



January 23, 2023

Bruce Fitzback
Land Use Agent
Town of Putnam
200 School Street
Putnam, CT 06260

Sent via email: Bruce.Fitzback@putnamct.us

Re: Supplemental Hydrogeologic Review
Proposed 11 Lot Subdivision
Putnam River Road, LLC & 285 River Road, LLC

Dear Mr. Fitzback:

We are in receipt of the following correspondence regarding the referenced project:

1. A letter dated December 29, 2022, with the subject "Hydrogeologic Impact Assessment, Putnam, Connecticut", addressed to Michael P. Carey, Esq. of Suisman Shapiro Attorneys-At-Law, 75 State Street, New London, CT 06320, prepared by Robert F. Good, Jr., of Weston & Sampson Engineers, Inc. ("the W&S letter")
2. A letter dated January 17, 2023, with the subject heading "285 River Rd LLC and Putnam River Rd LLC, Inland wetland application review, Town of Putnam, CLA 7399," addressed to Mr. Bruce Fitzback, Town of Putnam Land Use Agent, 200 School Street, Putnam, CT 06260" prepared by Robert C. Russo, Soil Scientist, of CLA Engineers, Inc. ("the CLA letter").

The authors of these letters indicated that they based their opinions, in part, on information provided by the applicant, and on One Earth's letter to you dated October 11, 2022, titled: "Hydrogeologic Review: Proposed 11 Lot Subdivision Putnam River Road, LLC & 285 River Road, LLC" ("the One Earth report").

One Earth provides this letter in response to the issues raised in the W&S letter and the CLA letter that pertain to the potential for hydrogeologic effects on the wetlands south and west of the proposed "Phase 1 Pond" excavation; (to maintain consistency with the W&S letter, we refer herein to these as the "Perimeter Wetlands").

As we discuss, One Earth and the applicant's engineer, Provost & Rovero, conducted additional tests and observations that provide site-specific information about the hydrology of the Perimeter Wetlands and the potential interaction of water in these wetlands with groundwater in the sand and gravel stratified drift deposits. This information confirmed our conclusion that the proposed excavation of sand and gravel in the Phase 1 Pond area does not have the potential to impact the hydrology of the wetlands.

Specifically, our studies show that the Perimeter Wetlands lie within a zone of perched groundwater, separated from the underlying sand and gravel aquifer by an unsaturated zone. Because the wetlands/perched groundwater zone is hydraulically distinct from the underlying aquifer, changes in groundwater elevation and hydraulic gradient in the sand and gravel aquifer cannot affect the hydrology or hydroperiod in the wetlands. As a result, localized changes in groundwater elevation within the sand and gravel aquifer that can be expected surrounding the Phase 1 Pond will have no potential to affect the hydrology of the Perimeter Wetlands.

The discussion below provides details regarding the W&S Letter and CLA Letter, and the procedures, findings, and conclusions of the studies we performed to address the comments in these letters.

Summary of Opinions and Conclusions Presented in the W&S Letter and CLA Letter

The W&S letter indicated that Weston & Sampson had “evaluated the potential for construction of the ponds to result in adverse impacts to the hydrology of [a] wetlands located on the Property and downstream properties (the Wetlands).” The W&S letter offered the following opinion:

Weston & Sampson is in general agreement with the assessment and conclusions documented in the OEE report, "that the proposed excavation and removal of sand and gravel, replacement of a portion of this material with clean silt, and construction of two ponds will not significantly impact the hydrology of Carpenter Brook or other wetlands or watercourses."

We find, however, that there is insufficient information to conclude there will be no impact to perimeter wetlands west and south of the Phase 1 Excavation/Pond (the Perimeter Wetlands).

The W&S letter concluded the following:

Groundwater within the proposed Phase 1 Excavation/Pond is not a significant source of hydrology to the perimeter wetlands but may seasonally, when groundwater levels are high, act to reverse or reduce the VHG (vertical hydraulic gradient) between wetland surface water and groundwater in the shallow sediments, which in turn could prolong the hydroperiod of the wetland.

Construction of the proposed Phase 1 Excavation/Pond could change the natural VHG and shorten the hydroperiod of the Perimeter Wetlands.

Absent site-specific information about the hydrology of the Perimeter Wetland and potential interaction with seasonal groundwater in the sand and gravel sediments, it is difficult to rule out any potential for impact to the wetlands.

The CLA letter concurred with the W&S letter, stating:

the currently available data cannot rule out the potential for the Phase 1 fringe wetland to experience a hydrologic change due to a steepening of the vertical groundwater gradient due to the proposed excavation.

We note that the W&S hydrogeologist agreed that there would be no significant impact, but suggested there was not sufficient information to rule out **any** potential for impact.

It is important to understand the conditions under which a change in the hydraulic gradient in the stratified drift might affect water flow in the wetlands. As the W&S letter pointed out, such effect could occur if construction of the Pond changed the vertical hydraulic gradient (VHG) in the wetland. However, this scenario is possible only if the stratified drift aquifer is continuous with the saturated zone in the wetland sediments; if these two saturated zones are separated by an intervening unsaturated zone, the hydraulic gradient in the stratified drift has no relevance to the gradient or flow in the wetlands.

Conceptual Model of the Hydrology of the Perimeter Wetlands

Before we discuss the procedures and findings of our recent hydrogeologic assessments, it is important to understand the hydrologic setting of the Perimeter Wetlands. The Soil Scientist's report (Joseph Theroux, 7/29/2022) described the Perimeter Wetlands as follows:

"Flag numbers WF-1C through WF-47C, WF-1D through WF-31D, WF-1E through WF-138E, WF-1I through WF-60I and WF-1J through WF-34J delineate a large palustrine forested wetland complex located in the southwestern portion of the property. This complex has several intermittent watercourses within its boundaries which flow downslope to the southeast. These watercourses receive hydrology from the larger portions of inland wetlands, from surface runoff and groundwater breakout."

One Earth agrees with Mr. Theroux that, aside from precipitation falling directly on the wetlands, the water in these wetlands originates as surface and subsurface drainage from the upland areas to the west. These "western uplands" are mapped by the NRCS as containing Charlton-Chatfield complex soils; (see the attached plan showing mapped soil units), characterized as stony, gravelly fine sandy loam, formed from melt-out glacial till. These are areas of groundwater recharge, where precipitation infiltrates and percolates slowly to the water table. Further downslope, groundwater discharges at seeps and springs, forming several intermittent watercourses that also collect and convey surface runoff during storm events. This hydrology is illustrated with the photos below.



Stone-lined, dug spring located about 350 feet west-northwest of the northern end of the proposed Phase 1 Pond; (view facing west; note pink wetland flag WF#1C hanging just above spring). Groundwater discharging here originates as infiltrating precipitation in the uplands and bedrock outcrops to the west. Note the abundant boulders characteristic of glacial till soils



Facing east (downslope) from the area of the stone-lined spring. Groundwater discharging to the surface here, and at other seeps and springs, forms intermittent watercourses that flow eastward down the slope about 200 feet to the flat area at beyond the base of the rock outcrops, where the channels merge to form the straight, dug channel that flows southeastward.

Water flowing from the western uplands drains eastward to the area of relatively flat topography where soils are mapped as Merrimac fine sandy loam (see attached soil map), formed in glaciofluvial sand and gravel. The Merrimac fine sandy loam has moderately high, to very high, capacity to transmit water, and as a result, these soils are somewhat excessively drained. The proposed Phase 1 Pond will be constructed in these sands and gravels.



Photos taken facing southwest in the vicinity of wetland flags #26C, #27C on January 20, 2023, during and following heavy rain. The bedrock outcrops and slopes rising in the background are the lower portions of the western uplands, which rise more than 100 feet above the elevation of the wetlands. The Perimeter Wetlands in the foreground are crossed by the intermittent watercourse, which flows southeastward (right to left in this view). Note the soil berm in the foreground of the left photo which appears to be material excavated to create or deepen the watercourse, probably during historic farming activities.



Views facing east from top of bedrock outcrop. In the relatively flat area in the middle-distance, the intermittent watercourse is visible flowing south-southeastward (left to right in this view). Note the straight channel, consistent with a man-made ditch. In the distance is a forest with abundant white pine trees, growing in the well-drained Merrimac soils of the stratified drift deposits.

In many settings, when a watercourse flowing over low-permeability till encounters highly permeable stratified drift, water in the channel will readily drain downward, sometimes disappearing entirely into the sand and gravels. Such “losing stream” hydrology is common in eastern Connecticut at the intersection of glacial till with coarse-grained stratified drift deposits. However, water draining from the western uplands spreads out over the flatter land surface, forming the Perimeter Wetlands.

One possible explanation for the existence of the Perimeter Wetlands is that soils in this area were mapped incorrectly and may, in fact, consist of low-permeability glacial tills or other low-permeability sediments instead of the well-drained and excessively drained Merrimac soils. A second possibility is that the water table in the sand and gravel deposits is consistently high enough to maintain the Perimeter Wetlands in a saturated or nearly saturated condition. A third explanation is that the Perimeter Wetlands are located in an area of perched groundwater, where layers of low-permeability sediment atop the sands and gravels restrict the downward seepage of water.

In October 2022, One Earth observed the following evidence that the Perimeter Wetlands nearest the proposed Phase 1 Pond are located in a zone of perched groundwater:

- The water table in the stratified drift aquifer, as measured in monitoring wells during the summer and fall of 2022, was much lower than the elevation of the intermittent watercourse and adjacent saturated soils. Based on the hydrogeologic setting, we considered it highly unlikely that the water table in the stratified drift would ever rise high enough to reach the level of the wetlands.
- The groundwater in the stratified drift flows toward the north-northeast, whereas the surface water in the intermittent watercourses flows to the south. Although this phenomenon does occur, it isn’t possible where saturated zones in the subsurface are in direct hydraulic communication with the watercourse above because it would require water in the thin layer of wetland soils to be flowing in opposite directions at the same time – inferring the existence of a horizontal hydrogeologic divide throughout the entire wetlands.

- If a significant hydraulic connection existed between the Perimeter Wetlands and the underlying stratified drift, we would expect that the wetlands would drain readily and dry up quickly in the summer, but this was not observed; (note that the project soil scientist, Joseph Theroux reported that the wetlands have a long hydroperiod, typically extending into July).

Nonetheless, because the W&S Letter suggested that site-specific information regarding the hydrology of the Perimeter Wetlands was needed to rule out **any** potential for impact to the wetlands by the project, we conducted studies to characterize the hydrology of the Perimeter Wetlands and underlying stratified drift aquifer.

Procedures

On January 12 and January 13, 2023, a total of seven test pits were dug by excavator at locations shown on the attached site plan. Test pits TP-A, TP-B, and TP-C were dug slightly outside of the Perimeter Wetlands. The purpose of these test pits was to:

1. characterize the geology of the shallow sediments
2. compare groundwater elevations in the stratified drift to the elevation of surface water in the nearby Perimeter Wetlands, and
3. to determine whether there was other visual evidence of a perched water table above the regional water table.

We dug these test pits about 5 to 10 feet outside of the delineated wetland boundary where we would not disturb the wetlands, but where we expected to observe evidence of perching, such as the presence of the edges of restrictive layer(s) or the occurrence of shallow groundwater seeping or flowing outward from the margins of the perched zone along preferential flow paths.

As we discuss below, the information gathered at TP-A, TP-B and TP-C clearly showed that the Perimeter Wetlands are in a perched zone. Therefore, we dug test Pits TP-D, TP-E TP-F, and TP-G at locations coinciding with the perimeter of the proposed Phase 1 Pond, approximately 50 feet beyond the delineated wetland boundaries; the purpose of these test pits was to confirm the absence of restrictive layers or other evidence of perching, thereby ensuring that excavation of the Phase 1 Pond would not directly disturb any geologic layers that are responsible for the perched groundwater zone.

Results and Discussion

The logs for test Pits TP-A, TP-B, and TP-C are attached. These following information from these test pits indicated perched groundwater conditions:

- The water table in the coarse sands and gravels of the stratified drift ranged in depth from 85 inches at TP-A, to 72 inches in TP-B to 57 inches at TP-C. These groundwater elevations were well below the level of saturated soils and surface water in the nearby wetlands and the intermittent watercourse.

- Soils from the ground surface down to the water table in each test pit were mostly unsaturated; however, layers heavily stained and cemented with iron oxides were present directly beneath the topsoil, suggesting a restrictive unit that would help to retard downward flow.
- Water was observed flowing steadily through shallow preferential flow paths in the direction away from the Perimeter Wetlands, indicating horizontal drainage away from the saturated perched area.

These test pits were dug during periods of high groundwater, following recent heavy rains. Although the water table in the stratified drift aquifer was likely not at its seasonal maximum elevation, it is unlikely that the seasonal high groundwater elevation would be more than a few inches higher. This is evidenced by the minor changes in groundwater elevations at monitoring wells MW-04, MW-05 and MW-06, following heavy precipitation.

**Groundwater Elevations Measured at Monitoring Wells
in the Stratified Drift Aquifer**

Date	MW-04	MW-05	MW-06
7/11/2022	274.96	276.8	278.8
10/3/2022	273.06	274.35	276.4
11/29/2022	275.06	277.33	279.2
12/30/2022	278.91	281.6	283.55
1/12/2023	279.06	281.85	283.78
1/20/2023	279.16	281.92	283.88

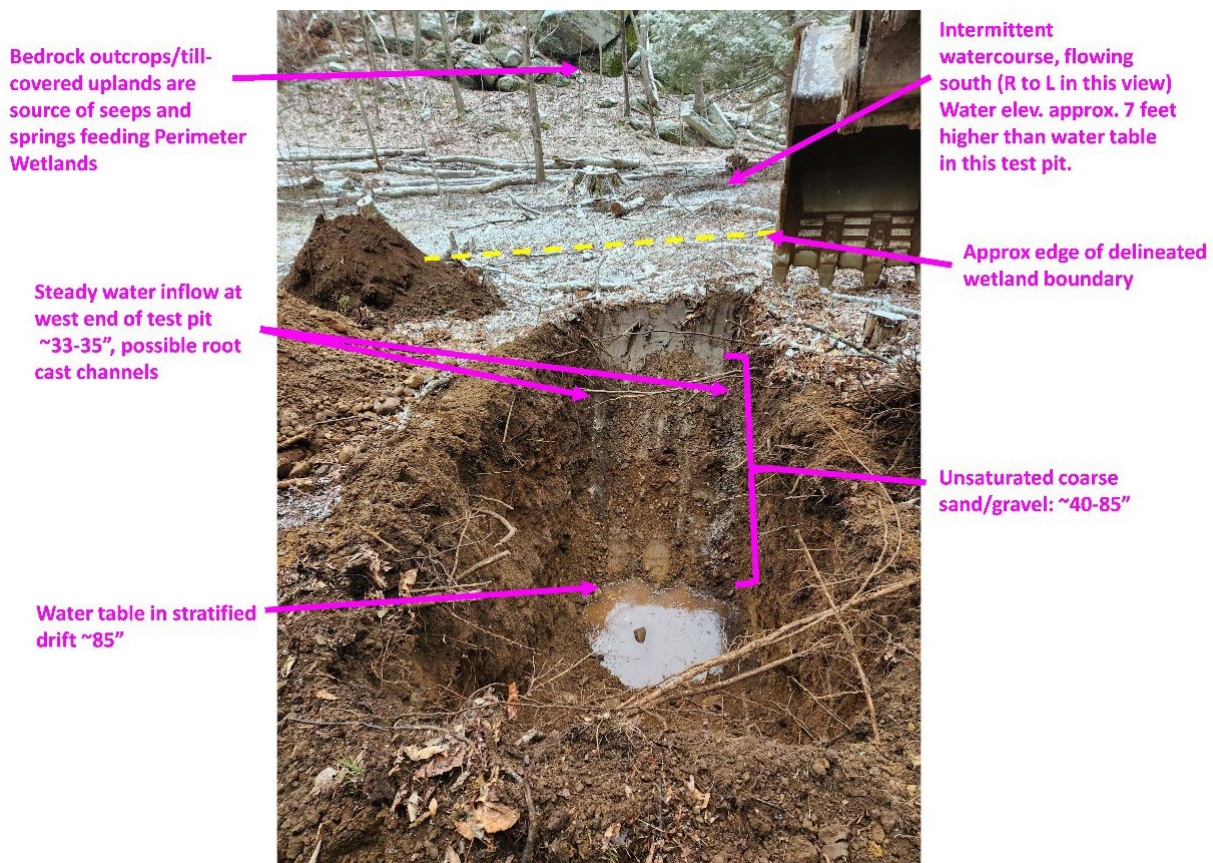
Note the very small rise in groundwater levels in all three wells between December 30 and January, 20 despite several periods of heavy rainfall and total rainfall throughout this period of more than 3.9 inches. This information is consistent with the hydrogeologic conditions of highly permeable stratified drift discharging readily to the wetlands to the northeast, along Carpenter Brook. Under these conditions, it is likely not possible under any meteorological conditions to saturate the stratified drift soils all the way up to the base of the perched zone of the Perimeter Wetlands.

The perching of shallow groundwater in the Perimeter Wetlands is likely a result of multiple factors:

1. Coarse sands and gravels of this area are overlain by fine sands, silts, and clays washed off of the till covered uplands to the west. These materials form a low-permeability layer above the permeable sands and gravels below, reducing downward vertical seepage
2. The slow seepage of water through the upper soil layers causes the formation of iron oxide minerals in the underlying mineral soils. As these iron oxides grow, they partially fill the voids in the soil and slow water flow, while also cementing the grains together. The cementing action of iron oxides was noted in Test Pits TP-A, TP-B and TP-C.
3. The accumulation of organic detritus on the ground surface of wetlands and at the bottom of channels of watercourses creates a partially decomposed organic layer (peat and muck) that

helps to create an efficient barrier to flow. In the flooded depressions and intermittent watercourses of the Perimeter Wetlands, such layers help to slow the downward seepage of water.

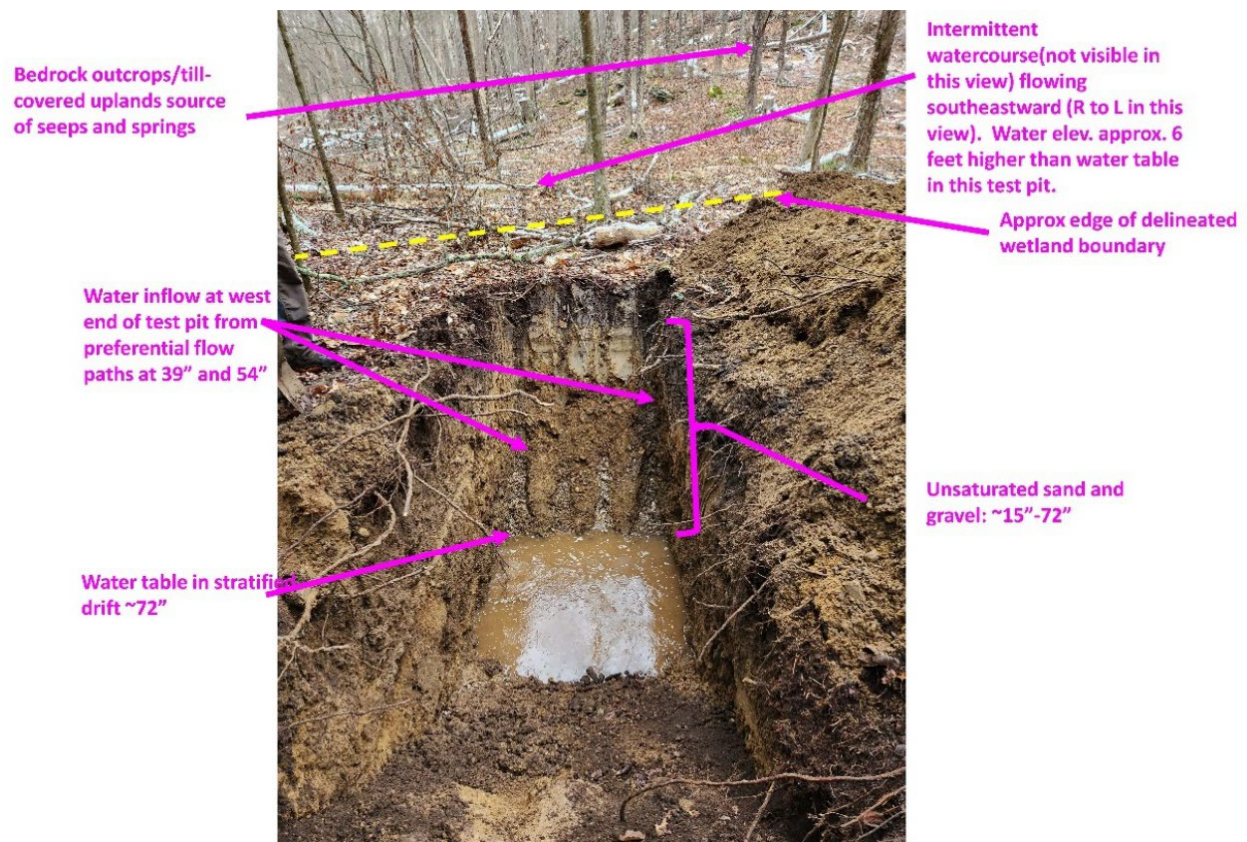
These mineral and organic restrictive layers, combined with a steady supply of water from precipitation and flow from the adjacent slopes to the west, create perched water conditions that are responsible for the Perimeter Wetlands.



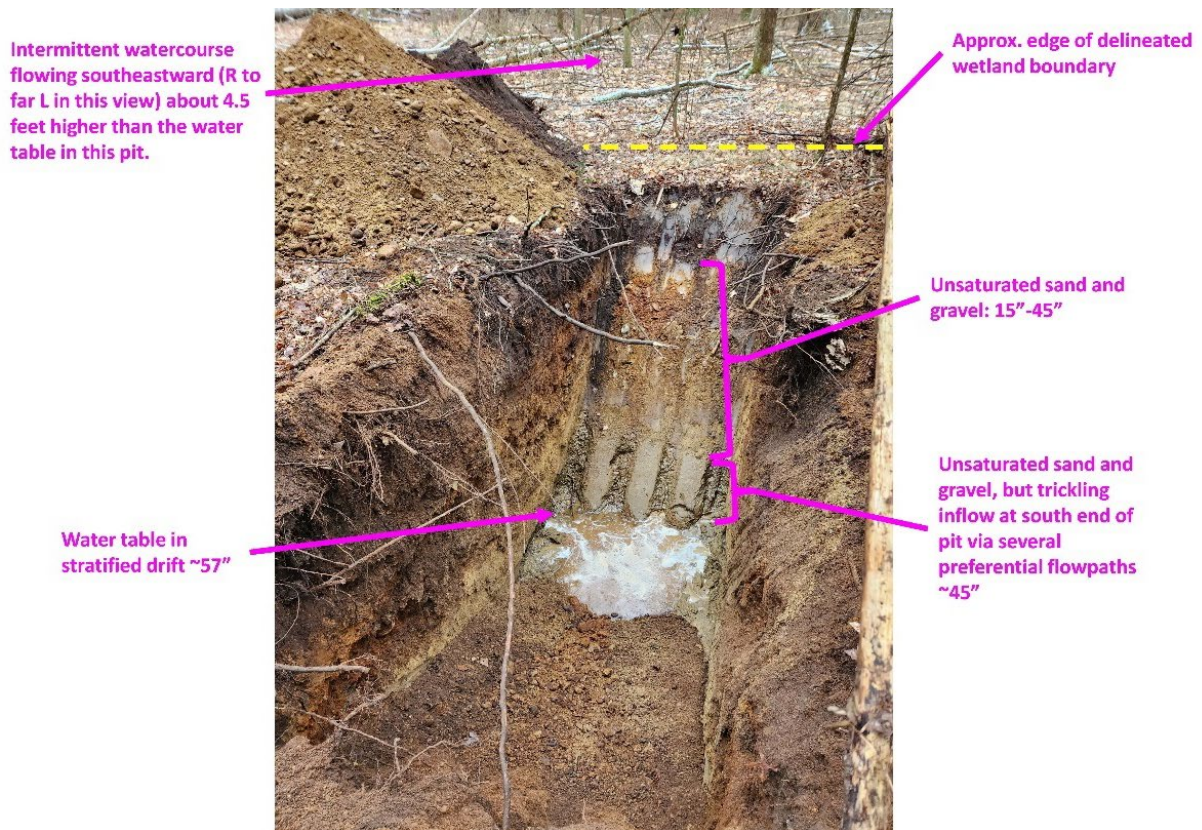
Test Pit TP-A. The water table here is about 85 inches deep, or about 7 feet below the level of water in the intermittent watercourse. The sands and gravels are highly permeable, indicating very little hydraulic gradient and confirming that the surface water exists in a perched zone that is isolated from the underlying stratified drift aquifer. Although the soils above the water table are unsaturated, steady horizontal flow through preferential flow paths at about 33-35 inches deep was contributing water to the hole in a steady trickle.



Test Pit TP-A. Note the glistening vertical streak at the right corner of the hole, marking the steady trickle of water flowing down over the unsaturated sand and gravel. This water entered the test pit at a depth of 35 inches along a preferential flow path. A smaller trickle of water flowed into the far left corner of the hole. The test pit was kept open for 15 minutes and the inflows continued without sign of decreasing. Preferential flow paths along the margins of perched areas are commonly caused by the presence of cemented root casts of decayed tree roots. These root cast channels and other layers or stringers of more permeable sands can intersect and form a network that drains water horizontally away from the saturated areas of the perched water zone. At some distance from the perched zone, this flow becomes a trickle and then disappears entirely, as the water will have soaked into the surrounding, unsaturated sediments or drained to the water table. Note that the inflows of shallow water along preferential flow paths occurred only on the end of TP-A nearest the wetland, indicating that the source of the water was the saturated soils and intermittent watercourse of the Perimeter Wetlands.



Test Pit TP-B. The water table in this test pit was about 72 inches deep, or about 5.5 feet below the level of water in the nearby intermittent watercourse. As in TP-A, the sands and gravels were unsaturated above the water table, but preferential flow paths at the end of the test pit nearest the wetland steadily discharged water into the hole at depths of 39 and 54 inches, well above the water table.



Test Pit TP-C. The water table in this test pit was about 57 inches deep, or 4.5 feet below the level of water in the nearby intermittent watercourse. As in TP-A, and TP-B, the sands and gravels were unsaturated above the water table, but preferential flow paths at the end of the test pit nearest the wetland discharged water into the hole at a depth of approximately 45 inches.

As shown in the attached test pit logs, TP-D, TP-E, TP-F and TP-G showed no evidence of a restrictive layer or other signs of geologic layering that could lead to perching conditions. This is consistent with the wetland delineation report by Mr. Theroux and confirms that the proposed Phase 1 excavation will not disturb any strata that might be connected to the perched groundwater zone beneath the Perimeter Wetlands.

Summary and Conclusions

1. The Perimeter Wetlands that lie west and south of the proposed Phase 1 Pond are a series of shallow depressions and intermittent watercourses. The source of water for these wetlands is groundwater seepage and surface runoff from the till-covered slopes and bedrock outcrops to the west of the proposed Phase 1 Pond.

2. Water flowing off of the uplands enters a relatively flat area where the surface water and shallow groundwater exists in a perched condition, where the zone of saturation is disconnected from the regional groundwater table. Water is lost from these wetlands by surface flow via intermittent watercourses that drain offsite to the south, by evapotranspiration, and by the horizontal drainage through preferential flowpaths, such as root cast channels, in the shallow subsurface. Vertical seepage directly through the perching zone is likely a minor component of the water loss from the wetlands, due to the very low vertical permeability of the restrictive layers.
3. Underneath the low-permeability sediments of the perched zone is a thick sequence of stratified drift deposits composed of high-permeability sand and gravel. The upper several feet of the sand and gravel is unsaturated. Groundwater in the stratified drift aquifer flows directly away from the Perimeter Wetlands and is hydraulically separated from the zone of perched water. Therefore, the stratified drift aquifer is not a source of water to the Perimeter Wetlands.
4. The proposed excavation for the Phase 1 Pond will extend to depths below the water table of the stratified drift aquifer. The Pond's surface will be flat, which can be expected to cause localized steepening of the groundwater hydraulic gradient in the areas immediately surrounding the Pond, though creation of the Pond will not result in significant changes to the overall rate or direction of groundwater flow through the aquifer;
5. It was suggested in the W&S Letter and CLA Letter that the steepening of the hydraulic gradient in the sand and gravel aquifer may have the potential to increase the rate of flow out of the Perimeter Wetlands, possibly affecting the hydroperiod of these Wetlands. However, the Perimeter Wetlands are in a perched zone that is not hydraulically connected to the underlying stratified drift aquifer. Therefore, any change in the elevation or gradient of the stratified drift aquifer will have no effect on water movement within the Perimeter Wetlands.
6. There is no evidence that groundwater elevations in the stratified drift aquifer will ever rise high enough such that the water table would become continuous with the perched saturated zone that supports the Perimeter Wetlands. However, if such event were to occur, it would result from extremely heavy flooding and would be of very short duration. Under these exceedingly rare conditions, the slight steepening of the hydraulic gradient around the margins of the proposed pond would have no meaningful effect on the hydrology or hydroperiod of the Perimeter Wetlands.

Based on this evidence, we conclude that the proposed Phase 1 excavation and pond construction will have no effect on the hydrology of the Perimeter Wetlands.

If you have questions or need any clarification regarding this report, please contact me at 860-933-0195.

Sincerely,



Wayne H. Bugden, PG, LEP
Owner/Manager

c. Harry Heller, Esq.
David Held, P.E.

Attachments

1. Test Pit Logs
2. Pond No. 1 Soils Map (Provost & Rovero), showing test pit locations

Test Pits Dug 01/12/2023	
Test Pit A 0-15" Dark brn and gray, fine sand and silt some clay, organic rich topsoil, root zone 15-40" – orange-brn, sand, silt, gravel, compact, dense, cemented, some mottling in west end of test pit; saturated 35" – water steadily pouring into hole from apparent decayed root cast tunnels in perched zone 40"-105" – loose v coarse sand, rounded gravel, few rounded cobbles. Unsaturated 40" to 85". Water at base of test pit; static level ~ 85"	
Test Pit B 0-14" Dk brn and gray, fine sand, silt, clay, organic topsoil 14-40"- orange-brn gravel, sand, some silt, cemented, Saturated with water flowing in ~39" and 54" in possible root cast preferential flow paths, in southwest end of test pit Unsaturated yellow-brn loose coarse sand and gravel 40-72" Static water ~72" with heavy flow entering from all sides of test pit. Bottom of hole ~100"	
Test Pit C 0-12" dark brn topsoil 12"-30" orange-brn coarse sand and gravel, cemented 30"-41" yellow coarse sand and gravel, loose, no mottles 41"-90" tan medium sand, Water at 57" Bottom of hole ~90"	
Test Pits Dug 01/13/2023	
Test Pit D 0-10" sandy topsoil 10"-22" loose loamy sand and gravel 22"-228" coarse sand and gravel No restrictive or potential perching layers observed in soil profile. Water at 222" with heavy flow coming in from east side of test pit. No water seepage or flow above 222" observed.	
Test Pit E 0-10" sandy topsoil 10"-24" loose sandy loam, possible faint mottling at 24" 24"-110" coarse sand and gravel No perching layers observed in soil profile. Water at 98" with heavy flow coming in from east side of test pit. Minor flow entering from other sides of pit. No water seepage or flow above 98" observed.	

Test Pit F

0-10" sandy topsoil

10"-27" loose sandy loam, possible faint mottling at 27"

27"-96" coarse sand and gravel

No perching layers observed in soil profile

Water at 74" with heavy flow entering from all sides of test pit. No water seepage or flow above 74" observed.

Test Pit G

0-13" topsoil

13"-29" loose sandy loam

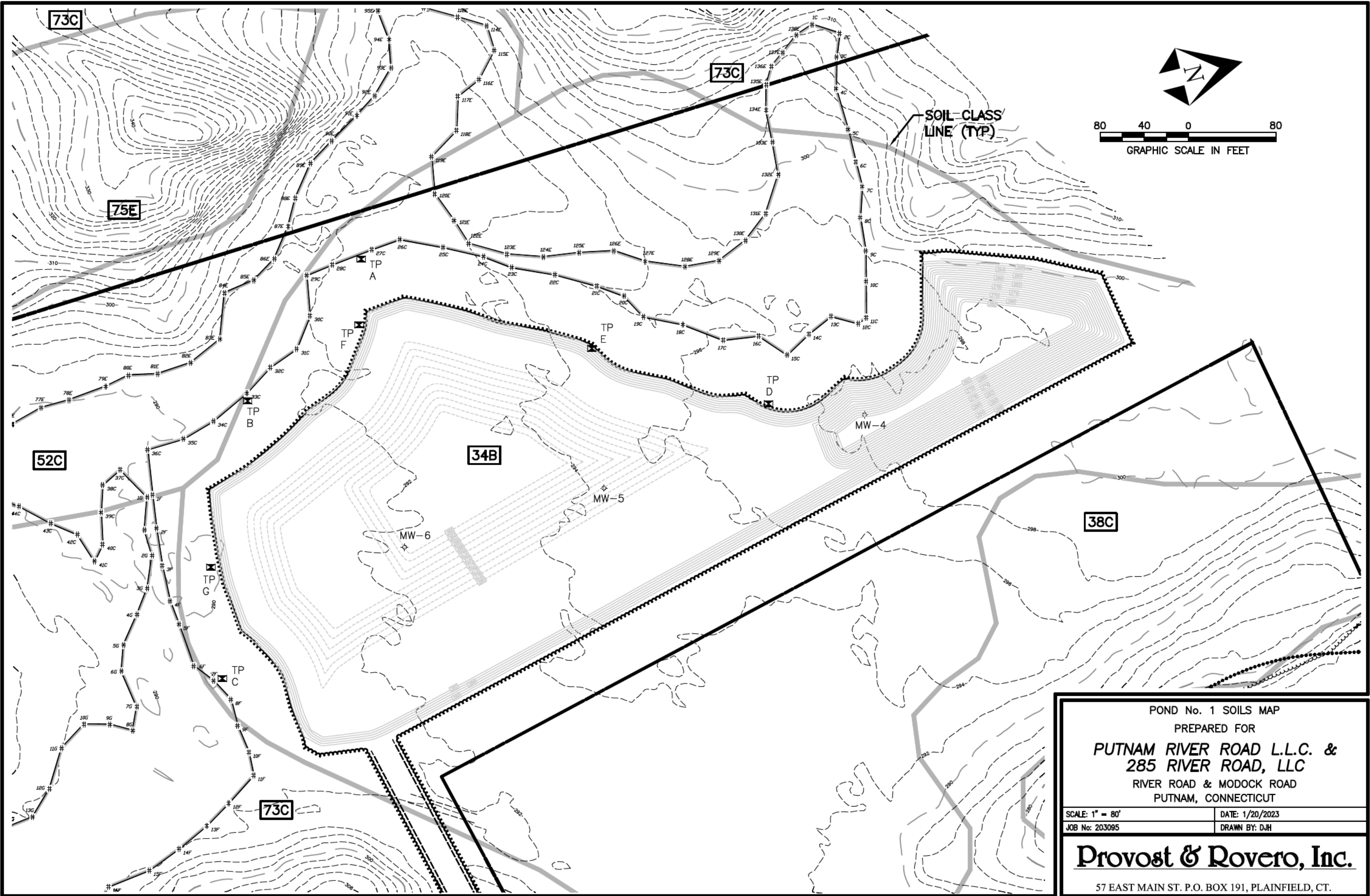
29"-54" coarse sand and gravel

54"-122" saturated fine sand

No perching layers observed in soil profile

Water at 54" with heavy flow entering from all sides of test pit. No water seepage or flow above 54" observed.

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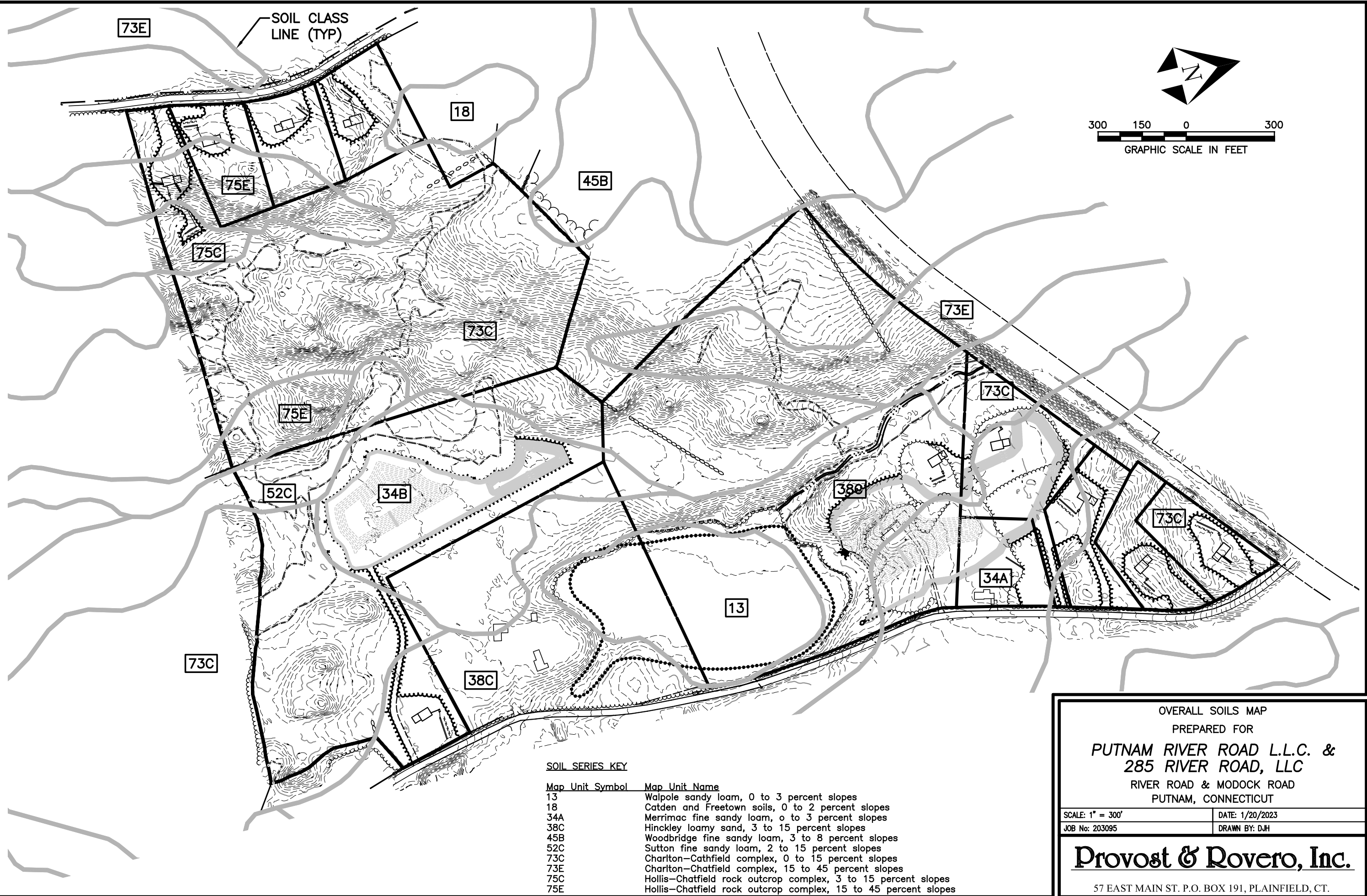


POND No. 1 SOILS MAP
PREPARED FOR
**PUTNAM RIVER ROAD L.L.C. &
285 RIVER ROAD, LLC**
RIVER ROAD & MODOCK ROAD
PUTNAM, CONNECTICUT

SCALE: 1" = 80'	DATE: 1/20/2023
JOB No: 203095	DRAWN BY: DJH

Provost & Rovero, Inc.
57 EAST MAIN ST. P.O. BOX 191, PLAINFIELD, CT.

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SOIL SERIES KEY

Map Unit Symbol	Map Unit Name
13	Walpole sandy loam, 0 to 3 percent slopes
18	Catden and Freetown soils, 0 to 2 percent slopes
34A	Merrimac fine sandy loam, 0 to 3 percent slopes
38C	Hinckley loamy sand, 3 to 15 percent slopes
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes
52C	Sutton fine sandy loam, 2 to 15 percent slopes
73C	Charlton-Cathfield complex, 0 to 15 percent slopes
73E	Charlton-Chatfield complex, 15 to 45 percent slopes
75C	Hollis-Chatfield rock outcrop complex, 3 to 15 percent slopes
75E	Hollis-Chatfield rock outcrop complex, 15 to 45 percent slopes

OVERALL SOILS MAP

PREPARED FOR

**PUTNAM RIVER ROAD L.L.C. &
285 RIVER ROAD, LLC**

RIVER ROAD & MODOCK ROAD
PUTNAM, CONNECTICUT

SCALE: 1" = 300'

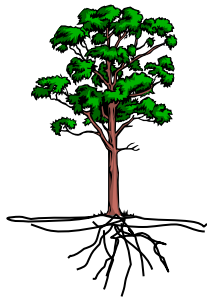
DATE: 1/20/2023

JOB No: 203095

DRAWN BY: DJH

Provost & Rovero, Inc.

57 EAST MAIN ST. P.O. BOX 191, PLAINFIELD, CT.



Joseph R. Theroux

~ Certified Forester/ Soil Scientist ~

Phone 860-428-7992~ Fax 860-376-6842

426 Shetucket Tpke, Voluntown, CT. 06384

Forestry Services ~ Environmental Impact Assessments

Wetland Delineations and Permitting ~ E&S/Site Monitoring

Wetland function and value assessments

1/20/2023

Mr. Bruce Fitzback
Town of Putnam
Land Use Agent
200 School Street
Putnam, Ct. 06260

Re: 285 River Road LLC and Putnam River Road LLC Inland Wetlands Application review

Dear Mr. Fitzback,

At the request of the applicants, I have reviewed the project site, plans, and the following reports associated with the review of the project:

- Hydrogeologic review report from One Earth Environmental, LLC dated October 11, 2022
- Hydrogeologic impact assessment report from Weston & Sampson dated December 29, 2022
- Report from CLA Engineers Inc. dated January 17, 2023

It is my opinion that the excavation and construction of the proposed ponds will not significantly or adversely impact the wetland functions and values of the inland wetlands and watercourses on or adjacent to the project site. This is provided that the proposed E&S measures are correctly implemented, monitored and maintained.

A significant source of hydrology that contributes to the perched water tables in the wetlands, aside from direct precipitation, is from the surface runoff, watercourses and groundwater discharge from the ledges and higher elevations to the west.

I noted that even in July 2022 many of the springs and watercourses in the ledges and wetlands were still flowing and numerous areas within these wetlands were still inundated.

I believe that these wetlands currently have a significantly long hydroperiod, extending from October to late July.

This is evidenced by the following soil characteristics found in the wetlands:

- Shallow oxidized rhizospheres, (pore linings).
- Shallow redoximorphic depletions and concentrations, (mottles).
- Low chroma colors within 20 inches of the soil surface.

The report issued by Weston & Sampson states that, "groundwater within the proposed phase one excavation/pond is not a significant source of hydrology to the perimeter wetlands but may seasonally, when groundwater levels are high, act to reverse or reduce the VHG between the wetland surface water and groundwater in the shallow sediments, which in turn could prolong the hydroperiod of the wetland", and "construction of the phase one excavation/pond could change the natural VHG and shorten the hydroperiod of the perimeter wetlands".

It is my opinion that if this is the case, the prolonged hydroperiod is obviously beneficial to the wetlands,

If the hydroperiod was shortened, this condition would remain for only a few months out of the year. The existing perched water tables would still have significant hydrological inputs from the surface runoff, groundwater discharge and intermittent watercourse flow from the higher elevations to the west to help offset any possible fluctuations in hydrology.

If the possibility of hydrological changes did occur, the reductions in hydrology would not significantly or adversely impact the wetland functions and values.

I concur with the findings of the One Earth Environmental, LLC report stating that "the proposed project would not have the potential to alter hydrogeologic conditions in a manner that would cause significant impacts to wetlands or watercourses", as outlined in pages 5 through 8 of their report.

Lastly, the report from CLA Engineers Inc. under their general comments, item #5 stated, "For this site, it is important to understand if the northerly proposed basin will discharge water to the nearby wetland, and if so, how much and when."

After reviewing the plans, it is my opinion that any seasonal discharges from the overflow discharge point will not significantly or adversely impact the downgradient wetlands.

Flows exiting through the 20'X25' rip-rap spillway should not have high flow velocities, the rip-rap and geotextile fabric will further serve to reduce flow velocities and stabilize the soils and the 50+ feet of gently sloping topography between the wetlands and outlet will allow for additional filtering of fine sediments and infiltration into the well drained upland soils.

It is also my opinion that the construction of the ponds will further enhance the existing wetland functions and values of the surrounding wetlands and watercourses by the addition of open, deep-water habitat. This will add to the diversity of the existing wildlife habitat, both in the uplands and wetlands surrounding the ponds.

In conclusion, if you have any questions concerning this report, please feel free to contact me.

Thank you,

Joseph R. Theroux

Joseph R. Theroux
Certified Soil Scientist
Member SSSSNE, NSCSS, SSSA.

Top of well casing elevation	298.81
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Date	Depth to water (ft)	Water elevation
7/11/2022	25.77	273.04
10/3/2022	26.15	272.66
11/29/2022	24.42	274.39
12/30/2022	21.35	277.46
1/20/2023	21.30	277.51

Top of well casing elevation	310.84
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Date	Depth to water (ft)	Water elevation
7/11/2022	25.45	285.39
10/3/2022	24.60	286.24
11/29/2022	22.39	288.45
12/30/2022	19.28	291.56
1/20/203	19.52	291.32

Top of well casing elevation	310.19
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Date	Depth to water (ft)	Water elevation
7/11/2022	35.80	274.39
10/3/2022	35.84	274.35
11/29/2022	33.80	276.39
12/30/2022	29.68	280.51
1/20/2023	29.82	280.37

Top of well casing elevation	300.16
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Date	Depth to water (ft)	Water elevation
7/11/2022	25.20	274.96
10/3/2022	27.10	273.06
11/29/2022	25.10	275.06
12/30/2022	21.25	278.91
1/12/2023	21.10	279.06
1/20/2023	21.00	279.16

Top of well casing elevation	296.15
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Date	Depth to water (ft)	Water elevation
7/11/2022	19.35	276.8
10/3/2022	21.80	274.35
11/29/2022	18.82	277.33
12/30/2022	14.55	281.6
1/12/2023	14.30	281.85
1/20/2023	14.23	281.92

Top of well casing elevation	294.35
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Date	Depth to water (ft)	Water elevation
7/11/2022	15.55	278.8
10/3/2022	17.95	276.4
11/29/2022	15.15	279.2
12/30/2022	10.80	283.55
1/12/2023	10.57	283.78
1/20/2023	10.47	283.88

HELLER, HELLER & McCOY

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Telephone: (860) 848-1248

Facsimile: (860) 848-4003

January 17, 2023

Town of Putnam Inland Wetlands and Watercourses Commission

Attn: Mr. Bruce Fitzback, LS, Land Use Agent

200 School Street

Putnam, CT 06260

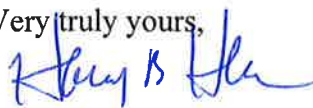
Re: Pending application of 285 River Road, LLC and Putnam River Road LLC

Dear Mr. Fitzback:

The above referenced applicants hereby grant an additional thirty (30) day extension of the statutory time period within which the Putnam Inland Wetlands and Watercourses Commission is required to complete the public hearing on the above referenced application for licenses to conduct regulated activities and for a Section 8-26 subdivision review with respect to a proposed 11-lot residential resubdivision and associated site grading and excavation on properties located at 285 River Road and 357 River Road currently in the public hearing process before the Inland Wetlands and Watercourses Commission.

This extension is granted pursuant to authority contained in Section 22a-42a(c)(1) and Section 8-7d, each of the Connecticut General Statutes. Should you have any questions, please feel free to contact me.

Very truly yours,



Harry B. Heller

HBH/tlk

Cc: Mr. David Held

Mr. Jeffrey Rawson



TOWN OF PUTNAM

MUNICIPAL COMPLEX

TOWN HALL

200 SCHOOL STREET • PUTNAM, CT 06260

Certified Mail
Return Receipt Request

January 6, 2023

Putnam River Road, LLC and 285 River Road, LLC
P.O. Box 271
Putnam, CT 06260

Re: Engineering review fee Notice

Dear Mr. Viens,

I am writing you today concerning the Putnam River Road, L.L.C. and 285 River Road L.L.C. wetlands application for an 11 Lot Residential Subdivision and Excavation permit on River Rd and Modock Rd in Putnam, CT.

As you may be aware, at the December 29th Inland Wetlands and Watercourses Commission meeting the Commission voted to have the application materials sent out for independent review.

The Wetlands Agency in accordance with the Town of Putnam Inland Wetlands and Watercourses Regulation Section 19.5 is requesting the applicant provide the fee for an independent engineering review.

This letter is to serve as notice for the required fee and the payment is due within ten (10) days from receipt of this notice.

The attached proposal has a review fee of \$4,800, estimated meeting attendance for both Soil Scientist and Professional Engineer fee \$700 total fee due \$5,500.

Thank you for your attention to this matter,

Bruce Fitzback, LS
Land Use Agent
Town of Putnam
200 School Street
Putnam, CT 06260
Office: 860-963-6800, x 114
Email: Bruce.Fitzback@putnamct.us

CC: Via email
Mr. David Held
Harry Heller Esq.
Mr. Robert Viens

Via Certified Mail
7015 1520 0000 7163 4101

860.963.6800 • WWW.PUTNAMCT.US