SECTION I

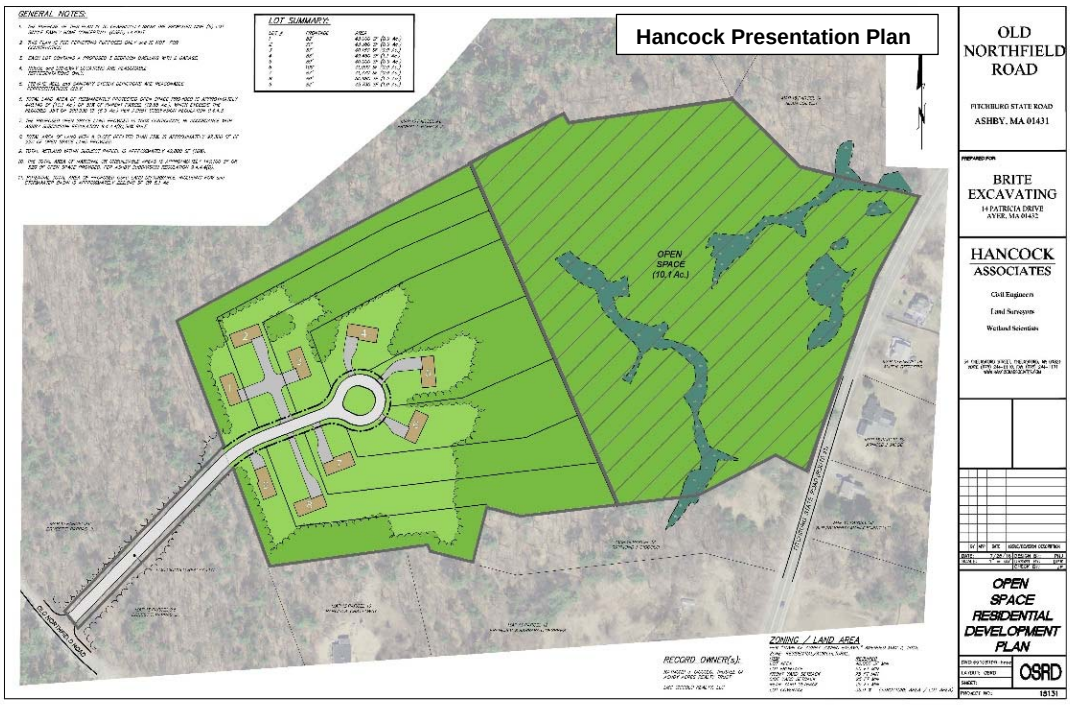
Hancock Associates, on behalf of Brite Excavating, respectfully submits the following Stormwater Report**,** in accordance with Federal, State and Local regulatory guidelines, as well usual and customary civil engineering practices. Please refer to Owner & Developer agency letters contained in the appendix.

The purpose of this Stormwater Report is to identify, study and quantify project specific stormwater impacts to the local watershed. To accomplish this purpose, the report is divided into four (4) sections. Section I will provide a project specific narrative, including an introductory statement, pre-development condition, post-development condition and report stormwater methodology with applicable regulations. Section II will discuss and describe MassDEP stormwater compliance. Section III includes project maps, exhibits and plans. The final Section IV, includes supportive stormwater information, such as the stormwater model results with plans, operations & maintenance plans and representative BMP's.

INTRODUCTION

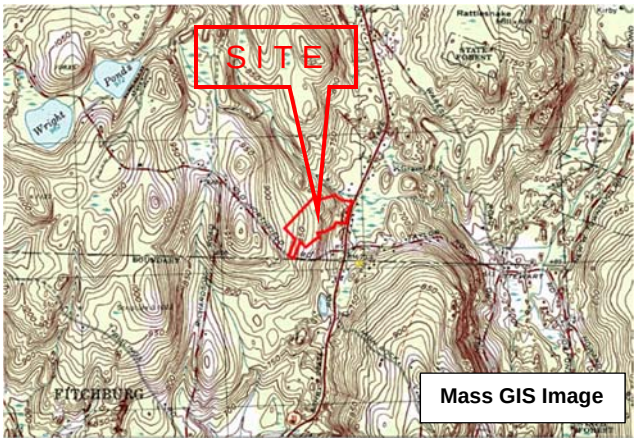
Brite Excavating, proposes to develop land currently known as Tax Map 15, Lots 13, 13.1, 13.2, 13.3 into an Open Space Residential Subdivision**.** The overall project seeks to develop an existing 19.7 Acre (more or less) parcel into nine (9) separate single family home building lots with one (1) additional open space lot. The residential construction is anticipated to be three-bedroom, two (2) car garage with typical rural New England residential architecture. All lots will be accessed from the proposed eight-hundred foot (800 ft) roadway, extending from an existing 50' Right of Way off Old Northfield Road.

The planned Open Space land use is unique and unlike any other community within Ashby. The proposed development will include an open space area that will protect and ensure the existing natural environment. The image below is an artistic rendering, graphically representing access, building placement, driveways and the purposeful land planning efforts around the existing environmentally sensitive areas, indicated in dark green.



PRE-DEVELOPMENT CONDITIONS:

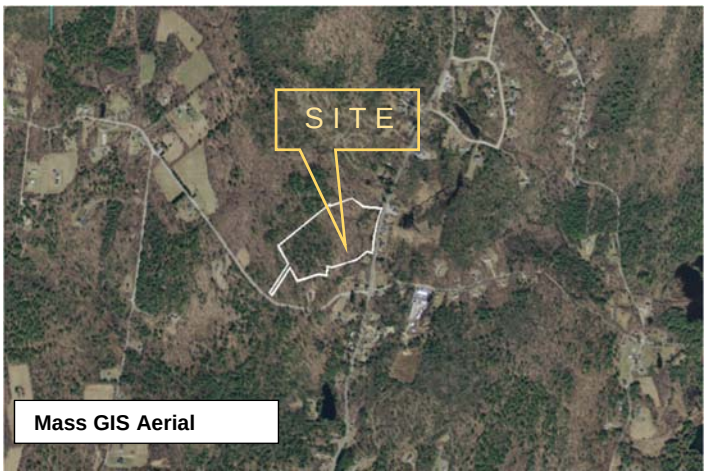
The existing terrain is fairly consistent across the intended development site, as well as the remaining open space. However, both are respectively unique and different. In the western portion, where the proposed development will occur, the site is completely wooded with stable ground conditions and slopes ranging from three (3) to twelve (12) percent. In the eastern portion, the site is also completely wooded, stable ground conditions, defined wetland resources and slopes ranging from fifteen (15) to twenty-five (25) percent and greater. The soils are relatively consistent throughout with "C" type soils in the west and "C & D" soils in the east, as confirmed with onsite soil testing and NRCS soil mapping (see appendix).



This study has identified and assessed three (3) hydraulic points of comparative analysis common to both pre & post-development conditions and are further described below: (pre-development condition)

PRE-DEVELOPMENT ANALYSIS SUMMARY:

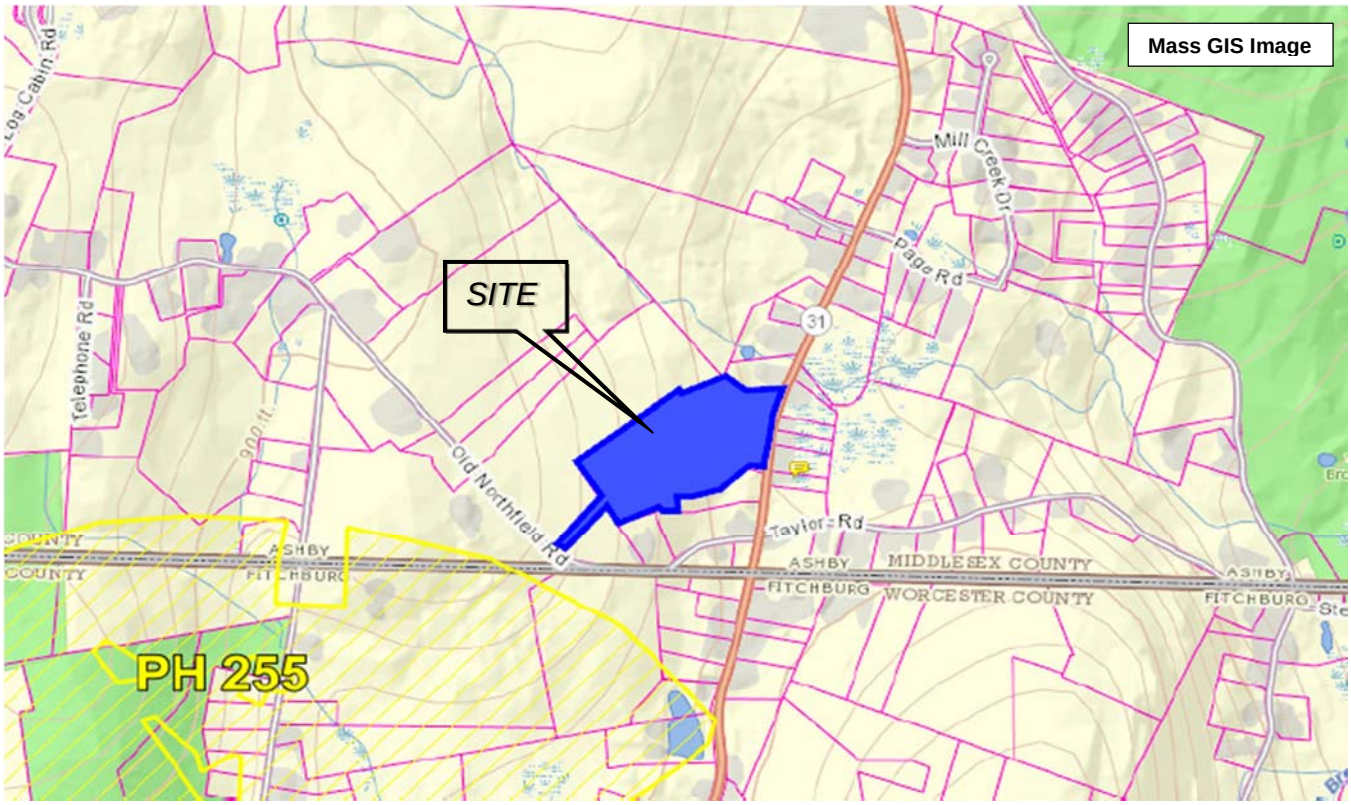
Analysis Point		Contributing Area (Acres)	CN	Tc (avg.)	Description
→	A	3.5	73	10.9	Map 15, Lot 9.6
→	B	3.4	71	10.0	Map 15, Lot 1A
→	C	6.3	73	14.9	Open Space



The project's existing land features include a few notable land characteristics. The first, is the site's steep slopes and wetland resources, located on the northeasterly land facing Fitchburg State Road (Route 31). The second, is a solitary draw within Map 15, Lot 9.6 that bisects the proposed OSRD roadway and continues in a southeasterly direction off site. These features are identifiable on the various reference images contained within the body of this document, as well as on the existing condition plans located within the report appendix.

The existing or "Pre-Development" site condition is predominately undeveloped woodlands with the minor exception of a woods path. The subject parcel's terrain slopes away from Old Northfield to Fitchburg State Roads in and easterly direction. The overall site experiences approximately One Hundred and Seventy-Eight (178) feet of elevation change (east to west), One Hundred and Twenty-four (124) feet of which is undisturbed and not within the project limits. Within the OSRD project limits, the average easterly grade is approximately eight (8) percent, while the northerly cross slope is about seven (7) percent. These land characteristics are directly attributable to the quantity and locations of stormwater analysis points, as summarized above.

The site's soils within the OSRD project limits are consistent, according to NRCS mapping (see appendix). The soil types on site vary from Montauk fine sandy loam to Hinckley loamy sand. Onsite Soil texture and perc rates were verified within the OSRD project limits and are included within the report appendix. While conservative Hydrologic Soil Group (HSG) designation of **C** is utilized throughout the stormwater modeling, the Rawls Rate (infiltration) utilized corresponds to the "Sandy Loam" texture, based on onsite testing (see appendix). The site's water table is also moderately deep, having an estimated seasonal high water table (34"), also based on onsite testing.



The **Proposed ORSD** project does not anticipate unmitigated land disturbance of natural resources or environmentally sensitive areas (delineated wetlands).

The **Proposed OSRD** pre-development stormwater modeling has been summarized with three (3) sub-catchments. The overall watershed study limits +/- 13.2 acres and site analysis points are indicated on the "Pre-Development Watershed" plan.

POST-DEVELOPMENT CONDITIONS:

The proposed **OSRD** project will alter the existing topography, while leaving an extensive portion of the site undisturbed. The total project is involves approximately 19.65 acres of land and proposes to disturb about 5.0 acres (more or less), which equates to 14.65 acres of "Open Space" or undisturbed land (+/- 75.0 %). The land remaining untouched is attributed to the 25.0 ft perimeter buffer, sloping land behind the new homes and the dedicated Open Space parcel. The isolated and separate "Open Space" parcel contains a majority of the steep slopes (>25.0 %) and all of the delineated wetland resources. Within the subject parcel and OSRD project limits, there is only one (1) moderately notable physical land feature. This solitary feature is a draw that begins north of the existing fifty (50) foot right of way (project access point) and continues in a southeasterly direction. The OSRD project is proposing a cross culvert in this location, although there is not a defined channel or any visible evidence of hydrology within the immediate vicinity.

The **OSRD** post-development stormwater modeling has been summarized with twelve (12) sub-catchments. The eleven (11) onsite and one (1) offsite post-development sub-catchment boundaries are indicated on the "Post-Development Watershed" plan, which also correlates with HydroCAD routing diagram.

STORMWATER METHODOLGY and REGULATIONS:

The proposed **OSRD** stormwater management systems will meet or exceed both State and local requirements. The independent onsite stormwater practices (Bio Infiltration Gardens), along with centralize Infiltration Basin (primarily roadway) with associated BMP's (deep sumps & hoods) are consistent with Massachusetts stormwater handbook stormwater design recommendations. Stormwater will be pre-treated, treated, retained to promote groundwater recharge and also detained to mitigate both peak discharge rates and volumes to the maximum extent practical, given the "C" soils and moderate sloping terrain. In addition, the natural stormwater paths will be preserved far upstream of the environmentally sensitive areas and their respective buffers. In short, the proposed project will provide practical, effective and regulatory compliant stormwater practices common to rural Massachusetts. These systems will be designed, installed and maintained in a responsible manner consistent with CMR 310 10, as well as Town of Ashby stormwater requirements (Subdivision Regulations, Section 4.8).

The proposed **OSRD** stormwater management site specific design is intended to provide stormwater treatment, while also providing storage and peak rate attenuation. These concepts are achieved through usual and customary stormwater measures. Specifically, whenever practical (lots 2, 4-8) include Bio Infiltration Gardens (LID Practice) designed to capture, treat, store and infiltration localized common single family home impervious surface (driveway or non-metal roof stormwater). The paved roadway stormwater will be collected and transported to the open (dry) shallow (5.0 ft) infiltration basin located behind lots 6-9. This project based stormwater infiltration basin includes a sediment forebay and outlet control structure designed to attenuate, store and infiltration stormwater. Collectively, the proposed stormwater infrastructure will provide adequate stormwater mitigation measures in accordance with local and state regulations.

This proposed **OSRD** stormwater design, modeling and associated report was developed in accordance with the Town of Ashby stormwater regulations (Subdivision Regulations, Section 4.8), as well as Massachusetts Department of Environmental Protection requirements (310 CMR 10 and Stormwater Handbook). To further demonstrate compliance, HydroCAD (version 10.0, SCS TR-20 methodology) was utilized to evaluate pre and post-development hydrologic and hydraulic site specific characteristics. The rainfall modeling parameters were defined as type III, 24-hour storm events (2, 10, 25, and 100-yr) having normal (II) Antecedent Moisture Conditions (AMC), as summarized below.

Type III, 24-HR event	NRCC	Regulation
2-year	3.03	Town of Ashby
10-year	4.48	Town of Ashby
25-year	5.60	Town of Ashby
100-year	7.88	Town of Ashby

Please refer to the appendices for specific NRCS soils report, on site test pit and infiltration rates used within the project stormwater analysis. In addition, please also refer to Section II of this stormwater report for specific project modeling results and MassDEP ten (10) standards compliance narratives.