

# Horsley Witten Group

*Sustainable Environmental Solutions*

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September 11, 2017

Winifred I. Li, Chair  
Zoning Board of Appeals  
Town of Weston  
11 Town House Road  
P.O. Box 378  
Weston, MA 02493

RE: 104 Boston Post Road 40B Project

Dear Ms. Li:

Horsley Witten Group, Inc. has been retained by the Town of Weston to review the above referenced project and more specifically to assess the water resources impacts associated with the project. To conduct this work we have reviewed the following documents:

- Allen & Major Associates, Inc., 40B Residential Housing Development 104 Boston Post Road, Weston, MA, Drainage Report, April 18, 2017
- Allen & Major Associates, Inc., 40B Residential Housing Development 104 Boston Post Road, Weston, MA, Drainage Report, August 11, 2017
- Allen & Major Associates, Inc., Site Development Plans for Stony Brook Weston 104 Boston Post Road, Weston, MA, Revised July 28, 2017
- Town of Weston, Stormwater & Erosion Control Regulations, March 14, 2012
- Town of Weston, Article XXVII. Stormwater and Erosion Control Bylaw, (undated)

I have thirty years of experience as a consulting hydrologist working for government, nonprofit, and private organizations throughout the United States and abroad. As a consultant to the U.S. Environmental Protection Agency I have developed Source Water (Drinking Water) Protection Guidance documents and provided related training in 43 states nationwide. I also serve on the Massachusetts DEP Stormwater Advisory Committee and have been integrally involved in the development of the Massachusetts Stormwater Standards. I also assisted in the preparation of the Massachusetts Smart Growth and Smart Energy Toolkit. I serve as an adjunct faculty at Tufts University and Harvard Extension School where I teach graduate courses in Water Resources Management, Low Impact Development, and Green Infrastructure.

The proposed project is located in close proximity to the Stony Brook Reservoir (a public drinking water supply for the City of Cambridge), Stony Brook (a perennial stream), and associated wetland resources areas. The applicant is requesting numerous waivers from local bylaws and regulations designed to protect water resources. The proposed project does not meet several critical requirements designed to protect drinking water supplies including minimum setbacks, lot coverage, impervious surfaces, and stormwater discharges. A detailed response to some of the waivers follows.

**Waiver from Article XXVIII Stormwater and Erosion Control Bylaw, Section VI (MA Stormwater Standard 3).** The Town of Weston has adopted the Massachusetts Stormwater Handbook and Standards within the context of the Stormwater and Erosion Control Bylaw and Regulations. This request is to waive the requirement to comply with the Massachusetts Stormwater Standard 3 (Recharge to Groundwater). The waiver request is made “due to the existing soil conditions, a proposed infiltration system that infiltrates the required recharge volume may not be possible”. It should be clear that it is the scale of the proposed project that makes compliance with this requirement difficult, not the existing soil conditions. The Massachusetts Stormwater Standard 3 takes into account the type of existing soil and set reasonable requirements for each soil type. Soils are divided into four groups with “A” being the most permeable and requiring the most amount of recharge and “D” being the least permeable and requiring the least amount of recharge. The following table shows the recharge requirements of each soil type.

Hydrologic Group Volume to Recharge (x Total Impervious Area)	
Hydrologic Group	Volume to Recharge x Total Impervious Area
A	0.60 inches of runoff
B	0.35 inches of runoff
C	0.25 inches of runoff
D	0.10 inches of runoff

The Stormwater Drainage Report prepared by Allen & Majors provides a summary of on-site soil conditions. This report indicates that there are 2.262 acres of hydrologic group A and 2.127 acres of C.

Standard 3 requires that predevelopment groundwater recharge rates be maintained. The purpose of Standard 3 is to replenish groundwater supplies and to preserve groundwater baseflow rates to streams, vegetated wetlands, and drinking water supplies. Baseflow provides perennial flow to streams (Stony Brook) and wetlands and supports their critical plant communities between precipitation events and during droughts. Groundwater levels (water table) are dependent upon groundwater recharge

rates. If recharge is reduced, water tables and groundwater flow rates will decline correspondingly. Additionally, because this project site is adjacent to a public water supply reservoir the sustainable yield of the drinking water supply is directly dependent upon groundwater recharge rates and subsequent subsurface discharge to the reservoir. Groundwater moves very slowly compared to surface water flow and provides storage within the soils that contribute to the reservoir. In this manner the groundwater is an extension of the reservoir and provides additional storage within the subsurface.

Groundwater recharge also provides an important water quality function. Water that infiltrates from the land surface down through the root zone and the underlying unconsolidated soils is filtered and treated on its pathway to the downgradient wetlands, streams and reservoir.

The existing site conditions provide a vegetated surface and underlying unconsolidated surficial materials that provide infiltration of precipitation and recharge of the underlying groundwater system that subsequently provides baseflow to the downgradient wetlands, stream and drinking water reservoir. This recharge process also provides a water quality function as described above. The project proponent proposes to remove virtually all of this vegetated surface and underlying surficial materials, thereby eliminating this important recharge function.

**Waiver from Article XXVIII Stormwater and Erosion Control Bylaw (MA Stormwater Standard 6) – (Inadequate Buffer to Drinking Water Source).** Standard 6 provides protection for critical areas including drinking water supplies and states, “stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply”. Zone A is established as a 400-foot buffer from the bank of the drinking water source.

Whereas this proposed stormwater discharge is unrelated to the operation of the public water supply but rather is designed to service the proposed development it is expressly prohibited.

This 400-foot protective buffer (Zone A) is a widely recognized drinking water protection provision. The Massachusetts Watershed Protection Regulations prohibit stormwater discharges in Zone A Areas as an integral tool to protect the Commonwealth’s drinking water supplies. They state, “Any Alteration, or the Generation, Storage, Disposal or Discharge of Pollutants is prohibited within those portions of the Watershed that lie within 400 feet of the Bank of a Reservoir” (313 CMR 11.04 (3)). While these regulations apply specifically to state drinking water supplies including the Quabbin, Sudbury, and Wachusett reservoirs the law establishes reasonable environmental standards for public water supply protection and further expressly indicates that it does not preempt other municipalities to apply similar regulatory requirements (313 CMR 11.08).

The loss of naturally vegetated buffers and subsequent urbanization of land within critical water resource buffer areas has been widely recognized as a threat to water quality. When naturally vegetated land in these protective buffer zones is converted to residential, commercial, industrial, and transportation uses (in sum, developed land), what was once a pollutant sink (i.e., a place that can detain and assimilate many pollutants) becomes a stormwater and pollutant source. Impervious surfaces prevent water from entering the soil and transmit the stormwater runoff downstream towards the water supply source, in a sense, short-circuiting the natural treatment processes associated with an undeveloped buffer zone. This limits or eliminates the time and opportunity for beneficial biological, chemical, and physical processes that naturally filter and protect water quality. Riparian vegetated buffers the last line of defense before overland or shallow subsurface flow enters streams, rivers, wetlands, lakes, and reservoirs are arguably the most important ecosystems in the watershed in relation to water supply protection.

**Waiver from Article XXVIII Stormwater and Erosion Control Bylaw, (Low Impact Development Requirements):** – The Massachusetts Stormwater Handbook requires that project proponents integrate low impact development (LID) and better site design into their projects. The Massachusetts Stormwater Management Standards state that project proponents “must consider environmentally sensitive site design and low impact development techniques to manage stormwater”. The Massachusetts Smart Growth and Smart Energy Toolkit provide guidance to developers on LID design.

There is no indication that any serious attempts for LID design were made for this project. The Stormwater Drainage Report simply states that, “low impact designs were considered for this project, however, due to site constraints including limited landscape area, are not considered feasible for this project.” I am not certain what the applicant means by “limited landscape area” or how this would prevent an LID design. There is a substantial naturally vegetated buffer in place on the southern portion of the property that could be preserved.

A credible LID approach would identify critical resources on site (including the 400-foot drinking water buffer, steep slopes, hydrologic conditions, wetlands) and would integrate these site constraints into a sensitive site design with appropriate buffers. An LID site design minimizes impervious surfaces and LID stormwater plans integrate vegetated best management practices to manage stormwater such as bioretention systems, vegetated swales, and constructed wetlands and promote infiltration practices to maintain groundwater recharge.

**Waiver from Section VI.D.2 Business B District Dimensional Requirements (Lot Coverage):** These zoning dimensional requirements limit the lot coverage to 25%. According to the requested waivers the project will cover over 50% of the lot. Lot coverage and specifically impervious cover is a critical standard with respect to water supply protection. Loss of natural vegetation and impervious surfaces within critical

water resources buffer zones are widely recognized as critical water quality protection parameters.

The Massachusetts Drinking Water Regulations require that land uses be controlled (and impervious surfaces be limited) within Zone A (400-foot buffer) areas. Section 22.20C (2) addresses “Restricted Activities upon Surface Water Sources and Within Protection Zones (including Zone A) and in subsection (l) prohibits “land uses that result in the rendering impervious of more than 15%, or more than 20% with artificial recharge, or 2500 square feet of any lot, whichever is greater”. The Massachusetts Watershed Protection Regulations (section 11.04 (3) l, also limit the amount of impervious surface within the critical 400-foot buffer, prohibiting “the rendering Impervious of more than 10% of any Lot or 2,500 square feet, whichever is greater;”

**Town of Weston Stormwater & Erosion Control Regulations revised through March 14, 2012, Section 7.0 – Design Standards (Depth to High Groundwater):**

The Stormwater Regulations require a minimum separation from detention structures of at least two feet to high groundwater. They state, “i. Detention systems must be located 2 feet above high ground water and be constructed in an area surrounded by existing pervious material to ensure drainage from the proposed drainage structures”. The subsurface data provided by the applicant is insufficient to meet this requirement. Three shallow borings were conducted to depths of 12 feet, 7 feet, and 2 feet. Based upon the site plan provided borings B-1 and B-2 were made in the vicinity of the proposed detention structure. According to the site topography provided by the Applicant these two borings were made at a grade elevation of 120.0 and were drilled to 108.0 and 113.0 respectively. According to Sheet C-3B of the Site Plans the bottom of the proposed detention structure is designed at elevation 99.45 to 100.37.

**Town of Weston Stormwater & Erosion Control Regulations revised through March 14, 2012, Section 7.0 – Design Standards (Peak Rates and Volumes):**

Subsection e. of the Regulations require that, “Projects are to be designed such that the peak rates of stormwater runoff and volumes in the post development conditions are less than in the pre-development conditions”. The earlier Drainage Report provided by the Applicant indicated how both of these requirements would be met. However the revised Drainage Report (August 11, 2017) has omitted any discussion of meeting the volume requirements. Increases in runoff volumes can cause alterations to vegetated wetland communities and can cause bank erosion in streams. An excerpt from MADEP’s Hydrology Handbook for Conservation Commission follows:

*4.3 Why should Conservation Commissioners be concerned about Runoff Volumes and Rates?*

*As discussed in Chapter 2: Fundamentals of Hydrology, the functions of wetland resource areas are primarily driven by, and sensitive to, the presence or absence of water, and the movement of water through the wetland system. A change in any one component of a wetland resource area’s water balance, can result in changes in the*

*other components, which in turn can result in altering the wetland. Examples of these kinds of impacts include the following:*

*Reducing the contributing watershed to a wetland can reduce the volume of runoff entering*

*the wetland. Also, increasing the watershed area draining to a wetland can introduce additional volumes of water, changing the hydrologic character of the wetland;*

- An increase in volume of runoff into a wetland can result in higher water levels for sustained periods, which may have adverse effects on the biological community in the wetland;*
- Increases in peak rates of runoff can overtax the capacity of existing drainage systems, including natural watercourses;*
- An increased frequency of bankfull flow events as the result of watershed changes can result in the erosion of natural stream banks.*

**Town of Weston Zoning Bylaw, Aquifer Protection District, Section H (Special Permit Requirements).** This section of the bylaw (Section H 94)) requires a Special Permit for “Rendering impervious more than fifteen (15) percent of the lot area by structures or paving provided that adequate recharge measures are taken”. This requirement is consistent with the requirements of the Massachusetts Drinking Water Regulations that require local regulations to control the amount of impervious cover within critical buffer areas to drinking water supplies.

The Special Permit Procedure section of the bylaw (Section H (6)) requires an,” analysis by a registered professional engineer experienced in groundwater evaluation and/or geohydrology, with an evaluation of the proposed use including its probable effects or impact on surface and groundwater quality and quantity, and natural flow patterns of water courses.”

Additionally, the Special Permit Findings section of the Bylaw (Section H (7)) requires a finding that the project “will not, during construction or thereafter, have an adverse environmental impact on the aquifer or recharge area; and will not adversely affect an existing or potential water supply.”

**Town of Weston Zoning Bylaw, Aquifer Protection District, Section H (5).** This portion of the bylaw prohibits, “Any excavation or grading, within 6 feet of the maximum high groundwater table elevation, for any purpose that is not expressly allowed either by right or by special permit shall be prohibited. For the purpose of this section, the term “excavation” shall mean any digging in one area that disturbs more than one cubic yard of material. “

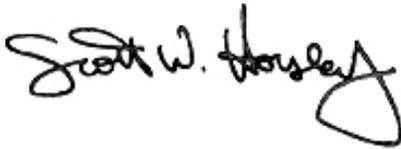
This provision is intended to preserve the natural recharge and filtering functions of surficial geologic materials for the protection of drinking water supplies. Removal of these materials reduces the inherent protections provided and increases the vulnerability of the water supply.

Although the applicant has not determined the water table conditions on the site, two of their borings (B-1 and B-2) indicate that the bedrock surface was found only two feet below existing grade at an elevation of approximately 118 feet. The bedrock surface serves as a low permeability layer that likely supports a seasonal (maximum) water table. This would suggest that the proposed excavations would be well within the six feet of the maximum high water table.

**Conclusions:** In summary, the proposed project does not comply with several local and state laws and guidelines that are designed to protect drinking water quality and wetland resource areas. The project does not incorporate better site planning or low impact development (LID) principles. As designed the project poses significant risks to downgradient water resources.

Sincerely,

HORSLEY WITTEN GROUP, INC.

A handwritten signature in black ink that reads "Scott W. Horsley". The signature is written in a cursive style with a large, looped "H" at the end.

Scott Horsley  
Principal