● Ecology
● Soil & Wetland Studies
● Water Quality Monitoring ● GPS
● Environmental Planning & Management
● Ecological Restoration & Habitat Mitigation
● Aquatic, Wildlife and Listed Species Surveys
● Application Reviews ● Permitting & Compliance

January 11, 2021

VIA EMAIL

Town of Coventry
Inland Wetlands Agency
1712 Main Street
Coventry, CT 06238

RE: ***WETLANDS ASSESSMENT & IMPACTS ANALYSIS: SUPPLEMENTAL***
2-Lot Re-subdivision
Zeya Drive, Coventry, CT

REMA Job # 20-2311-COV20

Dear Agency members:

On behalf of the applicant, Debbieann Durkin, REMA ECOLOGICAL SERVICES, LLC (REMA) is providing herein additional discussion regarding the proposed mitigative measures proposed to off-set the direct wetland impact upon regulated resources for the access driveway to the residential lots. These include:

1. The restoration of approximately 1,450 square feet of wetland, which will include a 750 square foot vernal pool habitat.

2. The creation of 2,720 square feet of wetland habitat as part of a bio-swale, which will treat existing stormwater runoff from both Zeya Drive, as well as from the new driveway to the two residential lots.

3. Preservation of upland wetland habitats through conservation easements on the two lots, totaling 19.66 acres.

This report also responds to the questions and comments raised by Todd Penney, Town Engineer/Wetlands Agent, in a December 21st, 2020 review memorandum, specifically those regarding our original December 12th, 2020 *Wetlands Assessment & Impact Analysis* report (WA).

1.0 Wetland Restoration

As mentioned in our December 12th, 2020 WA, an old spoils pile, located within wetlands in the proposed Lot 1 conservation easement, will be removed to restore wetland habitat. As part of the restoration a vernal pool habitat would be created. It is estimated that total wetland restoration will be approximately 1,450 square feet, while the "pool" portion will be +/- 750 feet (i.e., +/- 30' x 25').

Creating a long-term, functional vernal pool is not an easy task, even when one of the "obligate" species has been seen on several occasions and places throughout the overall property (i.e., wood frog; see Photo A, attached, and Photo 7 in original WA). Vernal pool mitigation must have defined goals or endpoints of success, which should include the long-term reproduction and metamorphosis of key indicator species, such as the wood frog. Following are several specific factors affecting vernal pool creation success that have been considered.

Hydrology

This is perhaps the most important factor, and is dictated by the hydro-geomorphic setting (i.e., position of the pool in the landscape). In our region the most successful breeding pools for the key obligate amphibians, which in addition to wood frog includes mole salamanders (i.e., spotted salamander, marbled salamander), are those that have a regime of seasonal flooding, which lasts through mid- to late July of a normal precipitation year. This allows not only wood frogs to emerge but also spotted salamanders which take up to an additional month past wood frog metamorphosis and emergence to successfully reproduce. Creating a semi-permanent hydrological regime runs the risk of attracting predators of egg masses and larvae of the vernal pool obligate species, including green frog and eastern newts. Therefore, the goal for the created pool is to have a maximum water depth of no more than 18 inches (average: 12 inches).

Hydro-geomorphic Setting

This pool will be a *seasonal groundwater depression*, mostly fed by direct precipitation, seasonal shallow groundwater inflow, and very limited surface flow. The surrounding wetland soils are poorly drained, till-derived, fine sandy loams. Groundwater is expressed at the surface of the ground in early spring (i.e., *seasonally saturated* hydrologic regime) and gradually recedes to 18 - 20 inches or more from the surface in the late summer or early fall of a typical year. One of the specific concerns that will have to be dealt with in the field is the outflow from the Zeya Drive drainage system, which passes close to this area. During pool creation a low berm or diversion may be needed to ensure that the vernal pool does not receive this flow, but that it bypasses it.

Vegetation

Within pool vegetation structure varies widely in vernal pools throughout our region, with many pools not supporting much vegetation during the season of inundation, except in its perimeter. Vegetation can be important in providing shade, refuge, and potential egg mass attachment site, especially for spotted salamanders.

Potential for invasive species is always high for any newly created habitat, especially if they exist nearby. For instance, Japanese barberry and multiflora rose are found in the immediate surroundings of the restoration area, even upon the spoils that will be removed. Eradication and control of invasives will be undertaken within a 25 to 30 foot swath around the restoration area in the year of wetland restoration (Year 1). After planting, a *two growing season monitoring program* for invasive control is proposed (i.e., Years 2 and 3).

Pool canopy cover affects pool temperature, supports detrital food webs through inputs of leaf litter, and both coarse and fine particulate organic matter (i.e., CPOM, FPOM). Canopy cover directly over the pool influences amphibian community composition, as increased light, temperature, and primary productivity (e.g., excessive algal growth) may attract a broader spectrum of amphibian and invertebrate species (e.g., green frog and predaceous diving beetles), which compete or prey on vernal pool obligate species.

To address the above factors, we are proposing the planting of both trees and shrubs in the outer hydrologic zone of the wetland restoration area, which will be minimally flooded and/or saturated during the spring of a given year. These mitigation plantings, which are

found attached as Table 1, is the revised table originally attached to the REMA WA (December 12, 2020) report. This planting schedule will cover approximately half (i.e., 750 sq. ft.) of the restoration area. No woody plantings are proposed in the center portion of the pool area.

Slope

It is important, when creating a vernal pool, that the slope to the seasonally inundated portion is gradual and will not impede the movement of amphibians, especially of newly hatched metamorphs. Shallow inundated areas, that is, the littoral zone, can be important for predator avoidance and for thermoregulation of the newly hatched amphibians, promoting growth. This slope factor will be worked out directly in the field when removal of the spoils pile and excavation will take place, and under the supervision of the wetlands professional.

Soils

Development of soils in the newly excavated are will depend primarily on the hydroperiod of flooding and saturation and on the parent materials. The subsoils at this location are sandy loams to loamy sands (at depth), and saturation will last through to early or mid-summer, at least in the center of the pool. We propose to import a few inches of topsoil from an upland, invasive free area of the overall site, which will be set aside or be directly transported to this area during construction. This will provide some initial organic matter and mycorrhizae (i.e., beneficial fungi) that will support the aquatic food chain.

Landscape Setting

This is an important factor which will ensure the long-term success of the vernal pool. The proposed pool site is ideally located in a forested upland/wetland matrix, and is set back several hundred feet from most development. Nearby uplands, located within an existing Town open space parcel, will support the terrestrial habitat needs of vernal pool obligate amphibians. This created habitat will be embedded within an existing extensive forested wetland, which also allows for habitat linkage to hundreds of acres of off-site undeveloped land, especially to the west and south. Considering the specific needs of wood frogs, which are likely be the first obligate vernal pool amphibian to use this created habitat, the scientific literature would suggest that they prefer areas with extensive forested wetlands,

where they spend most of the time during the late spring and summer, only migrating to upland areas in the fall for hibernation.

General Specifications

We should note that we have not provided a grading plan or a cross-section of the wetland restoration and vernal pool area for at least a couple of reasons. First, this is a relatively small area (i.e., +/- 1,450 sq. ft.) and, second, the qualified wetlands professional, in likelihood a REMA wetland scientist, will be involved in all the stages of restoration, including initial inspections, earthwork, and planting/seeding. In general, from existing elevation +/- 748.0 feet, which is the outer edge of the spoils pile, to roughly existing elevation 750.0 feet, excavation will be down to 747.5 feet. From existing elevation 750.0 feet to existing elevation 752.0 feet, which is near the top and center of the spoils pile, excavation will be down to 746.5, which will also accommodate 3 to 4 inches of imported topsoil, as discussed above. Also as stated above the goal is for maximum inundation to be 18 inches, with an average of 12 inches at the wettest portion of the spring season.

Perimeter erosion & sedimentation controls, consisting of hay bales and/or silt fence, will be available and utilized as needed based on field conditions to protect against migration of soils to adjacent wetlands and to surface waters from the discharge of the existing Zeya Drive system. Due to the fact that "construction access" will potentially have to traverse a section of wetlands, unless a preferable access can be found through the Town of Coventry Open Space parcel, we propose that the earthwork be completed in late August or early September, followed immediately by seeding and planting.

It should be noted that the excavated soils can be utilized within the development lots, but must be placed at least 50 feet from a wetland boundary, unless proper erosion and sedimentation controls are utilized.

2.0 Wetland Creation

The revised submitted plans show that the "bio-swale" has been extended further northerly approximately 75 feet along and to the east of the proposed driveway. The total potential wetland creation has now increased to roughly 2,720 square feet. As result, the planting materials table (i.e., Table 1, attached) has been revised. Also, the proposed seed mixes need to accommodate the increased area (i.e., add one pound each).

3.0 Wetland/Upland Preservation

An important component of the overall wetland mitigation strategy for the site is the protection of wetland and upland areas through conservation easements. A total of 19.66 acres of uplands and wetlands would be encompassed within separate conservation easements for each of the two proposed lots. The uplands and wetlands within each of these easements are shown on the revised compilation plan. This plan has digitized the wetland boundaries that were mapped by REMA in the field during our baseline inventories of the overall property.

4.0 Additional Responses to Staff Memo

While much of the responses to the REMA report are dealt with in the above sections, especially with regards to wetland restoration, further responses are as follows, keyed to the enumeration found in the staff memorandum:

1. Multiflora rose, as well as Japanese barberry, and some limited firebush, will be eradicated in the vicinity of the wetland restoration area, as indicated above, but also within the entire access easement from Zeya Drive to the property. This will allow for successful proliferation of both planted and volunteer plants within and adjacent to the proposed bio-swale wetland.

2. The CT Soils Survey is attached to the REMA September 21st, 2020, *On-Site Soil Investigation & Wetland Delineation Report*, submitted under separate cover.

3. While green ash was observed in the field, no living mature trees were seen in the delineated wetlands surrounding the proposed lots. For the most part the green ash observed were young saplings, which would not be infested by EAB for many years.

4. An investigation for active breeding by vernal pool obligates, especially wood frog, could be undertaken in early April of 2021. It is possible that wood frogs, which were observed at the site, may attempt to breed in several deeper wheel ruts created during logging operations. However, in all likelihood these ruts would not maintain favorable hydrology for the successful reproduction of wood frogs during a normal precipitation year and, therefore, would be considered “ecological sinks.”

5. The potential issue with Zeya Drive stormwater entering the proposed vernal pool has been addressed above. REMA recommends that monitoring and brief reporting on the restored wetland habitat and created vernal pool, as well of the bio-swale, be undertaken for two full growing seasons past the initial implementation season (i.e., Years 2 and 3), which would include eradication of invasive plants within a 25 to 30 foot zone around the restoration area, and within and adjacent to the created wetland (i.e., bio-swale). Moreover, REMA commits to continue monitoring this pool for an additional 4 years (i.e., Years 4 to 7), pro bono, with annual reports to the Commission. This is based on our personal experience that it could take more than 3 years for a vernal pool to become consistently active, and is based on the average 3 year life cycle of wood frogs, which do not reach sexual maturity for at least half their average life span.

Finally, plans have been submitted by the project engineer depicting a feasible alternative of accessing the developable portions of the property from Bread and Milk Street (Route 31). As can be seen there, not only would the impacts to wetlands be more extensive than the preferred alternative, but the wetlands that would be impacted are much higher functioning than those that would be impacted under the proposed plan. As discussed in our original WA, the wetlands to be impacted have been disturbed at least twice, the last time during logging operations in 2004, are mostly man-made, and confer low quality functions and values.

Please feel free to contact our office with any questions on the above.

Respectfully submitted,

REMA ECOLOGICAL SERVICES, LLC

George T. Logan, MS, PWS, CSE
Registered Soil Scientist/Professional Wetland Scientist
Certified Senior Ecologist

Attachments: Photo A; Table 1 (revised)

Residential 2-lot Development, Zeya Drive, Coventry, CT
Photos taken July through November 2020, by REMA Ecological Services, LLC

Photo A: One of several wood frogs observed during fieldwork (August 3, 2020)

Table 1. Mitigation Plantings

Scientific Name	Common Name	Size	Shade tolerant?	Form	*Bio-Swale*	*Wetland Restoration*
TREES/LARGE SHRUBS						
Acer rubrum	Red maple	5'-6'	Y	nursery pot		2
Nyssa sylvatica	Black gum	5'-6'	Y	nursery pot		2
Amelanchier canadensis	Shadblow	3'-4'	Y/N	nursery pot	3	
MEDIUM TO LOW SHRUBS						
Vaccinium corymbosum	Highbush blueberry	3'-4'	Y	nursery pot	5	3
Viburnum dentatum	Arrowwood viburnum	3'-4'	Y	nursery pot		4
Ilex verticillata	Winterberry holly	3'-4'	Y	nursery pot	8	3
Spirea latifolia	Meadowsweet	3'-4'	N	nursery pot	8	
Lindera benzoin	Spicebush	3'-4'	Y	nursery pot		3
Clethra alnifolia	Sweet pepperbush	3'-4'	Y	nursery pot	6	
Swida racemosa	Gray dogwood	3'-4'	Y	nursery pot	4	2
Viburnum lentago	Nannyberry	3'-4'	Y	nursery pot	2	3
Total:					**36**	**22**

NOTES:

1. Within the wetland portion of the bio-swale use New England Wet Mix (2 pounds)

2. Within the mid- and upper slope of the bio-swale use New England Erosion Control Mix for Detention Basins and Moist Site (3 pounds)

3. Add 20% by weight, annual ryegrass to above seed mixes for quick stabilization.