



March 12, 2019

Robert Gambale, Chair
Ipswich Zoning Board of Appeals
25 Green Street
Ipswich, MA 01938

**Subject: Essex Pastures Comprehensive 40B Permit
Response to the Ipswich River Watershed Association (IRWA) letter
dated August 13, 2018**

Dear Mr. Gambale:

This letter is provided to respond to the matters raised in the Ipswich River Watershed Association letter to the board dated August 13, 2018. The project designers have taken significant steps during design process to reduce the potential impact of the development to water quality by incorporating project components that exceed current standards and regulations for the protection of sensitive wetland and other resource areas. These design components are outlined as follows.

General

While we understand the current status of the Ipswich River Watershed, both water quality and quantity for both supply and runoff will be well-managed and will be significantly improved for this proposed mixed use community. As a general matter, water exportation (or the movement of water out of a particular watershed area) has become a systemic issue since the implementation of centralized wastewater treatment plants in the 1960's as a response to concentrated population growth. As a result, groundwater withdrawals from a particular watershed area are distributed for use, collected, treated and sent downstream rather than being infiltrated back into the ground to recharge the groundwater within the same watershed. The U.S. EPA and MassDEP have responded to this condition by promulgating regulations designed to reduce and reverse the damage caused by water exportation. These measures are codified at the State level in the State Building Code and Massachusetts Stormwater Regulations. The Ipswich River also experiences low flow events during the summer as a result of upstream water withdrawals (which in general are permitted by the Commonwealth). The conditions that contribute to watershed stress are multifold and systemic. When designing systems for new development, we are constrained by the regulations, which are the result of a well-documented, well-vetted process that provides for both increased water availability and the protection of water quality resources while allowing for necessary growth. These measures are required because the vast majority of existing development today, both in Ipswich and in other communities, have not incorporated stormwater quality and quantity measures which new development is now

1. – Statement is Based on MassDEP analysis of summer-to-winter water use ratios from the 2016 Annual Statistical Report data for two communities in Eastern Massachusetts. Stormwater treatment is not required for small subdivisions or single-family homes.

required to address. Contrary to popular belief, high-density development helps to reduce stress on watersheds by allowing for lower per-capita water use rates and a higher level of stormwater treatment than lower-density development.¹

Design

Water Supply

Ipswich per capita water usage for residential uses is an average of 67.1 gallons per capita per day (gpcd) for the 13 year period from 2002-2014. This is slightly higher than the recommended 65 gpcd. Conservation measures proposed for the development will meet or exceed the current regulations, which will reduce the gpcd rate for the development. These water conservation efforts will include the following:

- Toilets will be high-efficiency (HET) 1.28 gallons per flush (gpf) – 20% less than 1.6 gpf toilets. These fixtures bear the EPA Watersense certification for efficiency.
- Low flow fixtures will be specified for all units.
- All units will be sub-metered for water usage to monitor usage and for potential leaks.
- Plantings will be drought tolerant (further planting details will be provided by the landscaping consultant)

System demand calculations will be submitted in the forthcoming utilities report once a definitive site layout has been determined.

Stormwater Collection and Treatment

Existing conditions

The existing conditions of the site are well-documented and the proposed redevelopment was evaluated for factors that contribute to an efficient low-impact stormwater design within the limits of the Stormwater Regulations. According to US Natural Resources Conservation Service (NRCS) Soil Map, soils at the site are silt-loam and silt-clay-loam which are restrictive soils. . Additionally, approximately 70% of the existing commercial development parking lot currently discharges untreated to the adjacent wetland.

Proposed Conditions/Improvements

During design development, it was essential to maximize stormwater treatment using a variety of the MassDEP approved treatment and conveyance methods. The resulting stormwater system meets or exceeds these requirements. These improvements include:

- Upgrading the existing commercial parking lot drainage system to provide treatment where no stormwater treatment currently exists.
- Biofiltration – the implementation of biofiltration is one of the most effective stormwater treatment methods with a minimum of 91% Total Suspended Solids (TSS) removal, and for some locations at the site, TSS treatment and removal increases up to 96%. The state standard is 80% TSS removal, so this method of stormwater treatment for the site far exceeds what the State stormwater management standards require.
- Infiltration of roof runoff – The required infiltration volume for the site based on the soils is 5,845 cubic feet (c.f.). Infiltration of the rooftop runoff will provide 16,259 c.f. of stormwater in the 2 year storm. This is 2.8x the required volume.
- Treebox filters – these filters will provide greater than 90% TSS removal prior to discharge.
- Grassed swales – the integration of grass swales will provide pollutant removal prior to discharge to other infiltrative practices in a manner which also maintains green space.

Our stormwater analysis, which was performed in accordance with the MassDEP Stormwater Management Policy and related technical guidance, indicates a minimum of 24,791 c.f. of “water-quality” treatment volume. Under our proposed, and conservative, project stormwater design, however, the combination of Bio-filtration and rooftop infiltration allows for a minimum of 37,366 c.f. of treatment volume, or 1.5x the required volume.

The proposed site development also includes measures designed to meet the Ipswich Wetland Protection Bylaw Rules and Regulations by observing the 50-foot no disturb zone and 15-foot no build zone in most of the areas. These areas are currently maintained as mowed turf grass and cultivated agricultural land. The design also minimizes disturbance in the remainder in the 100-foot wetlands buffer zone.

Conclusion

Through careful design, the team has taken steps to exceed the state-mandated conservation and stormwater requirements, and to meet the more stringent Ipswich Wetland Protection Bylaw Rules and Regulations in most areas. Infiltrating 100% of the site runoff is not practical and does not replicate the current runoff regime. By exceeding the state regulations with respect to runoff infiltration volume and quality, we are providing well in excess of the stormwater quality and quantity protective measures than the minimum required. The combination of the installation of HET and low flow fixtures, higher-density development, and the incorporation of low-impact drought tolerant landscaping will significantly reduce the impact to water supply and water quality and

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provide for a per capita reduction in the average daily water demand for this development.

Sincerely,

BAYSIDE ENGINEERING, INC.

A handwritten signature in blue ink that reads "Bree Sullivan". The signature is written in a cursive, flowing style.

Bree Sullivan, P.E.
Senior Civil and Environmental Engineer