



## ***Ian T. Cole***

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August 22, 2022

Mr. Peter Gardner P.L.S.  
Dieter & Gardner, Inc.  
Land Surveying Planning Engineering  
P.O. Box 335  
Gales Ferry, CT 06335

**RE: WETLAND ASSESSMENT REPORT – AVERY BROOK HOMES, LLC;  
RESUBDIVISION OF 94,96, 98 and 100 STODDERS WHARF ROAD (aka ROUTE  
214), LEDYARD, CONNECTICUT.**

Dear Mr. Gardner:

On behalf of the applicant Avery Brook Homes, LLC I have completed a site review and wetland assessment of the above referenced Project for the construction of 36 new single-family affordable residential lots at 94, 96, 98, and 100 Stodders Wharf Road. I offer the following comments relative to assessing impacts to the inland wetlands and watercourses due to the proposed activities.

### **EXISTING CONDITIONS**

The site combines 4-parcels totaling approximately 9.2 acres of vacant land. A home site previously occupied the 1.37-acre parcel 98. Parcels 94, 96 and 100 are abandoned agricultural lands that have reverted into unmanaged xeric early successional habitat dominated by dry upland grasses and eastern red cedar (Photo 1). The bulk of the property was used as agricultural crop and pasture lands and can be seen in various stages of use in CTDEEP's Historic Air Photos for 1934 (Figure 2), 1951 and 1970. Post agriculture abandonment the site has been idle for several decades and has subsequently revegetated with early successional colonizers that flavor the dry sandy soil conditions and open canopy habitat.

Three wetland resources were identified at the peripheral of the property positioned in the low-lying lands to the north and east. Billings-Avery Pond is located off-site to the north; single family residential lots are found to the west and south along the road frontage of Route 214; and vacant woodlands occupy the bulk of the undeveloped lands east and north of the site which are contiguous to the Billings-Avery Pond watershed.



Photo 1: Typical upland conditions that characterize the property – abandoned agricultural lands



## Soil Evaluations



Figure 2: CTDEEP 1934 AIR PHOTO – Documenting past agricultural land use practices  
– Note Billings Avery Pond north of site has not yet been constructed.

In March 2022, I completed a field delineation of the jurisdictional freshwater inland wetland and watercourses boundaries of the above referenced properties.

### **Delineation Methodology**

The second order soil survey and wetland delineation were completed in accordance with the standards of the Natural Resources Conservation Services (NRCS) National Cooperative Soil Survey and the definitions of inland wetlands and watercourses as found in the Connecticut General Statutes, Chapter 440, Sections 22a-36 through 22a-45 as amended. Wetlands, as defined by the Statute are those soil types designated as poorly drained, very poorly drained, floodplain or alluvial in accordance with the NRCS National Cooperative Soil Survey. Such areas may also include disturbed areas that have been filled, graded, or excavated and which possess an aquic (saturated) soil moisture regime.

Watercourses means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, vernal, or intermittent, public, or private, which are contained within, flow through or border upon the Town of Ledyard or any portion thereof not regulated pursuant to sections 22a-28 through 22a-35, inclusive, of the Connecticut General Statutes. Intermittent watercourses are defined permanent channel and bank and the occurrence of two or more of the following characteristics: (a) evidence of scour or deposits of recent alluvium or detritus, (b) the presence of standing or flowing water for duration longer than a particular storm incident, and (c) the presence of hydrophytic vegetation.

### **Wetland Delineation Findings**

The on-site wetland delineation examined the upper 20" of the soil profile for the presence of hydric soil conditions. Those areas meeting the wetland criteria noted above were marked in the field with sequentially numbered pink and blue wetland flagging and are correctly illustrated on the subject site development plans.

### **Wetland Resources**

Three wetland boundaries were identified on the property. The wetlands partly have their origin tied to past agricultural and land management practices.

Wetland #1 is an unnamed intermittent watercourse that flows across the eastern property line (Photo 2). The watercourse is well-defined and is confined to the banks of the stream and its associated low-lying and level poorly drained soils. As the watercourse flows across the property line the channel takes an abrupt 90 degree turn to the north. Alder, dogwood, spicebush, sweet pepperbush, and high bush blueberry shrubs characteristically define the shrub layer that line the banks of the stream channel. A herbaceous growth of tussock sedge, cinnamon fern and skunk cabbage carpets the wetland forest floor. These wetland conditions quickly give rise to upland vegetation and well-drained sandy soil conditions that define the adjacent abandoned fields.

Wetland #2 is a wetland pocket that formed in the bottom of an excavated borrow pit (Photo 3). Material was excavated to a point where it intercepted the groundwater table creating seasonal ponding that supported the development of ephemeral wetland conditions.



Wetland #3 is associated with the wetted perimeter and forested fringe of Billings-Avery Brook (Photo 4). The wetland boundary is well-defined and closely follows a distinct break in slope. The wetlands exhibit classic seasonally flooded palustrine forested red maple swamp vegetation common to the area.

### **Wetland Functions and Values**

The assessment of wetland functions and values is based on the US Army Corps of Engineers' (USACE) Descriptive Approach (1995) methodology, and on best professional judgment.

The principal function of the regulated wetlands is groundwater discharge and recharge. Secondary functions include flood flow alteration (storage and desynchronization), water quality renovation properties (nutrient and sediment uptake and retention), and general wildlife habitat properties typically associated with undeveloped lands. Additionally, the short section of the intermittent watercourse channel adjacent to the development primarily functions to convey surface runoff down slope during the high seasonal water table period and after heavy rains.

Other wetland functions and services are somewhat limited due to the private ownership of the property, overall site setting, relatively small size (*specifically the wetland pocket on Lot #5*), association with an open channel, landscape position, intermittent hydro-period, lack of open standing deep water habitat, and presence of invasive and non-native species.



PHOTO 2: WETLAND #1 – Denoted by wetland flags 1 through 8 – Watercourse and Wetland that flows across eastern property line onto proposed lots #2 & #3.



Photo 3: Wetland Pocket in rear of proposed Lot #5. Ephemeral wetland is located in the bottom of a previously graveled-out “borrow pit”.





Photo 4: Typical early emergent conditions along Billings-Avery Brook in early March 2022. Generally, the watercourse channel and adjacent wetland boundary is well-defined.



### **Soil Survey**

The soils identified on-site are a refinement of the Natural Resources Conservation Service (NRCS) Websoil Soil Survey. The site occurs at the interface of the dense glacial till and bedrock-controlled landscape that characterizes the high elevations on the extreme westerly side of the site with the opposing glacial meltwater outwash sands and gravels that cover the Avery Brook watershed.

### **Wetland Soils**

The primary wetlands soil series along the flagged wetland boundaries are classified as (3) Ridgebury, Leicester, and Whitman fine sandy loams. The poorly drained soils along the wetland boundary belong to the Ridgebury and Leicester soil series. Ridgebury and Leicester soils are found within drainageways and depressions on glacial till landscapes. Ridgebury and Leicester soils have a seasonal high-water table at a depth of about 6 inches. Very poorly drained Whitman soils are found in the lowest lying areas within the interior the wetlands where the water table is at the surface thought most of the growing season.

A typical soil profile along the wetland boundary consists of approximately 2"-0" of intermediately decomposed organic material (Oi), followed by 0"-8" of a thick dark topsoil horizon (A), underlain by 8-20" of a wet weakly developed grayish subsoil horizon (Bg) with common redoximorphic features (Common medium distinct strong brown mottles, masses) ranging from fine sandy loam to very fine sandy loam. This subsoil is underlain by a saturated sandy loam to fine sandy loam gray substratum (2Cg).

### **Upland Soils**

The upland soils are located on a transition from the higher elevation till soils west and south of the proposed development to outwash material lower on the landscape. The bulk of the uplands are mapped as well drained – Agawam fine sandy loams. This stratified water sorted sands and gravels are well suited for development and are generally unrestricted. Along the property boundaries of the are notable pockets of excessively well-drained Hinckley loamy sands. These deep sands and gravels have rapid permeability and high infiltration rates. Surrounding the property are notable bands of mapped Udorthent soils. These mapping units occur in areas where material was previously mined, evidence of how useful the sandy soil material at the site is for building purposes.

Soil Map—State of Connecticut  
(Stodders Wharf Rd)





## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### 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 1:12,000.

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: State of Connecticut

Survey Area Data: Version 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Data not available.

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.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
29B	Agawam fine sandy loam, 3 to 8 percent slopes	6.2	47.1%
38C	Hinckley loamy sand, 3 to 15 percent slopes	2.0	15.4%
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	0.8	6.4%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	0.1	0.5%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	1.1	8.1%
306	Udorthents-Urban land complex	2.5	19.3%
703A	Haven silt loam, 0 to 3 percent slopes	0.4	3.1%
<b>Totals for Area of Interest</b>		<b>13.2</b>	<b>100.0%</b>



### **PROPOSED ACTIVITIES**

The proposed development of the site calls for the construction of 36 individual single-family homes. Lots range from .19 to .42 acres and are to be serviced by private well water and private on-site septic systems. The homes will be accessible by a private loop road to be named Avery Brook Circle.

### **IMPACT ASSESSMENT**

There are no direct impacts to the wetlands due to the proposed activities.

Wetlands are found on 4 of the 36 lots.

1. Billings Avery Brook's associated forested wetland fringe (Photo 4) encroaches onto the northern limits of Lot #12
2. A wetland pocket (Photo 3) is found in the rear of Lot #5
3. The wetted perimeter of an intermittent watercourse (Photo 2) flows along the easterly property boundary and onto the easterly portion of Lot #2 and Lot #3.

The development and associated activities will maintain the holistic functions and value of the wetlands. The wetland including their existing functions as well as the on-site drainage patterns will be maintained. The beneficial and functional service of the neighboring wetlands is the conveyance of seasonal flow and groundwater recharge, which the development will be preserving by maintaining overall existing drainage patterns and flow dynamics.

### **INDIRECT IMPACTS**

Indirect or secondary impacts to a wetland or watercourse can occur as a result of activities outside of the wetlands or watercourses. These impacts can be either short-term (*construction phase*) or long-term (*i.e., change in drainage patterns / whole-sale clear cutting*) and are typically associated with erosion and sedimentation during construction, removal or disturbance of vegetation in adjacent upland areas, alteration of ground / drainage patterns that could effect the flow regime of a watercourse, and the discharge of degraded or insufficiently treated surface or groundwater, which may adversely impact the water quality of the regulated resource.

The potential for any of these indirect impacts to occur at the site as a result of the development depends on the quality of the regulated resources, the sensitivity to said resources, the resource's physical and ecological characteristics, and the degree to which those resources provide recognized functions and values. These potential impacts are described in detail below:

### **EROSION AND SEDIMENTATION**

To minimize potential impacts the design incorporates industry standard best management practices (BMPs) and guidelines for residential developments. A construction sequence is

provided on the site plans notes. Additional construction notes include details on the proposed earthwork and grading, site stabilization, and best management practices (BMPs) for protecting the environment. All construction activities will be completed in compliance with the standards and guidelines provided by the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. These controls as well as compliance with permit approvals will assure that no permanent adverse effects will impact the receiving wetlands.

The site risk or potential for adverse impacts from erosion and sedimentation is considered low-moderate because 1.) a detailed erosion and sediment control plan has been prepared and submitted, and 2) the site's in-situ undisturbed soils are for the most part low to moderately erosive. 3) the site is generally level and topography is easily managed, 4) no need for large scale tree removal as the land is open field habitat, and 5) there is a neighboring nearby stream channels which provide opportunity for offsite migration. Therefore, it is my professional opinion that with watchful monitoring and maintenance of erosion and sediment controls until construction is completed and restoration is stabilized that no adverse impacts to the regulated resources are expected.

### **VEGETATION REMOVAL AND HABITAT LOSS**

Habitat loss associated with land clearing is a consequence of land development which has the potential of impacting wetlands and watercourses. The proposed development will kept clearing limits to a minimum by clearing what is physically needed for facilitating the construction of the homes and associated appurtenances. The past agricultural uses of the properties have maintained and promoted open conditions for a long time which will result in a reduction of whole-sale land clearing requirements to facilitate construction of the proposed development. The conversion of the vegetation cover within the development envelope will not change or diminish the ecological integrity of the surrounding forest and wetland communities.

### **POTENTIAL IMPACTS TO WETLAND HYDROLOGY AND STREAM DYNAMICS**

The hydrologic and flow regime of Billings Avery Brook and the intermittent watercourse along the eastern property line are supported by off-site contributions from groundwater and surface water inputs. The proposed development will not impact drainage patterns either on-site or off-site. The wetlands baseflow will be recharged from the natural high infiltration rates as stormwater runoff freely drains back into the underlying sandy soil.

### **POTENTIAL WATER QUALITY IMPACTS**

The proposed development has been reviewed by the Ledge Light Health District (LLHD) for the suitability of the proposal to support on-site septic service and provide adequate water supply. LLHD comments have been satisfied and LLHD has recommended that all 36 Lots are suitable for development in their current configuration with the caveat that no footing drains are required (*which given the demonstrated high soil permeability and high percolation test rates (generally > 5min/inch) footing drains are not needed and should not be required*).



Additionally, the project retained the professional engineering services of GEI Consultants Inc, to provide a water supply study “*Water Study Proposed Stoddard’s Wharf Road Subdivision Ledyard, CT*” July 6, 2022. The study demonstrates the sites natural capacity to provide each lot with a private well that would produce an adequate quantity of water to service a 3-bedroom single family dwelling. The study concludes that the current ground water supply is adequate to support the subdivision as proposed. Additionally, the report points out that the proposed subdivision is partially surround by an undeveloped watershed area, allowing for sufficient and natural replenishment of the aquifer that would serve the wells.

The proposed development will not create any new point discharges. The site will be graded so stormwater runoff will sheet flow across the landscape to promote infiltration into the surrounding well drained soils. This infiltration into the ground will recharge the nearby wetland resource baseflow.

### **CONCLUSION**

Due to the needs of the proposed development and proximity of the wetland resources the location of 5 homes on Lots #2-#6 will require activities within the 100’ upland review area. Additionally, the septic systems for lots #9 – #13 will be located within the upland review area, leaving the bulk of the development outside of any regulated area.

The naturally occurring very well drained sandy soils will beneficially and promote infiltration to maintain and recharge baseflow to downstream resources.

Alterations within the URA will have some conversion of habitat. The activities in the uplands required to facilitate the development will not result in any loss of wetland function. Post development the wetlands and watercourse will still have the same ability to perform the existing functions they currently provide. As a result, environmental effects will be minor and highly localized. The applicant will mitigate such impacts by implementing standard construction BMPs and conforming to permit conditions.

The design has minimized wetland disturbances by:

1. Avoidance of any direct wetland disturbance.
2. Providing and maintaining erosion and sediment controls during construction.
3. Commitment to adhering to permit conditions and construction industry standard best management practices (BMPs).

Please do not hesitate to contact me at; (860) 514-5642 or [itcole@gmail.com](mailto:itcole@gmail.com) if you have any questions or need any additional information.

Respectfully Submitted.

Ian T. Cole   
Professional Registered Soil Scientist  
Professional Wetland Scientist #2006

Exhibit #6

Revised 12/4/22

**IAN T. COLE**  
**DELEINEATIONS WITHOUT DELAY**  
**Professional Soil Scientist / Professional Wetland Scientist**

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**PROFESSIONAL SUMMARY AND ACCOMPLISHMENTS**

I have over 20 years of professional environmental experience throughout New England and the Mid-Atlantic states. I have professional certifications as a Registered Professional Soil Scientist (*Society of Soil Scientists of Southern New England*) and Certified Professional Wetland Scientist (#2006- *Society of Wetland Scientists*). I have over two decades of experience delineating wetlands and developing site-specific soil survey assessments. Skills and experience include the ability to identify resident and migrant avian species by sight and sound, and the ability to locate and identify all New England's native amphibians and reptiles. I have significant experience identifying and mapping vernal pools, including cryptic and range restricted vernal pool indicator species.

Over the course of my career I have assisted and lead hundreds of wildlife studies throughout New England. I routinely support projects with the processes and documentations required to work under Scientific Collectors Permits (including handling and trapping) of state-listed wildlife. I am responsible for the management, coordination and submittal of applications and subsequent state-listed species studies for a range of projects in the Utility industry and various local commercial and residential development projects. I have extensive experience in species research, plant phenology and am familiar with nuances of listed species and close associations with habitat requirements and time of year survey windows.

Delineations without Delay provides consulting services in the areas of biological, wetland, and soil sciences. In addition to the identification, description, and classification of natural resources, the firm also provides functional evaluation of wetlands and other biological systems, guidelines for mitigation of potential adverse impacts, and permit support through expert testimony and public representation. Services provided revolve around the impact of human activities on terrestrial, wetland, aquatic, and marine resources.

In addition to my biological science foundation, I have a strong working knowledge of local, state and federal environmental permitting process including but not limited to: United States of Army Corps of Engineers (ACOE) (404, 408 Section 10), Connecticut Department of Energy and Environmental Protection (CTDEEP)(401, NDDB, SWPCP), Massachusetts Department of Environmental Protection (MassDEP), as well as the review processes of Massachusetts Environmental Policy Act (MEPA), National Historic Preservation Act (NHPA) -Section 106, and Endangered Species Act (ESA) -Section 107, and Tribal consultations (THPO). I am accustomed to the fast-paced working environment and demands of planning and construction schedules and routinely navigate and provide resolution to complex issues that may arise during project planning keeping projects on critical path forward.

## **PROFESSIONAL EXPERIENCE**

### **Delineations Without Delay, Middletown, CT**

Lead Soil Scientist: May 2015-Present

- Expert in Wetland Delineation and Soil Science
- Rare, Threatened and Endangered species surveys – expert in Botanical, Avian, Amphibian & Reptile focused studies, coordination and participation in invertebrate species.
- Manage multiple licensing and permitting consultants to provide environmental services
- Develops strategies and permitting approach to secure required environmental permits
- Routinely consults with regulatory agencies on a range of permitting (404, 401, 106, 107)
- Oversees environmental compliance and mitigation to support construction projects
- Supports cross discipline project team including engineering, survey, outreach, planning and vegetation management
- Represents projects at public hearings, open houses, conservation meetings.

### **Kleinschmidt Associates, Essex, CT**

*Project Scientist:* April 2008-May 2015

- Project manager responsible for scope, schedule and budgets
- Technical lead for terrestrial, wetland and RTE studies
- Oversee and mentor junior staff
- Wetland mitigation planning and design
- FERC compliance liaison for relicensing of hydroelectric facilities
- Licensing and permitting specialist

### **CME Associates, Woodstock, CT**

*Wetland / Soil Scientist:* May 1999 - April 2008

- Wetland delineation & evaluations
- Wildlife, vernal pool, and vegetation surveys
- Soil evaluations and mapping
- Supported environmental remediation, civil engineering and land survey divisions

## **EDUCATION**

### **University of Rhode Island, Kingstown, RI**

*Bachelors of Science, Environmental Science and Management 1999*

- Focus on wetland and soil science
- Completed additional graduate coursework in wetland studies (24 credits)

## **TECHNICAL SKILLS**

- Proficient in Microsoft Office (Word, Excel, PowerPoint)
- Hands on experience with remote data loggers and software
- CT Safe Boating Certificate & familiarity with a range of off-road vehicles
- Expert in field identification of wetlands, soils, wildlife, botanical, vernal pool resources.

## **ASSOCIATIONS**

- Professional Member Soil Science Society of Southern New England
- Society of Wetland Scientist - Certified Professional Wetland Scientist
- Connecticut Association of Wetland Scientist
- Former commission member of The Town of Ledyard IWWC agency 2005-2012