



## JOSEPH R. THEROUX

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FORESTRY SERVICES ~ WETLAND IMPACT ASSESSMENTS  
WETLAND DELINEATIONS AND PERMITTING ~ E&S/SITE MONITORING  
WETLAND FUNCTION & VALUE ASSESSMENTS

11/30/2023

Killingly Engineering Associates  
P.O. Box 421  
Dayville, CT. 06241

Attn: Norm Thibeault

Re: Wetland function & value and impact assessment report for the proposed site development for the Sheehan property, 350 Breakneck Hill Road, Killingly, Connecticut.

Dear Mr. Thibeault,

At your request, I have reviewed the site plan for the proposed driveway improvements and single-family residence.

I have inspected the above referenced property for the purposes of assessing the wetland functions and values and potential impacts to the inland wetlands and watercourses from the construction of the driveway and drainage features.

The wetland function and value assessment was conducted on November 29th, 2023.

### **Existing Conditions**

The property is 21 acres in size and is located on the eastern side of Breakneck Hill Road in Killingly, CT.

The general topography across the property is gently sloping on the western side of the brook and the wetlands/driveway areas, to moderately sloping/steep along the eastern side of the brook.

The topography in the general area of the proposed house site is gently sloping.

The 21-acre parcel is bisected by a large palustrine forested wetland and brook that flows to the north across the existing access road.

The original woods road across this wetland was improved over the years with the addition of fill materials. Since then, the driveway has been used to access the site and it has degraded along the portion that extends through the wetlands and across the brook.

## **Wetlands**

The wetland corridor that extends through the parcel is a large palustrine forested wetland that is oriented north-south.

The brook, which is most likely perennial, flows to the north and crosses the existing access road over the road bed. Groundwater breakout and surface runoff flow from the wetlands on the western side of the brook onto and across the access road. Flows also flow on the road bed itself to the east, eventually entering the brook, carrying sediments.

A separate intermittent watercourse flows onto the property through a culvert under Breakneck Hill Road, and flows to the east downslope into the wetlands.

The other delineated wetland is a small, inundated, palustrine forested wetland located in the northeast corner of the property approximately 200 feet upslope from the proposed house site.

The forested wetland corridor is vegetated with red & sugar maples, white ash, white pine, red oak and yellow birch in the overstory, and the understory is mainly comprised of shrub species such as spicebush, ironwood, Japanese barberry and multiflora rose. Some beech, red and sugar maple saplings were also noted.

Herbaceous vegetation included skunk cabbage, Christmas, lady and sensitive ferns, misc. grasses and sphagnum moss.

Wildlife tracks/sign found or directly observed in and adjacent to the wetland/watercourse included mammals and bird species such as: white tailed deer, eastern coyote, red fox, raccoon, red tailed hawk, American crow, and numerous songbird species.

No fish, reptiles or amphibians were directly observed although undoubtedly, this wetland complex and brook serves as habitat to these species.

## **Wetland Functions and Values**

The forested wetlands and watercourse(s), were inspected to determine wetland functions and values utilizing the Army Corps. Of Engineers methodology as outlined in "The Highway Methodology Workbook Supplement".

This methodology recognizes 8 separate wetland functions: groundwater recharge/discharge, floodflow alteration/storage, fish/shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, sediment/shoreline stabilization and wildlife habitat.

The 6 wetland values include: recreational value, educational/scientific value, uniqueness/heritage value, visual quality/aesthetics, threatened/endangered species habitat and marine fish & shellfish habitat.

### **Palustrine forested wetland and brook corridor functions:**

The following is a list of the wetland functions exhibited by these wetlands and watercourse and their rationale:

#### **Ground water recharge/discharge:**

The wetland is associated with a watercourse; signs of groundwater recharge and discharge are present and the quality of the water associated with this wetland is high. This is one of the primary functions of this wetland.

#### **Fish habitat:**

Although no fish were directly observed, this watercourse is capable of sustaining a fish population, (providing it is perennial), and the water quality associated with the watercourse is high. Also, a small pond is associated with this watercourse, located to the south. This may be a source of fish, moving downstream.

The 1994 Connecticut DEEP fish survey did not include this general area.

#### **Sediment/toxicant retention:**

Potential sources of sediments/toxicants are present in the watershed above this wetland, mineral, fine grained and organic soils are present, the wetland edge is broad and intermittently anerobic, this wetland corridor is associated with a watercourse, and no indicators of erosive forces or high water velocities are present.

**Nutrient removal/retention:** This wetland is large relative to the size of its watershed, overall potential exists in the wetland, the wetland is saturated for most of the season, slowly drained mineral and organic soils are present, herbaceous vegetation is present, the opportunity for nutrient attenuation exists and water moves slowly through the wetlands adjacent to the brook.

**Production export:** Wildlife food sources grow within the wetland, detritus development is present, there is evidence of wildlife use in this wetland, high vegetation density is present, the wetland contains flowering plants that are used by nectar gathering insects, and indications of export are present.

**Sediment & shoreline stabilization:** This wetland is associated with a watercourse, roots from herbaceous grasses and plants, shrub species and trees found in the wetlands bind and stabilize soils which helps prevent erosion along edges of the watercourse & wetlands.

**Wildlife habitat:** The water quality associated with the wetlands and watercourse is high, the wetland is not fragmented by development, the wetland is contiguous with other wetland systems, wildlife overland access to other wetlands is present, wildlife food sources are present, and the dominant wetland class includes a wooded swamp and animal signs were observed. Wildlife habitat is the primary function of this wetland.

The wetland function of floodflow alteration/storage capacity was not exhibited, due to the fact that the wetland has a significant topographic gradient with no storage capacity, and is associated with a watercourse which transports flows to the north.

**Palustrine forested wetland and brook corridor values:**

The following wetland values were exhibited by this wetland/watercourse:

**Educational/scientific value:**

Little disturbance is occurring within this wetland, potential educational site contains a diversity of wetland classes that are potentially accessible, potential educational site is undisturbed and natural, the wetland is considered to be a valuable wildlife habitat, site is within a short drive to schools and other plant communities.

**Uniqueness/heritage value:**

The quality of the water associated with the wetland/watercourse is high, opportunities for wildlife observations are available, wetland is within 50 yards of nearest perennial watercourse, three or more wetland classes are present, wetland has local significance because it has biological, geological or other features that are locally rare or unique.

**Visual quality/aesthetics:**

Multiple wetland classes, and diversity of vegetative species visible from primary viewing locations, wetland dominated by flowering plants or plants that turn vibrant colors in different seasons, visible land use contrasts with wetland, wetland views absent of trash, debris and signs of disturbance, and wetland is considered a valuable wildlife habitat.

This wetland did not exhibit the wetland values of recreation, endangered species habitat or marine fish/shellfish habitat. These values were not exhibited as the property is not part of a recreation area, park or forest, it has no public access for boating, fishing or hunting, this wetland and surrounding areas are not shown within the shaded areas on the D.E.E.P. Natural Diversity Database mapping for state or federal listed threatened or endangered species and the wetland system is palustrine not marine or estuarine.

**Summary:**

Overall, the wetland function and value assessment indicates that the undisturbed portions of this wetland complex exhibit significant wetland function and value. These wetlands and brook exhibit 10 of the wetland functions and values out of the potential 14.

**Potential direct wetland impacts:**

The project plans and site were reviewed to assess the potential impacts to the wetlands and watercourse from the construction/improvement of the existing road bed and the proposed single-family residence.

**Proposed activities:**

Gravel/paved drive and wetland/stream crossing:

The existing roadbed is proposed to be widened to 12 feet in width with the first portion which is a 10% grade being paved, the more level central portion through the wetlands being gravel, and the last portion where the driveway climbs the hill at a 14% grade being paved.

The stream crossing that is proposed is an open bottom box culvert, four feet in width, two feet in depth and 30 feet in length.

To support the box culvert, two pre-cast or poured in place footings will have to be installed. This will require excavations on either side of the brook approx. 30 feet in length, 2 feet in width and one foot in depth to prepare the base for the footings.

*If de-watering is required during the excavation, I would recommend that the de-watering basin which receives the sediment laden water from the pump be located in an upland area. This as well as a detail for this feature should be shown on the plan.*

The improved roadbed and crossing will constitute 3,250 square feet of initial disturbance within the wetlands and stream bed. At the completion of construction, 1,920 square feet will be permanently eliminated. This is the only proposed activity within the wetlands.

Associated with the construction of the gravel/paved drive are the modified rip-rap swales and plunge pool designed to collect, attenuate, infiltrate and treat stormwater flows from the paved portions of the driveway leading from the road and to the proposed residence.

A 1,920 square foot wetland mitigation area is proposed on the eastern side of the forested wetland, south of the proposed driveway.

Proposed E&S measures shown are staked haybales at the limits of disturbance and temporary stone check dams adjacent to the brook.

*I would recommend that staked haybales be placed below the temporary check dams to provide additional filtration.*

*No E&S measures are shown along the brook on the eastern side of the crossing site adjacent to the proposed driveway and wetlands. I would recommend staked haybales.*

Single family residence:

A 3-bedroom residence and garage are proposed along with a well and septic system within the 200-foot upland review area.

Silt fencing is shown along the limits of clearing below the proposed septic system.

**Gravel drive and wetland/stream crossing direct impacts:**

As far as wetland impacts are concerned, the existing wetland functions within the newly filled sections of the wetlands on and adjacent to the roadbed will be rendered non-existent, (1,920 square feet).

However, it should be taken into consideration that the actual wetland functions exhibited on and adjacent to the roadbed itself are very limited due to the filling, grading and existing erosion. The significant functions and values of this wetland complex and brook are exhibited by the non-previously disturbed portions of the wetlands and watercourse, its overall size and characteristics.

The new gravel drive portion will have a processed gravel surface approx. one foot in elevation above the wetlands.

Due to the proposed gentle slope in this portion of the driveway, I see no erosion or sedimentation issues.

The filling of the roadbed will slightly hinder amphibian travel within the wetland/stream corridor, with the exception of the box culvert. The natural streambed bottom will allow amphibians, reptiles and mammals to have passage, and fish species as well, when seasonal stream flows are sufficient enough in depth.

The additional height in the elevation of the driveway surface will also prevent the current groundwater discharge and surface flows from eroding the driveway and entering the brook.

The construction and functioning of the rip-rap drainage swales and plunge pool will have no direct, significant or long-term impacts to the wetlands or water quality.

The rip-rap swales and pool are designed to collect, attenuate, treat and infiltrate stormwater before it can reach wetlands. Once vegetation begins to grow in the swales and pool, further sediment and nutrient retention and removal will occur. I see no impacts to water quality in the brook.

Overall, I only see temporary impacts to the forested wetland and brook as a whole. Once the roadbed and crossing are completed, this wetland complex will still exhibit the same wetland functions and values it currently exhibits. This is provided that the E&S measures are correctly installed and maintained during the construction timeframe.

*I would recommend that the project should be commenced when the water table is at its lowest point, stream flows are lower or non-existent, and the disturbed soils adjacent to the proposed driveway location be seeded and mulched ASAP.*

**Wetland mitigation area potential impacts:**

The proposed activity consists of the excavation of the topsoil/subsoil horizons to a depth of the seasonal water table, which is at or near the surface throughout most of the year. This ensures that the hydroperiod in the area is the same as the adjacent natural wetlands.

The area is then seeded with New England Wetmix seed mix.

As no detail for this feature is shown on the plan, I would recommend it be added on the detail sheet.

No E&S measures are shown along the western edge of the wetlands and the mitigation area, I would recommend that staked haybales be shown on the plan.

The area where the excavated materials are going to be deposited is not indicated on the plan. I would recommend that these materials be deposited, graded, and be seeded/stabilized a good distance from the wetlands or be hauled off site to avoid potential erosion and sedimentation impacts.

Provided that the E&S measures are correctly installed and maintained, I see no direct or significant impacts to the wetlands from the construction of this feature.

**Residential area potential impacts:**

The proposed clearing limits and septic system is proposed approx. 50 feet from the brook, with the residence and yard areas being approx. 100 feet from the brook.

The slopes below the proposed septic system are moderate at +/-10%.

I see no potential direct impacts from the construction of the residence and septic system. The discharge of septic effluents into the fine grained upland soils will not reach the brook or adjacent wetlands.

I would recommend that the proposed silt fencing be backed by staked haybales due to the moderate slopes in this area.

**Potential indirect impacts:**

The potential short-term impacts associated with the construction of the gravel/paved drive/wetland crossing and any land clearing, stumping, grading and construction activities would include potential sediment discharges during significant storm events if the E&S measures breach.

Provided that the recommended E&S measures are correctly installed and maintained, I see no direct or significant impacts to the wetlands from the construction of the project.

I would recommend that E&S inspections should occur at least weekly and prior to/after significant rainfall events.

## **Prudent and feasible alternatives**

I was provided with a site plan proposing an alternative driveway crossing site that was discussed at the site walk.

The location of the entrance of the proposed driveway is shown just to the north of the existing catch basin and 15-inch concrete culvert pipe from which the small intermittent watercourse flows downslope into the wetlands to the east.

This would obviously incur significantly more direct wetland/watercourse disturbance than the current proposed location.

On the date of the assessment, (11/29/2023), I flagged the limits of this watercourse and wetlands where the alternative location is proposed because the wetland delineation line was not flagged in this area, and is not shown accurately on the current plan.

It is my professional opinion that even if the alternative driveway location is moved to the south to avoid direct disturbance in the small intermittent watercourse, the wetland/watercourse disturbance and impacts would be significantly higher with this or any other alternatives which require a wetland crossing.

This is due to the following:

- The length of the crossing will be larger than the current proposal due to the width of the wetlands adjacent to the brook in this general area.
- The width of the crossing will be wider than the current proposal. This is due to the increased quantities of fill, and wider fill slopes at the brook crossing site because of the steeper stream banks in this area.
- The width of the crossing would also be wider because of the rip-rap swale drainage feature which has to be extended into the wetlands.
- Additional clearing and disturbance of the existing overstory and understory vegetation.

The only other alternative I believe was mentioned is the construction of a span bridge type structure extending +/- 120 or more feet from upland to upland, to avoid any direct wetland disturbance.

I do not see this as feasible, due to the extremely high cost and difficulty of construction, to only access a single residence.

Overall, I see no prudent or feasible alternatives to the current proposal.



## **Conclusions:**

The impacts to the wetlands and watercourse from the filling and construction in the crossing sites is significant, within the footprint of the filled areas, however the remaining wetlands and brook will still exhibit their current functions and values.

It is my opinion, provided that the E&S measures are correctly implemented and maintained throughout the project timeframe, the E&S inspections are conducted as proposed and no significant discharges of sediments reach the wetlands or watercourses, the disturbance associated with the construction within and adjacent to the wetlands will not significantly impact the wetlands or their existing functions due to erosion and sedimentation.

Once the disturbed areas are re-vegetated and stabilized, the well-drained soils in the upland areas will allow for good infiltration of storm water runoff both during and after construction.

The quick and permanent establishment of vegetation in the disturbed areas is crucial to the prevention of post-construction erosion.

The paving of steeper sections of the driveway & construction of the rip-rap plunge pool and swales to collect, attenuate, treat and infiltrate stormwater off of the driveway will help prevent impacts to water quality in the wetlands and brook.

In summary, I see no direct or adverse impacts to the functioning wetlands or the brook or their functions and values as a result of the construction of the driveway and residence.

This is provided that the recommended erosion and sedimentation control features are implemented, maintained and monitored throughout the construction and post construction timeframe.

If you have any questions concerning the site assessment or this report, please feel free to contact me.

Sincerely,

*Joseph R. Theroux*

Joseph R. Theroux  
Certified Forester and Soil Scientist  
Member SSSSNE, SSSA