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

RE: IWWC 22-18URA- UPDATED 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 revised the wetland assessment report dated August 22, 2022, in response to modifications of the Project design which now calls for the construction of twenty-six (26) new single family affordable residential lots at 94, 96, 98, and 100 Stodders Wharf Road. I offer the following updated 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 favor the dry sandy soil conditions and open canopy habitat.

Three wetland resources were identified at the periphery 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 a substantial portion is located within the Groton Utilities owned Billings-Avery Pond watershed.



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



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.

DELIEATION 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 RESULTS

The on-site wetland delineation examined the upper 20" of the soil profile for the presence of hydric soil conditions. The watercourse referenced below was delineated based upon its characteristics as an intermittent watercourse as defined in the preceding paragraph. 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 revised 10/31/2022

Wetland Resources

Three wetland/watercourse boundaries were identified on the property. The wetlands/watercourse 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 and exits the property. Alder, dogwood, spicebush, sweet pepperbush, and high bush blueberry shrubs characteristically define the shrub layer that line the banks of the stream channel. A thick 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 fallow 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. The 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 of 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. These stratified, water sorted sands and gravels are well suited for development and are generally unrestricted. Along the property boundaries 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.

PROPOSED ACTIVITIES

In response to review comments, the modified development proposal calls for the construction of 26 individual single-family residential homes consistent with the standards and guidelines for affordable subdivisions under the Affordable Housing Act, Connecticut General Statutes §8-30g. This is a reduction of 15 lots from the original concept project and a reduction of 10 lots from the originally submitted development initiative. Lots are to be serviced by health department approved private well water and private on-site septic systems. The homes will be accessible by a municipality owned and maintained loop road with a single access point to be named Avery Brook Circle. Stormwater generated from the entire road surface will be directed into a stormwater quality basin which will renovate and treat the first one inch of stormwater (90% of storm events) prior to its release as non-erosive sheet flow.

IMPACT ASSESSMENT

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

Wetlands and/or the 100' Upland Review Area are found on 5 of the 26 lots.

1. The 100' upland review area associated Billings Avery Brook's forested wetland fringe (Photo 4) encroaches onto the northern limits of Lots, #6, 7 & 8. The 100' upland review area on these lots will remain undisturbed and will be preserved in their existing vegetated state.
2. A wetland pocket (Photo 3) is found in the rear of Lot #2. Activities proposed within 100' of the subject wetlands include grading and construction of a portion of the house.
3. The perimeter of an intermittent watercourse (Photo 2) flows along the easterly property boundary and onto the easterly portion of the of the lot that will host the stormwater quality basin which is proposed within the upland review area.

The development and associated activities will maintain the holistic functions and value of the wetlands. The wetlands 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 affect 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 regulate 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 and the nature of the activities proposed in areas surrounding or which contribute flow (either surface water or groundwater to the regulated resource). These potential impacts are described in detail below:

EROSION AND SEDMIENTATION

To minimize potential impacts, the design incorporates industry standard best management practices (BMPs) and guidelines for residential developments. A detailed construction sequence has been provided as part of the application. Additional construction notes include details on the proposed earthwork and grading, site stabilization, and best management practices (BMPs) for protecting the environment have been incorporated into the Project requirements. 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 ensure 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 undistrubed soils are for the most part low to moderately erosive. 3) the site is generally level and topography is easily managed, and 4) there is no need for large scale tree removal as the bulk of the land is open field habitat. Therefore, it is my professional opinion that with coordination and watchful monitoring and maintenance of erosion and sediment controls until construction is completed and restoration activities have stabilized the ground conditions there will be no anticipated adverse impacts to the regulated resources resulting from the development of the Project.

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 keep clearing limits to a minimum by clearing what is physically needed for facilitating the construction of the homes and associated appurtenances. The proposed plans have been updated to show the limits of clearing. 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.

The Projects design engineer has provided an engineering analysis and stormwater management system to support the development. LBM Engineering LLC's stormwater report states and supporting calculations demonstrate that the proposal will not increase the potential for downstream flooding. The non-erosive sheet flow runoff from the development will precede the peak flow in Billings Avery Brook, thereby having no effect on downstream flooding.

POTENTIAL WATER QUALITY IMPACTS

The proposed development has been reviewed by the Ledge Light Health District (LLHD) for the suitability of the development to support 26 on-site septic service and provide adequate water supply. In the original proposal LLHD recommended that the proposed 36 Lots were suitable for development 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*). The revised plans have substantially reduced the number of lots down to 26 and moved all proposed septic systems a minimum of 100' away from any inland wetland or watercourse boundary. This increase in separation distance to the wetland resource will improve maximizing pollutant removal.

The maintained minimum 100' setback with regards to the on-site septic treatment system areas is also consistent with CTDEEP's recommended 100' buffer to a wetland resource area. The CTDEEP Scientific Basis for Protecting Riparian & Wetland Buffer Zones (REMA Ecological Services) indicates the following removal rates can generally be provided by a 100-foot buffer:

- 81 percent of total suspended solids
- 89 percent of sediment
- 89.5 percent of nitrogen
- 82 percent of phosphorous

Wide buffers (e.g., 100 feet or greater in width) provide the best protection for water quality by moderating temperature changes and improving control of erosion, sediment and pollution and provide the widest range of wildlife values. It can be concluded that wider buffers also provide more overall benefits such as reducing human disturbance, maintaining wildlife habitat and providing improved flood protection.

The revised plans have been updated to include an engineered stormwater management system. The stormwater quality basin is situated between Lots 1 and 2 and is sized to

receive and renovate the first 1 inch of rainfall, which in the northeastern U.S. equates to approximately 90 percent of rainfall events and is consistent with the design standards recommended in CTDEEPs 2004 Stormwater Quality Manual.

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

After receiving and reviewing initial review comments with respect to the development initiative, the Applicant has revised the development proposal by (1) eliminating 10 building lots (2) revising the infrastructure design of the roadway system for the project to provide a municipal street system within the development and by eliminating one street access point from Stoddards Wharf Road and (3) incorporating a stormwater quality treatment system that provides a partially closed drainage system which will capture and treat for stormwater quality purposes, a substantial portion of the improved site stormwater runoff. In addition, all proposed primary and reserve septic system areas have been removed from the one hundred (100') foot upland review area. With the exception of a portion of 1 house and the stormwater quality basin the bulk of the development is outside any regulated areas under the Ledyard Inland Wetlands and Watercourses Regulations.

In considering the feasible and prudent alternatives which have been presented by the Applicant, the current proposal of 26 residential lots (*on a site that has been demonstrated to support up to 41 homes*) with no direct wetland impacts and includes BMP measures that will protect the resource areas is the most feasible and prudent alternative for residential development of this property giving due consideration to balancing the protection of the inland wetlands and watercourses and fostering of the economic development of the site, particularly when that development is to provide workforce housing which is a required State mandate.

Alterations within the URA will have some minor 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.

There will be no significant adverse impacts to the wetlands and watercourses resulting from the development of the Avery Brook project as currently proposed. The design has minimized wetland impacts by:

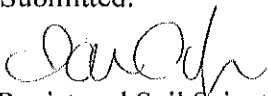
1. Avoidance of any direct wetland disturbance.
2. Providing and maintaining erosion and sediment controls during construction.
3. Commitment to adhering to permit conditions and construction industry standard best management practices (BMPs).

4. Compliance with all regulatory standards, including but not limited to, The Connecticut Public Health Code.

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

Respectfully Submitted.

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