAM
-302- 2' CONTOUR INTERVAL	360 10' CONTOUR INTERVAL
WETLAND SETBACK LINE	358 2' CONTOUR INTERVAL
EDGE OF WETLANDS	PERMANENT IMPACT
#33 DELINEATION FLAG & NUMBER	TEMPORARY IMPACT
EDGE OF GRAVEL	
STONE WALL	
D.H.(F) DRILL HOLE FOUND	
D.H.(S) DRILL HOLE SET	
I.PIPE(F) IRON PIPE FOUND	
I.PIN[TBS] IRON PIN OR DRILL HOLE TO BE SET	
G.B.[TBS] GRANITE BOUND TO BE SET	
WELL	
A-44-1 TAX MAP & LOT NUMBER	
3 PHOTO LOCATION AND DIRECTION	

NOTES:

1. THE OWNER OF RECORD FOR TAX MAP LOT A-44-1 IS SAN-KEN HOMES, INC – 586 TURNPIKE ROAD, NEW IPSWICH NH 03071 SEE H.C.R.D. BK. 9511 PG. 1239 DATED: AUGUST 13, 2021.
2. THE PURPOSE OF THIS PLAN IS TO DEPICT A PROPOSED WETLAND CROSSING LOCATION FOR PERMITTING THROUGH NH DES WETLAND BUREAU. TOWN OF WILTON ZONING BOARD OF ADJUSTMENT APPROVAL CASE#10/11/22-3, DECIDED TUESDAY, NOVEMBER 8, 2022.
3. THE BOUNDARY INFORMATION SHOWN WAS DEVELOPED FROM THE REFERENCE PLANS CITED HEREON TOGETHER WITH AN ON THE GROUND FIELD SURVEY PERFORMED BY THIS OFFICE DURING THE MONTH OF SEPTEMBER, 2021.
4. THE SUBJECT PARCEL LIES OUTSIDE THE WELLHEAD PROTECTION AREA (WHPA). PORTIONS OF THE SITE LIE WITHIN THE WETLANDS CONSERVATION DISTRICT, BUILDINGS MUST BE SETBACK 50 FEET FROM DELINEATED WETLANDS. THE ENTIRE SITE LIES OUTSIDE THE AQUIFER PROTECTION DISTRICT. A PORTION OF PROPOSED LOT 7 IS SUBJECT TO THE WATERSHED PROTECTION OVERLAY DISTRICT.
5. PROPOSED LOTS ARE TO BE SERVICED BY INDIVIDUAL SEPTIC SYSTEMS AND WELLS.
6. SUBJECT PARCELS LIE OUTSIDE THE FLOOD HAZARD AREA AS DETERMINED FROM THE FLOOD INSURANCE STUDY (FIRM), HILLSBOROUGH COUNTY, NEW HAMPSHIRE, TOWN OF WILTON, COMMUNITY NO. 330102 PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, MAP 33011C0431D, DATED SEPTEMBER 25, 2009.
7. HORIZONTAL ORIENTATION AND VERTICAL DATUM ARE NAD_83 AND NAVD 88 RESPECTIVELY PER A GPS CORS SOLUTION.

REV.	DATE	DESCRIPTION	C/O	DR	CK
A	4/14/23	REVISED PER NHDES RFMI	NHDES	KMR	CAG

WETLAND PERMITTING PLAN

TAX MAP A LOT 44-1

(BARRETT HILL ROAD)

WILTON, NEW HAMPSHIRE

PREPARED FOR AND LAND OF:

SAN-KEN HOMES, INC.

586 TURNPIKE ROAD - NEW IPSWICH NH 03071

SCALE: 1" = 20' DECEMBER 7, 2022

Surveying ⌖ Engineering ⌖ Land Planning ⌖ Permitting ⌖ Septic Designs

FIELDSTONE LAND CONSULTANTS, PLLC

206 Elm Street, Milford, NH 03055
Phone: (603) 672-5456 Fax: (603) 413-5456
www.FieldstoneLandConsultants.com