TO: **MANSFIELD INLAND WETLANDS AGENCY**

FROM: **DAVID S. ZIAKS, M.ENG., P.E.**
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RE: **STORRS LODGES, LLC APPLICATION NO. W1564**

DATE: **JULY 12, 2016**

RESPONSE TO INTERVENTION PETITION DATED MAY 16, 2016

The intervenors allege in paragraph 2 of the Petition that "this administrative proceeding involves conduct which is or reasonably likely to have, the effect of unreasonably polluting, impairing or destroying the public trust in the air, water and other natural resources of the state in the following ways, which it then goes on to enumerate.[1] The purpose of this memorandum is to respond in outline form to the specific claims of adverse environmental impacts made by the intervenors and alleged in the petition.

Proposed Road Crossing

The proposed crossing for the entrance driveway will be accomplished using a precast concrete arch bridge to insure there will be no unavoidable impacts to the wetlands and intermittent watercourse. Permanent disturbance is limited to 4,402 square feet. Development of two proposed wetlands mitigation areas on the site will more than compensate for this loss.

Any development of this 45.93-acre property, given its topographical features and practical access limitations to existing adjacent public roadways, would require access drives and public utility connections basically following the layout as shown on the site plans. There is no other feasible way to gain access to the property.

The one proposed wetland crossing necessary to gain roadway access to Hunting Lodge Road occurs at a location that has been used for many years based on our investigation of current site conditions and historical aerial photography. The driveway crossing must be modernized to current design standards by providing for the 24-foot wide required minimum paved roadway with a sidewalk to provide safe pedestrian access to connect the site to Hunting Lodge Road and the previously constructed public

[1] The intervenors claim that their allegations are "informed, inter alia, by expert consultants retained by the intervenors and as described in reports prepared by them and submitted to the Commission." The only expert testimony submitted to date by the intervenor is that of Michael Klemens, Ph.D., relating to the alleged adverse impacts of the proposed development on vernal pools.

walkway system leading to the UConn campus.

Crossing the wetlands using conventional pipe or box culverts was evaluated as a more cost effective alternative to the proposed precast arch bridge crossing. This would result in an additional estimated 1,100 square feet of direct wetland disturbance and loss of the natural intermittent watercourse across the roadway footprint.

Roadway access from the apartment complex abutting to the north is not feasible due to the layout of the existing housing units and parking areas within that complex. No connection to the west is possible due to topographic considerations and the abutting forestland that is under conservation.

Relocating the access to Hunting Lodge Road further to the north would require construction of a new roadway crossing through a significant undisturbed wetland corridor. There is no evidence to suggest that such a crossing has existed in the past at this location, and it offers no advantages to the crossing proposed.

The project site abuts an existing residential subdivision to the south. Northwood Road begins at North Eagleville Road essentially as a driveway to provide access to a student apartment complex owned and operated by the University of Connecticut. Both sides of the initial 800 feet of the road are bordered by head-in 90-degree parking and there are several raised pedestrian crossings and dumpster pads. From there, Northwood Road continues to and services the three existing residences at its northern extremity. Utilization of Northwood Road as the primary site access would generate unacceptable levels of traffic and have potentially adverse effects on the vernal pool in Wetland “A”.

Regardless of the type of development that is constructed on the site, primary vehicular and pedestrian access to Hunting Lodge Road will be required.

Stormwater Management

The proposed stormwater management system will effectively eliminate unacceptable levels of pollutants from the proposed development and prevent any negative impacts to the on-site wetland and watercourse resources and the downstream watershed. The storm sewer collection system proposed for the development is largely comprised a conventional catch basin and pipe system connected to underground infiltration systems and bio-retention treatment basins and swales at each of the outlets. The system design is based on a 10-year design storm using the Rational Method. The proposed design, materials, and equipment adhere to Town of Mansfield and Connecticut Department of Transportation specifications for small drainage collection systems. Detailed design

calculations are included in the Engineering Design and Drainage Report submitted with this application.

The design goals for the on-site storm sewer system are as follows:

- Provide a collection system that has the hydraulic capacity for the 10-year design storm
- Create multiple discharge points around the project site to replicate existing runoff patterns to receiving wetlands and watercourses and the on-site vernal pool
- Maintain or reduce peak flow to the residential neighborhood to the south
- Create a “Treatment Train” that will provide a minimum of 80% Total Suspended Solids (TSS) removal
- Provide for calculated Water Quality Volume and required Groundwater Recharge Volume
- Implement Best Management Practices and Low Impact Design techniques where feasible
- Provide riprap outlet protection to minimize erosion and provide final treatment of runoff before downstream discharge

The Stormwater Management Plan incorporates Best Management Practices with Low Impact Design techniques to produce a Treatment Train to treat runoff consistent with the guidelines recommended by the Connecticut Department of Energy and Environmental Protection, as follows:

- Implementation of a comprehensive routine site cleaning and maintenance program included in the plans
- Use of permeable paver units in selected overflow parking areas
- Installation of pre-cast catch basins with 4-foot precast sumps and hooded outlets
- Use of a combination of underground infiltration systems, bio-retention basins and in-line hydrodynamic separator structures prior to outlet discharge for primary treatment, along with the use of permeable pavers, flared end sections, and level spreaders for secondary treatment to meet the design goals of 80% TSS removal, Water Quality Volume (WQV), and Groundwater Recharge Volume (GRV)
- Discharge of roof leaders not connected to the storm sewer system to multiple splash blocks around the building perimeter and connection to the underground infiltrator systems to the extent possible to promote infiltration

In summary, the proposed stormwater management system meets all the design goals established and ensures that there will be no harmful pollutant or hydraulic loads discharged to on-site wetlands or watercourse resources or downstream watersheds.

Preservation of Site Hydrology

Every effort has been made to maximize open space and minimize building coverage in the design of the proposed development.[2] In order to maintain groundwater infiltration and recharge to the receiving wetland and watercourse resources resulting from the inevitable and unavoidable increase in impervious area, an extensive system of underground stormwater infiltrators and bio-retention basins has been incorporated into the site design. Components of the proposed system have been positioned throughout the site to replicate the existing surface runoff and groundwater flow patterns. Pre-development Groundwater Recharge Volume as defined by CTDEEP has been met with the design as documented in the Engineering Design and Drainage Report submitted with the application. There will be no negative impacts to groundwater resources on the property or to downstream watersheds.

Avoidance of Thermal Impacts

Potential impacts from thermal pollution associated with stormwater runoff from the project have been minimized to the extent possible through employing Low Impact Development (LID) design techniques including the following:

- The site layout is comprised of a series of relatively small clusters connected by an internal roadway system thereby minimizing the area of impervious surfaces in each cluster. A separate drainage system and outlet is provided for each cluster
- Permeable pavement reduces surface stormwater volumes
- Underground infiltrator systems greatly reduce the amount of surface stormwater flow
- Bio-retention basins further capture surface flow and discharge to uplands and not directly to wetlands or watercourse resources

The design goal of infiltrating the “first flush” of generated runoff to the underlying soils quickly dissipates the thermal load to background levels. Moreover, none of the above-ground treatment system, such as the bioretention basins, will pond water for any significant period of solar exposure, which could raise temperatures. The site does not

[2] For example, Article 10.A.6.h of the Mansfield Zoning Regulations would require 130,800 square feet of open space; more than 175,000 square feet are provided. Similarly, Article 8 allows a maximum of 25 percent of building ground coverage; 8.8 percent is proposed.

contain any regulated resources that are considered to be sensitive to potential thermal impacts, such as perennial cold-water streams. Finally, no direct discharge from impervious surfaces is proposed within the watershed of the site's vernal pool habitat.

Minimization of Use of Chloride Deicing Agents

There has been a great deal of independent research conducted over the years regarding potential impacts from chloride deicing agents on wetlands and watercourses resources. The consensus suggests that the best solution to minimizing adverse impacts to aquatic life and plants is to implement a strong Best Management Practices Plan for the facility. See, e.g., "Winter Highway Maintenance Operations: Connecticut" (July 2015), prepared by the Connecticut Academy of Science and Engineering. This is the approach we have followed for the proposed development.

Sodium, calcium and magnesium chloride are the inorganic chemicals most widely used for deicing, with sodium chloride being by far the most popular used by both public and private entities. A number of additional inorganic deicing agents have been developed over the years. The environmental benefits of using these types of agents versus chloride based agents remains highly disputed.

The stormwater management system as designed will result in no direct discharge of runoff to the vernal pool, wetlands or watercourses on the site. The extensive use of infiltrator systems and bio-retention basins will minimize runoff volume to downstream wetlands and watercourses and sets up a treatment train prior to discharge.

In accordance with recognized Best Management Practices for deicing, the applicant is proposing the following measures to minimize impacts to aquatic species and plants within the wetland and watercourse systems on the property and downstream to the extent feasible:

- Professional supervision of the application of deicing agents and overall snow and ice removal, who will monitor the ongoing development of more environmentally friendly agents as they become commercially available and adjust the long term site management plan accordingly
- No stockpiling of chemical agents or sand on site
- Snow storage only in designated areas physically separate from sensitive environmental resources. A snow storage plan for the proposed development has been included with the site development plans
- Minimization of the application of sand and chloride-based agents to the extent feasible while maintaining safe operations on the site

- Comprehensive clean-up of site through sweeping and cleaning of storm drainage systems each year in early Spring

In summary the implementation of the foregoing Best Management Plan for deicing by a professional on-site management team will result in negligible unavoidable impacts to aquatic species and plants and wetlands and watercourse resources associated with the property.

Potential Impacts to Vernal Pool

The potential impact of the development on the vernal pool is the subject of the letter from Michael W. Klemens, Ph.D. to the Inland Wetlands Agency dated June 6, 2016. Dr, Klemens raises two issues in his letter, "[t]he first is whether the development as proposed adequately protects the well documented, highly functioning vernal pool located in the wetland complex that drains to Cedar Swamp Brook. The second is whether the application is complete as it pertains to wildlife and vernal pool conservation."

1. Hydrology and Stormwater Discharge

The effect of the proposed development on the hydrology of the vernal pool and treatment and discharge of stormwater runoff are discussed above and exhaustively addressed in the Engineering Design and Drainage Report submitted with this application.

2. Relevance of Ponde Place Development Plan

Dr. Klemens begins by observing that "[u]nlike Pawlak (2007) and the ERT report (2009) which predicted impacts to vernal pool biota because of proposed development footprints, REMA blithely concludes that …it is REMA's professional opinion that the proposal, if constructed as designed and shown on the plans, will not result in long-term adverse impacts to the site's regulated resources, or the function and values that they provide."

The 2007 Pawlak report[3] and the 2009 ERT report[4] reviewed the potential environmental impacts of Ponde Place, a proposed 648 resident multi-family housing project consisting of three apartment buildings and 18 townhouses with 667 parking

[3] Pawlak, Ed/Connecticut Ecosystems LLC: Wetlands Report: Ponde Place, Mansfield CT (July 5, 2007).
[4] Eastern Connecticut Environmental Review Team Report: Ponde Place Residential Apartment Community, Mansfield CT Report No. 624 (April 2009).

spaces which was withdrawn by this applicant. Ponde Place represents an entirely different development plan, one which is discussed as an undesirable alternative to the present proposal in a separate submission on alternatives analysis.

3. Vernal Pool Management Zone

Relying on Calhoun and Klemens (2002),[5] Dr. Klemens recommends that the area within 750 feet of the vernal pool located on this property be preserved as a "vernal pool management zone," an area approximately 50 acres in size. The applicant's consultants believe that this approach to the conservation of on-site wetlands resources is both unwarranted and unnecessary.

First, the Mansfield Inland Wetlands Agency has no regulatory basis to prohibit or limit development on this scale. The "Upland Review Area" is defined in § 2.0 of the Mansfield Inland Wetlands and Watercourses Regulations as "all land within one hundred and fifty (150) feet from the edge of a wetlands or watercourse, as measured horizontally from the boundary of any wetland or watercourse." (p. 8). Section 12.1 Inland Wetlands and Watercourses Regulations allows the authorized agent of the agency to authorize additions and improvements to existing structures within 100 feet from a vernal pool without review and approval by the agency (p. 23).

Although the Regulations do allow the agency to regulate "areas at a greater distance than 150 feet from the edge of a wetlands or watercourse where in the determination of the agency proposed activities are likely to impact or affect wetlands or watercourses," there is no evidence in the record of any such impact to the vernal pool in question. In his letter to the Mansfield Inland Wetlands Agency, Dr. Klemens implies that failure to implement a 750-foot buffer from the vernal pool will result in increased wood frog mortality. He continues by saying that "[s]urvival of wood frogs is important because of their ability to cycle nutrients effectively in small wetlands during the tadpole stage, countering eutrophication," and that "[l]oss of wood frog populations results in impairment to wetlands by altering the quality of the water chemistry, and thereby ultimately the quality of the wetlands." Dr. Klemens provides no support for these statements, either in the scientific literature or on the basis of his own investigation of the vernal pool.[6]

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[5] Calhoun, A. J. K. and M. W. Klemens (2002): Best Development Practices (BDPs) for Conserving Pool-breeding Amphibians in Residential and Commercial Developments. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, NY.

[6] In his letter, Dr. Klemens makes reference to River Sound Development, LLC v. Inland Wetlands and Watercourses Commission, 122 Conn. App. 644 (2010), a case involving an inland wetlands application to build a residential community and golf course on property having 38 vernal pools within 114.5 acres of interconnected wetlands. Dr. Klemens was a consultant in that case, and apparently much more tolerant of intrusions into the "critical upland habitat zone" than he is now. Only eighteen of the 38 vernal pools

General Statutes § 22a-41 (d) provides that an "inland wetlands agency shall not deny or condition an application for a regulated activity in an area outside wetlands or watercourses on the basis of an impact or effect on aquatic, plant, or animal life unless such activity will likely impact or affect the physical characteristics of such wetlands or watercourses." No evidence of any probable impact to the physical characteristics of the vernal pool which is the subject of this application has been presented.

Further, while Calhoun and Klemens (2002) was an influential monograph which "heightened interest" in vernal pools among the ACOE and other regulatory agencies when first published, its analytical framework is now somewhat dated. Commenting on recommendations for the large buffer zones which early research favored, a recent, peer-reviewed article observes:

> These studies led to conservation recommendations for terrestrial buffers or "life zones" that entirely encircle, and extend up to 300 m[eters] from, the pond edge (e.g., Semlitsch 1998; Faccio 2003). Although the buffer approach is useful in undisturbed landscapes, where forest habitat is plentiful and amphibians orient in nonrandom but inconsistent directions around breeding ponds (Jenkins et al. 2006; Carcagno 2009), this amount of protection may be unrealistic in urbanizing environments. In such altered landscapes, habitat can be relatively rare and amphibians exhibit highly directional movement toward remnant forest patches, which can be spatially disjunct from breeding ponds (e.g., Vasconcelos & Calhoun 2004; Rittenhouse & Semlitsch 2006; Blomquist & Hunter 2010). Such selective use of remnant forest patches suggests these species are likely to use corridors in disturbed landscapes.[7]

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were to be conserved, and most would be proximate to roads, houses, and fairways. On behalf of the developer, Dr. Klemens testified as follows:

> "Let me be clear that a non-conserved pool is not filled or destroyed, and there are many highly functional vernal pools in Connecticut that have 25-50% development in the critical upland habitat zone. However, for *denovo* development [Calhoun and Klemens (2002)] recommended that no more than 25% of the upland habitat zone be developed to <u>optimize conservation</u>. In retrospect, a terminology that would have been less confusing would have been optimally conserved (for pools up to 25% development in the critical upland habitat zone) conserved (for pools between 25%-50% development in the critical upland habitat zone); and non-conserved for any pools with more than 50% development in the critical upland habitat zone."

Letter dated February 12, 2011 from Michael W. Klemens, Ph.D. to Mr. Robert McIntyre, Chairman (p.2), (Emphasis in original; copy attached). If we apply Dr. Klemens's criteria to the proposed Storrs Lodges development plan, the vernal pool at issue would be classified as "conserved."

[7] Coster, Vesey-Powell and Babbit (2014), "Characterizing the Width of Amphibian Movements During Postbreeding Migration," Conservation Biology 28: 756-762 (p. 759).

Even Aram J. K. Calhoun, a co-author of Calhoun and Klemens (2002), soon recognized the limitations of the so-called core habitat conservation model. In a more recent paper, she urges careful consideration of local conditions:

> Existing BMPs (e.g., Calhoun and Klemens 2002; Calhoun and deMaynadier 2004), were tailored to scientific data available when they were written, therefore they must be viewed as provisional best-attempts to provide useful recommendations. BMP models are generally designed to be used at the local scale and, as such, must be tailored to meet specific local conservation needs.[8]

In another paper, Dr. Calhoun emphasizes the need to be cognizant of the context in which the vernal pool is found:

> In urbanizing areas, we recommend a shift from a core-habitat conservation model to a spatially explicit approach that considers pool-breeding amphibian habitat as a network of migration-connected habitat elements (e.g., breeding pools, upland forest, nearby forested wetlands".[9]

In any event, although vegetated buffers are used extensively to manage wetland-dependent wildlife, “buffer utility has not been experimentally validated for most species."[10]

4. Existence of Second Vernal Pool

Finally, Dr. Klemens suggests that a second, smaller vernal pool exists on the property and questions whether REMA made “any effort to locate it, study it or describe it.”

The Mansfield Inland Wetlands and Watercourses Regulations incorporate a procedure to allow an applicant to seek a declaratory ruling from the Inland Wetlands Agency with respect to the location and boundaries of inland wetlands and watercourses, which was followed with respect to the subject property.

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[8] Windmiller, B. and A.J.K Calhoun (2006), “Conserving vernal pool wildlife in urbanizing landscapes. Pages 233-252 in A.J.K. Calhoun and P.G. deMaynadier, eds., Science and conservation of vernal pools in northeastern North America. CRC Press, Boca Raton, Florida (p. 246).

[9] Baldwin, R.F.A., A.J.K Calhoun and P.G. deMaynadier (2006), “Conservation planning for amphibian species with complex habitat requirements: a case study using movements and habitat selection of the wood frog Rama sylvatica,” Journal of Herpetology 40:442-453.

[10] J.S. Vesey Powell and K.J. Babbitt (2015) “An Experimental Test of Buffer Utility as a Technique for Managing Pool-Breeding Amphibians, PloS ONE 10(7): eo133642.doi:10.1371/journal.pone 0133642

Storrs Lodges, LLC submitted an application (W1559) pursuant to § 3.2 of the Inland Wetlands Regulations to amend the inland wetlands and watercourses map of the Town of Mansfield with respect to the subject property and a public hearing was held pursuant to § 3.4 of the Regulations on December 7, 2015. Mr. Logan, a registered soil scientist and professional wetlands scientist, delineated the wetlands and watercourses on behalf of the applicant. At the request of the Agency, Mr. Logan's delineation was reviewed by Thomas W. Pietras, also a professional wetlands and soil scientist, who visited the property twice to conduct his own field inspection. Mr. Pietras verified Mr. Logan's delineation with three minor adjustments, none of which related to the presence of any additional vernal pools.

The Inland Wetlands Agency amended the Inland Wetlands and Watercourses Map in accordance with Mr. Logan's delineation as amended by Mr. Pietras on January 20, 2016. Legal notice of the public hearing and the Agency's approval of the amended map was published as required by statute. Beverly Sims, an intervenor in the present proceeding, received personal notice of the application. The appeal period has long passed. There is no basis to question the delineation because no additional evidence relevant to the delineation has been produced subsequent to the date of the agency's decision.