Environmental Impact Analysis of the Wetland Filling

LOCATED AT

208 Fishing Trail
Stamford, CT

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CONTENT

LOCATION AND SITE PHYSICAL CHARACTERISTIC

This one-acre site is located on the northern side of Fishing Trail in Stamford, CT. The site supports a single-family residence with a driveway and a septic system. The area has been recently seeded and mulched. The edges of the site remain wooded with some large trees scattered though the area. The property drains towards the west and east with the residence being located over the sub-watershed divider. The property is located within the residential RA1 and the Poorhouse Brook watershed.

Google, aerial photograph of the site taken in 2023

WETLAND/WATERCOURSE AREA

The regulated area was delineated by Steven Danzer, PhD, Soil Scientist on May 16, 2022. The flagged in the field area consists of a wetland/watercourse system which expands throughout the neighborhood. The property captures only fringes of this system which is associated with Poorhouse Brook. This wetland/watercourse area loops around the developed area of the site.

The Poorhouse Brook enters the area from a street culvert situated at the southeastern property corner. The flow runs along the western property line. At the northeastern property corner the flow splits between two channels entering into two different man-made ponds located off-site. The floodplain containing a wetland area expands up to 55 feet into the site.

The western leg of this system is initiated at the southwestern property corner. A street culvert feeds a narrow wetland finger draining into the man-made pond located off-site to the north. An intermittent watercourse cuts through this area to became a tributary to Poorhouse Brook.

A view of the *Poorhouse Brook* from the west.

This wetland/watercourse system is fed by direct precipitation, storm water shedding of the upland and ground water. The flow in the brook is of law velocity dissipated by the level terrain and several ponds the brook passes through along its way. The edges of the channel are stable and protected either by stone armoring and/or deeply rooted vegetation. Wetland soils depicted in the wetland report prepared by Steven Danzer include Ridgebury, Leicester, and Whitman which are extremely stony. Large number of stones readily available in this area help bottom armoring and of the channel and dissipates the flow.

The area along the brook is wooded. Deep root system generated by trees anchors the soil and keeps the bank stable. These trees form a narrow, but dense cover dominated by yellow birches, red, black and white oaks, red maples, American hornbeams, American beaches, tulips, trees of haven, black gums, and white ashes. Occasional shrubs are sparsely filling in the gaps of the understory growth consisting of sweet pepperbush, spice bush, wild raspberry, Japanese barberry, privet, multiflora rose, buttonbush, mountain laurel, and viburnum. Herbaceous ground cover was partially dormant this time of the year. The species which were emerging or recognizable based on the old stem fragments included mugwort, skunk cabbage, garlic mustard, tussock sedge, and goldenrod. Plant assembly found within the western wetland/watercourse finger was similar to the one accompanying the Poorhouse Brook's wetland fringe.

The area associated with both Poorhouse Brook and the intermittent channel are surrounded by red maple swamp environment which expands all the way to the man-made pond located off-site to the north where both streams meet. The swamp area suffers from seasonal flooding. Flooded area had developed hummock-hollow microtopography allowing the water to be contained within the hollows and keeping hummocks dryer. These subtle hydrological variations increase plant diversity in the area accommodating a variety of moisture preferences. Hollows are preferred by mosses, while hummocks are mainly vegetated by sedges, grasses and dwarf shrubs. Red maple swamps are one of the most common forested wetlands in the Northeast. They are classified as broad-leaved deciduous forested wetlands and are one of the components of a palustrine ecosystem.

Based on the vegetative cover, this wetland/watercourse most likely is utilized by a variety of wildlife that is known to use the existing plants as their primary food source. Red maple that dominates the vegetated cover provides flowers that are pollinated by variety of bees, flies, and moths. Rabbits and deer eat the shoots and leaves. Red maple seeds are eaten by squirrels, eastern chipmunks, voles, and white-footed mice. Yellow birch is the second tree dominating this canopy. This species provides food and breeding space for a number of birds. The seeds mature in early spring, offer a vital food source for wetland birds at a time when many other food sources are scarce.

The understory growth is dominated by spicebush that is an excellent source of nectar for butterflies and other pollinators in early spring. In addition, this shrub provides cover and nesting site as well as red berries to various birds. Buttonbush found in the swamp is one of the last native shrubs to leaf out in the spring. The leaves provide food for larval stage of several local moths. Flowers bursting with nectar emerge in early to mid-July attract bees, hummingbirds, and butterflies. This plant is important because it flowers when many other plants aren’t. Its fruits persist through winter and sustain waterfowl, mallards, and other birds. Wood ducks use the plant to protect their nests. Sweet pepperbush accompanying spicebush is also valued for its flowers. A wide variety of bees and butterflies, visit the plant collecting both nectar and pollen.

The herbaceous plant cover is dominated by skunk cabbage, which is the first source of pollen in spring for honeybees. The leaves and the spathe are eaten by slugs, snails and caterpillar of the ruby tiger moth. During summer and fall, rotting leaves of skunk cabbage attract tiny flies and moths.

Seasonal flooding within the swamp occurs during early spring. Most of the aquatic species wait for the flood to start breeding, lay eggs, hatch, or metamorphose. Flooding provides new food sources for many aquatic organisms. It flushes insects, bugs, and warms from the land to the ponds and brooks. Storm water, washes dead brush and leaves into the swamp and both brooks, adding structure to the habitat. The edge of the Poorhouse Brook supported by vegetative cover is used by frogs, turtles and snails which love moist areas preserved underneath leaves, rocks, logs and exposed roots. Wood ducks may nest in cavities in large trees or snags located within the areas associated with the neighboring ponds.

Many birds feed or nest within red maple swamps. They like the layers of vegetation of varying heights. Their number and variety depend on the age of the trees, thickness of the shrubby vegetation, size and wetness of the wetland. Generally, the bigger the area the greater the number of bird species. Higher plant diversity also attracts more birds. In addition, the presence of flowing water is an important element of a good bird habitat. The wetland/watercourse areas contained within the property boundary are degraded.

Both sections of the swamp are narrow and covered with a sparse understory growth not supportive of the need for shelter and hiding space required by the majority of birds. Lack of protective buffer, exposes this area directly to light and noise pollution. Recent site filling, grading, removal of vegetation, and use of portion of the wetland area for storage of construction material have amplified the human impact on this environment. Expected species in this area are limited to the edge species tolerant to the urban environment. These species include Robins, thrushes, wrens, tits, finches, jays, cardinals, chickadees, etc.

No mammal limits its life to the wetland area; they utilize both the wetland and the upland in search for food and shelter. The subject wetland/watercourse area is most likely visited by white tailed deer, which feeds in swamps and uses them for refuge. Other common edge species include: wild turkey, raccoon, opossum, fox, squirrels, short-tailed shrews, red-back voles, and white-footed mice. Nearby ponds may attract muskrats, mink, and otters.

WETLAND VALUES AND FUNCTIONS

The Highway Methodology Workbook – Supplement was used to evaluate the functions and values of the wetland/watercourse system. The workbook was prepared by US Army Corps of Engineers – New England District. The list below includes evaluation of eight functions and five values including:

- groundwater recharge/discharge — The Poorhouse Brook wetland/watercourse system discharges the ground water, except for the drought condition when the collected storm water is used to replenish the aquifer.

- floodflow alteration— Wide wetland fringes provide some capacity for flood storage.

- fish and shellfish habitat — The brook supports a variety of aquatic life including fish and shellfish. The most common ones are Brown trout, Largemouth bass, and Brook trout, but also suckers, minnows, etc. Potential shellfish may include Yellow Lampmussel, Eastern Elliptio, and Eastern Pearlshell

- sediment/toxicant/pathogen retention — Gentle topography in this area slows the flow and encourages sedimentation. Numerous of ponds encounter by the Poorhouse Brook along its way are sinks for sediment. Vegetated wetlands slow down the storm water runoff and retain the sediment improving the water quality entering the adjacent water bodies.

- nutrient removal/retention/transformation — Moving water within the channel limits water renovation. The contact between the water and vegetation/soil is too brief to initiate any nutrient exchange. The area of the wetland fringes on the other hand offers quieter environment. Captured by vegetation and microtopography sediment and organic material, settles for a longer period of time. This allows the microbes and soli organisms to work on the captured material and extract/transform the nutrients.

- production export — Tree canopy generates a considerable amount of organic matter. Leaves, twigs and other plant fragments are transported by wind and storm water flow into the wetland area. Decomposition process is mostly conducted by microbes and other soil organisms and breaks the material into smaller particles. These particles are carried by the flowing water downstream providing food and nutrients to aquatic plants and organisms.

- sediment/shoreline stabilization — Large trees and shrubs anchor the soil preventing erosion. The canopy shields the surface against rain erosion.

- wildlife habitat — This area is the most successful in supporting a variety of aquatic species and local pollinators. Wetland fringes along the brooks provide migratory corridors and connectors between adjacent water bodies.

- recreation – none of the water bodies are located on the property, but there is an access to the edge of Poorhouse Brook. This access facilitates the connection to the neighboring ponds for kayaking.

- educational/scientific value — bird watching, especially waterfowls

- uniqueness/heritage — n/a

- visual quality/aesthetics — The *Poorhouse Brook* flows through a very picturesque landscape. Numerous ponds and wooded edges make the views of the river aesthetically pleasing. The scenery is greatly enhanced during fall season when foliage of mature trees burst with many shades of bright colors.

- threatened or endangered species habitat — The Natural Diversity Data was checked online and the available map entitled *State and Federal Listed Species and Significant Natural Communities – Stamford, CT*, prepared by CT DEP updated on December 2022 does not identify this site as an area of special concern.

SITE IMPROVEMENTS

The activities which took place up to date include site clearing, filling and grading. The affected area has been recently seeded and mulched using strow mulch. The edge of disturbance was secured with a line of silt fence. Filling activities were conducted within the wetland and 25-foot upland review area without authorization form the EPB. This application is being made to request a permit after the fact.

SITE IMPACTS

There are two types of impacts from the site improvements: short- and long-term. The short-term impacts ocured during the site clearing and filling. These activites caused introduction of an unconsolidated fill material and esposure to erosion. It is unknow how many trees and shrubs were removed. A couple of photographs of the pre-clearing condition was found in Google maps, dated December 2015.

December 2015 view from the street of the eastern side (Google)

December 2015 view of the site from the strees, western side (Google)

Due to the lack of proper soil erosion and sediment control measures some of the fill was able to travel with strom water deeper into the wetland area.

The long-term impacts include loss of indegnous soil and vegetative cover, alteration of the original draiange patterns and soil moisture, spread of invasive species and encouragement for them to take over the disturbed areas.

A large area of indigenous soil was covered with nutrient poor fill of an unknown origin. It takes from 500-1000 years to form one eanch of soil. Soil provides important functions to the environment including: strom water infitration, retention and filtration, plant suppor, nutrients retention and transformation, habitat for microbes and other organisms, carbon sequstration, regulates temperature, etc. These functions were lost or altered. Heavy equipment used for delivery and spreading of fill were most likely driven over saturated wetland soils casing soil compaction.

Cleared trees and shrubs resulted in permananet loss of their functions such as noise, rain and polution absorbtion, wildlife habitat support, strom water management, temperature moderation, wind shielding, carbon sequestation, soil formation and protection, etc. The clared area was filled and exposed to seeds of invasive species present in this area. Loss of shade most likely would encourage their establishment.

Insalled fill varies from zero to 30 inches. The thicker layers were found within the northwestern and northeastern corners. These gradient modification caused some changes to the strom water flow. The runoff withn these areas had been redirected towards the north rather than nortwest and northeast respectivly.

The filling in those areas had adverse impact on the exisitng trees. Their burried root system has been causing slow deth. Raised grade has been suffocating their roots. The addition of fill compacted the soil thereby reducied the amount of pore space. These trees show significant strees which is reflected in lack of leafs and/or sparser leaves and their delayed development. Those trees are also showing more intensive insect damage and dieback of large branches compared to other trees which receved less or no fill.


Grade change around trees – view of the southwestern corner.

Site filling resulted in change to wetland hydroperiod. The ground water provides less saturation and less often reaches the surface of the wetland soil. Deeper levels of ground water table supply less saturation and moisture to the soil profile making this area dryer for the plants to grow. In addition, a different moisture regime cause changes to the microbial makeup of the soil. Soil organisms are involved in ongoing geochemical processes including nutrients circulation and decomposition rate. Imported fill has a different characteristic than indigenous soil. The texture is higher in sand content and poor in organic and clay particles. Less or lack or organic and clay particles lowers the cation exchange capacity of the soil and allows for less moisture to be stored. The permeability rate increases so areas situated on the slope intensify their moisture loss. Wetland hydrology is the driving force of wetland processes, lack of soil saturation will cause the area to lose its wetland functions. The degree of these changes depends on the thickness of the fill. Areas covered by an excess of 24 inches may have to be reclassified as an upland.

MITIGATION MEASURES

The proposed mitigation measures include installation of a line of silt fence which prevents the sediment from being washed deeper into the wetland and watercourse areas. This fence needs to be properly installed and maintained in working condition. The bottom of the fence is not properly imbedded into the soil and some sections are down.



The area was recently seeded and mulched. Lack of topsoil dressing will result in sparse cover, encourage soil compaction and foster competition from invasive species. Prolonged lack of precipitation had delayed the lawn establishment.



To restore the wetland areas a planting plan consisting of native shrubs and trees is offered. The proposed shrubs will restore the cleared understory growth and replace invasive species such as Japanese barberry, multiflora rose and burning bush. The new plant material will stabilize the soil and improve wildlife habitat.