



MEMORANDUM #3

TO:	Town of Southborough Zoning Board of Appeals 9 Cordaville Road Southborough, MA 01772	DATE:	June 16, 2025
FROM:	Lucas Environmental, LLC Joseph H. Orzel, PWS, CWS Christopher M. Lucas, PWS, CWS, RPSS	PROJECT NUMBER:	10030.382
		RE:	Comprehensive Permit Review 250 Turnpike Road Southborough, MA

Lucas Environmental, LLC (LE) has completed a review of a Vernal Pool Migration Study submitted in support of a Comprehensive Permit application under M.G.L. c.40B, §21-23, and 760 CMR 56.00, and under the Massachusetts Wetlands Protection Act M.G.L. c. 131 §40 (WPA) and its implementing regulations 310 CMR 10.00 *et seq*, for a project located at 250 Turnpike Road in Southborough, Massachusetts. The project has also been reviewed with respect to the Southborough Wetlands Protection By-law (Chapter 170), and the Southborough Wetland Regulations as requested by the Town of Southborough Zoning Board of Appeals (ZBA).

1.0 DOCUMENTS REVIEWED

- Document titled “*Wildlife Habitat Evaluation & Vernal Pool Migration Study Report for 250 Turnpike Road (Map: 27, Lots: 46 & 2A), Southborough, MA 01772*,” prepared by Goddard Consulting, LLC, dated May 15, 2025.
- Calhoun, A. J. K., and M. W. Klemens. 2002. *Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States*. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

2.0 COMMENTS & REQUESTS FOR ADDITIONAL INFORMATION

The following are our comments and/or requests for additional information related to the Wildlife Habitat Evaluation & Vernal Pool Migration Study Report prepared by Goddard Consulting (hereafter “GC Study”). LE notes that this review is specific to the above cited documents and does not include previous LE comments from our Review Memorandum #2, dated March 12, 2025.

Additional materials submitted to the Southborough Zoning Board of Appeals during the course of the public hearing will be reviewed by LE and commented on, as needed.

Vernal Pool Migration Study

LE has the following comments with respect to the Vernal Pool Migration Study.

1. LE requests the Applicant provide the dates the Vernal Pool Study was started and ended, as this information was not found in the GC Study.
2. The GC Study refers to the pool in question as a Potential Vernal Pool. LE notes that the pool is in fact a Vernal Pool, as it has been demonstrated to provide breeding habitat for two obligate Vernal Pool species and meets both biological and physical requirements to be considered a Vernal Pool, providing Vernal Pool habitat.
3. LE acknowledges that the Vernal Pool in question is not a pristine or exemplary example of a Vernal Pool. It is a stormwater basin created approximately 35 years ago that receives parking lot runoff, that was determined to be a jurisdictional Bordering Vegetated Wetland (BVW) by the Town of Southborough Conservation Commission. However, based on observed evidence of use by two species of obligate Vernal Pool amphibians: wood frog (*Lithobates sylvaticus*) and spotted salamander (*Ambystoma maculatum*), and two species of facultative vernal pool amphibians: springer peeper (*Pseudacris crucifer*) and American toad (*Anaxyrus americanus*), it is apparent that the biological conditions at the pool are sufficient to provide Vernal Pool habitat. In addition, the pool provides habitat for other amphibians, such as the observed green frog (*Rana clamitans*) and pickerel frog (*Lithobates palustris*), as well as other wildlife species.
4. LE notes that the observation of nineteen egg masses (12 wood frog and 7 spotted salamander) at this pool is almost four times greater than the five egg masses required to have a Vernal Pool certified under the *Guidelines for the Certification of Vernal Pool Habitat, March 2009*, published by the Massachusetts Natural Heritage & Endangered Species Program (NHESP). Given that NHESP considers pools with five egg masses as sufficiently significant for Certification (i.e., protection), it suggests that this pool should be considered as providing more than “*minimal ecological capacity for the long-term viability of obligate vernal pool amphibian populations,*” or “*minimal reproductive activity,*” or “*little habitat value.*”
5. LE notes that the GC Study references the document “*Calhoun, A. J. K., and M. W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York*” (hereafter “Best Development Practices”). LE concurs that this is an appropriate reference document for Vernal Pool habitat evaluations.
6. LE notes that per Best Development Practices, the Vernal Pool in question meets “Tier II” criteria based on the biological assessment (i.e., use by two or more Vernal Pool indicator species) and the condition of the Critical Terrestrial Habitat (i.e., at least 75% of the Vernal Pool envelope within 100 feet of the pool is undeveloped). Best Development Practices state that for Vernal Pools meeting Tier II criteria “*Management Recommendations should be applied at these sites to the maximum extent practicable.*” The Applicant did not include that the Vernal Pool in question meets the Tier II Criteria. The project does not meet the Management Recommendations to the maximum extent practicable.
7. The following Management Recommendations are provided in Best Development Practices:
 - a. *Maintain the pool basin, associated vegetation and the pool water quality in an undisturbed state.*

This recommendation cannot be completely met as the basin is a functioning stormwater basin. However, the Southborough Conservation Commission has conditioned the maintenance of the basin to maintain Vernal Pool habitat features to the extent practicable.

- b. *Maintain undeveloped forested habitat within the Vernal Pool Envelope (100 feet of the pool), including both canopy and understory.*

LE notes that a portion of the undeveloped Vernal Pool Envelope is proposed to be developed. LE recommends that the Applicant provide the percentage of the undeveloped Vernal Pool Envelope that is proposed to be developed.

- c. *Avoid barriers to amphibian dispersal (emigration, immigration) within the Vernal Pool Envelope.*

The project should be conditioned to avoid barriers to amphibian dispersal to the maximum extent practicable. LE notes that the proposed development will create barriers to amphibian dispersal within the Vernal Pool Envelope in the areas of Units 20, 21, 28, 29, and 30.

- d. *Protect and maintain pool hydrology and water quality.*

This recommendation can be met to a limited extent due to the fact that the pool is also a stormwater basin. The GC Study states that the pool water quality is poor because it functions as a stormwater basin. However, no water quality data has been provided, and the water is apparently of sufficient quality to provide Vernal Pool breeding habitat. The Applicant should provide empirical evidence that the water quality is poor.

- e. *Maintain a pesticide-free environment within the Vernal Pool Envelope.*

The project could be conditioned to meet this recommendation. However, as noted in the GC Study, much of the area within 100 feet of the pool contains dense invasive vegetation and the GC Study proposes targeted removal of invasive species and replacement with native species as potential mitigation. Therefore, any Invasive Species Management Plan (ISMP) would likely require the use of herbicides to effectively manage the invasive species at the site.

LE recommends that the existing ISMP for portions of the site issued by the Southborough Conservation Commission under MassDEP File #190-1107, including the use of herbicides, be used as a template for an ISMP for the entire site.

- f. *Maintain or restore a minimum of 75% of the Critical Terrestrial Habitat (i.e., within 750 feet of the pool) in contiguous (i.e., unfragmented) forest with undisturbed ground cover.*

This recommendation cannot be met as only approximately 36 to 40 percent of the Critical Terrestrial Habitat is currently undeveloped. However, the proposed project will develop a large portion of the remaining Critical Terrestrial Habitat and will bisect the on-site Critical Terrestrial Habitat with the proposed road. LE recommends that the Applicant provide the percentage of the Critical Terrestrial Habitat that is proposed to remain undeveloped.

- g. *Maintain or restore forested corridors connecting wetlands or vernal pools.*

LE recommends that the project be designed to maintain forested corridors between the pool and adjacent wetlands to the extent practicable, and further explore design alternatives to achieve this.

- h. *Provide suitable terrestrial habitat for pool-breeding amphibian populations by maintaining or encouraging at least a partially closed-canopy stand that will provide shade, deep litter, and woody debris.*

LE notes that the GC Study describes replanting native trees and shrubs and increasing coarse woody debris in adjacent upland and wetland areas as potential mitigation. LE supports this mitigation.

- i. *Minimize disturbance to the forest floor.*

LE recommends that the project be conditioned to minimize disturbance to the forest floor to the extent practicable.

- j. *Where possible, maintain native understory vegetation (e.g., shrubs and herbs).*

As noted above, the GC Study describes replanting native trees and shrubs as potential mitigation, which LE supports.

With respect to roads, the following recommendations are provided in Best Development Practices:

- k. *Roads and driveways should be excluded from the vernal pool depression and vernal pool envelope.*

It appears that the proposed project meets this recommendation, and LE recommends that the Applicant verify that this the case.

- l. *Roads and driveways with projected traffic volumes in excess of 5-10 cars per hour should not be sited within 750 feet of a vernal pool (Windmiller 1996). Regardless of traffic volumes, the total length of roads within the critical terrestrial habitat should be limited to the greatest extent possible (Egan and Paton, in prep.).*

LE recommends that the Applicant provide the projected traffic volume with respect to this Best Development Practice recommendation but notes that the entire property is located within 750 feet of the Vernal Pool; therefore, it is impossible not to site the road within 750 feet of the Vernal Pool. LE recommends that the total length of road within the critical terrestrial habitat be limited to the extent practicable and wildlife crossings be examined as previously recommended.

- m. *Use Cape Cod-style curbing (see Figure 10) or no-curb alternatives on low capacity roads.*

LE notes that the GC Study indicates the use of Cape Cod berms throughout the development as a potential mitigation measure. LE supports this mitigation measure.

- n. *Use oversize square box culverts (2 feet wide x 3 feet high) near wetlands and known amphibian migration routes to facilitate amphibian movement under roads. These should be spaced at 20-foot intervals and use curbing to deflect amphibians toward the box culverts.*

LE notes that the GC Vernal Pool Migration Study describes the use of a wildlife crossing and fencing as a potential mitigation measure. However, the Study concludes that “large scale mitigation strategies, such as wildlife underpasses, are not warranted due to the limited ecological value or conservation benefit they would provide for the site.” See LE Comment #9. a-f. below.

- o. *Use cantilevered roadways (i.e., elevated roads that maximize light and space underneath) to cross low areas, streams, and ravines that may be important amphibian migratory routes.*

See LE Comment #9. a-f. below.

- p. *Cluster development to reduce the amount of roadway needed and place housing as far from vernal pools as possible.*

LE recommends that the Applicant meet this recommendation to the maximum extent practicable.

8. LE notes the following from the GC Study:

- a. LE notes that the results of the drift fence and pitfall traps indicated that 21 wood frogs (*Lithobates sylvaticus*) were captured entering the pool at the drift fence around the pool. Fewer were observed exiting the pool, which is not unexpected since not all the individuals would necessarily have left the pool area at the time the Study ended. Of the wood frogs entering the pool, nine entered generally from the east (42.9%), seven generally from the south (33.3%), five generally from the west (23.8%), and two generally from the north (9.5%). LE notes that most of the wood frogs were captured entering from the east and south, with a relatively high percentage also entering from the west. Few entered from the north, which is not unexpected since this is the most highly developed portion of the site.
- b. The results of the drift fence and pitfall traps indicated that 13 spotted salamanders (*Ambystoma maculatum*) were captured entering the pool at the drift fence around the pool. Of these, nine entered generally from the east (69.2%), two generally from the south (15.4%), one generally from the west (7.7%), and one generally from the north (7.7%). LE notes that over two-thirds of the spotted salamanders were captured entering from the east.
- c. In addition, 22 other amphibians including green frogs (*Rana clamitans*), pickerel frogs (*Lithobates palustris*), spring peeper (*Pseudacris crucifer*), and American toad (*Anaxyrus americanus*) were captured entering the pool at this drift fence. Of these, fourteen entered generally from the east (63.6%), one generally from the south (4.5%), six generally from the west (27.3%), and one generally from the north (4.5%). LE notes that almost two-thirds of the other amphibians were captured entering from the east.
- d. With respect to the drift fence installed along the approximate location of the proposed road, four wood frogs, two spotted salamanders, and eighteen other amphibians were captured moving east between wetlands and toward the vernal pool.
- e. The above results indicate that the majority of the amphibians utilizing the Vernal Pool are entering generally from the east, with a number of those captured, primarily “other” amphibians, crossing between wetlands in the general area of the proposed road. Therefore, the data indicates that there is amphibian migration occurring from the wetlands located east of the Vernal Pool to the Vernal Pool, and to a lesser extent observed migration from the Vernal Pool back to these wetlands.

9. LE has the following comments regarding the conclusions of the GC Migration Study:
- a. The GC Study concludes that the pool supports a relatively small number of obligate and facultative amphibian species. LE agrees that the number of individuals and egg masses reported in the GC Study are fairly small related to larger pools in more rural areas; however, LE also notes that the number of egg masses reported is almost four times the number of egg masses required by NHESP for Vernal Pool certification.
 - b. The GC Study concludes that the pool's *"artificial origin, degraded water quality, and fragmented surrounding habitat substantially limits its ecological value."* LE disagrees that the pool's artificial origin necessarily limits its ecological value as there are numerous examples of created wetlands that provide Vernal Pool habitat. LE agrees that degraded water quality generally limits a pool's ecological value; however, the Applicant has not provided empirical data indicating the water quality is unsuitable, and based on its observed use appears that the water quality is sufficient to provide breeding habitat for Vernal Pool amphibians. LE agrees that the fragmented surrounding habitat limits the pools ecological value, and further fragmentation from development will further limit the pools ecological value.
 - c. The GC Study concludes that the *"presence of only 19 egg masses and fewer than 45 observed breeding amphibians indicates minimal reproductive activity, far below thresholds typically associated with ecologically significant Vernal Pool systems."* LE agrees that these are modest numbers; however, as noted previously, the number of egg masses reported is almost four times the number of egg masses required by NHESP for Vernal Pool certification. In LE's opinion, this indicates that this pool should be considered to provide more than *de minimis* or minor Vernal Pool habitat value. LE requests the Applicant to provide additional information on the *"thresholds typically associated with ecologically significant Vernal Pool systems"* and provide the source/citation of the data.
 - d. The GC Study concludes that *"the critical terrestrial habitat surrounding the pool is largely developed and fails to meet state-recommended thresholds for undeveloped support area."* LE agrees that the critical terrestrial habitat is largely developed; however, requests that the Applicant provide additional information on the *"state-recommended thresholds"* referenced above and provide the source/citation of the data.
 - e. The GC Study concludes that the above noted factors *"collectively suggest that the basin offers little habitat value, likely acting as a secondary or opportunistic breeding site."* As stated previously, LE acknowledges that the Vernal Pool in question is not pristine or an exemplary example of a Vernal Pool; however, based on observed evidence it is apparent that the pool provides Vernal Pool habitat that is of sufficient value to meet NHESP certification criteria, indicating that this pool should be considered to provide more than minor habitat value.

LE agrees that the pool may act as a secondary or opportunistic breeding site, to some extent. However, LE also believes that there is likely a local population of wood frogs and spotted salamanders, as well as other amphibians, utilizing the pool. The closest mapped Certified or Potential Vernal Pool is located approximately 3,000 feet southwest of the site. As the maximum migration distances reported in Best Development Practices for spotted salamanders is up to 817 feet and for wood frogs up to 3,835 feet, in LE's opinion it is unlikely that the numbers observed were solely individuals that came across this pool while migrating to another pool.

- f. The GC Study concludes that “*therefore, large-scale mitigation strategies, such as wildlife underpasses, are not warranted due to the limited ecological value or conservation benefit they would provide for this site.*” LE notes that although the pool at the site is likely not significant on a regional basis since it is relatively small and is apparently not part of a larger interconnected Vernal Pool complex, it is significant for the local population of Vernal Pool organisms that breed in and otherwise utilize this pool in this developed area. Therefore, LE disagrees that mitigation strategies such as a wildlife underpass are completely unwarranted and recommends that the ZBA consider requiring a wildlife underpass at a location between the two wetlands that will be bisected by the proposed road.

Wildlife Habitat Evaluation

LE has the following comments with respect to the Wildlife Habitat Evaluation (WHE).

10. LE is in general agreement with the methodology of the Wildlife Habitat Evaluation.
11. The WHE states that the proposed project is not expected to significantly disrupt ecological connectivity with adjacent natural habitats. LE concurs, as several potential wooded connections would remain outside the property bounds. However, it is LE’s opinion that the proposed project will disrupt the connectivity of habitats within the property bounds as it will bisect the property.
12. The WHE states “*The proposed residential development will impact a portion of the remaining undisturbed upland forest; however, these areas are limited and already affected by surrounding development. With careful planning, including selective clearing, invasive species control, and restoration of native vegetation, the project can minimize its impact on local wildlife habitat while supporting the overall ecological health of the site.*” LE concurs and recommends that all the above mitigation measures be implemented.
13. The WHE states that the northernmost BVW on-site is bisected by a pedestrian bridge. This area was excluded from the Undeveloped Critical Terrestrial Habitat. LE notes that this is an elevated bridge over the wetland and does not create a barrier to wildlife movement through this area, and although there is development on three sides, the pedestrian bridge should not exclude this area from being considered Undeveloped Critical Terrestrial Habitat.
14. The WHE states “*By designing the development within previously disturbed areas and maintaining natural vegetation along site edges, the project can preserve what remains of these localized migratory pathways and ecological connections.*” LE notes that maintaining natural vegetation along the road edges does not fully preserve localized migration pathways and would require crossing of the roadway by species utilizing these pathways.
15. The WHE stated that no special or unique habitats or habitat features were found on or proximal to the areas of impact. LE would argue that the Vernal Pool is considered a special habitat.
16. The WHE states that “*Overall, the effects on amphibians are likely small.*” LE disagrees, based on the large area of upland Critical Habitat that is proposed to be impacted and the migration corridor impacted with the proposed roadway.
17. LE agrees that the potential mitigation measures listed in the WHE are acceptable, which include replanting native trees and shrubs, placement of nest boxes, targeted removal of invasive species, and increasing coarse woody debris in upland and wetland areas.

18. The WHE summary states *“The loss of some upland forest cover, including mature trees and understory vegetation, will reduce local habitat quality, primarily affecting small and large mammals as well as some forest-nesting birds.* LE concurs and recommends the mitigation measures described in the WHE.
19. The WHE summary states *“The proposed access road may slightly disrupt amphibian movement between upland areas and potential vernal pool habitats, though these effects are limited in scale and can be mitigated. While the site does contribute to localized ecological connectivity, the project is not expected to significantly alter migratory patterns or the site's overall ability to support common wildlife species.”* LE disagrees. The proposed project will bisect the site, requiring alterations in migratory pathways, and although many common wildlife species may not be significantly impacted, it is LE’s opinion that the Vernal Pool amphibian species, particularly the spotted salamander and wood frog which require suitable upland habitat, will be impacted. Therefore, the project should meet Best Development Practices management recommendations to the maximum extent practicable.
20. Based upon the potential impacts to the Vernal Pool amphibian species with the proposed roadway bisecting a migratory corridor, and the impacts to the undeveloped areas of the site and Vernal Pool Envelope, the ZBA should consider the importance of maintaining the Conservation Commission’s local 20-Foot No Work Zone for this site.

The comments provided above are based on the plans, documentation, and supporting information received at the time of this review. Any revision to the plans, documentation, and supporting information will require additional review. LE has no further comments as this time.