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Expanded Environmental Notification Form Analysis

Wareham, Massachusetts

LOCATION: 27 Charge Pond Road, 140 Tihonet Road and 150 Tihonet Road
REPORT DATE: May 8, 2021

This review is based on (1) an Expanded Environmental Notification Form (EENF) prepared by Beals & Thomas (B&T) and dated March 15, 2021, and (2) on public record documents for a Notice of Intent (NOI) filing before the Wareham Conservation Commission (Commission) for 140 Tihonet Road. It identifies technical flaws in the permitting process which have in turn affected the underlying EENF assumptions made by the proponent. Those flaws are detailed below, and include inadequate vernal pool analysis and classification, as well as the use of obsolete extreme precipitation data.

As background, I note that the EENF is required because the three undeveloped sites each alter more than 25 acres. Specifically, 27 Charge Pond Road alters more than 40 acres of forested land; 140 Tihonet Road alters more than 65 acres of forested land; and 50 Tihonet Road alters more than 49 acres of forested land. Further, land alteration of the three sites combined is greater than 154 acres of forested, undeveloped land. Soils on all sites are largely sand and gravel (Hydrologic Soil Group A).

The work proposed is predominately outside protected wetland resource areas, and largely outside buffer zones to those resource areas. Exceptions occur for stormwater-related infrastructure. The Commission has issued Order of Conditions (OOC) for all three sites; at the date of this report the period to appeal OOCs has passed for 27 Charge Pond Road and 150 Tihonet Road.

The sites contain pockets of Isolated Vegetated Wetlands (IVW) which is not protected by the state Wetland Protection Act (WPA), but is protected by the Town of Wareham under its wetland by-law. Finally, no work is proposed in FEMA floodplains, and no endangered species have been identified by NHESP. The proponent asserts they are working with NHESP to mitigate potential impacts.

WETLAND OBSERVATIONS

Vernal Pools

All three sites contain potential vernal pools (PVPs). Vernal pools (VP) have not been certified on any of the three sites, although the proponent's engineering firm, B&T, states it has been observing these pools since at least April of 2020—*and* that it observed

Wood frog masses of sufficient quantity in several of the pools to meet certification standards.

- 27 Charge Pond Road contains four PVPs that may be interrelated in terms of biological breeding characteristics, and
- 140 Tihonet Road and 150 Tihonet Road each contain at least one PVP.

The Commission did not require the proponent to apply to NHESP for certification of the VPs—a common requirement for an OOC. That standard Special Condition was not specified by the Commission for any of these sites.

- Under state regulations certified VPs become an Outstanding Resource Water (ORW), with enhanced protection.
- **An EENF requires a proponent to describe all ORWs within a "half mile radius" of the site (page 7).** ***Because none of the PVPs is certified, the proponent is able to state there are no ORWs within that radius.***
- **Because the proponent has made observations that at least several of the PVPs meet NHESP certification thresholds—and meet the Town By-law definition of VPs—MEPA should assume that the VPs are certifiable, and that they should be regulated as ORWs.**
- **Overflow from proposed stormwater basins is as close 50-feet from several of the PVPs. Stormwater discharge into VP habitat alters pH and potentially increases nitrogen and potassium balances in the pools. Either or both of these impacts would alter the fragile VP habitat.** [1]
- **Given that the proponent's designs indicate intrusion into the 100-foot habitat zone, the stormwater design appears to have been predicated on the VPs *not* being certified.**

Further, note that certified VP habitat *only* extends 100 feet beyond the pool edge. Protecting VP habitat areas is critical because the scientific community is in concurrence that this regulatory zone is inadequate to maintain the necessary upland areas used by obligate species found in VPs. For instance, Wood frogs roam up to 800 feet from a VP during their seasonal activity.

Therefore, at a minimum project grading or infrastructure must not intrude into the 100-foot habitat. [2]

HYDROLOGY OBSERVATIONS

Extreme Precipitation Data

B&T conducted pre- and post-development stormwater analysis for all three sites, using

1 WPA: 10.04 Vernal Pool Habitat means confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions, to the extent that such habitat is within an Area Subject to Protection under M.G.L. c. 131, § 40 as specified in 310 CMR 10.02(1). These areas are essential breeding habitat, and provide other extremely important wildlife habitat functions during non breeding season as well, for a variety of amphibian species such as wood frog (Rana sylvatica) and the spotted salamander (Ambystoma macultum), and are important habitat for other wildlife species.

2 310 CMR 10.60 WPA Wildlife Habitat Evaluations states in part, (1) Measuring Adverse Effects on Wildlife Habitat.

(a) … Adverse effects on wildlife habitat mean the alteration of any habitat characteristic listed in 310 CMR 10.60(2), insofar as such alteration will, following two growing seasons of project completion and thereafter (or, if a project would eliminate trees, upon the maturity of replanted saplings) substantially reduce its capacity to provide the important wildlife habitat functions listed in 310 CMR 10.60(2) ...

a software program called HydroCAD. The B&T engineer certified that the final design plans meet the MassDEP Stormwater Regulations, which I concur appears generally accurate. *That said, B&T has used 60-year old precipitation data that does not reflect climate change and <u>underestimates</u> large storm events by almost 20%.*

- B&T used source data from a 1961 publication (US Weather Bureau, TP-40) that is appended in graphical form to a software program called TR-55.
- Although from a *regulatory* perspective, MassDEP continues to allow use of the TP-40 data, climate-aware science-driven engineering firms in the Commonwealth have shifted to precipitation data generated by the Northeast Regional Climate Center (NRCC); NRCC works in collaboration with Cornell University and the Natural Resources Conservation Service (NRCS). The NRCC data is constantly updated to reflect real-time precipitation data from all over New England.
- B&T's use of the 1961 data disregards 60-years of recorded precipitation data, embedding a mid-20th century period of drought into the 2021 designs. [3]
- Based on scientific consensus—and on available data that reflects contemporary climate change—use of the 1961 data, although still permitted under the obsolete MassDEP statute, is incomprehensible today, particularly given that B&T constantly cites "climate change" in the EENF as justifying the proposed solar uses on the three sites. Failure to use *accurate* extreme precipitation data contradicts that claim.
- The difference between the 1961 data and the current NRCC data for Wareham follows:
  - The 100-year storm event used by B&T is 7-inches, and
  - the NRCC 100-year storm in 2021 is 8.62-inches.
- Based on these differences, the 100-year storm event used by B&T represents an underestimation of almost 20%.
- **Consequently, all stormwater infrastructure designed for the sites may be undersized by the same 20%.**
- **Use of accurate precipitation quantities is critical. Given that over 154 acres of Pine forest would be eliminated under these proposals—and replaced by solar panels and herbaceous grasses—post-development runoff will increase, leading to greater offsite stormwater runoff.**

<u>Hydrology Alterations to Vernal Pools</u>

There is no public record that B&T performed a Water Budget analysis for the PVPs. Pre- and post-development water budgets are a critical analytical tool to ensure that VP hydroperiods will not be altered by a given project.

- VP habitat is dependent on seasonal, episodic groundwater and surface flooding. Analyzing water budgets has become a critical component of site design near VPs.
- A 2016 OADR adjudicatory decision In the Matter of Bosworth (Dighton, Mass.) states, "... vernal pools contain wetlands habitat that is highly vulnerable to changes in water, light and chemical composition from development in the buffer

3 The NRCC website states, "The previous climatologies have been based on the premise that the extreme rainfall series do not change through time. Therefore it is assumed that older analyses reflect current conditions. Recent analyses show that this is not the case, particularly in New York and New England where the frequency of 2 inch rainfall events has increased since the 1950s and storms once considered a 1 in 100 year event have become more frequent. Such storms are now likely to occur almost twice as often."

zone." [4]

- The large scale topographic and vegetative cover changes proposed are likely to make significant changes to post-development VP hydroperiods, thereby altering the VP habitat.

The necessity of a Water Budget in evaluating impacts to Wildlife Habitat and Vernal Pool Habitat from work in the buffer zone to wetlands was confirmed in the 2016 OADR Bosworth decision, which states in part:

> It is well known that vernal pool habitat is particularly susceptible to impacts from certain work in the buffer zone because of the habitat's relative fragility. Vernal pool habitat is sensitive to changes in water, light, and chemical influences. Generally, in order for vernal pool habitat to continue to function and co-exist with nearby development its water budget must be sustained post-development. If surface runoff is redirected or groundwater recharge in proximity to the vernal pool is reduced by impervious surfaces, then the vernal pool water budget could be adversely impacted, potentially resulting in adverse impacts to the vernal pool habitat. Land use changes, such as clearing, increases in impervious surfaces, and changes in the watershed can increase or decrease water runoff, which could alter the amount of water received by a vernal pool, destroying the water budget that is necessary to sustain the habitat of that pool. Vernal pools with a significantly disturbed watershed generally have a higher pH, more mineral substrate, and more algae, which negatively impacts the habitat.... This susceptibility to changes in light, chemicals, or water is why in similar cases project applicants have performed detailed assessments to determine how work in the buffer zone will impact the vernal pool habitat, particularly its water budget. [5]

- **Accordingly, Water Budget calculations are necessary to ensure that existing hydroperiods are sustained post-development.**

Hydrology Alterations Due to Grading and Site Excavation

Proposed work on the three sites includes extensive grading and topographic alteration. Excavation on 140 Tihonet Road, particularly, is far more extensive than necessary for a mere solar array design. The EENF is largely silent on sand and gravel removal. The EENF does not include results of any deep holes or borings; depth to seasonal high groundwater is not discussed.

Excavation has multiple impacts, including

- Potential alteration of groundwater levels, which in turn may affect the hydrology of adjacent wetland areas, and
- alteration of surface runoff patterns, redirecting flow from one sub-watershed area to another. Such changes may directly affect the vegetation and wildlife habitat characteristics of adjacent parcels.

SUMMARY

Because precipitation data submitted to the Wareham Conservation Commission is climatologically obsolete—and VP analysis is absent—the subsequent Orders of Conditions (OOCs) issued by the Commission are flawed. *As a result, the OOCs issued by said Commission should not be considered assurances that the environment will be*

4 In the Matter of David A. Bosworth Co., Inc., February 2016. OADR Docket No. WET-2015-015. Page 2 of 18.
5 Ibid.

protected as required under multiple state statutes and regulations.

Specifically, MEPA should

- View the uncertified VPs as ORWs. The failure to certify the VPs allows denser development and minimizes likely impacts during the EENF process;
- Consider that all stormwater infrastructure was designed using 60-year old precipitation data, and as a consequence, is likely to fail to protect environmental interests; and
- Take into account that no VP water budget analysis was performed during the Commission permitting process. Therefore, the VPs—which have not been submitted by the proponent or the Commission to NHESP for certification—may be in danger of being destroyed as their hydroperiods would be significantly altered by the proposed uses.

Very truly yours,

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