

# *Environmental Notification Form*

## ***CENTECH PARK NORTH***

***384-386 South Street, Shrewsbury, Massachusetts  
Worcester County***



**Submitted to:**

Executive Office of Energy and Environmental Affairs  
100 Cambridge Street, 9<sup>th</sup> Floor, Boston, MA 02114  
Attn: MEPA Office

**Proponent:**

Town of Shrewsbury  
100 Maple Ave., Shrewsbury, MA 01545

**Prepared by:**

**BOHLER ENGINEERING**  
352 Turnpike Road, Southborough, MA 01772

MDM Transportation Consultants, Inc.  
28 Lord Road, Suite 280, Marlborough, MA 01752

EcoTec, Inc.  
102 Grove Street, Worcester, MA 01605

Whitestone Associates, Inc.  
352 Turnpike Road, Suite 320  
Southborough, MA 01772





November 30, 2018

Secretary Matthew A. Beaton  
Executive Office of Energy and Environmental Affairs (EEA)  
Attn: MEPA Office  
110 Cambridge Street, Suite 900  
Boston, MA 02114

**Re: Environmental Notification Form  
Centech Park North  
384-386 South Street  
Shrewsbury, Massachusetts**

Dear Mr. Beaton:

Enclosed please find two (2) copies of the Environmental Notification Form (ENF) for the proposed Centech Park North project located in Shrewsbury. Additionally, a CD is provided with a full copy of the ENF in digital format.

Included in the ENF is a circulation list prepared in accordance with 301 CMR 11.16. Please notice the ENF in the December 5, 2018 Environmental Monitor to commence public review. In accordance with the 2018 Publication Schedule, Comments and Decisions Deadlines, public comments are due on December 26, 2018 with an ENF Decision expected on January 4, 2019.

Additional agencies or persons who would like to review the ENF should contact Michael J. Dryden by telephone at (508) 480-9900 or via e-mail at [mdryden@bohlereng.com](mailto:mdryden@bohlereng.com).

We trust the enclosed information is sufficient to facilitate your review. Should you have any questions or require additional information, please do not hesitate to contact us at (508) 480-9900.

Sincerely,

BOHLER ENGINEERING

Michael J. Dryden, Project Manager

John A. Kucich, P.E.

Cc: ENF Distribution List  
Kristen Las, Town of Shrewsbury  
Claire O'Neill, MassDevelopment

MEPA Cover Ltr (2018-11-30).docx

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## **APPENDICIES**

### **APPENDIX A: PROJECT MAPS**

- *USGS Site Location Map*
- *Existing Conditions Map*
- *Town of Shrewsbury Zoning Map*
- *Town of Shrewsbury Flexible Development Overlay District Map*
- *Areas of Critical Concern Map*
- *Natural Heritage & Endangered Species (NHESP) Map*
- *Wetland Map*
- *Watershed Map*
- *FEM A Flood Insurance Rate (FIRM) Map*
- *Natural Resources Conservation Service (NRCS) Soil Map*

### **APPENDIX B: EXISTING AND PROPOSED CONDITIONS PLANS**

### **APPENDIX C: SUPPLEMENTAL INFORMATION (BY OTHERS)**

- *“Transportation Scoping Letter – Proposed Centech Park North”, prepared by MDM Transportation Consultants, Inc., dated 11/19/18.*
- *“Wetland Resource Evaluation, Allen Farm, South Street, Shrewsbury, MA”, prepared by EcoTec, Inc., dated 10/24/18.*
- *“Report of Geotechnical Investigations”, prepared by Whitestone Associates, Inc., dated 11/12/18.*

### **APPENDIX D: LIST OF REQUIRED PERMITS**

### **APPENDIX E: PUBLIC NOTICE OF ENVIRONMENTAL REVIEW**

### **APPENDIX F: CIRCULATION LIST**

**Commonwealth of Massachusetts**  
**Executive Office of Energy and Environmental Affairs**  
**Massachusetts Environmental Policy Act (MEPA) Office**

**Environmental Notification Form**

<i>For Office Use Only</i>
EEA#: _____
MEPA Analyst: _____

*The information requested on this form must be completed in order to submit a document electronically for review under the Massachusetts Environmental Policy Act, 301 CMR 11.00.*

Project Name: Centech Park North		
Street Address: 384-386 South Street		
Municipality: Shrewsbury	Watershed: Blackstone & Concord (SuAsCo)	
Universal Transverse Mercator Coordinates: 4,683,200 meters N, 278,100 meters E	Latitude: 42° 16' 08.91" N	Longitude: 71° 41' 35.15" W
Estimated commencement date: Fall 2019	Estimated completion date: Fall 2024	
Project Type: Commercial	Status of project design: 20 %complete	
Proponent: Town of Shrewsbury		
Street Address: 100 Maple Ave.		
Municipality: Shrewsbury	State: MA	Zip Code: 01545
Name of Contact Person: Michael J. Dryden		
Firm/Agency: Bohler Engineering	Street Address: 352 Turnpike Road	
Municipality: Southborough	State: MA	Zip Code: 01772
Phone: (508) 480-9900	Fax: (508) 480-9080	E-mail: mdryden@bohlereng.com

<p>Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?  <input checked="" type="checkbox"/> Yes   <input type="checkbox"/> No</p> <p>If this is an Expanded Environmental Notification Form (ENF) (see 301 CMR 11.05(7)) or a Notice of Project Change (NPC), are you requesting:</p> <p>a Single EIR? (see 301 CMR 11.06(8))                      <input type="checkbox"/> Yes   <input checked="" type="checkbox"/> No  a Special Review Procedure? (see 301CMR 11.09)                      <input type="checkbox"/> Yes   <input checked="" type="checkbox"/> No  a Waiver of mandatory EIR? (see 301 CMR 11.11)                      <input type="checkbox"/> Yes   <input checked="" type="checkbox"/> No  a Phase I Waiver? (see 301 CMR 11.11)                      <input type="checkbox"/> Yes   <input checked="" type="checkbox"/> No  <i>(Note: Greenhouse Gas Emissions analysis must be included in the Expanded ENF.)</i></p> <p>Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?  <b>Land:</b>  301 CMR 11.03 (1)(a)(2) – Creation of 10 or more acres of impervious area (EIR)  301 CMR 11.03 (1)(b)(1) – Direct alteration of 25 or more acres of land (ENF)  <b>Transportation:</b>  301 CMR 11.03 (6)(a)(6) – Generation of 3,000 or more new ADT on roadways providing access to a single location (EIR)  301 CMR 11.03 (6)(a)(7) – Construction of 1,000 or more new parking spaces at a single location (EIR)</p>
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301CMR 11.03 (6)(b)(13) – Generation of 2,000 or more new ADT on roadways providing access to a single location (ENF)

301CMR 11.03 (6)(b)(14) – Generation of 1,000 or more new ADT on roadways providing access to a Single location and construction of 150 or more new parking spaces at a single location (ENF)

301CMR 11.03 (6)(b)(15) – Generation of 300 or more new parking spaces at a single location (ENF)

Which State Agency Permits will the project require?  
 Highway Access Permit – Massachusetts Department of Transportation (MassDOT, District 3)

Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres:  
**Agency: MassDevelopment**  
 Site Readiness Funding for the Project Grant - \$302,000  
**Agency: Executive Office of Housing and Economic Development**  
 MassWorks Infrastructure Grant – 2019 Application  
**Agency: Executive Office of Housing and Economic Development**  
 Chapter 43D Expedited Permitting Grant - \$150,000  
**Agency: Massachusetts Association of Regional Planning Agencies (MARPA)**  
 District Local Technical Assistance (DLTA) for CMRPC Planning - \$10,000

Summary of Project Size & Environmental Impacts	Existing	Change	Total
<b>LAND</b>			
Total site acreage	66.5±		
New acres of land altered		+ 26 ±	
Acres of impervious area	2 ±	+20 ±	22 ±
Square feet of new bordering vegetated wetlands alteration		+ 4,900±	
Square feet of new other wetland alteration		0	
Acres of new non-water dependent use of tidelands or waterways		0	
<b>STRUCTURES</b>			
Gross square footage	9,000±	+ 441,000±	450,000±
Number of housing units	0	0	0
Maximum height (feet)	15' ±	+ 35' ±	50' (max.)
<b>TRANSPORTATION</b>			
Vehicle trips per day*	0	+ 4,384 ±	4,384 ±
Parking spaces*	50 ±	+ 1,075 ±	1,125 ±
<b>WASTEWATER</b>			
Water Use (Gallons per day)*	0	+ 33,750± (max.)	33,750± (max.)
Water withdrawal (GPD)	0	0	0
Wastewater generation/treatment* (GPD)	0	+ 33,750± (max.)	33,750± (max.)
Length of water mains (miles)	0	+ 0.32 ±	0.32 ±

Length of sewer mains (miles)	0	+ 0.38 ±	0.38 ±
Has this project been filed with MEPA before? <input type="checkbox"/> Yes (EEA # _____) <input checked="" type="checkbox"/> No			
Has any project on this site been filed with MEPA before? <input type="checkbox"/> Yes (EEA # _____) <input checked="" type="checkbox"/> No			

\* Assumes the conservative build-out of the entire Project at 450,000 GSF of general office space

## **GENERAL PROJECT INFORMATION – all proponents must fill out this section**

### **PROJECT DESCRIPTION:**

Describe the existing conditions and land uses on the project site: \_\_\_\_\_

#### **Existing Site**

The project site (the “Site”) is located at 384-386 South Street, identified as Tax Assessor’s Map 42, Parcel 011, consisting of approximately 66.5± acres of land. The Site is bordered by South Street and commercial property (Charles River Lab) to the north, a ground-mounted solar field and residential properties to the west, commercial businesses and Route 20 to the south, and residential dwellings and South Street to the east. A portion of the Site along South Street is currently developed with three (3) vacant buildings and a paved/gravel parking area associated with the prior agricultural use of the property. The remaining portion of the Site consists of undeveloped woodlands with mature tree growth, areas covered by scrub vegetation and secondary tree growth within the former farm fields, and wetland resource areas. The Site has undeveloped frontage along South Street and Route 20, and is separated into two distinct developable areas by a large wetland resource area that generally extends from the southwest edge of the Site to northeast.

The Site is located within the Town’s Flexible Development Overlay District, which contains two Sub-Districts, Sub-Districts A and B located in the north and south portions, respectively. The underlying zoning is Office-Research (O-R). Adjacent parcels to the north and northeast are zoned O-R, while parcels to the east, south, and southwest are Limited-Industrial. Parcels located to the west of the site are zoned Rural “B”.

Wetland resources located on or immediately adjacent to the Site include:

- Bordering Vegetated Wetlands (BVW) – numerous areas containing BVW were field delineated and survey located in September of 2018.
- Intermittent Stream Bank – A total of three (3) intermittent Streams are shown on the USGS map. In all cases, the streams are located internal to the BVW area(s).
- Potential Vernal Pools – Two (2) PVP’s were identified in the western portion of the Site using the Massachusetts Geographical Information System (MassGIS) Online Maps. Refer to the Wetland Map provided in Appendix A. Based on preliminary site investigations, both onsite PVP’s meet vernal pool criteria but have not been certified. A PVP was also observed on the Charles Street Laboratory Site to the north during onsite investigations. Further inspections will be required to determine if this offsite pond meets the criteria to be certified. Early site investigations indicate that a depression within a wetland system in the west-central portion of the site is a potential isolated land subject to flooding (ILSF). Further investigations and calculations will be required to confirm this depression would be regulated as ILSF.

According to the most recent Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), there are no areas located within the 100-year flood plain on the Site. According to the latest addition of the Massachusetts Natural Heritage Atlas, 14<sup>th</sup> edition, there are no areas of Priority Habitats or Estimated Habitats located on the Site. Refer to the FEMA and Natural Heritage & Endangered Species Maps provided in Appendix A.

Runoff generated onsite flows overland to on-site wetlands located in the northwest and central portions of the Site. The northwest drainage area is associated with the Blackstone Watershed, and the central drainage area is associated with the SuAsCo (Concord) Watershed. Elevations onsite range from a maximum of 564 feet in the west to 496 feet adjacent to wetlands in the east.

For more information, refer to the Project Maps provided in Appendix A, the Existing Conditions Plan provided in Appendix B, and the “Wetland Resource Evaluation”, prepared by EcoTech and provided in Appendix C .

### **Site and Project History**

The Site, formerly known as the “Allen Property”, was previously used for agricultural purposes and was previously zoned Limited Industrial and Rural “B”. After numerous unsuccessful attempts by the previous owner to market the land for light industrial development, the owners entered into a purchase and sale agreement with a national rental housing developer in 2002. Because much of the property had been assessed as Chapter 61A land, the Town of Shrewsbury was afforded a right of first refusal to match the housing developer’s purchase offer.

In 2002, the Town of Shrewsbury obtained a state grant to implement several of the Town’s 2001 Master Plan commercial and industrial zoning recommendations, which identified the Site as suitable for industrial, office, and research and development uses. In September of 2002, the Town acquired approximately 49-acres by exercising its right of first refusal, and acquired the remaining portion through negotiations with the previous owner. The acquisition was made under the auspices of the Shrewsbury Development Corporation (SDC), which was established in February of 2003.

In 2007, after four years of conceptual site planning, the Town was awarded a Chapter 43D Expedited Permitting planning grant to conduct an independent assessment of the lands potential, explore the impacts of development possibilities, and prepare a plan for the Board of Selectman’s consideration in accordance with the requirements of Chapter 493. A Conceptual Site Development Plan was prepared by Beta Group, Inc. as part of the 2008 “Allen Property Master Plan Report”, which proposed amendments to the Zoning Bylaw to allow more flexible uses to be developed on the Site and ultimately supplement the existing Office-Research district. In 2009, Shrewsbury Town Meeting voted to rezone the property and establish a Flexible Development Overlay District and associated by-law. The goal of the overlay zoning district was to encourage flexible, planned development to provide employment and fiscal benefits to the town, and to establish review and permitting procedures for a Priority Development Site under the provisions of M.G.L . Chapter 43D.

In early 2018, the Town commissioned a second study to evaluate the former Allen Property as a potential site for the proposed Beal Early Childhood Center. The study evaluated and compared the merits of the Site and an alternative site known as the Glavin Center on Lake Street. It was determined that the alternate site was more suitable for the development of the school.

Funding sources for the project include the following:

- \$302,000 Site Readiness Program grant from MassDevelopment for engineering and permitting costs;
- \$150,000 Chapter 43D expedited permitting grant; and
- \$10,000 District Local Technical Assistance (DLTA) grant for CMRPC Planning.

The Town of Shrewsbury will also seek a grant under the 2019 MassWorks Infrastructure Program to fund the cost of initial roadway construction in Sub-District A.

Describe the proposed project and its programmatic and physical elements: \_\_\_\_\_

*NOTE: The project description should summarize both the project's direct and indirect impacts (including construction period impacts) in terms of their magnitude, geographic extent, duration and frequency, and reversibility, as applicable. It should also discuss the infrastructure requirements of the project and the capacity of the municipal and/or regional infrastructure to sustain these requirements into the future.*

### **Proposed Project**

Under the proposed Master Plan, approximately 450,000 GSF of mixed commercial space is envisioned, along with associated access roadways, parking and circulation areas, stormwater management systems, and utility infrastructure (the "Project"). At this time, the Project master plan is in early stages of development. The Town of Shrewsbury is currently working with the Central Massachusetts Regional Planning Commission (CMRPC) and its broker to determine the highest and best uses for the property based on current/projected market conditions. The Project is likely to include a mix of commercial uses consistent with those envisioned under the Flexible Development Overlay District. The uses include but are not limited to office, research and development, manufacturing, warehousing/distribution, and similar complimentary uses.

The project Site is bisected by a large wetland resource area which creates two distinct developable areas, Sub-Districts A and B in the north and south, respectively. Sub-District A will gain access from South Street and Sub-District B from Route 20. Sub-District A will consist of a dead-ended subdivision road of approximately 1,000 feet in length, which will provide access and frontage for approximately 275,000 GSF of commercial space in five (5) or more individual building lots. Sub-District B will consist of a dead-ended subdivision road of approximately 800 feet in length, which will provide access and frontage for approximately 175,000 GSF of commercial space in three (3) or more individual building lots.

For flexibility and marketing purposes, the current Master Plan depicts a range of building footprints and building heights. Both Sub-Districts contain a large, four-story building, ranging in size from 120,000 to 160,000 GSF, which are conducive to general office or research and development, while multiple smaller building footprints with 1.5 or two-stories are also incorporated. The smaller buildings range in size from 21,000 sf to 40,000 GSF lending themselves to a variety of "flex" uses.

For the purposes of quantifying impacts such as trip generation, parking, and water/sewer demand, the development program for this ENF filing is conservatively assumed to be entirely office space. However, it is anticipated that the mix of uses will ultimately be less impactful than office. For this reason, the impacts outlined herein should be considered conservatively high. As more is learned about the current market, the Master Plan will be refined to target a more specific mix of uses. Subsequent MEPA filings (i.e. Draft and Final Impact Reports), will reflect these refinements.

The Project will increase the amount of impervious onsite by approximately 20± acres, which will be mitigated by the construction of surface and subsurface infiltration/detention systems. The Project will be serviced by municipal water and sewer systems, and is estimated to generate approximately 33,750 GPD of sewer use and 33,750 GPD potable water demand. New power and gas services are also proposed to the Site. Refuse will be handled by onsite dumpsters that will routinely be emptied by a private waste disposal company. Buildings will incorporate fire suppression sprinkler systems, as required by the Massachusetts State Building Code. Access to the Site from Route 20 as well as utility connections to existing infrastructure within the highway are proposed as part of the development of Sub-District B. The Proponent is committed to working with MassDOT and the Town of Shrewsbury to provide safe and efficient access to the Site and to limit potential impacts caused by construction. Project impacts during construction will be confined within the property boundary and the immediately adjacent roadways for utility connections. Site construction is expected to last approximately 5 years.

Proposed pedestrian infrastructure will include an on-site sidewalk system that connects the proposed buildings with South Street. The sidewalk system will provide a pedestrian connection to area businesses and to the nearby Charles River and UMass office parks. Trip generation estimates for the Project are based on the higher-generating general office land use category. The development is estimated to generate a total of 4,384 vehicle trips on a weekday. The project will also include exterior bicycle racks within the property and will provide a Transportation Management Program (TMP). The Proponent will continue to work with MassDOT and MEPA during the state review process to provide a framework for project mitigation and timelines through a monitoring program. For additional detail and information, refer to the “Transportation Scoping Letter”, prepared by MDM Transportation, provided in Appendix C.

Funding sources for the project include the following:

- \$302,000 Site Readiness Program grant from MassDevelopment for engineering and permitting costs;
- \$150,000 Chapter 43D expedited permitting grant; and
- \$10,000 District Local Technical Assistance (DLTA) grant for CMRPC Planning.

The Town of Shrewsbury will also seek a grant under the 2019 MassWorks Infrastructure Program to fund the cost of initial roadway construction in Sub-District A.

Describe the on-site project alternatives (and alternative off-site locations, if applicable), considered by the proponent, including at least one feasible alternative that is allowed under current zoning, and the reasons(s) that they were not selected as the preferred alternative:

**NOTE:** *The purpose of the alternatives analysis is to consider what effect changing the parameters and/or siting of a project, or components thereof, will have on the environment, keeping in mind that the objective of the MEPA review process is to avoid or minimize damage to the environment to the greatest extent feasible. Examples of alternative projects include alternative site locations, alternative site uses, and alternative site configurations.*

## **Alternatives Analysis**

### **No-Built Alternative**

The “No-Built” alternative is not an economically viable option for the property. The Town of Shrewsbury purchased the property in 2002 in an effort to increase tax revenue, supply jobs, and promote the growth of the regional economy by supplementing the area with additional office and research and development space. The Town has been making principal and interest payments on the \$6.1 million borrowed to purchase the Allen Property since 2012. The Town’s intention for the property is to provide a pad-ready Site that aligns with the Town and SDC’s overall goals and objectives for development.

### **“2008 Master Plan” (Alternative A)**

In 2008, the Site was evaluated for the development of two (2) office/industrial parks located in the North and South portions of the Site. The Conceptual Site Development Plan, provided in Appendix C, consisted of 405,000sf office/research space to the North, and 206,000sf of office/manufacturing space to the South. Due to the intensity of the program, this Alternative would require additional infrastructure improvements and significantly more site work cost premiums when compared to the Preferred Alternative, proposing more overall building area, parking, and impervious coverage, and increased potable water use and sanitary sewer generation. Similar impacts to wetlands are proposed as in the Preferred Alternative, including a wetland crossing to access the western portion of the site, and a waterline crossing to loop water service through the entire project.

## **“Beal Early Childhood Center” (Alternative B)**

The Town commissioned a study in early 2018 to evaluate the Site and another local property for an educational use known as the Beal Early Childhood Center. The Site is zoned Office-Research; however, public and non-profit educational uses are exempt from local zoning under Chapter 40A of the Massachusetts General Law (M.G.L. c. 40A, §3). A comprehensive site suitability analysis was conducted based on a comparative rating system. Categories rated included geographic location, physical and regulatory constraints, encumbrances, and access conditions. Given the preliminary nature of this evaluation, a conceptual development plan and full environmental impact study was not prepared. Based on the comparative results of the study, the Town determined that the alternate site was best suited for the development of the school.

### **Preferred Alternative**

The Project is limited to this Site and considers no alternate due to the Proponent and SDC’s interests for development of the parcel, as this is Shrewsbury’s last significant parcel of industrial land. It is their objective to develop this site in a way that limits environmental impacts, promotes economic growth, facilitates respectful development, and creates high-quality jobs. The Preferred Alternative appears to be the best use of the property.

The Preferred Alternative proposes 450,000 GSF of development in Sub-District’s A & B. It should be noted that the wetland resource area limits have changed and more notably increased in size since the development of Alternate A; therefore, less developable area is shown onsite resulting in reduced environmental impacts when compared to Alternate A. The Preferred Alternative proposes a similar build-out of the site but on a reduced scale, limiting permitting efforts to the maximum extent practicable and meeting all regulatory requirements.

Summarize the mitigation measures proposed to offset the impacts of the preferred alternative:

### **Mitigation Measures**

#### **Transportation**

Currently, there are no transit or bike facilities within the study area. MassDOT is in the process of planning roadway improvements along Route 20 near the project site which are expected to be designed as a multimodal facility under MassDOT’s Complete Streets guidelines. Based on a preliminary meeting held with MassDOT District 3 staff on October 31, 2018, planning improvements along Route 20 would include adding additional capacity to the system via a four-lane cross-section. The Proponent will work with MassDOT to provide a project that is compatible and cohesive with the long-range improvements planned for the area.

The Project will require a highway access permit for Sub-District B, which will have direct access/egress from Route 20 via a right-in/right-out driveway (subject to MassDOT approval). All work to be completed by the Proponent to support the project will comply with local requirements and to the extent applicable MassDOT requirements within State Highway Layout.

Based on preliminary discussions with MassDOT, it is anticipated that the Project will be required to prepare a Road Safety Audit at the Route 9 intersection with South Street and will be responsible for the implementation of a pedestrian crossing and pedestrian traffic signal phasing at said intersection. To enhance capacity, the Project is will also likely require widening of the South Street southbound approach to Route 20 to provided dedicated turn lanes. Any improvements would be designed to complement

MassDOT's Route 20 pending improvement initiatives. The Proponent will continue to work with MassDOT and MEPA during the State review process to provide a framework for project mitigation and timelines through a monitoring program.

The Project will include sidewalks along each of the proposed access roadways that will connect with the existing sidewalk along South Street. Exterior bicycle racks will also be proposed onsite. The Project will review the feasibility of providing shuttle service to/from the nearby Grafton Commuter Rail Station that is located along Pine Street approximately 2 miles to the south. The Proponent will implement a Travel Demand Management (TDM) program that encourages ridesharing among tenant employees and on-site amenities that reduce vehicle trips by tenant employees.

## **Utilities**

The existing Site is serviced by a 6-inch sewer stub extending from an 8-inch sewer main that was extended up South Street by the Town in 2012. Other service connections to the site were not observed on record plans or during site investigations. Existing 6- and 12-inch water mains and an 8-inch gas line are available in South Street. An existing 12-inch sewer main, 12-inch water main and 4- and 12-inch gas lines are available in Route 20. 3-phase power is available in both streets. According to discussions with the Town a fiber optic line is available in South Street. Drainage with South Street is collected via a series of catch basins and manholes and discharges to wetlands on the Site. A drainage system was observed in Route 20, but its point of discharge is unknown at this time.

The Project proposes to connect to the existing 12" main in South Street and loop an 8-inch water service through the Site via a wetland crossing which will connect the Subdivision Roadways in Sub-Districts A & B. The Project will implement efficient water use strategies to reduce overall portable water use onsite.

Sewer, gas, and electric will extend from South Street and Route 20 to service Sub-Districts A & B, respectively. The Project will implement efficient water use strategies to reduce overall sewer discharges. Utility work in South Street and Route 20 will be fully coordinated with the Town and MassDEP (as applicable) to ensure safe and efficient construction practices are conducted.

## **Stormwater**

The Project will increase the amount of impervious area by approximately 20± acres. The resulting increase in runoff will be mitigated by the construction of surface and subsurface infiltration/detention basins. The drainage system will be designed to meet or exceed MassDEP Standards by attenuating runoff rates to less than the pre-development condition, providing treatment and TSS removal prior to infiltration and discharge, and promoting groundwater recharge. Additional Best Management Practices (BMPs), such as deep sump and hooded catch basins, proprietary stormwater quality units, and forebays, will be incorporated into the design to further enhance the systems treatment effectiveness.

Investigations were conducted in early October 2018 by Whitestone Associates, Inc., to understand subsurface conditions onsite. Refer to Appendix C for a detailed summary of findings and design recommendations.

## **Wetlands**

The Site contains a series of intermittent streams, bordering vegetated wetlands (BVW), potential isolated land subject to flooding (ILSF) and potential vernal pools (PVP). The Project proposes work within 100 feet of wetlands onsite as well as direct alteration of BVW, therefore a permit is required to be filed with the Shrewsbury Conservation Commission under the Massachusetts Department of Environmental Protection

(MassDEP) Wetlands Protection Act (WPA). Direct impacts to BVW will be less than 5,000 sf and therefore will not require regulatory action with the Army Corps of Engineers. Wetland replication equal to the area impacted is proposed and will meet the requirements of the WPA for BVW's (310 CMR 10.55(4)).

**Construction**

The Project will provide construction period erosion and sedimentation controls as required by the National Pollutant Discharge Elimination System (NPDES) General Construction Permit (CGP). This will include a proposed construction entrance, protection for stormwater inlets, temporary sediment basins, protection around temporary material stock piles, and various other techniques. The total site and project area is greater than one acre. Accordingly, the project will require filing a Notice of Intent (NOI) with the United States Environmental Protection Agency (US EPA). A Stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to the start of construction and will be implemented by the site contractor under the guidance and responsibility of the projects proponent.

An Operation and Maintenance (O&M) Plan for this site will be included with the project Drainage Report. The O&M Plan will outline procedures and time tables for the long-term operation and maintenance of the proposed site stormwater management system, including initial inspections upon completion of construction, and periodic monitoring of the system components, in accordance with established practices and the manufacturer's recommendations. The O&M will include a list of responsible parties, and the stormwater management system will be maintained by the owner and/or the owner's representative.

If the project is proposed to be constructed in phases, please describe each phase:

The Project will be built out in two (2) phases. The initial phase will entail the Subdivision Roadway in Sub-District A and construction of the associated parcels. The subsequent phase will involve the Subdivision Roadway and associated parcels located in Sub-District B.

**AREAS OF CRITICAL ENVIRONMENTAL CONCERN:**

Is the project within or adjacent to an Area of Critical Environmental Concern?

- Yes (Specify \_\_\_\_\_)  
 No

if yes, does the ACEC have an approved Resource Management Plan? \_\_\_ Yes \_\_\_ No;  
If yes, describe how the project complies with this plan.

Will there be stormwater runoff or discharge to the designated ACEC? \_\_\_ Yes \_\_\_ No;

If yes, describe and assess the potential impacts of such stormwater runoff/discharge to the designated ACEC.

**RARE SPECIES:**

Does the project site include Estimated and/or Priority Habitat of State-Listed Rare Species? (see [http://www.mass.gov/dfwele/dfw/nhosp/regulatory\\_review/priority\\_habitat/priority\\_habitat\\_home.htm](http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/priority_habitat/priority_habitat_home.htm))

- Yes (Specify \_\_\_\_\_)  No

**HISTORICAL /ARCHAEOLOGICAL RESOURCES:**

Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?

- Yes (Specify \_\_\_\_\_)  No

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources?  Yes (Specify \_\_\_\_\_)  No

A review of the Massachusetts Cultural Resource Information System (MACRIS) indicated that there are no historic properties or areas located on or near the Site. A Project Notification Form (PNF) was filed with the Massachusetts Historical Commission (MHC) on November 20, 2018. The Proponent is awaiting a response letter from the MHC to confirm the Site does not meet the criteria of eligibility for listing in the State Register of Historical Places.

**WATER RESOURCES:**

Is there an Outstanding Resource Water (ORW) on or within a half-mile radius of the project site?

Yes  No;

if yes, identify the ORW and its location.  Two (2) onsite vernal pools appear to meet the criteria to be certified in western and northwestern portions of the site (Refer to GIS Map in Appendix A). One potential vernal pool (PVP) was observed to the north on the Charles River Laboratories site.

*(NOTE: Outstanding Resource Waters include Class A public water supplies, their tributaries, and bordering wetlands; active and inactive reservoirs approved by MassDEP; certain waters within Areas of Critical Environmental Concern, and certified vernal pools. Outstanding resource waters are listed in the Surface Water Quality Standards, 314 CMR 4.00.)*

Are there any impaired water bodies on or within a half-mile radius of the project site?  Yes  No; if yes, identify the water body and pollutant(s) causing the impairment: \_\_\_\_\_

Is the project within a medium or high stress basin, as established by the Massachusetts Water Resources Commission?  Yes  No

Based on Figure 5: Stressed Basin Map, provided in a report entitled, "Stressed Basins in Massachusetts", prepared by the Commonwealth of Massachusetts Water Resources Commission, dated December 13, 2001, the northwestern portion of the site flows to a Low Stress Basin, and the remainder of the site flows to a Medium Stress Basin. Flows from the northwest portion of the site are associated with the Blackstone Watershed, and the flows from the remainder of the site are associated with the SuAsCo Watershed.

**STORMWATER MANAGEMENT:**

Generally describe the project's stormwater impacts and measures that the project will take to comply with the standards found in MassDEP's Stormwater Management Regulations: \_\_\_\_\_

There are no stormwater runoff mitigation measures associate with the existing site. The proposed Project will be designed in accordance with the MassDEP Stormwater Standards. Stormwater runoff will be treated for TSS removal with the use of deep sumps and trap hoods and proprietary stormwater quality units prior to any infiltration or outfall. The proposed drainage design will be consistent with maintaining natural drainage flow patterns to the extent practicable, and will utilize BMPs, including surface and subsurface infiltration/detention systems, to promote groundwater recharge and attenuate peak rates of runoff. The Proponent will work with the Town of Shrewsbury to evaluate and mitigate any potential impacts to the existing stormwater infrastructure and to resource areas on and surrounding the Project site.

**MASSACHUSETTS CONTINGENCY PLAN:**

Has the project site been, or is it currently being, regulated under M.G.L.c.21E or the Massachusetts Contingency Plan?

Yes  No  ; if yes, please describe the current status of the site (including Release Tracking Number (RTN), cleanup phase, and Response Action Outcome classification): \_\_\_\_\_

Is there an Activity and Use Limitation (AUL) on any portion of the project site? Yes  No  ; if yes, describe which portion of the site and how the project will be consistent with the AUL: \_\_\_\_\_.

Are you aware of any Reportable Conditions at the property that have not yet been assigned an RTN? Yes  No  ; if yes, please describe: \_\_\_\_\_

A Phase I Environmental Site Assessment was conducted in February 5, 2018 and did not identify any

Recognizable Environmental Concerns. Due to the historic use of a portion of the Site as an orchard, a Potential Environmental Concern is noted due to possible use of lead arsenate pesticides.

**SOLID AND HAZARDOUS WASTE:**

If the project will generate solid waste during demolition or construction, describe alternatives considered for re-use, recycling, and disposal of, e.g., asphalt, brick, concrete, gypsum, metal, wood: \_\_\_\_\_

The existing site contains paved/gravel parking areas and three (3) existing vacant buildings. Minimal solid waste will be generated during demolition of the site. Excess materials will be reused or recycled when possible or will otherwise be properly disposed of to a licensed facility per the DEP regulations for Solid Waste Facilities, 301 CMR 16.00.

*(NOTE: Asphalt pavement, brick, concrete and metal are banned from disposal at Massachusetts landfills and waste combustion facilities and wood is banned from disposal at Massachusetts landfills. See 310 CMR 19.017 for the complete list of banned materials.)*

Will your project disturb asbestos containing materials? Yes \_\_\_ No X ;  
if yes, please consult state asbestos requirements at <http://mass.gov/MassDEP/air/asbhom01.htm>

Describe anti-idling and other measures to limit emissions from construction equipment: \_\_\_\_\_

The Proponent will take the following reasonable efforts to minimize impacts associated with Construction efforts:

- Equipment will not needlessly idle on site during construction
- Enclosures or barriers will be provided on small equipment that operates continuously
- Equipment used throughout construction will be maintained properly with particular attention put to proper operation of equipment mufflers

**DESIGNATED WILD AND SCENIC RIVER:**

Is this project site located wholly or partially within a defined river corridor of a federally designated Wild and Scenic River or a state designated Scenic River? Yes \_\_\_ No X ;  
if yes, specify name of river and designation:

If yes, does the project have the potential to impact any of the “outstandingly remarkable” resources of a federally Wild and Scenic River or the stated purpose of a state designated Scenic River? Yes \_\_\_ No \_\_\_ ; if yes, specify name of river and designation: \_\_\_\_\_;

if yes, will the project will result in any impacts to any of the designated “outstandingly remarkable” resources of the Wild and Scenic River or the stated purposes of a Scenic River.

Yes \_\_\_ No \_\_\_ ;

if yes, describe the potential impacts to one or more of the “outstandingly remarkable” resources or stated purposes and mitigation measures proposed.

## **ATTACHMENTS:**

1. List of all attachments to this document.
2. U.S.G.S. map (good quality color copy, 8-½ x 11 inches or larger, at a scale of 1:24,000) indicating the project location and boundaries.
- 3.. Plan, at an appropriate scale, of existing conditions on the project site and its immediate environs, showing all known structures, roadways and parking lots, railroad rights-of-way, wetlands and water bodies, wooded areas, farmland, steep slopes, public open spaces, and major utilities.
- 4 Plan, at an appropriate scale, depicting environmental constraints on or adjacent to the project site such as Priority and/or Estimated Habitat of state-listed rare species, Areas of Critical Environmental Concern, Chapter 91 jurisdictional areas, Article 97 lands, wetland resource area delineations, water supply protection areas, and historic resources and/or districts.
5. Plan, at an appropriate scale, of proposed conditions upon completion of project (if construction of the project is proposed to be phased, there should be a site plan showing conditions upon the completion of each phase).
6. List of all agencies and persons to whom the proponent circulated the ENF, in accordance with 301 CMR 11.16(2).
7. List of municipal and federal permits and reviews required by the project, as applicable.

Refer to the Appendices section of this document for the attachments listed above.

**LAND SECTION – all proponents must fill out this section**

**I. Thresholds / Permits**

A. Does the project meet or exceed any review thresholds related to **land** (see 301 CMR 11.03(1))  
 Yes \_\_\_ No; if yes, specify each threshold:

(1)(a)(2) – Creation of 10 or more acres of impervious area (EIR)

(1)(b)(1) – Direct alteration of 25 or more acres of land (ENF)

**II. Impacts and Permits**

A. Describe, in acres, the current and proposed character of the project site, as follows:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Footprint of buildings	<u>0.2±</u>	<u>+ 3.7±</u>	<u>3.9±</u>
Internal roadways	<u>0</u>	<u>+ 1.7±</u>	<u>1.7±</u>
Parking and other paved areas	<u>1.8±</u>	<u>+14.6±</u>	<u>16.4±</u>
Other altered areas	<u>0</u>	<u>+ 6.0±</u>	<u>6.0±</u>
Undeveloped areas	<u>64.5±</u>	<u>- 26.0±</u>	<u>38.5±</u>
<b>Total: Project Site Acreage</b>	<u>66.5±</u>	<u>0</u>	<u>66.5±</u>

B. Has any part of the project site been in active agricultural use in the last five years?  
\_\_\_ Yes  No; if yes, how many acres of land in agricultural use (with prime state or locally important agricultural soils) will be converted to nonagricultural use?

C. Is any part of the project site currently or proposed to be in active forestry use?  
\_\_\_ Yes  No; if yes, please describe current and proposed forestry activities and indicate whether any part of the site is the subject of a forest management plan approved by the Department of Conservation and Recreation:

D. Does any part of the project involve conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97? \_\_\_ Yes  No; if yes, describe:

E. Is any part of the project site currently subject to a conservation restriction, preservation restriction, agricultural preservation restriction or watershed preservation restriction?  
\_\_\_ Yes  No; if yes, does the project involve the release or modification of such restriction?  
\_\_\_ Yes \_\_\_ No; if yes, describe:

F. Does the project require approval of a new urban redevelopment project or a fundamental change in an existing urban redevelopment project under M.G.L.c.121A? \_\_\_ Yes  No; if yes, describe:

G. Does the project require approval of a new urban renewal plan or a major modification of an existing urban renewal plan under M.G.L.c.121B? Yes \_\_\_ No ; if yes, describe:

**III. Consistency**

A. Identify the current municipal comprehensive land use plan  
Title: Town of Shrewsbury Master Plan  
Date: March 3, 2016

B. Describe the project's consistency with that plan with regard to:  
1) economic development \_\_\_\_\_

The proposed Centech Park North Project is consistent with the Master Plan's vision for development of the Site located at South Street and Route 20. The development of the Site has

been an economic development priority for over a decade. The SDC and Board of Selectmen hope to attract higher-end office and research tenants to the Site. Residents have voiced strong support for commercial development with better site and architectural design to provide a non-residential tax base to handle the cost of population and school growth. The Project will align with these objectives and will create additional economic opportunity for new businesses in the area.

2) adequacy of infrastructure \_\_\_\_\_

The Site has access to water, sewer, gas, and electric services within South Street and Route 20. To accommodate future growth, mainly for commercial and industrial activities, the Town has implemented limitations on existing public water well withdrawals to minimize impacts to the Blackstone River Basin. The Town recently upgraded and extended sewer service in South Street to accommodate the Project. Based on discussions with Town Officials, there are no known capacity issues and future upgrades to utility infrastructure are not anticipated.

3) open space impacts \_\_\_\_\_

The proposed Project will meet the minimum open space requirement for the project in accordance with the Town of Shrewsbury Zoning By-Laws. The Site is zoned Office-Research with associated Flexible Development Overlay Sub-Districts (FDOS) A & B, and is consistent with the proposed development.

4) compatibility with adjacent land uses \_\_\_\_\_

The proposed Project remains consistent with the adjacent land uses. The Site is surrounded by Office-Research to the north and east, Light Industrial to the south, and Rural "B" to the west. When the Town purchased the Site in 2002, the property was re-zoned from Light Industrial to Office-Research to allow for commercial development and to align with the goals and objectives of the Town for the future build-out. In 2009 the FDOS overlay districts were established to allow more flexibility in the types of uses developed onsite.

C. Identify the current Regional Policy Plan of the applicable Regional Planning Agency (RPA)  
RPA: \_\_\_\_\_

Title Central Massachusetts Regional Planning Commission (CMRPC) Land Use Priority Plan  
Process Summary  
Date: December 2014

Title: 495/MetroWest Development Compact Plan & Priority Development and Preservation  
Base Map

Date: March 2012 & June 12, 2018, respectively

D. Describe the project's consistency with that plan with regard to:

1) economic development \_\_\_\_\_

The Project is consistent with the regional plan. The regional plan and Priority Development and Preservation Base Map identify the Site as a Development Priority Area. The Project will align with the objectives of the regional plan and will create additional economic opportunity for new businesses in the area.

2) adequacy of infrastructure \_\_\_\_\_

The Site has access to municipal water and sewer services within South Street and Route 20, as well as gas and electric services. The Town recently upgraded and extended sewer service in South Street to accommodate the Project. Based on discussions with Town Officials, there are no known capacity issues and future upgrades to utility infrastructure are not anticipated.

3) open space impacts \_\_\_\_\_

The Future Land Use Plan within the regional plan indicates the Site within an area of special planning interest associated with Commercial/Office Research, and does not designate it as a Public & Private Open Space/Recreation Land. The vast network of wetland resource areas onsite limits the developable area onsite and will ensure significant wildlife habitats are protected as a result of the future build-out. In addition, the proposed Project will meet the minimum open space for the property as required by the Town of Shrewsbury Zoning By-Laws.

## **RARE SPECIES SECTION**

### **I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **rare species or habitat** (see 301 CMR 11.03(2))? \_\_\_ Yes  No; if yes, specify, in quantitative terms:

*(NOTE: If you are uncertain, it is recommended that you consult with the Natural Heritage and Endangered Species Program (NHESP) prior to submitting the ENF.)*

B. Does the project require any state permits related to **rare species or habitat**? \_\_\_ Yes  No

C. Does the project site fall within mapped rare species habitat (Priority or Estimated Habitat?) in the current Massachusetts Natural Heritage Atlas (attach relevant page)? \_\_\_ Yes  No.

Refer to the NHESP Map in Appendix A.

D. If you answered "No" to all questions A, B and C, proceed to the **Wetlands, Waterways, and Tidelands Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Rare Species section below.

### **II. Impacts and Permits**

A. Does the project site fall within Priority or Estimated Habitat in the current Massachusetts Natural Heritage Atlas (attach relevant page)? \_\_\_ Yes \_\_\_ No. If yes,

1. Have you consulted with the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP)? \_\_\_ Yes \_\_\_ No; if yes, have you received a determination as to whether the project will result in the "take" of a rare species? \_\_\_ Yes \_\_\_ No; if yes, attach the letter of determination to this submission.

2. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? \_\_\_ Yes \_\_\_ No; if yes, provide a summary of proposed measures to minimize and mitigate rare species impacts

3. Which rare species are known to occur within the Priority or Estimated Habitat?

4. Has the site been surveyed for rare species in accordance with the Massachusetts Endangered Species Act? \_\_\_ Yes \_\_\_ No

4. If your project is within Estimated Habitat, have you filed a Notice of Intent or received an Order of Conditions for this project? \_\_\_ Yes \_\_\_ No; if yes, did you send a copy of the Notice of Intent to the Natural Heritage and Endangered Species Program, in accordance with the Wetlands Protection Act regulations? \_\_\_ Yes \_\_\_ No

B. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? \_\_\_ Yes \_\_\_ No; if yes, provide a summary of proposed measures to minimize and mitigate impacts to significant habitat:

## WETLANDS, WATERWAYS, AND TIDELANDS SECTION

### I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wetlands, waterways, and tidelands** (see 301 CMR 11.03(3))? \_\_\_ Yes  No; if yes, specify, in quantitative terms:

B. Does the project require any state permits (or a local Order of Conditions) related to **wetlands, waterways, or tidelands**?  Yes \_\_\_ No; if yes, specify which permit:

The Project will be required to file a Notice of Intent with the Shrewsbury Conservation Commission.

C. If you answered "No" to both questions A and B, proceed to the **Water Supply Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wetlands, Waterways, and Tidelands Section below.

### II. Wetlands Impacts and Permits

A. Does the project require a new or amended Order of Conditions under the Wetlands Protection Act (M.G.L. c.131A)?  Yes \_\_\_ No; if yes, has a Notice of Intent been filed? \_\_\_ Yes  No; if yes, list the date and MassDEP file number: \_\_\_\_\_; if yes, has a local Order of Conditions been issued? \_\_\_ Yes \_\_\_ No; Was the Order of Conditions appealed? \_\_\_ Yes \_\_\_ No. Will the project require a Variance from the Wetlands regulations? \_\_\_ Yes  No.

B. Describe any proposed permanent or temporary impacts to wetland resource areas located on the project site:

The Project proposes to impact approximately 4,900± SF of wetland resource areas onsite. A "limited crossing" is proposed to access the western side of Sub-District A. A water service wetland crossing is proposed to loop the water service between Sub-Districts A and B. Small impacts to wetlands are also proposed for roadway and parking area development. Wetland replication equal to the area impacted is proposed and will meet the requirements of the WPA for BVW's (310 CMR 10.55(4)).

C. Estimate the extent and type of impact that the project will have on wetland resources, and indicate whether the impacts are temporary or permanent:

<u>Coastal Wetlands</u>	<u>Area (square feet) or Length (linear feet)</u>	<u>Temporary or Permanent Impact?</u>
Land Under the Ocean	_____	_____
Designated Port Areas	_____	_____
Coastal Beaches	_____	_____
Coastal Dunes	_____	_____
Barrier Beaches	_____	_____
Coastal Banks	_____	_____
Rocky Intertidal Shores	_____	_____
Salt Marshes	_____	_____
Land Under Salt Ponds	_____	_____
Land Containing Shellfish	_____	_____
Fish Runs	_____	_____
Land Subject to Coastal Storm Flowage	_____	_____
 <u>Inland Wetlands</u>		
Bank (If)	_____	_____
Bordering Vegetated Wetlands	4,900± SF	4,900± SF
Isolated Vegetated Wetlands	_____	_____
Land under Water	_____	_____
Isolated Land Subject to Flooding	_____	_____

Bordering Land Subject to Flooding \_\_\_\_\_  
Riverfront Area \_\_\_\_\_

D. Is any part of the project:

1. proposed as a **limited project**? \_\_\_ Yes  No; if yes, what is the area (in sf)? \_\_\_\_\_
2. the construction or alteration of a **dam**? \_\_\_ Yes  No; if yes, describe:
3. fill or structure in a **velocity zone** or **regulatory floodway**? \_\_\_ Yes  No
4. dredging or disposal of dredged material? \_\_\_ Yes  No; if yes, describe the volume of dredged material and the proposed disposal site:
5. a discharge to an **Outstanding Resource Water (ORW)** or an **Area of Critical Environmental Concern (ACEC)**?  Yes \_\_\_ No
6. subject to a wetlands restriction order? \_\_\_ Yes  No; if yes, identify the area (in sf):
7. located in buffer zones?  Yes \_\_\_ No; if yes, how much (in sf): 210,000± sf (impervious)

E. Will the project:

1. be subject to a local wetlands ordinance or bylaw? \_\_\_ Yes  No
2. alter any federally-protected wetlands not regulated under state law? \_\_\_ Yes  No; if yes, what is the area (sf)?

### III. Waterways and Tidelands Impacts and Permits

A. Does the project site contain waterways or tidelands (including filled former tidelands) that are subject to the Waterways Act, M.G.L.c.91? \_\_\_ Yes  No; if yes, is there a current Chapter 91 License or Permit affecting the project site? \_\_\_ Yes \_\_\_ No; if yes, list the date and license or permit number and provide a copy of the historic map used to determine extent of filled tidelands:

B. Does the project require a new or modified license or permit under M.G.L.c.91? \_\_\_ Yes  No; if yes, how many acres of the project site subject to M.G.L.c.91 will be for non-water-dependent use? Current \_\_\_ Change \_\_\_ Total \_\_\_  
If yes, how many square feet of solid fill or pile-supported structures (in sf)?

C. For non-water-dependent use projects, indicate the following:

Area of filled tidelands on the site: \_\_\_\_\_

Area of filled tidelands covered by buildings: \_\_\_\_\_

For portions of site on filled tidelands, list ground floor uses and area of each use:

\_\_\_\_\_

Does the project include new non-water-dependent uses located over flowed tidelands?

Yes \_\_\_ No \_\_\_

Height of building on filled tidelands \_\_\_\_\_

Also show the following on a site plan: Mean High Water, Mean Low Water, Water-dependent Use Zone, location of uses within buildings on tidelands, and interior and exterior areas and facilities dedicated for public use, and historic high and historic low water marks.

D. Is the project located on landlocked tidelands? \_\_\_ Yes  No; if yes, describe the project's impact on the public's right to access, use and enjoy jurisdictional tidelands and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

E. Is the project located in an area where low groundwater levels have been identified by a municipality or by a state or federal agency as a threat to building foundations? \_\_\_ Yes  No; if yes, describe the project's impact on groundwater levels and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

F. Is the project non-water-dependent **and** located on landlocked tidelands **or** waterways or tidelands subject to the Waterways Act **and** subject to a mandatory EIR? \_\_\_ Yes  No;

(NOTE: If yes, then the project will be subject to Public Benefit Review and Determination.)

G. Does the project include dredging? \_\_\_ Yes  No; if yes, answer the following questions:

What type of dredging? Improvement \_\_\_ Maintenance \_\_\_ Both \_\_\_

What is the proposed dredge volume, in cubic yards (cys) \_\_\_\_\_

What is the proposed dredge footprint \_\_\_length (ft) \_\_\_width (ft)\_\_\_depth (ft);

Will dredging impact the following resource areas?

Intertidal Yes\_\_\_ No\_\_\_; if yes, \_\_\_ sq ft

Outstanding Resource Waters Yes\_\_\_ No\_\_\_; if yes, \_\_\_ sq ft

Other resource area (i.e. shellfish beds, eel grass beds) Yes\_\_\_ No\_\_\_; if yes \_\_\_ sq ft

If yes to any of the above, have you evaluated appropriate and practicable steps to: 1) avoidance; 2) if avoidance is not possible, minimization; 3) if either avoidance or minimize is not possible, mitigation?

If no to any of the above, what information or documentation was used to support this determination?

Provide a comprehensive analysis of practicable alternatives for improvement dredging in accordance with 314 CMR 9.07(1)(b). Physical and chemical data of the sediment shall be included in the comprehensive analysis.

Sediment Characterization

Existing gradation analysis results? \_\_\_Yes \_\_\_No; if yes, provide results.

Existing chemical results for parameters listed in 314 CMR 9.07(2)(b)6? \_\_\_Yes \_\_\_No; if yes, provide results.

Do you have sufficient information to evaluate feasibility of the following management options for dredged sediment? If yes, check the appropriate option.

Beach Nourishment \_\_\_

Unconfined Ocean Disposal \_\_\_

Confined Disposal:

Confined Aquatic Disposal (CAD) \_\_\_

Confined Disposal Facility (CDF) \_\_\_

Landfill Reuse in accordance with COMM-97-001 \_\_\_

Shoreline Placement \_\_\_

Upland Material Reuse\_\_\_

In-State landfill disposal\_\_\_

Out-of-state landfill disposal \_\_\_

(NOTE: This information is required for a 401 Water Quality Certification.)

#### IV. Consistency:

A. Does the project have effects on the coastal resources or uses, and/or is the project located within the Coastal Zone? \_\_\_ Yes  No; if yes, describe these effects and the projects consistency with the policies of the Office of Coastal Zone Management:

B. Is the project located within an area subject to a Municipal Harbor Plan? \_\_\_ Yes  No; if yes, identify the Municipal Harbor Plan and describe the project's consistency with that plan:

## WATER SUPPLY SECTION

### I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))?  Yes \_\_\_ No; if yes, specify, in quantitative terms: +33,750± GPD

B. Does the project require any state permits related to **water supply**? \_\_\_ Yes  No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

### II. Impacts and Permits

A. Describe, in gallons per day (gpd), the volume and source of water use for existing and proposed activities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Municipal or regional water supply	<u>0</u>	<u>+33,750±</u>	<u>33,750±</u>
Withdrawal from groundwater	<u>0</u>	<u>0</u>	<u>0</u>
Withdrawal from surface water	<u>0</u>	<u>0</u>	<u>0</u>
Interbasin transfer	<u>0</u>	<u>0</u>	<u>0</u>

(NOTE: Interbasin Transfer approval will be required if the basin and community where the proposed water supply source is located is different from the basin and community where the wastewater from the source will be discharged.)

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project?  Yes \_\_\_ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source, has a pumping test been conducted? \_\_\_ Yes  No; if yes, attach a map of the drilling sites and a summary of the alternatives considered and the results. \_\_\_\_\_

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons per day)? \_\_\_\_\_ Will the project require an increase in that withdrawal? \_\_\_ Yes  No; if yes, then how much of an increase (gpd)?

E. Does the project site currently contain a water supply well, a drinking water treatment facility, water main, or other water supply facility, or will the project involve construction of a new facility? \_\_\_ Yes  No. If yes, describe existing and proposed water supply facilities at the project site:

	<u>Permitted Flow</u>	<u>Existing Avg Daily Flow</u>	<u>Project Flow</u>	<u>Total</u>
Capacity of water supply well(s) (gpd)	_____	_____	_____	_____
Capacity of water treatment plant (gpd)	_____	_____	_____	_____

F. If the project involves a new interbasin transfer of water, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed?  
N/A

G. Does the project involve:

1. new water service by the Massachusetts Water Resources Authority or other agency of the Commonwealth to a municipality or water district? \_\_\_ Yes  No
2. a Watershed Protection Act variance? \_\_\_ Yes  No; if yes, how many acres of alteration?

3. a non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities? \_\_\_ Yes  No

**III. Consistency**

Describe the project's consistency with water conservation plans or other plans to enhance water resources, quality, facilities and services:

The Project will implement efficient water use strategies to reduce overall potable water use onsite.

**WASTEWATER SECTION**

**I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **wastewater** (see 301 CMR 11.03(5))?  Yes \_\_\_ No; if yes, specify, in quantitative terms: +33,750± GPD

B. Does the project require any state permits related to **wastewater**? \_\_\_ Yes  No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Transportation -- Traffic Generation Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wastewater Section below.

**II. Impacts and Permits**

A. Describe the volume (in gallons per day) and type of disposal of wastewater generation for existing and proposed activities at the project site (calculate according to 310 CMR 15.00 for septic systems or 314 CMR 7.00 for sewer systems):

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Discharge of sanitary wastewater	<u>0</u>	<u>+ 33,750±</u>	<u>33,750±</u>
Discharge of industrial wastewater	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL		<u>+ 33,750±</u>	<u>33,750±</u>
	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Discharge to groundwater	<u>0</u>	<u>0</u>	<u>0</u>
Discharge to outstanding resource water	<u>0</u>	<u>0</u>	<u>0</u>
Discharge to surface water	<u>0</u>	<u>0</u>	<u>0</u>
Discharge to municipal or regional wastewater facility	<u>0</u>	<u>+ 33,750±</u>	<u>33,750±</u>
TOTAL		<u>+ 33,750±</u>	<u>33,750±</u>

B. Is the existing collection system at or near its capacity? \_\_\_ Yes  No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

C. Is the existing wastewater disposal facility at or near its permitted capacity? \_\_\_ Yes  No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

D. Does the project site currently contain a wastewater treatment facility, sewer main, or other wastewater disposal facility, or will the project involve construction of a new facility? \_\_\_ Yes  No; if yes, describe as follows:

	<u>Permitted</u>	<u>Existing Avg Daily Flow</u>	<u>Project Flow</u>	<u>Total</u>
Wastewater treatment plant capacity (in gallons per day)	_____	_____	_____	_____

E. If the project requires an interbasin transfer of wastewater, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or new?

*(NOTE: Interbasin Transfer approval may be needed if the basin and community where wastewater will be discharged is different from the basin and community where the source of water supply is located.)*

The Project will not require an interbasin transfer of wastewater.

F. Does the project involve new sewer service by the Massachusetts Water Resources Authority (MWRA) or other Agency of the Commonwealth to a municipality or sewer district? \_\_\_ Yes X No

G. Is there an existing facility, or is a new facility proposed at the project site for the storage, treatment, processing, combustion or disposal of sewage sludge, sludge ash, grit, screenings, wastewater reuse (gray water) or other sewage residual materials? \_\_\_ Yes X No; if yes, what is the capacity (tons per day):

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Treatment	_____	_____	_____
Processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

H. Describe the water conservation measures to be undertaken by the project, and other wastewater mitigation, such as infiltration and inflow removal.

The Project will introduce new watertight sewer mains which will limit infiltration entering the sewer system onsite. Design strategies will be incorporated to promote smarter use of water within the buildings and onsite, and to reduce potable water consumption. By reducing water consumption, the project will reduce wastewater discharges.

### III. Consistency

A. Describe measures that the proponent will take to comply with applicable state, regional, and local plans and policies related to wastewater management:

The Project will comply with all applicable state, regional and local plans and policies, as required.

B. If the project requires a sewer extension permit, is that extension included in a comprehensive wastewater management plan? \_\_\_ Yes X No; if yes, indicate the EEA number for the plan and whether the project site is within a sewer service area recommended or approved in that plan:

## **TRANSPORTATION SECTION (TRAFFIC GENERATION)**

### **I. Thresholds / Permit**

- A. Will the project meet or exceed any review thresholds related to **traffic generation** (see 301 CMR 11.03(6))?  Yes \_\_\_ No; if yes, specify, in quantitative terms:

- 11.03(6)(a)6: Generation of 3,000 or more new ADT on roadways providing access to a single location.  
 11.03(6)(a)7: Construction of 1,000 or more new parking spaces at a single location.  
 11.03(6)(b)13: Generation of 2,000 or more new ADT on roadways providing access to a single location.  
 11.03(6)(b)14: Generation of 1,000 or more new ADT on roadways providing access to a single location and construction of 150 or more new parking spaces at a single location.  
 11.03(6)(b)15: Construction of 300 or more new parking spaces at a single location.

- C. Does the project require any state permits related to **state-controlled roadways**?  Yes \_\_\_ No; if yes, specify which permit:

The project will require a MassDOT Highway Access Permit

- C. If you answered "No" to both questions A and B, proceed to the **Roadways and Other Transportation Facilities Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Traffic Generation Section below.

### **II. Traffic Impacts and Permits**

- A. Describe existing and proposed vehicular traffic generated by activities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Number of parking spaces	<u>50±</u>	<u>+1,075 ±</u>	<u>1,125 ±</u>
Number of vehicle trips per day	<u>0</u>	<u>+4,384 ±</u>	<u>4,384 ±</u>
ITE Land Use Code(s):			

*Proposed:* ITE 10<sup>th</sup> Edition, LUC 710 (General Office Building) applied to 450,000 gsf.

- B. What is the estimated average daily traffic on roadways serving the site?

<u>Roadway</u>	<u>Existing</u>	<u>Change</u>	<u>Total</u>
1. <u>Route 9 – East of the South St</u>	<u>38,714±</u>	<u>+695</u>	<u>39,409±</u>
2. <u>Route 9 – West of the South</u>	<u>38,233±</u>	<u>+1,395</u>	<u>39,628±</u>
3. <u>Route 20 – East of South St</u>	<u>24,156±</u>	<u>+876</u>	<u>25,032±</u>
4. <u>Route 20 – West of Centech Blvd</u>	<u>20,013±</u>	<u>+1,424</u>	<u>21,437±</u>
5. <u>South St – North of Route 9</u>	<u>14,182±</u>	<u>+329</u>	<u>14,511±</u>
6. <u>Centech Blvd – South of Route 20</u>	<u>5,782±</u>	<u>+220</u>	<u>6,002±</u>

- C. If applicable, describe proposed mitigation measures on state-controlled roadways that the project proponent will implement:

The project will require a highway access permit and the southern portion of the Site (175,000 sf) will have direct access/egress from Route 20 via a right-in/right-out driveway (subject to MassDOT approval).

Based on preliminary discussions with MassDOT, it is anticipated that the project will be required to prepare a Road Safety Audit at the Route 9 intersection with South Street and will be responsible for the implementation of a pedestrian crossing and pedestrian traffic signal phasing at said intersection. To enhance capacity, the project is will also likely require widening of the South Street southbound approach to Route 20 to provided dedicated turn lanes. Any improvements would be designed to complement MassDOT's Route 20 pending improvement initiatives. The Proponent will continue to work with MassDOT and MEPA during the state

review process to provide a framework for project mitigation and timelines through a monitoring program.

- D. How will the project implement and/or promote the use of transit, pedestrian and bicycle facilities and services to provide access to and from the project site?

Currently, there are no transit or bike facilities within the study area. However, MassDOT is in the process of planning roadway improvements along Route 20 which are expected to be designed as a multimodal facility under MassDOT's Complete Streets guidelines.

The Project will include sidewalks along each of the proposed access roadways that will connect the existing sidewalk along South Street. Exterior bicycle racks will also be proposed onsite. The Project will review the feasibility of providing shuttle service to/from the nearby Grafton Commuter Rail Station that is located along Pine Street approximately 2 miles to the south. The Proponent will implement a Travel Demand Management (TDM) program that encourages ridesharing among tenant employees and on-site amenities that reduce vehicle trips by tenant employees.

- F. Is there a Transportation Management Association (TMA) that provides transportation demand management (TDM) services in the area of the project site? \_\_\_\_ Yes  No; if yes, describe if and how will the project will participate in the TMA:
- G. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation facilities? \_\_\_\_ Yes  No; if yes, generally describe:
- H. If the project will penetrate approach airspace of a nearby airport, has the proponent filed a Massachusetts Aeronautics Commission Airspace Review Form (780 CMR 111.7) and a Notice of Proposed Construction or Alteration with the Federal Aviation Administration (FAA) (CFR Title 14 Part 77.13, forms 7460-1 and 7460-2)?

The project will not penetrate approach airspace of any airports.

### III. Consistency

Describe measures that the proponent will take to comply with municipal, regional, state, and federal plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services:

The proposed project is located within the town's office-research zoning district with a flex-business overlay and will meet all requirements of that district. All work to be completed by the Proponent to support the project will comply with local requirements and to the extent applicable MassDOT requirements within State Highway Layout.

Pedestrian infrastructure proposed as part of the Project will consist of a sidewalk system that connects the development in Sub-District A to South Street. This will provide a pedestrian connection to area businesses and to the nearby Charles River and UMass office parks. A sidewalk will also be proposed along the access road in Sub-District B to connect to the future Route 20 sidewalk if applicable. The Project will also include exterior bicycle racks and will provide a Transportation Management Program (TMP). The Proponent will continue to work with MassDOT and MEPA during the state review process to provide a framework for project mitigation and timelines through a monitoring program.

**TRANSPORTATION SECTION (ROADWAYS AND OTHER TRANSPORTATION FACILITIES)**

**I. Thresholds**

A. Will the project meet or exceed any review thresholds related to **roadways or other transportation facilities** (see 301 CMR 11.03(6))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **roadways or other transportation facilities**? \_\_\_ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Energy Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Roadways Section below.

**II. Transportation Facility Impacts**

A. Describe existing and proposed transportation facilities in the immediate vicinity of the project site:

- B. Will the project involve any
1. Alteration of bank or terrain (in linear feet)? \_\_\_\_\_
  2. Cutting of living public shade trees (number)? \_\_\_\_\_
  3. Elimination of stone wall (in linear feet)? \_\_\_\_\_

**III. Consistency** -- Describe the project's consistency with other federal, state, regional, and local plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services, including consistency with the applicable regional transportation plan and the Transportation Improvements Plan (TIP), the State Bicycle Plan, and the State Pedestrian Plan:

**ENERGY SECTION**

**I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **energy** (see 301 CMR 11.03(7))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **energy**? \_\_\_ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Air Quality Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Energy Section below.

**II. Impacts and Permits**

A. Describe existing and proposed energy generation and transmission facilities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Capacity of electric generating facility (megawatts)	_____	_____	_____
Length of fuel line (in miles)	_____	_____	_____
Length of transmission lines (in miles)	_____	_____	_____
Capacity of transmission lines (in kilovolts)	_____	_____	_____

- B. If the project involves construction or expansion of an electric generating facility, what are:
1. the facility's current and proposed fuel source(s)?
  2. the facility's current and proposed cooling source(s)?

C. If the project involves construction of an electrical transmission line, will it be located on a new, unused, or abandoned right of way? \_\_\_ Yes \_\_\_ No; if yes, please describe:

D. Describe the project's other impacts on energy facilities and services:

**III. Consistency**

Describe the project's consistency with state, municipal, regional, and federal plans and policies for enhancing energy facilities and services:

**AIR QUALITY SECTION**

**I. Thresholds**

A. Will the project meet or exceed any review thresholds related to **air quality** (see 301 CMR 11.03(8))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **air quality**? \_\_\_ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Solid and Hazardous Waste Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Air Quality Section below.

**II. Impacts and Permits**

A. Does the project involve construction or modification of a major stationary source (see 310 CMR 7.00, Appendix A)? \_\_\_ Yes \_\_\_ No; if yes, describe existing and proposed emissions (in tons per day) of:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Particulate matter	_____	_____	_____
Carbon monoxide	_____	_____	_____
Sulfur dioxide	_____	_____	_____
Volatile organic compounds	_____	_____	_____
Oxides of nitrogen	_____	_____	_____
Lead	_____	_____	_____
Any hazardous air pollutant	_____	_____	_____
Carbon dioxide	_____	_____	_____

B. Describe the project's other impacts on air resources and air quality, including noise impacts:

**III. Consistency**

A. Describe the project's consistency with the State Implementation Plan:

B. Describe measures that the proponent will take to comply with other federal, state, regional, and local plans and policies related to air resources and air quality:

## **SOLID AND HAZARDOUS WASTE SECTION**

### **I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? \_\_\_ Yes  No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **solid and hazardous waste**? \_\_\_ Yes  No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

### **II. Impacts and Permits**

A. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of solid waste? \_\_\_ Yes \_\_\_ No; if yes, what is the volume (in tons per day) of the capacity:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Treatment, processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

B. Is there any current or proposed facility at the project site for the storage, recycling, treatment or disposal of hazardous waste? \_\_\_ Yes \_\_\_ No; if yes, what is the volume (in tons or gallons per day) of the capacity:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Recycling	_____	_____	_____
Treatment	_____	_____	_____
Disposal	_____	_____	_____

C. If the project will generate solid waste (for example, during demolition or construction), describe alternatives considered for re-use, recycling, and disposal:

D. If the project involves demolition, do any buildings to be demolished contain asbestos? \_\_\_ Yes \_\_\_ No

E. Describe the project's other solid and hazardous waste impacts (including indirect impacts):

### **III. Consistency**

Describe measures that the proponent will take to comply with the State Solid Waste Master Plan:

## **HISTORICAL AND ARCHAEOLOGICAL RESOURCES SECTION**

### **I. Thresholds / Impacts**

A. Have you consulted with the Massachusetts Historical Commission?  Yes  No; if yes, attach correspondence. For project sites involving lands under water, have you consulted with the Massachusetts Board of Underwater Archaeological Resources?  Yes  No; if yes, attach correspondence

A review of the Massachusetts Cultural Resource Information System (MACRIS) indicated that there are no historic properties or areas located on or near the Site.

A Project Notification Form (PNF) was filed with the Massachusetts Historical Commission (MHC) on November 20, 2018. The Proponent is awaiting a response letter from the MHC to confirm the Site does not meet the criteria of eligibility for listing in the State Register of Historical Places.

B. Is any part of the project site a historic structure, or a structure within a historic district, in either case listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth?  Yes  No; if yes, does the project involve the demolition of all or any exterior part of such historic structure?  Yes  No; if yes, please describe:

See response above in Section A.

C. Is any part of the project site an archaeological site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth?  Yes  No; if yes, does the project involve the destruction of all or any part of such archaeological site?  Yes  No; if yes, please describe:

See response above in Section A.

D. If you answered "No" to all parts of both questions A, B and C, proceed to the **Attachments and Certifications** Sections. If you answered "Yes" to any part of either question A or question B, fill out the remainder of the Historical and Archaeological Resources Section below.

### **II. Impacts**

Describe and assess the project's impacts, direct and indirect, on listed or inventoried historical and archaeological resources:

### **III. Consistency**

Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to preserving historical and archaeological resources:

**CERTIFICATIONS:**

1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

(Name) Worcester Telegram & Gazette (Date) 11/30/18

2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

**Signatures:**

<u>11/27/18</u>		<u>11-30-18</u>	
Date	Signature of Responsible Officer or Proponent	Date	Signature of person preparing ENF (if different from above)

<u>John I. Lebeaux</u>	<u>Michael J. Dryden</u>
Name (print or type)	Name (print or type)

<u>Town of Shrewsbury-Board of Selectmen</u>	<u>Bohler Engineering</u>
Firm/Agency	Firm/Agency

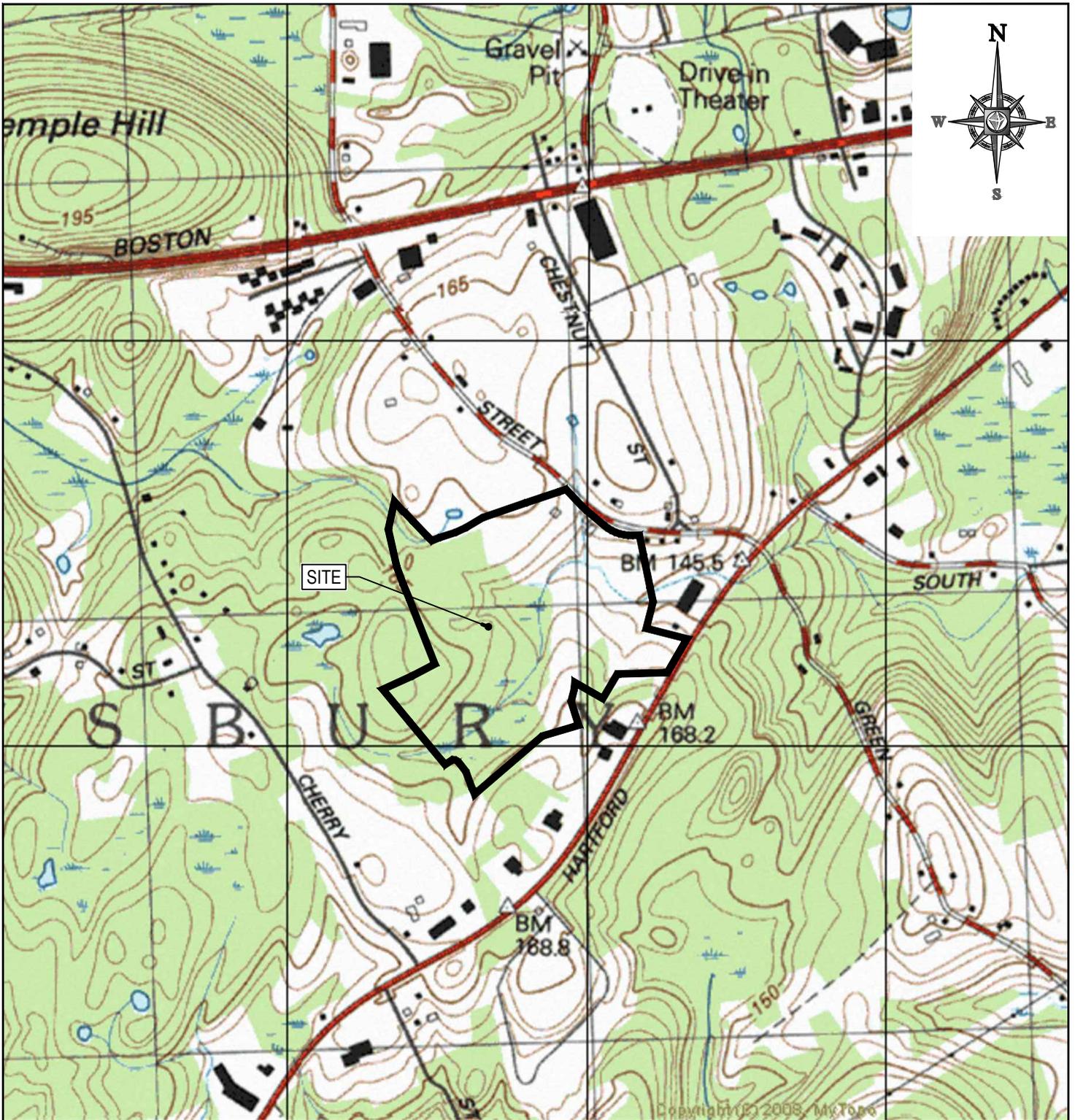
<u>100 Maple Avenue</u>	<u>352 Turnpike Road</u>
Street	Street

<u>Shrewsbury, MA 01545</u>	<u>Southborough, MA 01772</u>
Municipality/State/Zip	Municipality/State/Zip

<u>508-841-8504</u>	<u>508-480-9900</u>
Phone	Phone

## **APPENDIX A: PROJECT MAPS**

- *USGS Site Location Map*
- *Existing Conditions Map*
- *Town of Shrewsbury Zoning Map*
- *Town of Shrewsbury Flexible Development Overlay District Map*
- *Areas of Critical Concern Map*
- *Natural Heritage & Endangered Species (NHESP) Map*
- *Wetland Map*
- *Watershed Map*
- *FEM A Flood Insurance Rate (FIRM) Map*
- *Natural Resources Conservation Service (NRCS) Soil Map*



SCALE: 1"=1000'  
 PLAN REFERENCE: MARLBOROUGH, MASSACHUSETTS USGS QUADRANGLE

PROJECT: USGS MAP  
 FOR  
**CENTECH PARK NORTH**  
 MAP #42, LOT #11  
 384-386 SOUTH STREET  
 TOWN OF SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS



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◆ BOSTON, MA	◆ PITTSBURGH, PA	◆ NORTHERN VIRGINIA	◆ TAMPA, FL
◆ NEW YORK, NY	◆ LEHIGH VALLEY, PA	◆ CENTRAL VIRGINIA	◆ SOUTH FLORIDA
◆ NEW YORK METRO	◆ SOUTHEASTERN PA	◆ RALEIGH, NC	◆ DALLAS, TX
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PROJECT:

AERIAL EXHIBIT

FOR

CENTECH PARK NORTH

MAP #42, LOT #11  
384-386 SOUTH STREET  
TOWN OF SHREWSBURY  
WORCESTER COUNTY, MASSACHUSETTS



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- |                       |                       |                     |                 |
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| ◆ NEW ENGLAND         | ◆ PHILADELPHIA, PA    | ◆ SOUTHERN MARYLAND | ◆ ATLANTA, GA   |
| ◆ BOSTON, MA          | ◆ PITTSBURGH, PA      | ◆ NORTHERN VIRGINIA | ◆ TAMPA, FL     |
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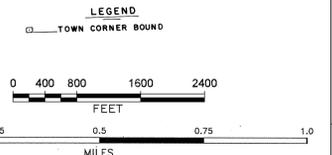
# ZONING MAP TOWN OF SHREWSBURY, MASS.

EFFECTIVE:  
AUGUST 2, 1967  
REVISED THROUGH: MAY 18, 2017



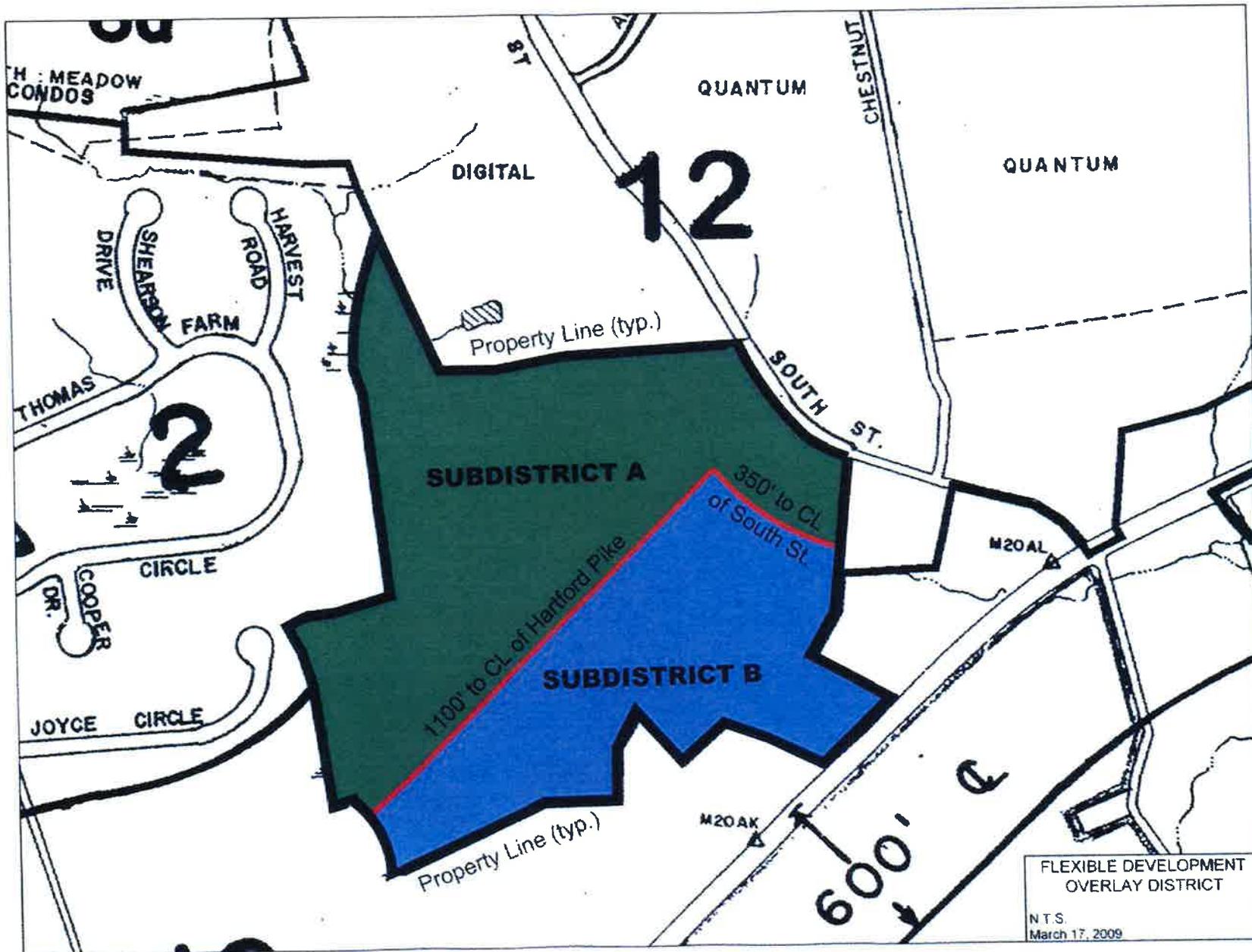
- ZONING DISTRICTS**
- 1 RURAL "A"
  - 1a RURAL "AA"
  - 2 RURAL "B"
  - 3 RESIDENCE "A"
  - 4 RESIDENCE "B-1"
  - 5 RESIDENCE "B-2"
  - 6 MF-1 GARDEN-TYPE
  - 6a MF-2 TOWNHOUSE-TYPE
  - 7 APARTMENT
  - 8 LIMITED BUSINESS
  - 9 COMMERCIAL-BUSINESS
  - 9a LIMITED COMMERCIAL-BUSINESS
  - 10 LIMITED INDUSTRIAL
  - 11 NEIGHBORHOOD BUSINESS
  - 12 OFFICE-RESEARCH
  - 12g LIMITED OFFICE-RESEARCH

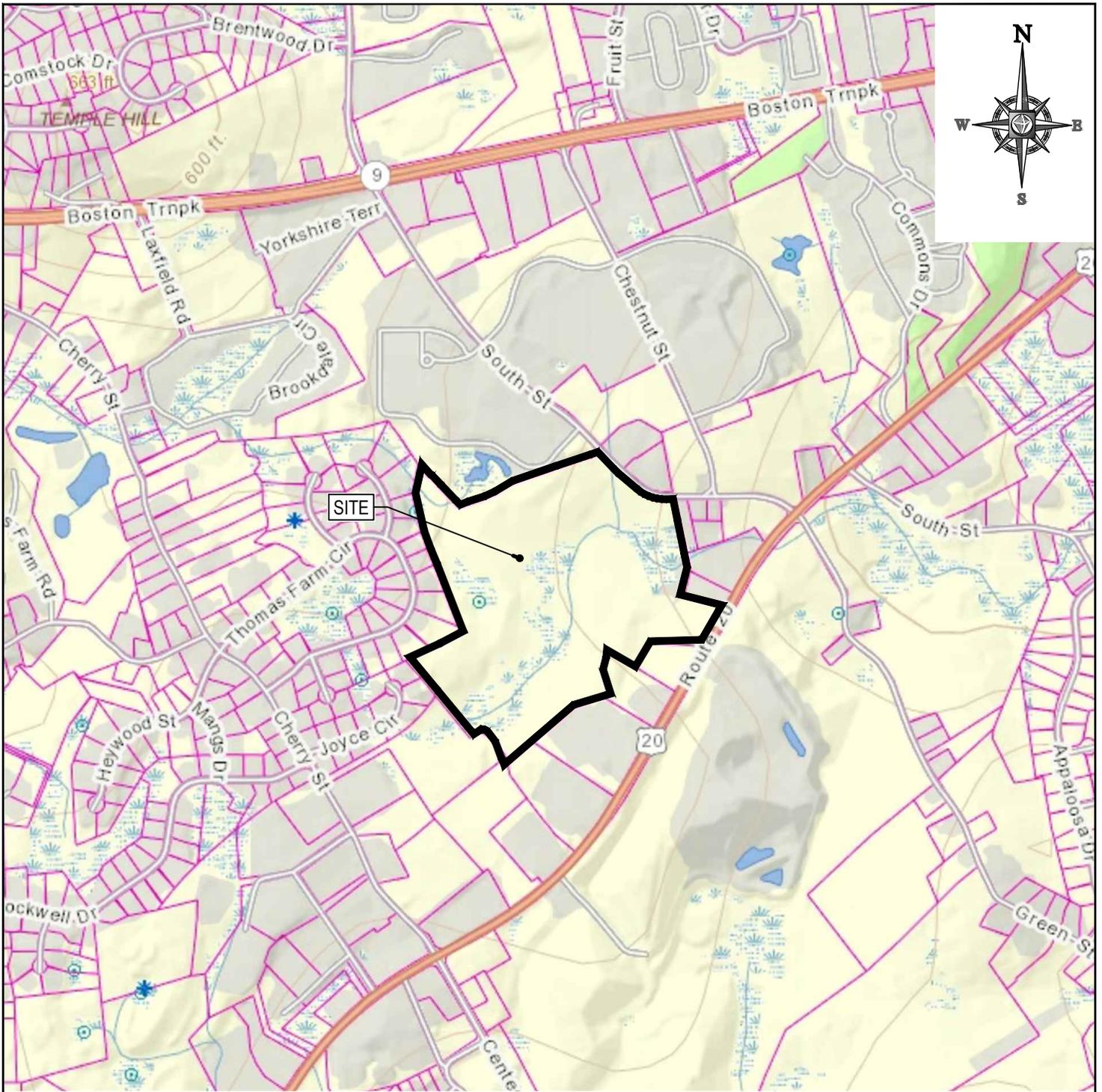
NOTE: Refer to the Zoning Bylaws for the following maps:  
 - Lakeway Overlay District  
 - Aquifer Protection Overlay District  
 - Route 20 Overlay District  
 - Edgemere Village Overlay District



Please contact the Office of the Town Clerk for additional information if the zoning line boundary cannot be determined from this map.

Prepared By  
 Engineering Department  
 Jeffrey W. Howland P.E. - Town Engineer





**LEGEND**

- AREA OF CRITICAL ENVIRONMENTAL CONCERN (NON SHOWN ON MAP EXTENTS)
- POTENTIAL VERNAL POOL (PVP)

SCALE: 1"=1000'  
 SOURCE: MASSGIS (DEPARTMENT OF CONSERVATION & RECREATION)

PROJECT:

**AREAS OF CRITICAL ENVIRONMENTAL CONCERN MAP**  
 FOR  
**CENTECH PARK NORTH**

MAP #42, LOT #11  
 384-386 SOUTH STREET  
 TOWN OF SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS

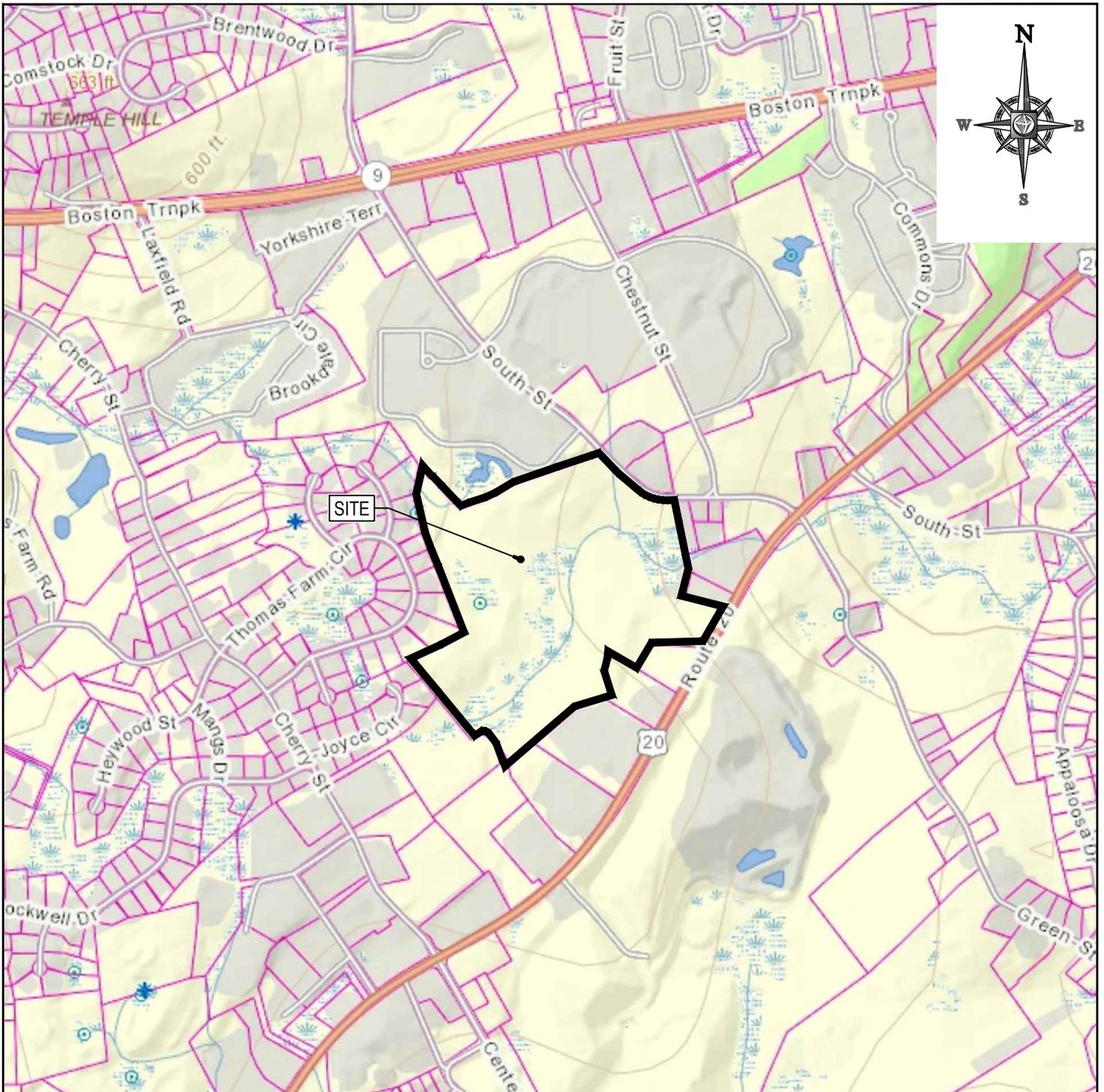


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◆ NEW YORK, NY	◆ LEHIGH VALLEY, PA	◆ CENTRAL VIRGINIA	◆ SOUTH FLORIDA
◆ NEW YORK METRO	◆ SOUTHEASTERN, PA	◆ RALEIGH, NC	◆ DALLAS, TX
◆ NORTHERN NEW JERSEY	◆ REHOBOTH BEACH, DE	◆ WASHINGTON, DC	

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**LEGEND**

-  NHESP ESTIMATED HABITATS OF RARE WILDLIFE (NON SHOWN ON MAP EXTENTS)
-  NHESP PRIORITY HABITATS OF RARE SPECIES (NON SHOWN ON MAP EXTENTS)

SCALE: 1"=1000'  
SOURCE: MASSGIS (NHESP 2008)

PROJECT:

**NATURAL HERITAGE &  
ENDANGERED SPECIES MAP**

FOR

**CENTECH PARK NORTH**

MAP #42, LOT #11  
384-386 SOUTH STREET  
TOWN OF SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS

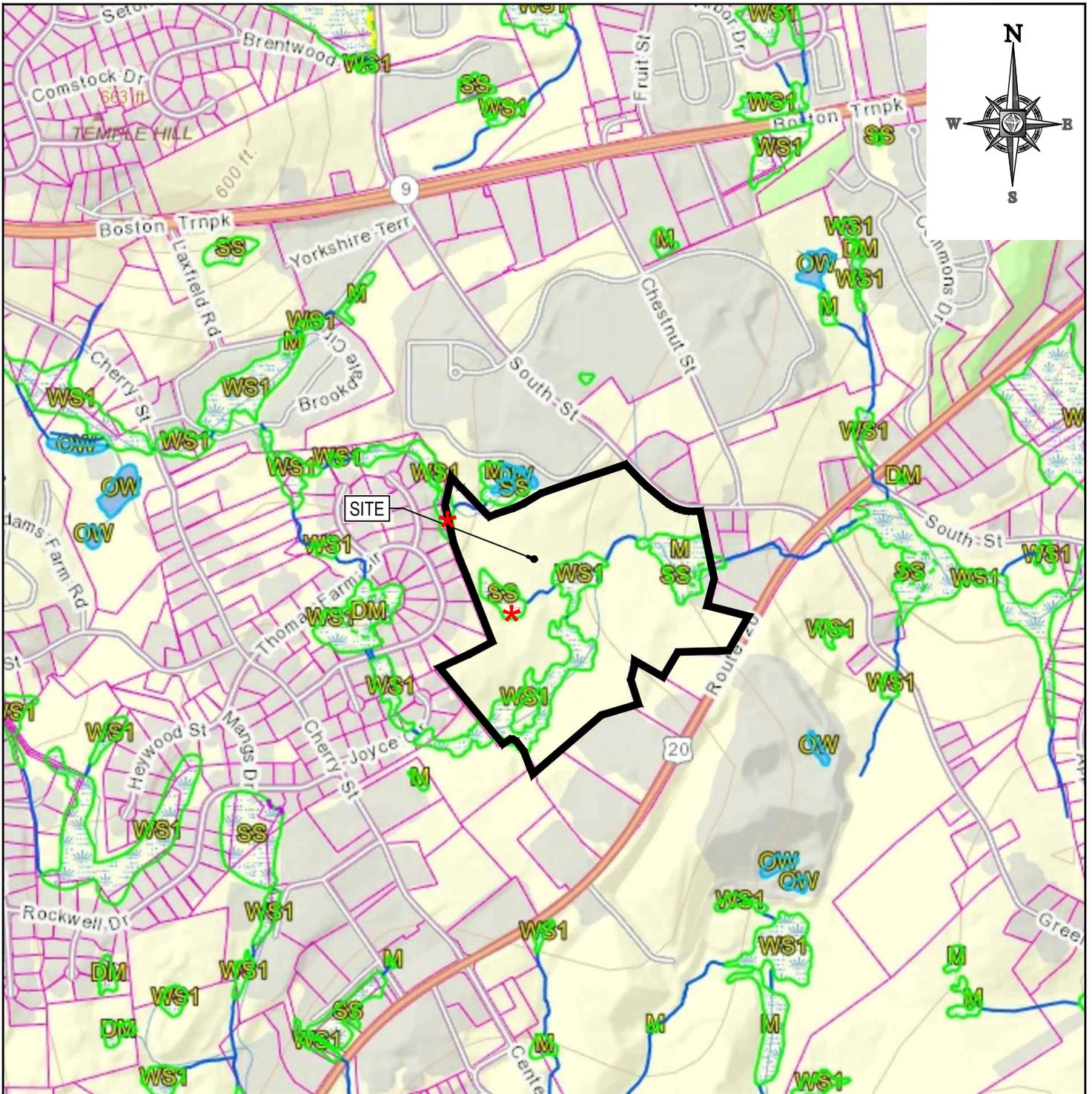


**BOHLER**  
ENGINEERING

SITE CIVIL AND CONSULTING ENGINEERING  
PROGRAM MANAGEMENT LANDSCAPE ARCHITECTURE  
SUSTAINABLE DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES

◆ UPSTATE NEW YORK	◆ SOUTHERN NEW JERSEY	◆ BALTIMORE, MD	◆ CHARLOTTE, NC
◆ NEW ENGLAND	◆ PHILADELPHIA, PA	◆ SOUTHERN MARYLAND	◆ ATLANTA, GA
◆ BOSTON, MA	◆ PITTSBURGH, PA	◆ NORTHERN VIRGINIA	◆ TAMPA, FL
◆ NEW YORK, NY	◆ LEHIGH VALLEY, PA	◆ CENTRAL VIRGINIA	◆ SOUTH FLORIDA
◆ NEW YORK METRO	◆ SOUTHEASTERN, PA	◆ RALEIGH, NC	◆ DALLAS, TX
◆ NORTHERN NEW JERSEY	◆ REHOBOTH BEACH, DE	◆ WASHINGTON, DC	

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**LEGEND:**

- SHORELINE
- HYDROLOGIC CONNECTION
- APPARENT WETLAND LIMIT
- POTENTIAL VERNAL POOL (PVP)

**ABBREVIATIONS:**

- DM DEEP MARSH
- M SHALLOW MARSH, MEADOW, OR FEN
- OW OPEN WATER
- SS SHRUB SWAMP
- WS1 WOODED SWAMP DECIDUOUS

SCALE: 1"=1000'  
SOURCE: MASSDEP ONLINE MAP VIEWER

PROJECT:

**WETLAND MAP**

FOR

**CENTECH PARK NORTH**

MAP #42, LOT #11  
384-386 SOUTH STREET  
TOWN OF SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS

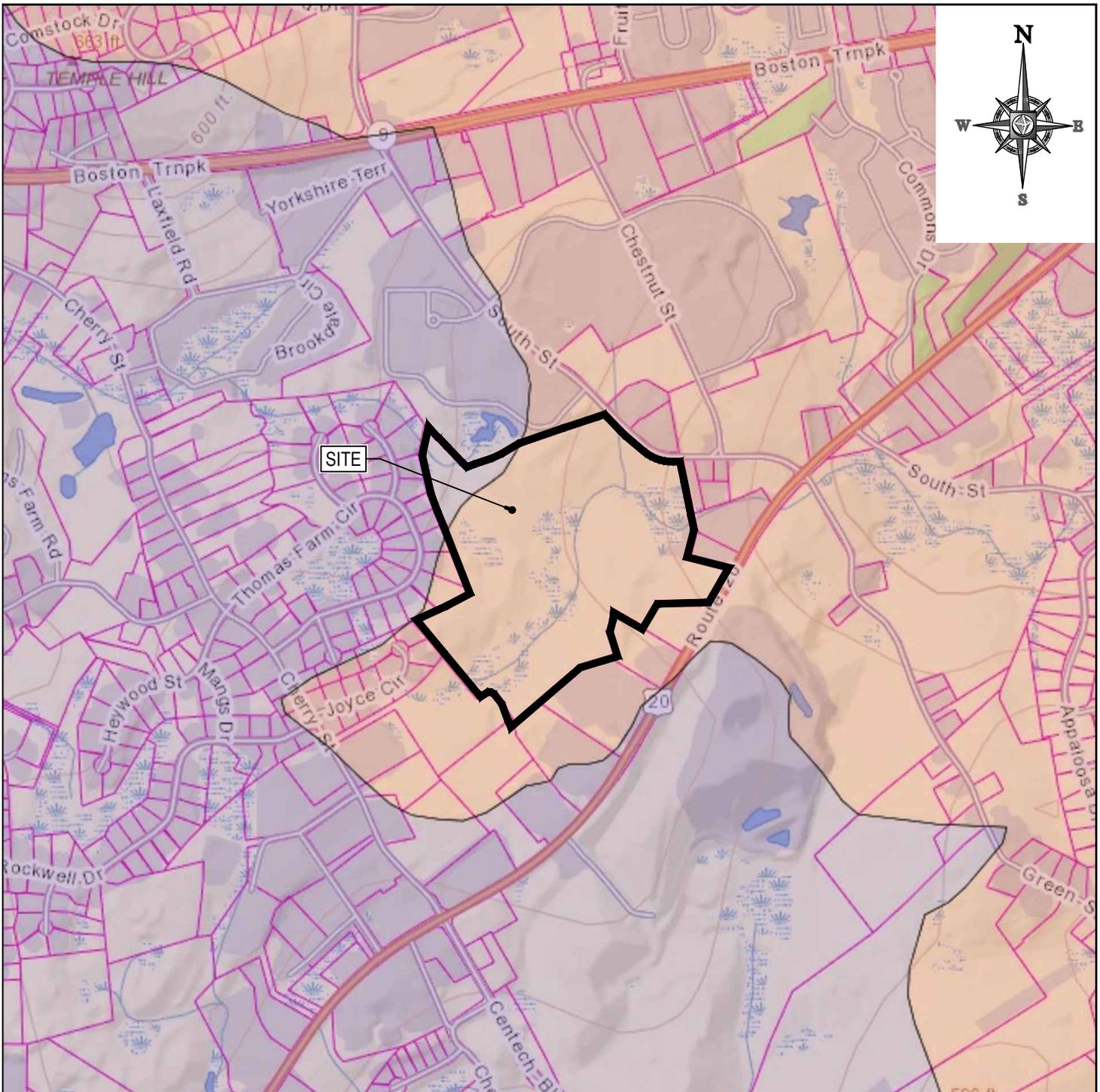


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SITE CIVIL AND CONSULTING ENGINEERING  
LAND SURVEYING PROGRAM MANAGEMENT LANDSCAPE ARCHITECTURE  
SUSTAINABLE DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES

- ◆ UPSTATE NEW YORK
- ◆ NEW ENGLAND
- ◆ BOSTON, MA
- ◆ NEW YORK, NY
- ◆ NEW YORK METRO
- ◆ NORTHERN NEW JERSEY
- ◆ SOUTHERN NEW JERSEY
- ◆ PHILADELPHIA, PA
- ◆ PITTSBURGH, PA
- ◆ LEHIGH VALLEY, PA
- ◆ SOUTHEASTERN, PA
- ◆ REHOBOTH BEACH, DE
- ◆ BALTIMORE, MD
- ◆ SOUTHERN MARYLAND
- ◆ NORTHERN VIRGINIA
- ◆ CENTRAL VIRGINIA
- ◆ RALEIGH, NC
- ◆ WASHINGTON, DC
- ◆ CHARLOTTE, NC
- ◆ ATLANTA, GA
- ◆ TAMPA, FL
- ◆ SOUTH FLORIDA
- ◆ DALLAS, TX

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**LEGEND**

- BLACKSTONE DEP 2010 WATSHED
- SuAsCo (CONCORD) DEP 2010 WATSHED

SCALE: 1"=1000'  
 SOURCE: MASSGIS (DEP 2010  
 WATERSHED DELENTATIONS)

PROJECT:

**WATERSHED MAP**  
 ——— FOR ———  
**CENTECH PARK NORTH**

MAP #42, LOT #11  
 384-386 SOUTH STREET  
 TOWN OF SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS



**BOHLER**  
**ENGINEERING**

SITE CIVIL AND CONSULTING ENGINEERING  
 LAND SURVEYING PROGRAM MANAGEMENT LANDSCAPE ARCHITECTURE  
 SUSTAINABLE DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES

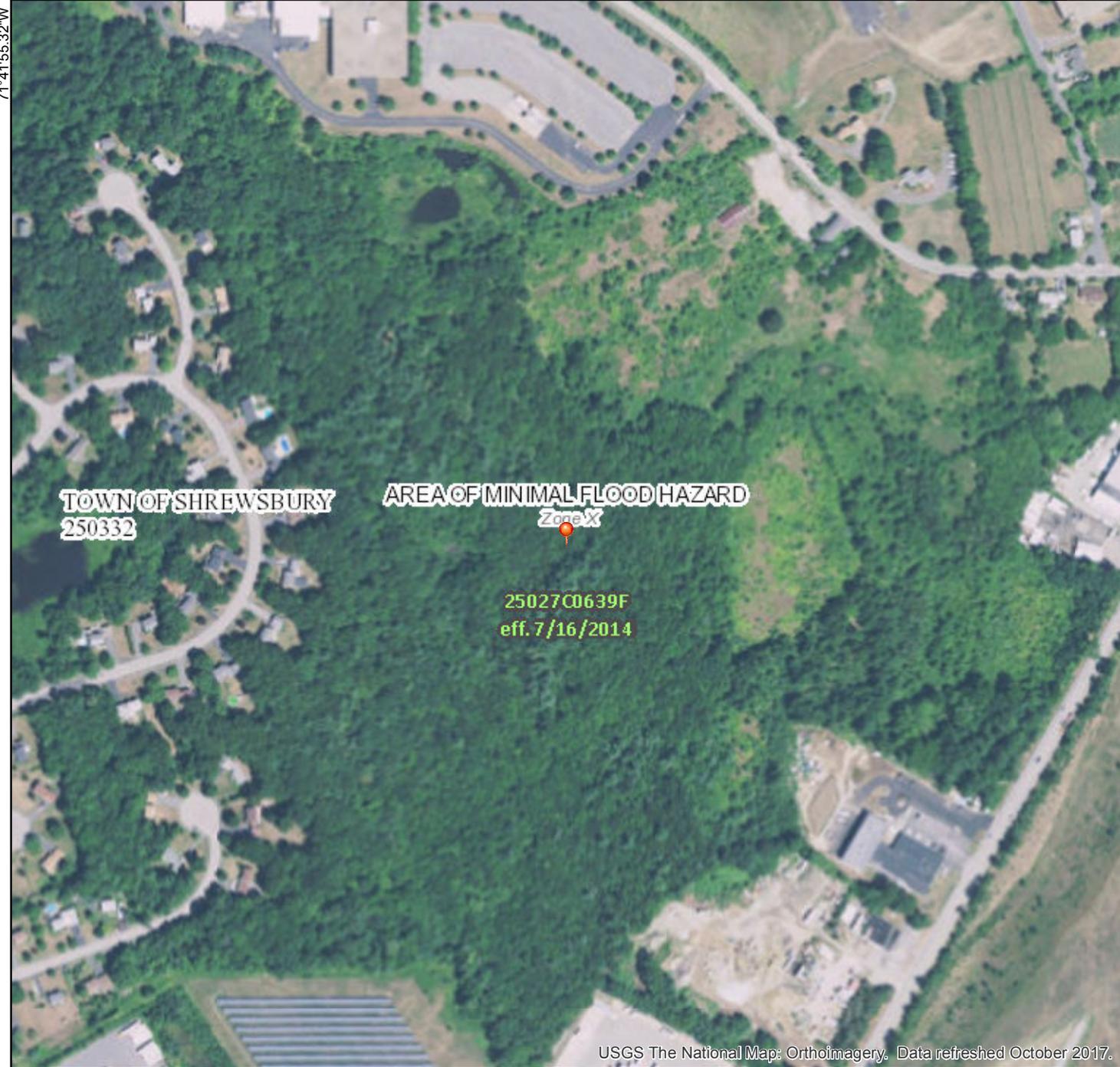
- |                       |                       |                     |                 |
|-----------------------|-----------------------|---------------------|-----------------|
| ◆ UPPSTATE NEW YORK   | ◆ SOUTHERN NEW JERSEY | ◆ BALTIMORE, MD     | ◆ CHARLOTTE, NC |
| ◆ NEW ENGLAND         | ◆ PHILADELPHIA, PA    | ◆ SOUTHERN MARYLAND | ◆ ATLANTA, GA   |
| ◆ BOSTON, MA          | ◆ PITTSBURGH, PA      | ◆ NORTHERN VIRGINIA | ◆ TAMPA, FL     |
| ◆ NEW YORK, NY        | ◆ LEHIGH VALLEY, PA   | ◆ CENTRAL VIRGINIA  | ◆ SOUTH FLORIDA |
| ◆ NEW YORK METRO      | ◆ SOUTHEASTERN, PA    | ◆ RALEIGH, NC       | ◆ DALLAS, TX    |
| ◆ NORTHERN NEW JERSEY | ◆ REHOBOTH BEACH, DE  | ◆ WASHINGTON, DC    |                 |

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# National Flood Hazard Layer FIRMette



42°16'22.75"N



71°41'55.32"W

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
OTHER FEATURES		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **11/9/2018 at 1:26:05 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



USGS The National Map: Orthoimagery. Data refreshed October 2017.

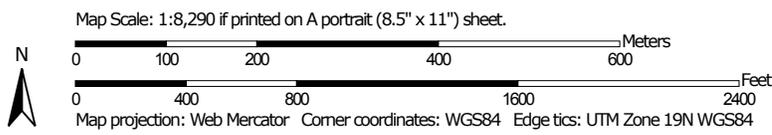
42°15'56.13"N

71°41'17.87"W

Soil Map—Worcester County, Massachusetts, Northeastern Part



Soil Map may not be valid at this scale.



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts,  
 Northeastern Part  
 Survey Area Data: Version 13, Sep 11, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

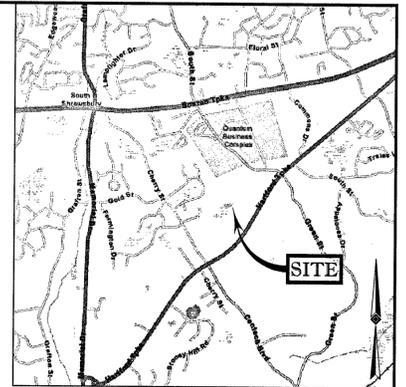
Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

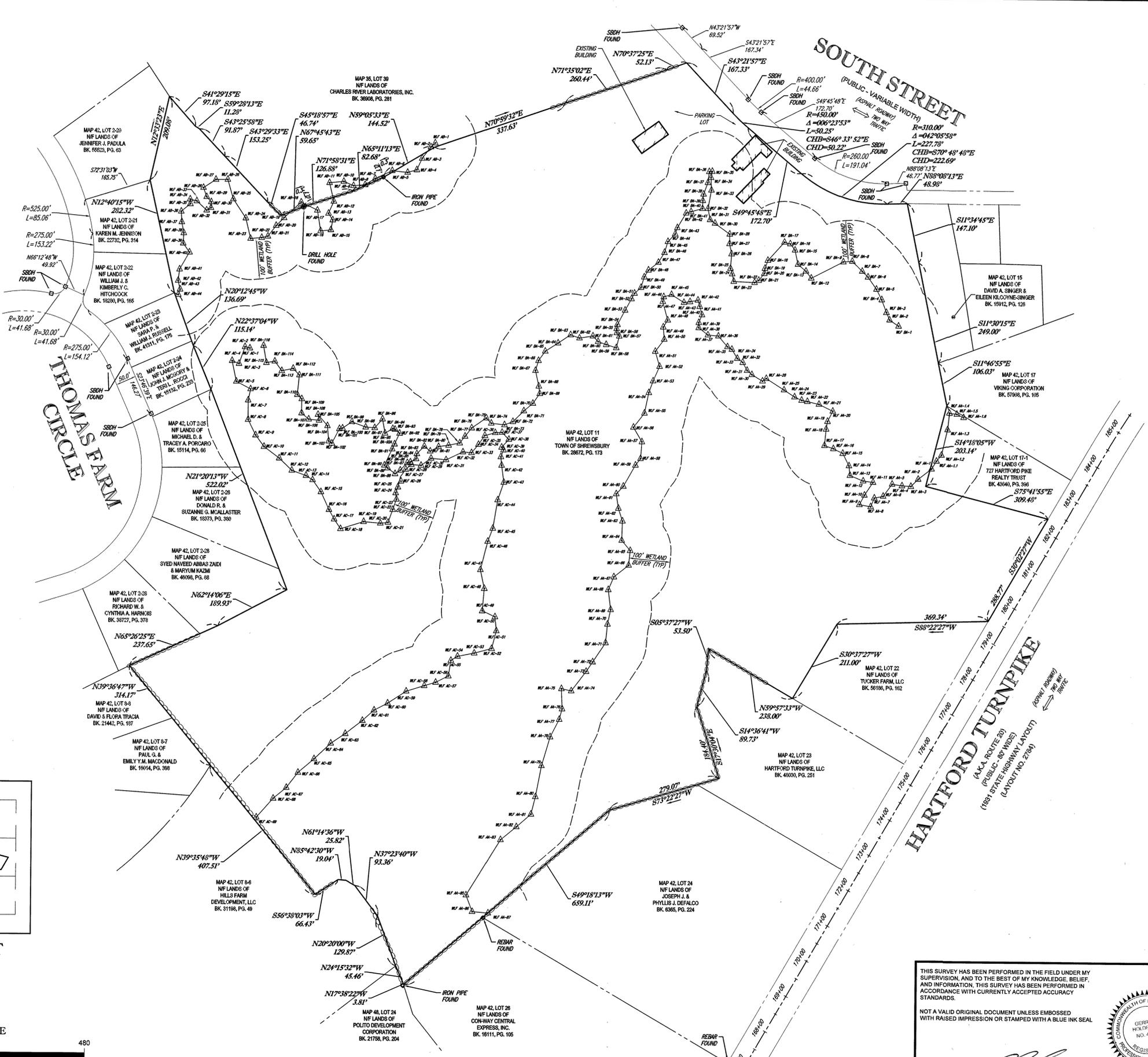
## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
71A	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	18.3	9.7%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	2.2	1.1%
72A	Whitman loam, 0 to 3 percent slopes	14.2	7.6%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	2.7	1.5%
102D	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	2.6	1.4%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	72.4	38.4%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	2.7	1.4%
306B	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	35.0	18.6%
306C	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	2.7	1.4%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	1.6	0.9%
310A	Woodbridge fine sandy loam, 0 to 3 percent slopes	0.7	0.4%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	16.0	8.5%
310C	Woodbridge fine sandy loam, 8 to 15 percent slopes	3.1	1.6%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	8.1	4.3%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	4.7	2.5%
651	Udorthents, smoothed	1.2	0.6%
<b>Totals for Area of Interest</b>		<b>188.3</b>	<b>100.0%</b>

**APPENDIX B: EXISTING AND PROPOSED CONDITIONS PLANS**

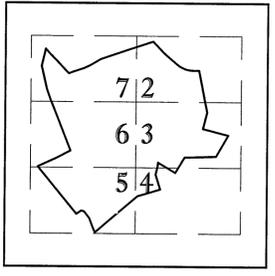


LOCUS MAP  
© 2013 ESRI WORLD STREET MAPS  
(NOT TO SCALE)

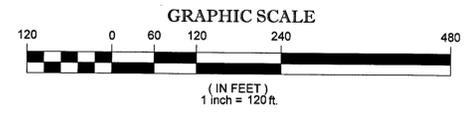


- NOTES:
- PROPERTY KNOWN AS LOT 11 AS SHOWN ON THE TOWN OF SHREWSBURY, WORCESTER COUNTY, COMMONWEALTH OF MASSACHUSETTS MAP NO. 42.
  - AREA = 2,895,896 SQUARE FEET OR 66,481 ACRES
  - LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE. LOCATIONS AND SIZES ARE BASED ON UTILITY MARK-OUTS, ABOVE GROUND STRUCTURES THAT WERE VISIBLE & ACCESSIBLE IN THE FIELD, AND THE MAPS AS LISTED IN THE REFERENCES AVAILABLE AT THE TIME OF THE SURVEY. AVAILABLE AS-BUILT PLANS AND UTILITY MARK-OUT DOES NOT ENSURE MAPPING OF ALL UNDERGROUND UTILITIES AND STRUCTURES. BEFORE ANY EXCAVATION IS TO BEGUN, ALL UNDERGROUND UTILITIES SHOULD BE VERIFIED AS TO THEIR LOCATION, SIZE AND TYPE BY THE PROPER UTILITY COMPANIES. CONTROL POINT ASSOCIATES, INC. DOES NOT GUARANTEE THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA EITHER IN SERVICE OR ABANDONED.
  - THIS PLAN IS BASED ON INFORMATION PROVIDED BY A SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC. AND OTHER REFERENCE MATERIAL AS LISTED HEREON.
  - THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND IS SUBJECT TO THE RESTRICTIONS, COVENANTS AND/OR EASEMENTS THAT MAY BE CONTAINED THEREIN.
  - BY GRAPHIC PLOTTING ONLY PROPERTY IS LOCATED IN FLOOD HAZARD ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) PER REF. #2
  - ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON GPS OBSERVATIONS UTILIZING THE KEYSTONE VRS NETWORK (KEYNETGPS).
- TEMPORARY BENCH MARKS SET:  
 TBM-A: MAG NAIL SET IN ASPHALT WALK - ELEVATION = 514.40' (SEE SHEET 2)  
 TBM-B: MAG NAIL SET IN ASPHALT WALK - ELEVATION = 527.78' (SEE SHEET 2)
- PRIOR TO CONSTRUCTION IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT THE BENCHMARKS ILLUSTRATED ON THIS SKETCH HAVE NOT BEEN DISTURBED AND THEIR ELEVATIONS HAVE BEEN CONFIRMED. ANY CONFLICTS MUST BE REPORTED PRIOR TO CONSTRUCTION.
- THE DELINEATION LINE WAS PLACED IN THE FIELD BY ECOTEC, INC. ON AUGUST 31, 2018, AND FIELD LOCATED BY CONTROL POINT ASSOCIATES, INC. ON SEPTEMBER 17, 2018.

- REFERENCES:
- THE TAX ASSESSOR'S MAP OF SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS, SHEET #42.
  - MAP ENTITLED "NATIONAL FLOOD INSURANCE PROGRAM, FIRM, FLOOD INSURANCE RATE MAP, WORCESTER COUNTY, MASSACHUSETTS (ALL JURISDICTIONS), PANEL 639 OF 1075, MAP NUMBER 25027C0639F, MAP REVISED, JULY 18, 2014.
  - MAP ENTITLED "PROPOSED LAYOUT PLAN FOR A PORTION OF SOUTH STREET FOR ACCEPTANCE AS A PUBLIC STREET, TOWN OF SHREWSBURY," PREPARED BY MOORE SURVEY & MAPPING CORP., DATED MARCH 20, 1991, RECORDED IN THE WORCESTER COUNTY REGISTRY OF DEEDS IN PLAN BOOK 649 AS PLAN 113.
  - MAP ENTITLED "PLAN OF LAND IN SHREWSBURY OWNED BY RUTH FRIARS," PREPARED BY MORAN SURVEY, DATED MARCH 28, 1975, RECORDED IN THE WORCESTER COUNTY REGISTRY OF DEEDS IN PLAN BOOK 411 AS PLAN 59.
  - MAP ENTITLED "LAND IN SHREWSBURY, MASSACHUSETTS OWNED BY HAMILTON CORPORATION OF CAMBRIDGE, INC.," PREPARED BY RENEY BROTHERS INC., DATED JUNE 20, 1975, RECORDED IN THE WORCESTER COUNTY REGISTRY OF DEEDS IN PLAN BOOK 417 AS PLAN 89.
  - MAP ENTITLED "PLAN OF LAND, SHREWSBURY, MASS AT 727 HARTFORD PIKE - ROUTE 20, OWNED BY JOSEPH J. DEFALCO ET UX.," PREPARED BY EDWARD S. HOLLAND, DATED MARCH 1979, RECORDED IN THE WORCESTER COUNTY REGISTRY OF DEEDS IN PLAN BOOK 479 AS PLAN 6.
  - SUBDIVISION PLAN OF LAND IN SHREWSBURY, MASS. (WORCESTER COUNTY), PREPARED BY MILLER & NYLANDER CO., DATED MAY 27, 1981, LAST REVISED JULY 24, 1981, RECORDED IN THE WORCESTER COUNTY REGISTRY OF DEEDS IN PLAN BOOK 488 AS PLAN 95.
  - PLAN SET ENTITLED "PRATT FARMS, PRATT FARMS ESTATES, DEFINITIVE PLAN OF LAND IN SHREWSBURY, MASSACHUSETTS, PREPARED FOR PRATT FARMS REALTY TRUST," PREPARED BY THOMPSON LITTON ASSOCIATES, INC., DATED OCTOBER 21, 1987, LAST REVISED SEPTEMBER 18, 1988, RECORDED IN THE WORCESTER COUNTY REGISTRY OF DEEDS IN PLAN BOOK 638 AS PLAN 25.
  - MAP ENTITLED "PLAN OF LAND LOCATED IN SHREWSBURY, MASSACHUSETTS, JOYCE CIRCLE, LOTS 7A, 7B, 8A & 8B," PREPARED BY S & W LANDTECH, DATED JULY 12, 1993, RECORDED IN THE WORCESTER COUNTY REGISTRY OF DEEDS IN PLAN BOOK 673 AS PLAN 6.
  - MAP ENTITLED "PLAN OF PROPERTY SURVEYED FOR EDWARD POUR, ROUTE 20 & CHERRY STREET, SHREWSBURY, MASSACHUSETTS," PREPARED BY JARVIS LAND SURVEY, DATED AUGUST 2, 1999, RECORDED IN THE WORCESTER COUNTY REGISTRY OF DEEDS IN PLAN BOOK 745 AS PLAN 58.
  - MAP ENTITLED "SHREWSBURY - 1931 STATE HIGHWAY LAYOUT," LAYOUT NO. 2764.
  - UNDERGROUND GAS FACILITY MAPPING PROVIDED BY EVERSOURCE.
  - MAP ENTITLED "RECORD PLAN OF SOUTH STREET SEWER, SHREWSBURY, MASSACHUSETTS," PREPARED BY THE TOWN OF SHREWSBURY ENGINEERING DEPARTMENT, DATED JANUARY 2015, SHEET 5 OF 6.



KEY SHEET



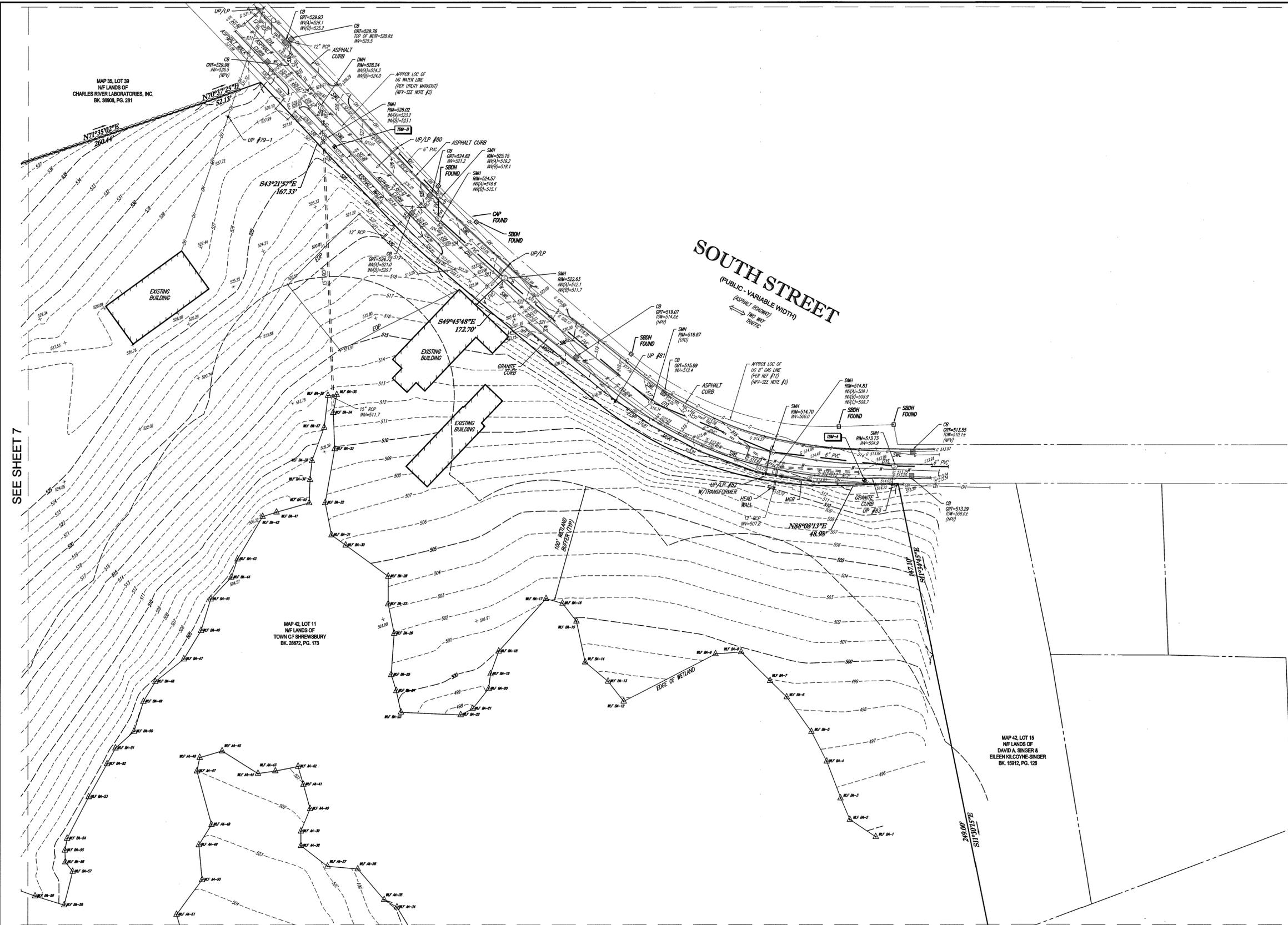
THIS SURVEY HAS BEEN PERFORMED IN THE FIELD UNDER MY SUPERVISION, AND TO THE BEST OF MY KNOWLEDGE, BELIEF, AND INFORMATION, THIS SURVEY HAS BEEN PERFORMED IN ACCORDANCE WITH CURRENTLY ACCEPTED ACCURACY STANDARDS.

NOT A VALID ORIGINAL DOCUMENT UNLESS EMBOSSED WITH RAISED IMPRESSION OR STAMPED WITH A BLUE INK SEAL

**GERRY L. HOLDRIGHT, PLS**  
 MASSACHUSETTS PROFESSIONAL LAND SURVEYOR #49211



1	REVISED PER ADDITIONAL UTILITY MAPPING	A.M.M.	G.L.H.	11-8-18	
No.	DESCRIPTION OF REVISION	FIELD CREW	DRAWN	APPROVED	DATE
1	FIELD DATE	9-17-18	<b>BOUNDARY &amp; TOPOGRAPHIC SURVEY</b>		
2	FIELD BOOK NO.	18-14MA	<b>MASSDEVELOPMENT</b>		
3	FIELD BOOK PG.	4-15	384-386 SOUTH STREET		
4	FIELD CREW	T.M./T.O.	LOT 11, MAP 42		
5	DRAWN	A.M.M.	TOWN OF SHREWSBURY, WORCESTER COUNTY		
6	REVIEWED	J.R.Z.	COMMONWEALTH OF MASSACHUSETTS		
7	APPROVED	G.L.H.	<b>CONTROL POINT ASSOCIATES, INC.</b>		
8	DATE	10-22-18	352 TURNPIKE ROAD		
9	SCALE	1"=40'	SOUTHBOROUGH, MA 01772		
10	FILE NO.	03-160198	508.948.3000 - 508.948.3003 FAX		
11	DWG. NO.	1 OF 7	ALBANY, NY 5182175010		
12			CHALFONT, PA 215720800		
13			MANHATTAN, NY 947800411		
14			MT LAUREL, NJ 609872099		
15			WARRREN, NJ 908680099		

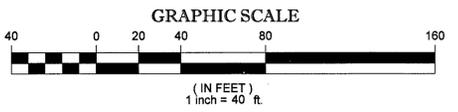


**LEGEND**

---	EXISTING CONTOUR
x	EXISTING SPOT ELEVATION
x	EXISTING TOP OF CURB ELEVATION
x	EXISTING GUTTER ELEVATION
x	EXISTING TOP OF WALL ELEVATION
x	EXISTING BOTTOM OF WALL ELEVATION
○	HYDRANT
○	WATER VALVE
—	OVERHEAD WIRES
—	APPROX. LOC. UNDERGROUND GAS LINE
—	APPROX. LOC. UNDERGROUND WATER LINE
UP #	UTILITY POLE
UP/LP #	UTILITY POLE/LIGHT POLE
MW	MONITORING WELL
□	AREA LIGHT
—	SIGN
MGR	METAL GUIDE RAIL
EOP	EDGE OF PAVEMENT
LSA	LANDSCAPED AREA
DMH	DRAINAGE/STORM MANHOLE
SMH	SANITARY/SEWER MANHOLE
CB	CATCH BASIN OR INLET
△	DELINERATION FLAG
SWL	SOLID WHITE LINE
DYL	DOUBLE YELLOW LINE
DWL	DASHED WHITE LINE
NVP	NO VISIBLE PIPE
SBDH	STONE BOUND w/DRILL HOLE
CBOH	CONC. BOUND w/DRILL HOLE
PVC	POLYVINYL CHLORIDE PIPE
INV	INVERT ELEVATION
GR	GRATE ELEVATION
●	DRILL HOLE
○	REBAR/IRON PIPE
□	STONE BOUND
○	STONE WALL
△	DELINERATION FLAG
SBDH	STONE BOUND WITH DRILL HOLE
(TYP)	TYPICAL
(TYP)	NOT FIELD VERIFIED

SEE SHEET 7

SEE SHEET 3



CONTROL POINT ASSOCIATES, INC. ALL RIGHTS RESERVED. THIS IS A PRELIMINARY SURVEY. THE ORIGINAL PRODUCT OR THE ORIGINAL DATA FROM WHICH THIS SURVEY WAS DERIVED IS THE PROPERTY OF CONTROL POINT ASSOCIATES, INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF CONTROL POINT ASSOCIATES, INC. IS PROHIBITED.

THIS SURVEY HAS BEEN PERFORMED IN THE FIELD UNDER MY SUPERVISION, AND TO THE BEST OF MY KNOWLEDGE, BELIEF, AND INFORMATION, THIS SURVEY HAS BEEN PERFORMED IN ACCORDANCE WITH CURRENTLY ACCEPTED ACCURACY STANDARDS.

NOT A VALID ORIGINAL DOCUMENT UNLESS EMBOSSED WITH RAISED IMPRESSION OR STAMPED WITH A BLUE INK SEAL

**GERRY L. HOLDRIGHT, PLS**  
MASSACHUSETTS PROFESSIONAL LAND SURVEYOR #49211

DATE: 11-8-18

FIELD DATE 9-17-18		<b>BOUNDARY &amp; TOPOGRAPHIC SURVEY</b>	
FIELD BOOK NO. 18-14MA		<b>MASSDEVELOPMENT</b>	
FIELD BOOK PG. 4-15		384-386 SOUTH STREET LOT 11, MAP 42 TOWN OF SHREWSBURY, WORCESTER COUNTY COMMONWEALTH OF MASSACHUSETTS	
FIELD CREW T.M.T.O.		<b>CONTROL POINT ASSOCIATES, INC.</b>	
DRAWN: A.M.M.		352 TURNPIKE ROAD SOUTHBOROUGH, MA 01772 508.948.3000 - 508.948.3003 FAX	
REVIEWED: J.R.Z.	APPROVED: G.L.H.	DATE 10-22-18	SCALE 1"=40'
FILE NO. 03-160198		DWG. NO. 2 OF 7	

SEE SHEET 2

MASSACHUSETTS MAINLAND STATE PLANE (MADS3)



MAP 42, LOT 17  
NF LANDS OF  
VINGING CORPORATION  
BK. 57908, PG. 105

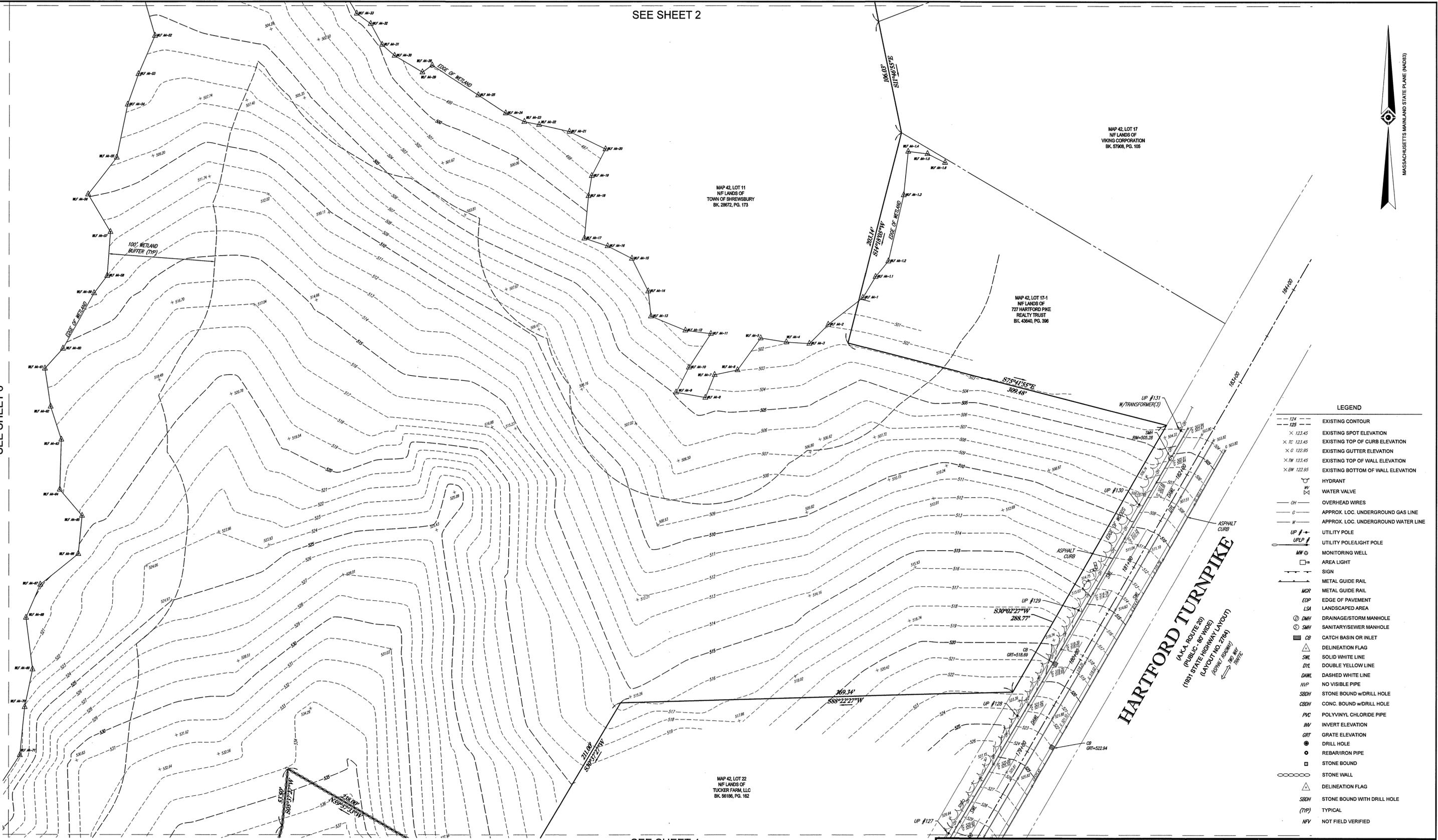
MAP 42, LOT 11  
NF LANDS OF  
TOWN OF SHREWSBURY  
BK. 28672, PG. 173

MAP 42, LOT 17-1  
NF LANDS OF  
727 HARTFORD PIKE  
REALTY TRUST  
BK. 43840, PG. 396

MAP 42, LOT 22  
NF LANDS OF  
TUCKER FARM, LLC  
BK. 56188, PG. 182

SEE SHEET 4

SEE SHEET 6

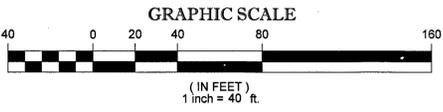


LEGEND

---	124	EXISTING CONTOUR
---	125	EXISTING CONTOUR
X	123.45	EXISTING SPOT ELEVATION
X	TC 123.45	EXISTING TOP OF CURB ELEVATION
X	G 122.85	EXISTING TOP OF GUTTER ELEVATION
X	TW 123.45	EXISTING TOP OF WALL ELEVATION
X	BW 122.95	EXISTING BOTTOM OF WALL ELEVATION
⊕		HYDRANT
WV		WATER VALVE
OH		OVERHEAD WIRES
G		APPROX. LOC. UNDERGROUND GAS LINE
W		APPROX. LOC. UNDERGROUND WATER LINE
UP #		UTILITY POLE
UP/LP #		UTILITY POLE/LIGHT POLE
MW		MONITORING WELL
AL		AREA LIGHT
S		SIGN
MGR		METAL GUIDE RAIL
EOP		EDGE OF PAVEMENT
LSA		LANDSCAPED AREA
DMH		DRAINAGE/STORM MANHOLE
SMH		SANITARY/SEWER MANHOLE
CB		CATCH BASIN OR INLET
DL		DELINEATION FLAG
SWL		SOLID WHITE LINE
DYL		DOUBLE YELLOW LINE
DWL		DASHED WHITE LINE
NVP		NO VISIBLE PIPE
SBWH		STONE BOUND w/DRILL HOLE
CBWH		CONC. BOUND w/DRILL HOLE
PVC		POLYVINYL CHLORIDE PIPE
INV		INVERT ELEVATION
GR		GRATE ELEVATION
DR		DRILL HOLE
RP		REBAR/IRON PIPE
ST		STONE BOUND
SW		STONE WALL
DL		DELINEATION FLAG
SBWH		STONE BOUND WITH DRILL HOLE
(TYP)		TYPICAL
NFV		NOT FIELD VERIFIED

**HARTFORD TURNPIKE**  
(A.L.A. ROUTE 20)  
(RUBIC. 80 WIDE)  
(LAYOUT NO. 2784)  
(ACQUAT. ROADWAY)

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**GERRY L. HOLDRIGHT, PLS**  
MASSACHUSETTS PROFESSIONAL LAND SURVEYOR #49211

FIELD DATE	9-17-18	<b>BOUNDARY &amp; TOPOGRAPHIC SURVEY</b> <b>MASSDEVELOPMENT</b> 384-386 SOUTH STREET LOT 11, MAP 42 TOWN OF SHREWSBURY, WORCESTER COUNTY COMMONWEALTH OF MASSACHUSETTS									
FIELD BOOK NO.	18-14MA										
FIELD BOOK PG.	4-15										
FIELD CREW	T.M./T.O.	<b>CONTROL POINT ASSOCIATES, INC.</b> 352 TURNPIKE ROAD SOUTHBOROUGH, MA 01772 508.948.3000 • 508.948.3003 FAX ALBANY, NY 5182175010 CHALFONT, PA 2157128800 MANHATTAN, NY 6467800411 MT LAUREL, NJ 6098572099 WARREN, NJ 9086680099									
DRAWN	A.M.M.										
DATE	11-8-18										
REVIEWED:	J.R.Z.	APPROVED:	G.L.H.	DATE	10-22-18	SCALE	1"=40'	FILE NO.	03-160198	DWG. NO.	3 OF 7

1	REVISED PER ADDITIONAL UTILITY MAPPING	A.M.M.	G.L.H.	11-8-18	
No.	DESCRIPTION OF REVISION	FIELD CREW	DRAWN	APPROVED	DATE



SEE SHEET 6

MASSACHUSETTS MAINLAND STATE PLANE (MADS)



MAP 42, LOT 8-8  
NF LANDS OF  
DAVID A. FLORA TRACIA  
BK. 21442, P.3, 157

MAP 42, LOT 8-7  
NF LANDS OF  
PAUL G. &  
EMILY M. MACDONALD  
BK. 16014, P.3, 386

MAP 42, LOT 11  
NF LANDS OF  
TOWN OF SHREWSBURY  
BK. 28672, PG. 173

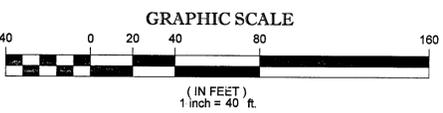
MAP 42, LOT 8-6  
NF LANDS OF  
HILLS FARM  
DEVELOPMENT, LLC  
BK. 31198, P.3, 49

MAP 42, LOT 24  
NF LANDS OF  
JOSEPH J. &  
PHYLLIS J. DEPALCO  
BK. 6366, PG. 24

MAP 42, LOT 26  
NF LANDS OF  
CONWAY CENTRAL  
EXPRESS, INC.  
BK. 18111, PG. 105

LEGEND

- 124 --- EXISTING CONTOUR
- 125 --- EXISTING SPOT ELEVATION
- × 123.45 EXISTING TOP OF CURB ELEVATION
- × 10. 123.45 EXISTING GUTTER ELEVATION
- × 6. 122.85 EXISTING TOP OF WALL ELEVATION
- × 17. 123.45 EXISTING BOTTOM OF WALL ELEVATION
- × BW 122.85 EXISTING BOTTOM OF WALL ELEVATION
- HYDRANT
- WATER VALVE
- OH --- OVERHEAD WIRES
- APPROX. LOC. UNDERGROUND GAS LINE
- W --- APPROX. LOC. UNDERGROUND WATER LINE
- UP --- UTILITY POLE
- UPLP --- UTILITY POLE/LIGHT POLE
- MW ○ MONITORING WELL
- AREA LIGHT
- SIGN
- METAL GUIDE RAIL
- MGR --- METAL GUIDE RAIL
- EDP --- EDGE OF PAVEMENT
- LSA --- LANDSCAPED AREA
- DMH --- DRAINAGE/STORM MANHOLE
- SMH --- SANITARY/SEWER MANHOLE
- CB --- CATCH BASIN OR INLET
- △ DELINEATION FLAG
- SWL --- SOLID WHITE LINE
- DYL --- DOUBLE YELLOW LINE
- DWL --- DASHED WHITE LINE
- NVP --- NO VISIBLE PIPE
- SBWH --- STONE BOUND w/DRILL HOLE
- CBWH --- CONC. BOUND w/DRILL HOLE
- PVC --- POLYVINYL CHLORIDE PIPE
- INV --- INVERT ELEVATION
- GRT --- GRATE ELEVATION
- DRILL HOLE
- REBAR/IRON PIPE
- STONE BOUND
- STONE WALL
- △ DELINEATION FLAG
- SBWH --- STONE BOUND WITH DRILL HOLE
- (TP) --- TYPICAL
- NFV --- NOT FIELD VERIFIED



N85°42'30"W 19.04'  
N61°14'36"W 25.82'  
66.43'  
S56°38'12"W  
N17°23'10"W 92.36'

N20°20'00"W 129.87'

N24°15'32"W 45.46'

N17°38'22"W 3.81'  
IRON PIN FOUND

N39°35'48"W 407.51'

N39°36'47"W 314.17'

100' WETLAND BUFFER (TYP)

659.11'  
S49°18'12"W

REBAR FOUND

STONE WELL

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GERRY L. HOLDRIGHT, PLS  
MASSACHUSETTS PROFESSIONAL LAND SURVEYOR #49211

DATE 11-0-18

FIELD DATE 9-17-18  
FIELD BOOK NO. 18-14MA  
FIELD BOOK PG. 4-15

BOUNDARY & TOPOGRAPHIC SURVEY  
**MASDEVELOPMENT**  
384-386 SOUTH STREET  
LOT 11, MAP 42  
TOWN OF SHREWSBURY, WORCESTER COUNTY  
COMMONWEALTH OF MASSACHUSETTS

FIELD CREW T.M.T.O.  
DRAWN BY A.M.M.  
REVIEWED BY J.R.Z.  
APPROVED BY G.L.H.  
DATE 10-22-18  
SCALE 1"=40'  
FILE NO. 03-160198  
DWG. NO. 5 OF 7

1	REVISED PER ADDITIONAL UTILITY MAPPING	A.M.M.	G.L.H.	11-8-18
No.	DESCRIPTION OF REVISION	FIELD CREW	DRAWN	APPROVED

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SEE SHEET 7

THOMAS FARM  
CIRCLE

MAP 42, LOT 2-24  
NF LANDS OF  
JOHN J. MCGORY &  
TERI L. ROCCI  
BK. 15132, PG. 233

MAP 42, LOT 2-25  
NF LANDS OF  
MICHAEL D. &  
TRACEY A. PORCARO  
BK. 15114, PG. 66

MAP 42, LOT 2-26  
NF LANDS OF  
DONALD R. &  
SUZANNE G. MCALLASTER  
BK. 15373, PG. 380

MAP 42, LOT 2-28  
NF LANDS OF  
SYED NAVEED AHMAD ZADI  
& MARIAM KAZMI  
BK. 46096, PG. 88

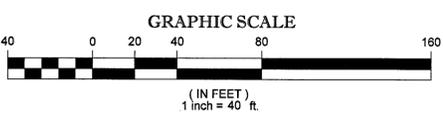
MAP 42, LOT 2-29  
NF LANDS OF  
RICHARD W. &  
CYNTHIA A. HARNON  
BK. 38721, PG. 378

MAP 42, LOT 11  
NF LANDS OF  
TOWN OF SHREWSBURY  
BK. 28672, PG. 173

- LEGEND
- - - 124 - - - EXISTING CONTOUR
  - - - 125 - - - EXISTING CONTOUR
  - X 123.45 EXISTING SPOT ELEVATION
  - X TO 123.45 EXISTING TOP OF CURB ELEVATION
  - X G 122.85 EXISTING GUTTER ELEVATION
  - X TW 123.45 EXISTING TOP OF WALL ELEVATION
  - X BW 122.85 EXISTING BOTTOM OF WALL ELEVATION
  - HYDRANT
  - WV WATER VALVE
  - OH OVERHEAD WIRES
  - G APPROX. LOC. UNDERGROUND GAS LINE
  - W APPROX. LOC. UNDERGROUND WATER LINE
  - UP / - - - UTILITY POLE
  - UPLP / - - - UTILITY POLE/LIGHT POLE
  - MW G MONITORING WELL
  - AREA LIGHT
  - SIGN
  - MGR METAL GUIDE RAIL
  - EDP EDGE OF PAVEMENT
  - LSA LANDSCAPED AREA
  - DMH DRAINAGE/STORM MANHOLE
  - SMH SANITARY/SEWER MANHOLE
  - CB CATCH BASIN OR INLET
  - △ DELINEATION FLAG
  - SWL SOLID WHITE LINE
  - DYL DOUBLE YELLOW LINE
  - DWL DASHED WHITE LINE
  - NIP NO VISIBLE PIPE
  - SBWH STONE BOUND w/DRILL HOLE
  - CBWH CONC. BOUND w/DRILL HOLE
  - PVC POLYVINYL CHLORIDE PIPE
  - INV INVERT ELEVATION
  - GRT GRATE ELEVATION
  - DRILL HOLE
  - REBAR/IRON PIPE
  - STONE BOUND
  - STONE WALL
  - △ DELINEATION FLAG
  - SBWH STONE BOUND WITH DRILL HOLE
  - (TYP) TYPICAL
  - NFV NOT FIELD VERIFIED

SEE SHEET 3

SEE SHEET 5



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GERRY L. HOLDRIGHT, PLS  
MASSACHUSETTS PROFESSIONAL LAND SURVEYOR #49211

FIELD DATE 9-17-18	BOUNDARY & TOPOGRAPHIC SURVEY	
FIELD BOOK NO. 18-14MA	MASSEVELOPMENT	
FIELD BOOK PG. 4-15	384-386 SOUTH STREET LOT 11, MAP 42 TOWN OF SHREWSBURY, WORCESTER COUNTY COMMONWEALTH OF MASSACHUSETTS	
FIELD CREW T.M./T.O.	CONTROL POINT ASSOCIATES, INC.	
DRAWN: A.M.M.	355 TURNPIKE ROAD SOUTHBOROUGH, MA 01772 508.948.3000 - 508.948.3003 FAX	
REVIEWED: J.R.Z.	APPROVED: G.L.H.	DATE 10-22-18
SCALE 1"=40'	FILE NO. 03-160198	DWG. NO. 6 OF 7

1	REVISED PER ADDITIONAL UTILITY MAPPING	A.M.M.	G.L.H.	11-8-18
No.	DESCRIPTION OF REVISION	FIELD CREW	DRAWN	APPROVED

**LEGEND**

--- 124 ---	EXISTING CONTOUR	△	DELINEATION FLAG
× 123.45	EXISTING SPOT ELEVATION	SWL	SOLID WHITE LINE
× TC 123.45	EXISTING TOP OF CURB ELEVATION	DYL	DOUBLE YELLOW LINE
× G 122.85	EXISTING GUTTER ELEVATION	DLWL	DASHED WHITE LINE
× TW 123.45	EXISTING TOP OF WALL ELEVATION	NVP	NO VISIBLE PIPE
× BW 122.85	EXISTING BOTTOM OF WALL ELEVATION	SBDH	STONE BOUND w/DRILL HOLE
○	HYDRANT	CBDH	CONC. BOUND w/DRILL HOLE
○	WATER VALVE	PVC	POLYVINYL CHLORIDE PIPE
— OH —	OVERHEAD WIRES	INV	INVERT ELEVATION
— G —	APPROX. LOC. UNDERGROUND GAS LINE	GRT	GRATE ELEVATION
— W —	APPROX. LOC. UNDERGROUND WATER LINE	○	DRILL HOLE
UP	UTILITY POLE	○	REBAR/IRON PIPE
ULP	UTILITY POLE/LIGHT POLE	□	STONE BOUND
MW	MONITORING WELL	○	STONE WALL
□	AREA LIGHT	△	DELINEATION FLAG
—	SIGN	SBDH	STONE BOUND WITH DRILL HOLE
MGR	METAL GUIDE RAIL	(TYP)	TYPICAL
EOP	EDGE OF PAVEMENT	NFY	NOT FIELD VERIFIED
LSA	LANDSCAPED AREA		
DMH	DRAINAGE/STORM MANHOLE		
SMH	SANITARY/SEWER MANHOLE		
CB	CATCH BASIN OR INLET		

MAP 36, LOT 38  
NF LANDS OF  
CHARLES RIVER LABORATORIES, INC.  
BK. 38908, PG. 281

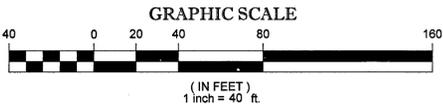
MAP 42, LOT 230  
NF LANDS OF  
JENNIFER J. PADULA  
BK. 66623, PG. 63

MAP 42, LOT 221  
NF LANDS OF  
KAREN M. JOHNSON  
BK. 22732, PG. 314

MAP 42, LOT 222  
NF LANDS OF  
WILLIAM J. &  
KIMBERLY C.  
HITCHCOCK  
BK. 18280, PG. 185

MAP 42, LOT 223  
NF LANDS OF  
SARA P. &  
WILLIAM J. RUSSELL  
BK. 41311, PG. 176

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SEE SHEET 6

SEE SHEET 2

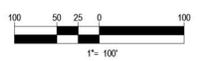
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GERRY L. HOLDRIGHT, PLS  
MASSACHUSETTS PROFESSIONAL LAND SURVEYOR #49211

FIELD DATE 9-17-18	<b>BOUNDARY &amp; TOPOGRAPHIC SURVEY</b>			
FIELD BOOK NO. 18-14MA	<b>MASSDEVELOPMENT</b>			
FIELD BOOK PG. 4-15	384-386 SOUTH STREET LOT 11, MAP 42 TOWN OF SHREWSBURY, WORCESTER COUNTY COMMONWEALTH OF MASSACHUSETTS			
FIELD CREW T.M./T.O.	<b>CONTROL POINT ASSOCIATES, INC.</b>			
DRAWN A.M.M.	ALBANY, NY 5182175010 CHALFONT, PA 2157128800 332 TURNPIKE ROAD SOUTHBOROUGH, MA 01772 508.948.3000 - 508.948.3003 FAX MANHATTAN, NJ 6098780411 MT LAUREL, NJ 609872009 WARREN, NJ 9086680099			
REVIEWED J.R.Z.	APPROVED G.L.H.	DATE 10-22-18	SCALE 1"=40'	FILE NO. 03-160198
				DWG. NO. 7 OF 7

1	REVISED PER ADDITIONAL UTILITY MAPPING	A.M.M.	G.L.H.	11-4-18
No.	DESCRIPTION OF REVISION	FIELD CREW	DRAWN	APPROVED



**BOHLER ENGINEERING**

SITE CIVIL AND CONSULTING ENGINEERING ARCHITECTURE  
 LAND SURVEYING DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES  
 SUSTAINABLE DESIGN

• BALTIMORE, MD  
 • CHARLOTTE, NC  
 • CHICAGO, IL  
 • COLUMBIA, SC  
 • DALLAS, TX  
 • DENVER, CO  
 • HOUSTON, TX  
 • LOS ANGELES, CA  
 • MIAMI, FL  
 • MINNEAPOLIS, MN  
 • NEW YORK, NY  
 • PHILADELPHIA, PA  
 • RICHMOND, VA  
 • SOUTH BEND, IN  
 • TAMPA, FL  
 • WASHINGTON, DC

REVISIONS			
REV	DATE	COMMENT	BY
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

**PRELIMINARY**

PROJECT No: W181144  
 DRAWN BY: GJZ  
 CHECKED BY: MJD  
 DATE: 11/30/2018  
 SCALE: AS NOTED  
 CAD I.D.: W181144CB0-REND

**PROJECT: SITE DEVELOPMENT PLANS FOR CENTECH PARK NORTH**

LOCATION OF SITE  
 MAP #42, LOT #11  
 384-386 SOUTH STREET  
 TOWN OF SHREWSBURY  
 WORCESTER COUNTY,  
 MASSACHUSETTS

**BOHLER ENGINEERING**

352 TURNPIKE ROAD  
 SOUTHBOROUGH, MA 01772  
 Phone: (508) 480-9900  
 Fax: (508) 480-9080  
[www.BohlerEngineering.com](http://www.BohlerEngineering.com)

**NORTH DEVELOPMENT AREA (SUBDISTRICT A)**

KEY	FLOORPLATE	STORIES	GROSS SF	PARKING SPACES
A	15,000 SF	1.5	25,000 SF	63 SPACES
B	13,000 SF	1.5	21,000 SF	53 SPACES
C	20,000 SF	1.5	35,000 SF	88 SPACES
D	40,000 SF	4	160,000 SF	400 SPACES
E	20,000 SF	1.5	34,000 SF	85 SPACES
TOTAL	108,400 SF	N/A	275,000 SF	689 SPACES

**SOUTH DEVELOPMENT AREA (SUBDISTRICT B)**

KEY	FLOORPLATE	STORIES	GROSS SF	PARKING SPACES
F	10,000 SF	1.5	15,000 SF	38 SPACES
G	30,000 SF	4	120,000 SF	300 SPACES
H	20,000 SF	2	40,000 SF	100 SPACES
TOTAL	60,000 SF	N/A	175,000 SF	438 SPACES

SHEET TITLE: **CONCEPTUAL MASTER PLAN**

SHEET NUMBER: **1** OF 1

REV 0 - 11/30/2018

**APPENDIX C: SUPPLEMENTAL INFORMATION (BY OTHERS)**

- “Transportation Scoping Letter – Proposed Centech Park North”, prepared by MDM Transportation Consultants, Inc., dated 11/19/18.
- “Wetland Resource Evaluation, Allen Farm, South Street, Shrewsbury, MA”, prepared by EcoTec, Inc., dated 10/24/18.
- “Report of Geotechnical Investigations”, prepared by Whitestone Associates, Inc., dated 11/12/18.

November 19, 2018

Mr. Lionel Lucien  
Manager, Public/Private Development Unit Office of Transportation Planning  
10 Park Plaza Room 4150  
Boston, MA 02116

Re: **Transportation Scoping Letter – Proposed Centech Park North**  
Route 20 at South Street, Shrewsbury, Massachusetts

Dear Mr. Lucien,

On behalf of the Town of Shrewsbury (the Proponent), MDM has prepared this Transportation Scoping Letter (TSL) to outline the technical assumptions and key transportation matters that will be addressed in a Transportation Impact and Access Study (TIAS) for the above-referenced Project.

### **Proposed Development**

The Site comprises approximately 66.5± acres bounded by Route 20 to the south and South Street to the east in Shrewsbury, Massachusetts. The location of the site relative to adjacent roadways is shown in **Figure 1**. The property includes 3 vacant structures associated with former agricultural use, a paved parking area and undeveloped land. Site access/egress currently includes two full access/egress driveways along South Street.

A Master Plan is being advanced for the property under which a total yield of approximately 450,000 sf of commercial space at the property is envisioned with up to 275,000± sf of commercial space buildings being developed via a full access driveway along South Street (Sub-District A) and up to 175,000± sf of commercial space buildings being developed with right-in/right out access via a driveway along Route 20 (Sub-District B). The full buildout of approximately 450,000 sf is the subject of the forthcoming ENF filing. Anticipated land uses may include a range of business uses including research and development, warehouse/distribution, light industrial and office. The Proponent is currently applying for a MassWorks grant to construct a development roadway with access at South Street and associated infrastructure.

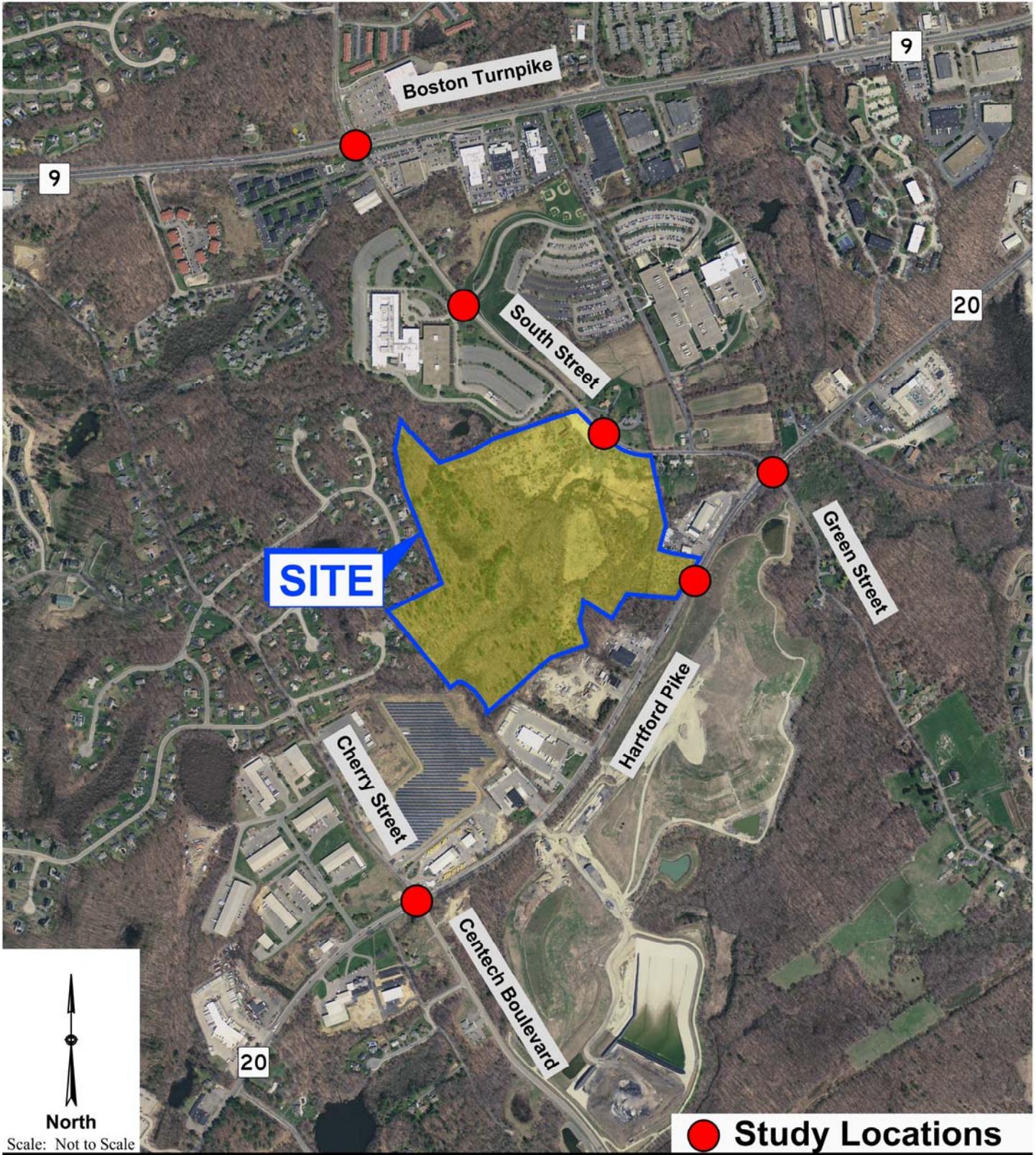


Figure 1

### **Study Area Network & Analysis Periods**

The TIAS will evaluate transportation characteristics of roadways and intersections that provide a primary means of access to the site, and that are likely to sustain a measurable level of traffic impact from the development. MDM proposes the study area includes the following intersections, which represent locations at which additional project traffic for approximately 450,000 sf development represent increases of 5 percent or more over existing traffic volumes:

- Route 9 (Boston Turnpike) at South Street (Signalized)
- Route 20 (Hartford Turnpike) at South Street/Green Street (Signalized)
- Route 20 (Hartford Turnpike) at Centech Boulevard/Cherry Street (Signalized)
- South Street at Charles River Labs/Umass Campus Access Road (Unsignalized)
- Proposed Site Driveway at South Street
- Proposed Site Driveway at Route 20 (Hartford Turnpike)

Traffic-volume data used in the TIAS will include counts obtained by mechanical and manual methods in October 2018. Automatic traffic recorder counts (ATRs) were conducted along South Street and Route 20 while manual turning movement counts (TMCs) were conducted at the study intersections. Traffic data were collected during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods. These hours represent the combination of busiest activity periods of the site and adjacent roadway network. Permanent count station data (see **Attachments**) for the area indicate that October is an above-average month; however, as a conservative measure, no seasonal adjustments are applied. Existing traffic volumes for proposed study area intersections are presented in **Figure 2** and **Figure 3**.

### **Trip Generation**

Future Build condition traffic volumes are developed by estimating the number of peak-hour trips expected to be generated by the proposed development and distributing this additional traffic onto the local roadway network. These future development-related trips are added to future No-Build traffic volumes to evaluate future traffic operations with the proposed development in place. The methodology utilized to estimate the future trip-generation characteristics of the proposed approximate 450,000 sf development are summarized below; initial trip estimates are also provided for the 275,000 sf buildout associated with the MassWorks grant for reference.

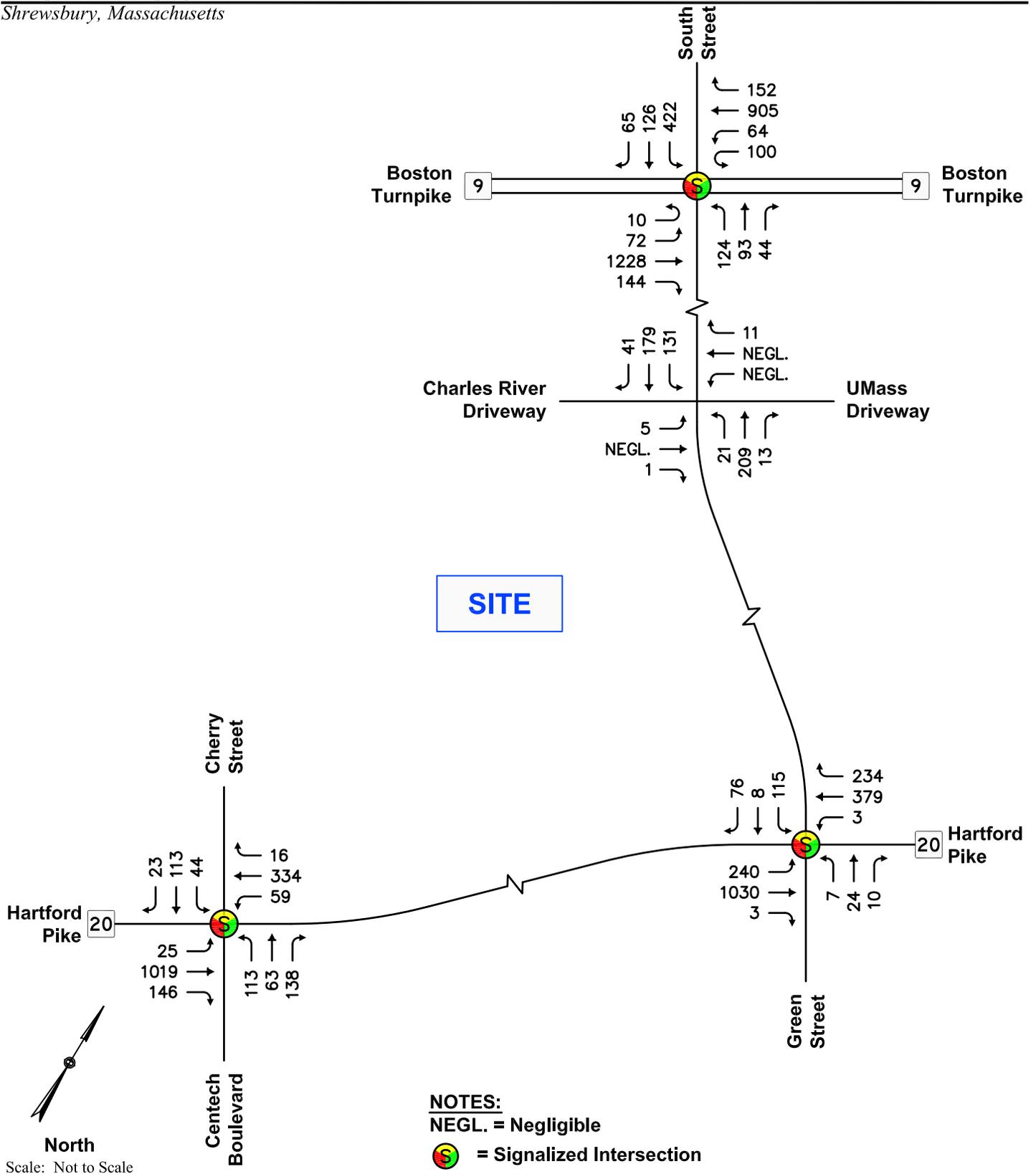


Figure 2

**2018 Existing Condition  
 Weekday Morning Peak Hour  
 Traffic Volumes**

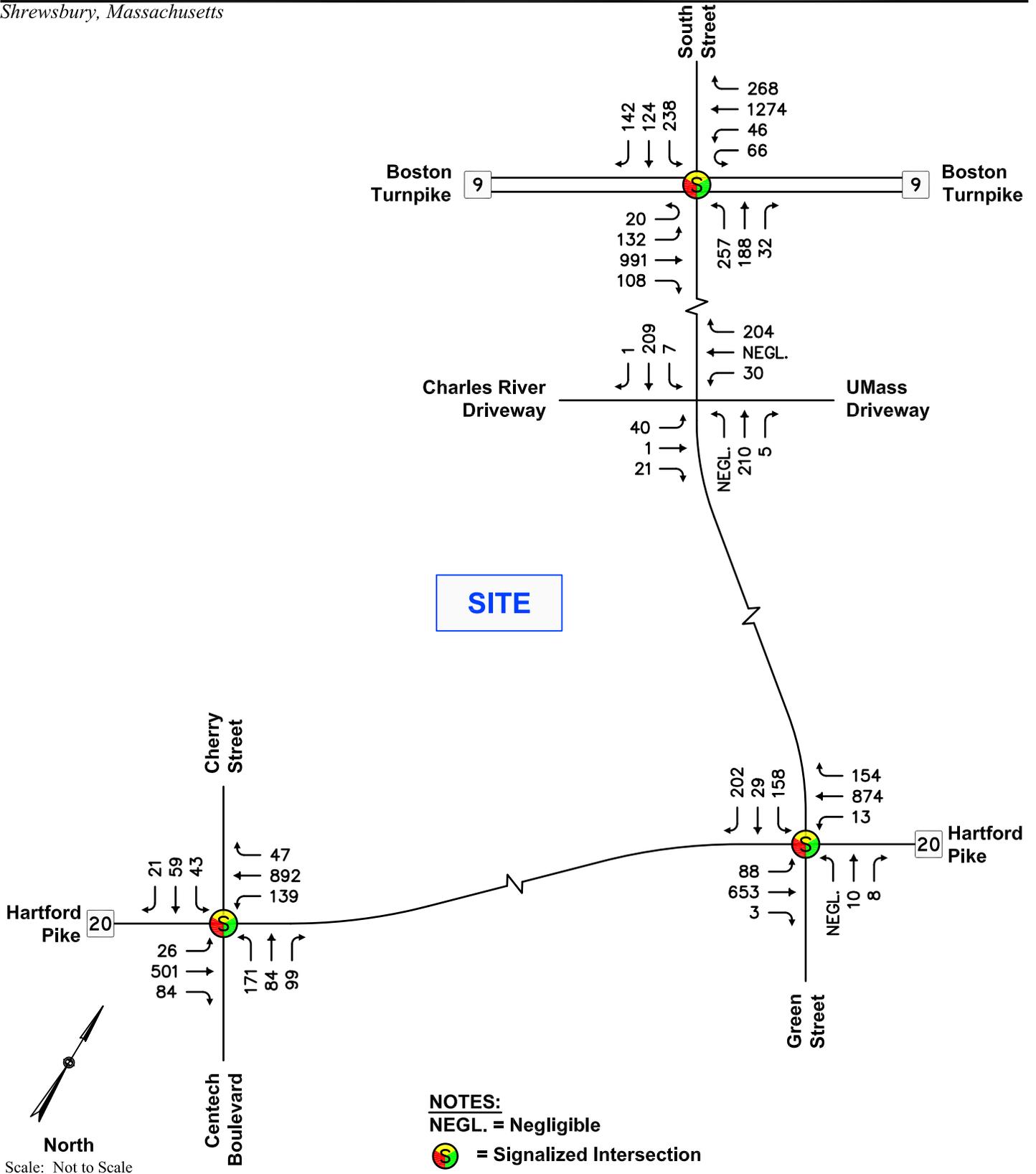


Figure 3

**2018 Existing Condition  
 Weekday Evening Peak Hour  
 Traffic Volumes**

In accordance with EEA/MassDOT guidelines, the traffic generated by the proposed development was estimated using trip rates published in ITE’s *Trip Generation* (10<sup>th</sup> Edition) for relevant Land Use Codes (LUCs) that include General Office (LUC 710) and Research and Development (LUC 760). Since no specific tenant information is available at this time, for planning purposes the higher of the two LUC trip estimates is selected as the basis for ENF filing and analysis to present a conservative assessment. Results comparing trip generation for general office and R&D land use categories are summarized in **Table 1** (proposed approximate 450,000 sf development) and **Table 2** (MassWorks Grant). The **Attachments** contain the relevant ITE Trip Generation 10<sup>th</sup> Edition worksheets.

**TABLE 1**  
**TRIP-GENERATION COMPARISON (Master Plan)**

Peak Hour/Direction	SITE TRIPS	
	General Office (450 ksf) <sup>1</sup>	R&D (450 ksf) <sup>2</sup>
<i>Weekday Morning Peak Hour:</i>		
Entering	449	324
<u>Exiting</u>	<u>73</u>	<u>66</u>
Total	522	390
<i>Weekday Evening Peak Hour:</i>		
Entering	83	77
<u>Exiting</u>	<u>435</u>	<u>403</u>
Total	518	480
<i>Weekday Daily (24 hours)</i>	4,384	4,808

Source: ITE *Trip Generation*, Tenth Edition; 2017.  
<sup>1</sup>ITE LUC 710 – General Office applied to 450,000± gsf.  
<sup>2</sup>ITE LUC 760 – R&D Office applied to 450,000± gsf.

**TABLE 2**  
**TRIP-GENERATION COMPARISON (MassWorks Grant)**

Peak Hour/Direction	SITE TRIPS	
	General Office (275 ksf) <sup>1</sup>	R&D (275 ksf) <sup>2</sup>
<i>Weekday Morning Peak Hour:</i>		
Entering	274	210
<u>Exiting</u>	<u>45</u>	<u>43</u>
Total	319	253
<i>Weekday Evening Peak Hour:</i>		
Entering	51	48
<u>Exiting</u>	<u>265</u>	<u>250</u>
Total	316	298
<i>Weekday Daily (24 hours)</i>	2,678	3,018

Source: ITE Trip Generation, Tenth Edition; 2017.

<sup>1</sup>ITE LUC 710 – General Office applied to 275,000± gsf

<sup>2</sup>ITE LUC 760 – R&D Office applied to 275± gsf

As summarized in **Table 1**, under the Master Plan scenario, an approximate 450,000 sf development program assuming the higher-generating general office land use category is estimated to generate approximately 522 vehicle trips during the weekday morning peak hour (449 entering and 73 exiting) and 518 vehicle trips during the weekday evening peak hour (83 entering and 435 exiting). On a daily basis, the development is estimated to generate approximately 4,384 vehicle trips on a weekday.

Under the MassWorks Grant which will be used to construct a development roadway with access at South Street and associated infrastructure, the proposed approximate 275,000 sf development assuming the higher-generating general office land use category is estimated to generate approximately 319 vehicle trips during the weekday morning peak hour (274 entering and 45 exiting) and 316 vehicle trips during the weekday evening peak hour (51 entering and 265 exiting). On a daily basis, the development is estimated to generate approximately 2,678 vehicle trips on a weekday.

Trip generation estimates presented above are based on the anticipated maximum development programming for the Site and will be further refined during the MEPA process as more definitive Site layout plans are developed.

### Trip Distribution

The directional distribution of development-generated trips on the roadway network is a function of a number of variables including employee place of residence, existing travel patterns along area roadways, and the efficiency of these roadways leading to the site. Journey to Work data published by the US Census, existing travel patterns in the area including the adjacent Charles River and UMass Campuses, driveway restrictions, and area roadway infrastructure will serve as the primary basis for determining the employee trip distribution pattern for the proposed Site. Preliminary trip distribution calculations for the Site are summarized in **Table 3** with supporting worksheets provided in the **Attachments**.

**TABLE 3  
 TRIP-DISTRIBUTION PATTERNS**

Roadway Segment	Office Uses <sup>2</sup>	
	Enter	Exit
Route 20 (East)	25%	15%
Route 20 (West)	15%	50%
Route 9 (East)	5%	15%
Route 9 (West)	40%	10%
South Street (North)	10%	5%
Cherry Street (North)	NEGL	NEGL
Green Street (South)	NEGL.	NEGL.
<u>Centech Boulevard (South)</u>	<u>5%</u>	<u>5%</u>
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>

<sup>1</sup>Existing travel patterns and Journey to Work Census 2010 data for workers within Shrewsbury.

Application of the above trip distribution patterns to projected trips for the approximate 450,000 sf development scenario result in relative trip increases identified in **Figure 4** and **Figure 5**.

### Mode Split

There are currently no available transit options in the immediate vicinity of the Site and no mode share adjustments are proposed. The existing pedestrian system serving the study area is limited and the existing network of sidewalks and crosswalks will be documented in the study. There are no formal bicycle accommodations within the study area. The TIAS will document currently available pedestrian and bicycle accommodations and volumes.

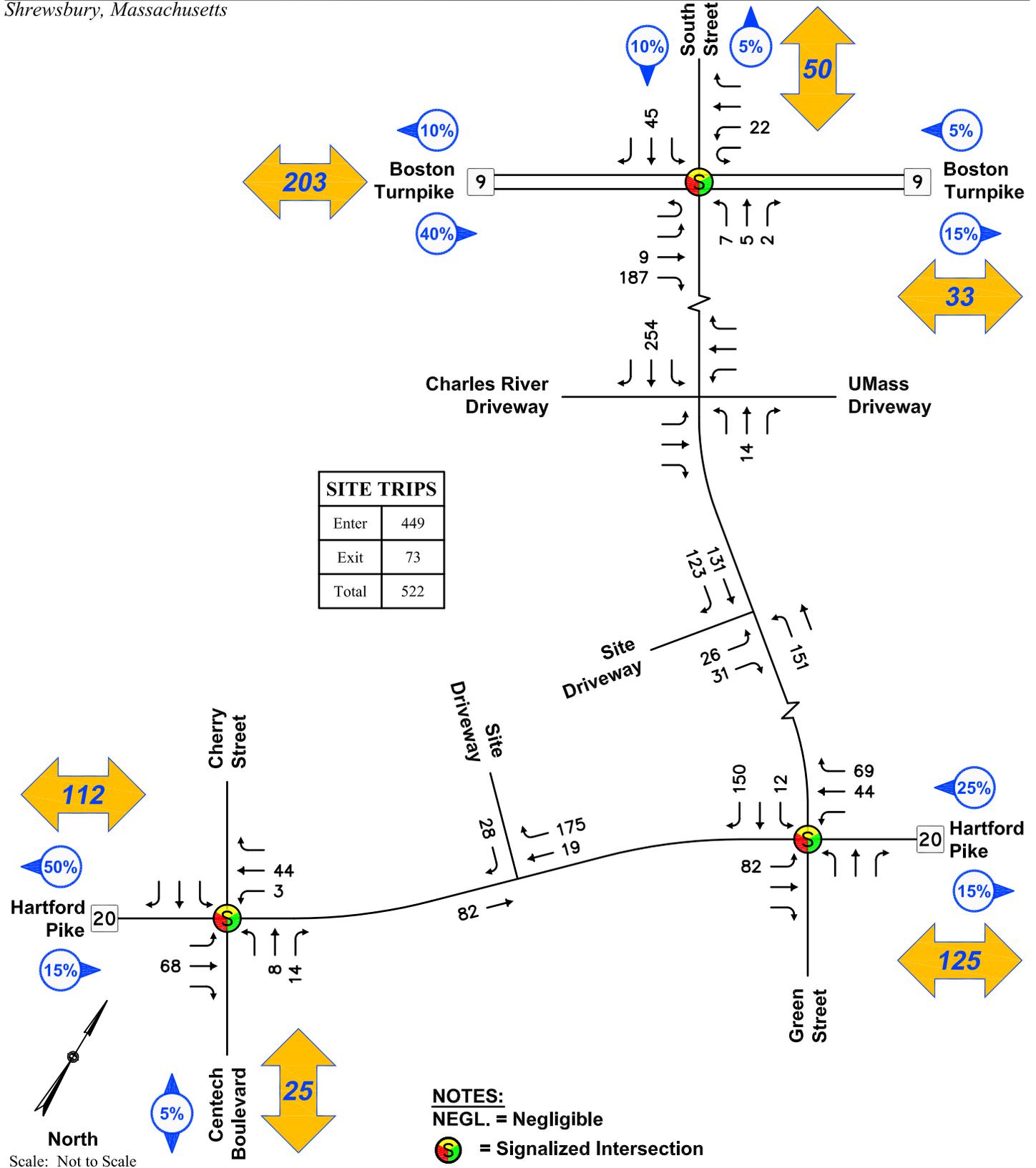


Figure 4

**Site Generated Trips  
 Weekday Morning Peak Hour  
 Traffic Volumes**

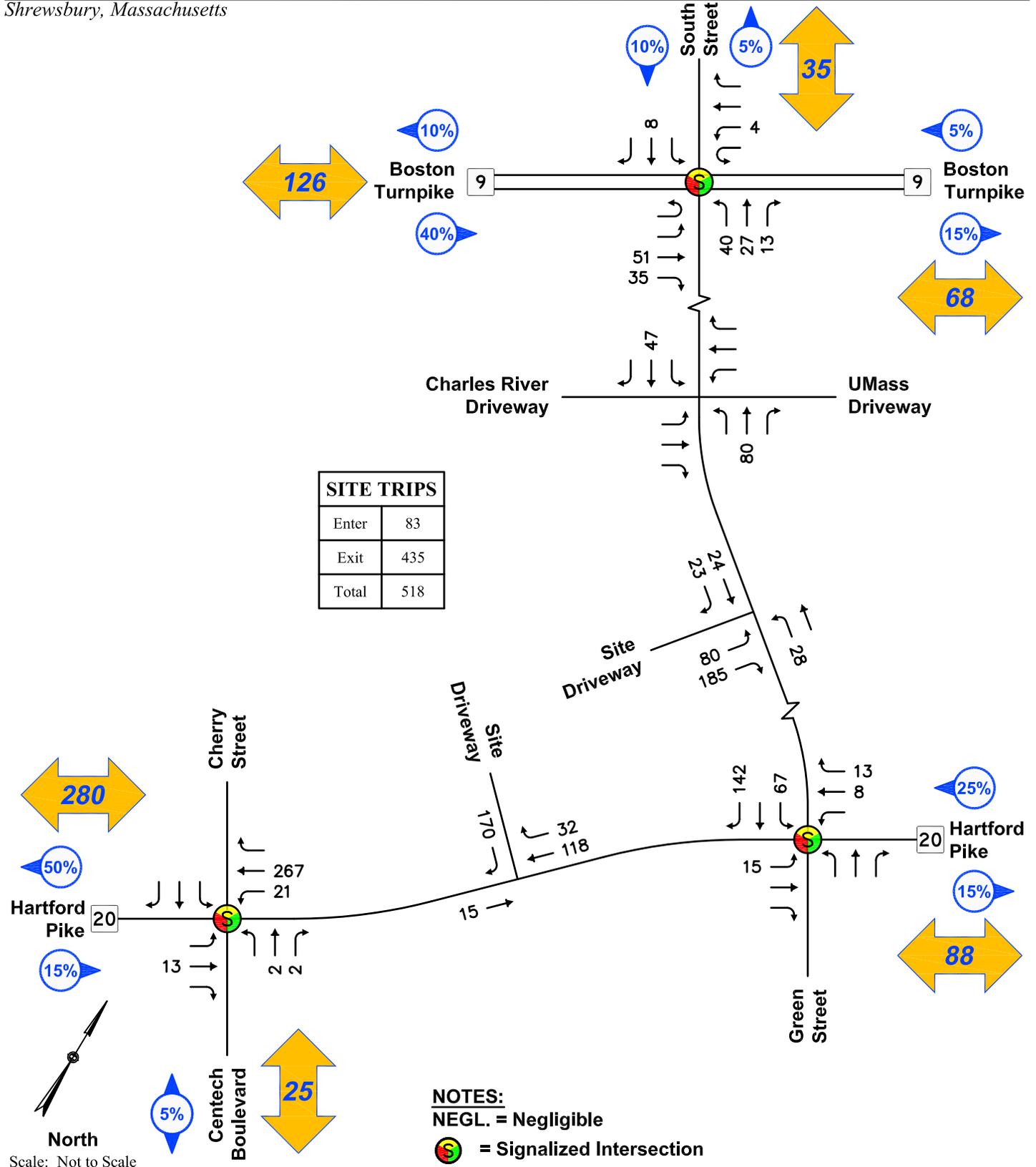


Figure 5

**Site Generated Trips  
 Weekday Evening Peak Hour  
 Traffic Volumes**

## Background Growth

Background traffic includes demand generated by other planned developments in the area as well as demand increases caused by external factors. External factors are general increases in traffic not attributable to a specific development and are determined using historical data.

Nearby permanent count station data published by MassDOT indicates a -0.65 percent per year growth rate. For purposes of this evaluation, a 0.5-percent compounded annual growth rate is proposed (3.6 percent increase over a 7-year horizon). This growth rate is higher than historic rates and is also expected to account for any small fluctuation in hourly traffic as may occur from time to time in the study area and traffic associated with other potential small developments or vacancies in the area. MassDOT permanent count station data and background growth calculations are provided in the **Attachments**.

Based on a review of MEPA files, consultation with the Town of Shrewsbury planning department, and consultation with Grafton and Northborough planning staff there are several vacancies and site-specific projects in the study area that may also modestly increase traffic at the study intersections as follows:

- *The Pointe at Hills Farm*. The residential project is currently permitted to include 280 apartment units to be located along Route 20 in Shrewsbury between the two Stoney Hill Road connections. The site-specific trip tracings were obtained from the TIAS prepared by Tetra Tech in November 2015. Trips for this project will be included in the future No-Build traffic volume networks.
- *Charles River Laboratories*. The Charles River building at 334 South Street in Shrewsbury includes 412,000± sf of R&D space which is currently half vacant based on discussions with the Town. To account for the full occupancy of the building, trips will be added based on the existing trip generation rates and distribution patterns for the building. Trips for this project will be included in the future No-Build traffic volume networks.
- *University of Massachusetts Office*. The UMass buildings at 333 South Street in Shrewsbury include 664,000± sf of Office/R&D space which is currently ¼ vacant based on discussions with the Town. To account for the full occupancy of the buildings, trips will be added based on the existing trip generation rates and distribution patterns for the buildings. Trips for this project will be included in the future No-Build traffic volume networks.
- *UPS Grafton*. UPS is in discussions with the Town of Grafton to develop a 900,000± sf facility within Centech Park location on Centennial Drive. The project is preliminary and no formal site plans or filings have occurred, therefore, trips for this project will not be included in the future No-Build traffic volume networks.

Mr. Lucien  
November 19, 2018  
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In summary, to account for future traffic growth in the study area future No-Build traffic volumes will be developed by increasing the existing (2018) volumes by approximately 3.6 percent (0.5 percent compounded annually over 7 years) and adding trips associated with the proposed Point at Hills Farm project as well as vacancies for Charles River Laboratories and UMass both located along South Street.

### **Long Range Route 20 Improvements**

Based on a preliminary meeting held with MassDOT District 3 staff on Wednesday October 31, 2018, MassDOT is currently planning improvements along Route 20 in the study area which would include adding additional capacity to the system with improvements to include a four lane cross-section. The Proponent will work with MassDOT to provide a project that is compatible and cohesive with the long range improvements planned for the area.

### **Conclusions**

Based on the preliminary information presented in this TSL, we respectfully request your feedback on the TIAS scope. If you have any questions or need additional information to review the TSL, please contact me at 508-303-0370 x104 or via e-mail.

Sincerely,



Robert J. Michaud, P.E.  
Managing Principal

Cc: J. Robida, MassDOT District 3  
K. Las, Town of Shrewsbury  
File

# ATTACHMENTS

- Seasonal/ Yearly Growth Data
- Trip Generation
- Trip Distribution Calculations
  - Existing Patterns
  - Charles River Patterns
  - UMass Patterns
  - Journey to Work Data

□ Seasonal Data/ Yearly Growth

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 307 - WESTBOROUGH - RTE.9 - EAST OF NORTHBOROUGH T.L.														
YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
07	47,505	47,283	49,268	49,136	50,000	52,000	53,000	52,322	49,031	50,571	49,662	47,007	49,732	
	-4%	-2%	-3%	1%	1%	-4%	-8%	-7%	-1%	-3%	-4%	-1%	-3%	
08	45,614	46,112	47,829	49,816	50,518	49,936	48,629	48,759	48,531	49,009	47,490	46,696	48,245	
	-3%	1%	-3%	-2%	-2%	0%	-2%	-3%	-2%	-1%	0%	2%	-1%	
09	44,103	46,434	46,455	49,049	49,474	49,934	47,638	47,056	47,762	48,663	47,379	47,564	47,626	
	-1%	0%	2%	0%	0%	1%	-1%	1%	1%	1%	2%	2%	1%	
11	43,244	46,150	48,016	48,943	49,781	50,525	46,812	48,234	48,825	49,198	49,151	49,888	48,231	
	7%	2%	1%	-1%	1%	-1%	3%	4%	0%	2%	2%	-5%	1%	
12	46,381	46,883	48,608	48,662	50,126	49,961	48,380	49,941	48,882	50,056	50,015	47,600	48,791	
	0%	-1%	-2%	1%	1%	-9%	3%	-1%	2%	0%	-1%	2%	0%	
13	46,393	46,220	47,421	49,359	50,657	45,623	49,797	49,223	49,935	50,021	49,651	48,441	48,562	
	1.07	1.04	1.01	0.99	0.97	0.98	0.99	0.99	0.99	0.98	0.99	1.01	0.99	
Seasonal Adjustment Factor (to average month)													Growth	-0.65%

Average Yearly Growth Calculated -0.7%  
Yearly Growth Factor Used 0.5%

## □ Trip Generation

**Institute of Transportation Engineers (ITE) 10th Edition  
Land Use Code (LUC) 710 - General Office Building**

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area  
Independent Variable (X): 275

**AVERAGE WEEKDAY DAILY**

$$T = 9.74 * (X)$$

$$T = 9.74 * 275$$

$$T = 2678.50$$

T = 2,678 vehicle trips

with 50% ( 1,339 vpd) entering and 50% ( 1,339 vpd) exiting.

**WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC**

$$T = 1.16 * (X)$$

$$T = 1.16 * 275$$

$$T = 319.00$$

T = 319 vehicle trips

with 86% ( 274 vph) entering and 14% ( 45 vph) exiting.

**WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC**

$$T = 1.15 * (X)$$

$$T = 1.15 * 275$$

$$T = 316.25$$

T = 316 vehicle trips

with 16% ( 51 vph) entering and 84% ( 265 vph) exiting.

**SATURDAY DAILY**

$$T = 2.21 * (x)$$

$$T = 2.21 * 275$$

$$T = 607.75$$

T = 608 vehicle trips

with 50% ( 304 vpd) entering and 50% ( 304 vpd) exiting.

**SATURDAY MIDDAY PEAK HOUR OF GENERATOR**

$$T = 0.53 * (X)$$

$$T = 0.53 * 275$$

$$T = 145.75$$

T = 146 vehicle trips

with 54% ( 79 vph) entering and 46% ( 67 vph) exiting.

**Institute of Transportation Engineers (ITE) 10th Edition  
Land Use Code (LUC) 760 - Research and Development Center**

Average Vehicle Trips Ends vs: 1,000 sf gross floor area  
Independent Variable (X): 275

**AVERAGE WEEKDAY DAILY**

$$T = 10.23(X) + 204.68$$

$$T = 10.23 \quad 275 \quad + (204.68)$$

$$T = 3017.93$$

$$T = 3,018 \quad \text{vehicle trips}$$

with 50% ( 1,509 vpd) entering and 50% ( 1,509 vpd) exiting.

**WEEKDAY MORNING PEAK HOUR OF GENERATOR**

$$\ln T = 0.88 \ln (X) + 0.59$$

$$\ln T = 0.88 \ln \quad 275 \quad + (0.59)$$

$$\ln T = 5.53$$

$$T = 252.84$$

$$T = 253 \quad \text{vehicle trips}$$

with 83% ( 210 vph) entering and 17% ( 43 vph) exiting.

**WEEKDAY EVENING PEAK HOUR OF GENERATOR**

$$T = 1.04 * (X) + 12.86$$

$$T = 1.04* \quad 275 \quad + 12.86$$

$$T = 298.86$$

$$T = 298 \quad \text{vehicle trips}$$

with 16% ( 48 vpd) entering and 84% ( 250 vpd) exiting.

**SATURDAY DAILY**

$$T = 1.25 * (X) + 112.04$$

$$T = 1.25* \quad 275 \quad + 112.04$$

$$T = 455.79$$

$$T = 456 \quad \text{vehicle trips}$$

with 50% ( 228 vpd) entering and 50% ( 228 vpd) exiting.

**SATURDAY MIDDAY PEAK HOUR OF GENERATOR**

$$T = 0.15 * (X) + 12.67$$

$$T = 0.15* \quad 275 \quad + 12.67$$

$$T = 53.92$$

$$T = 54 \quad \text{vehicle trips}$$

with 50% ( 27 vpd) entering and 50% ( 27 vpd) exiting.

**Institute of Transportation Engineers (ITE) 10th Edition  
Land Use Code (LUC) 710 - General Office Building**

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area  
Independent Variable (X): 450

**AVERAGE WEEKDAY DAILY**

$$T = 9.74 * (X)$$

$$T = 9.74 * 450$$

$$T = 4383.00$$

T = 4,384 vehicle trips

with 50% ( 2,192 vpd) entering and 50% ( 2,192 vpd) exiting.

**WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC**

$$T = 1.16 * (X)$$

$$T = 1.16 * 450$$

$$T = 522.00$$

T = 522 vehicle trips

with 86% ( 449 vph) entering and 14% ( 73 vph) exiting.

**WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC**

$$T = 1.15 * (X)$$

$$T = 1.15 * 450$$

$$T = 517.50$$

T = 518 vehicle trips

with 16% ( 83 vph) entering and 84% ( 435 vph) exiting.

**SATURDAY DAILY**

$$T = 2.21 * (x)$$

$$T = 2.21 * 450$$

$$T = 994.50$$

T = 994 vehicle trips

with 50% ( 497 vpd) entering and 50% ( 497 vpd) exiting.

**SATURDAY MIDDAY PEAK HOUR OF GENERATOR**

$$T = 0.53 * (X)$$

$$T = 0.53 * 450$$

$$T = 238.50$$

T = 239 vehicle trips

with 54% ( 129 vph) entering and 46% ( 110 vph) exiting.

**Institute of Transportation Engineers (ITE) 10th Edition  
Land Use Code (LUC) 760 - Research and Development Center**

Average Vehicle Trips Ends vs: 1,000 sf gross floor area  
Independent Variable (X): 450

**AVERAGE WEEKDAY DAILY**

$$T = 10.23(X) + 204.68$$

$$T = 10.23 \quad 450 \quad + (204.68)$$

$$T = 4808.18$$

$$T = 4,808 \quad \text{vehicle trips}$$

with 50% ( 2,404 vpd) entering and 50% ( 2,404 vpd) exiting.

**WEEKDAY MORNING PEAK HOUR OF GENERATOR**

$$\ln T = 0.88 \ln (X) + 0.59$$

$$\ln T = 0.88 \ln \quad 450 \quad + (0.59)$$

$$\ln T = 5.97$$

$$T = 390.00$$

$$T = 390 \quad \text{vehicle trips}$$

with 83% ( 324 vph) entering and 17% ( 66 vph) exiting.

**WEEKDAY EVENING PEAK HOUR OF GENERATOR**

$$T = 1.04 * (X) + 12.86$$

$$T = 1.04* \quad 450 \quad + 12.86$$

$$T = 480.86$$

$$T = 480 \quad \text{vehicle trips}$$

with 16% ( 77 vpd) entering and 84% ( 403 vpd) exiting.

**SATURDAY DAILY**

$$T = 1.25 * (X) + 112.04$$

$$T = 1.25* \quad 450 \quad + 112.04$$

$$T = 674.54$$

$$T = 674 \quad \text{vehicle trips}$$

with 50% ( 337 vpd) entering and 50% ( 337 vpd) exiting.

**SATURDAY MIDDAY PEAK HOUR OF GENERATOR**

$$T = 0.15 * (X) + 12.67$$

$$T = 0.15* \quad 450 \quad + 12.67$$

$$T = 80.17$$

$$T = 80 \quad \text{vehicle trips}$$

with 50% ( 40 vpd) entering and 50% ( 40 vpd) exiting.

- Trip Distribution Calculations
  - Existing Patterns
  - Charles River Patterns
  - UMass Patterns
  - Journey to Work Data

## ATTACHMENT

### TRIP-DISTRIBUTION SUMMARY

The directional distribution of development-generated trips on the roadway network is a function of a number of variables including employee place of residence, existing travel patterns along area roadways, and the efficiency of these roadways leading to the site. Journey to Work data published by the US Census, existing travel patterns in the area including the adjacent Charles River and UMass Campuses, driveway restrictions, and area roadway infrastructure will serve as the primary basis for determining the employee trip distribution pattern for the proposed Site. The preliminary average distribution is as follows

### TRIP-DISTRIBUTION PATTERNS – UNADJUSTED

Roadway Segment	Office Uses <sup>1</sup>
	Enter
Route 20 (East)	25%
Route 20 (West)	15%
Route 9 (East)	5%
Route 9 (West)	40%
South Street (North)	10%
Cherry Street (North)	NEGL
Green Street (South)	NEGL.
<u>Centech Boulevard (South)</u>	<u>5%</u>
<b>TOTAL</b>	<b>100%</b>

<sup>1</sup>Existing travel patterns and Journey to Work Census 2010 data for workers within Shrewsbury.

A preliminary review of area infrastructure indicates the general use of Route 20 from the east for inbound trips and a 50/50 split between Route 20 and Route 9 to the east for outbound trips. Likewise, the inbound trips are expected to use Route 9 from the west and South Street from the north for 50% of the inbound trips with a shift of 35% of the exiting trips re-allocated to Route 20 and Route 140 based on area infrastructure at the Route 9 and South Street intersection and anticipated capacity along Route 20 under future conditions. Accordingly, the resulting trip distribution pattern for entering and exiting trips is shown below.

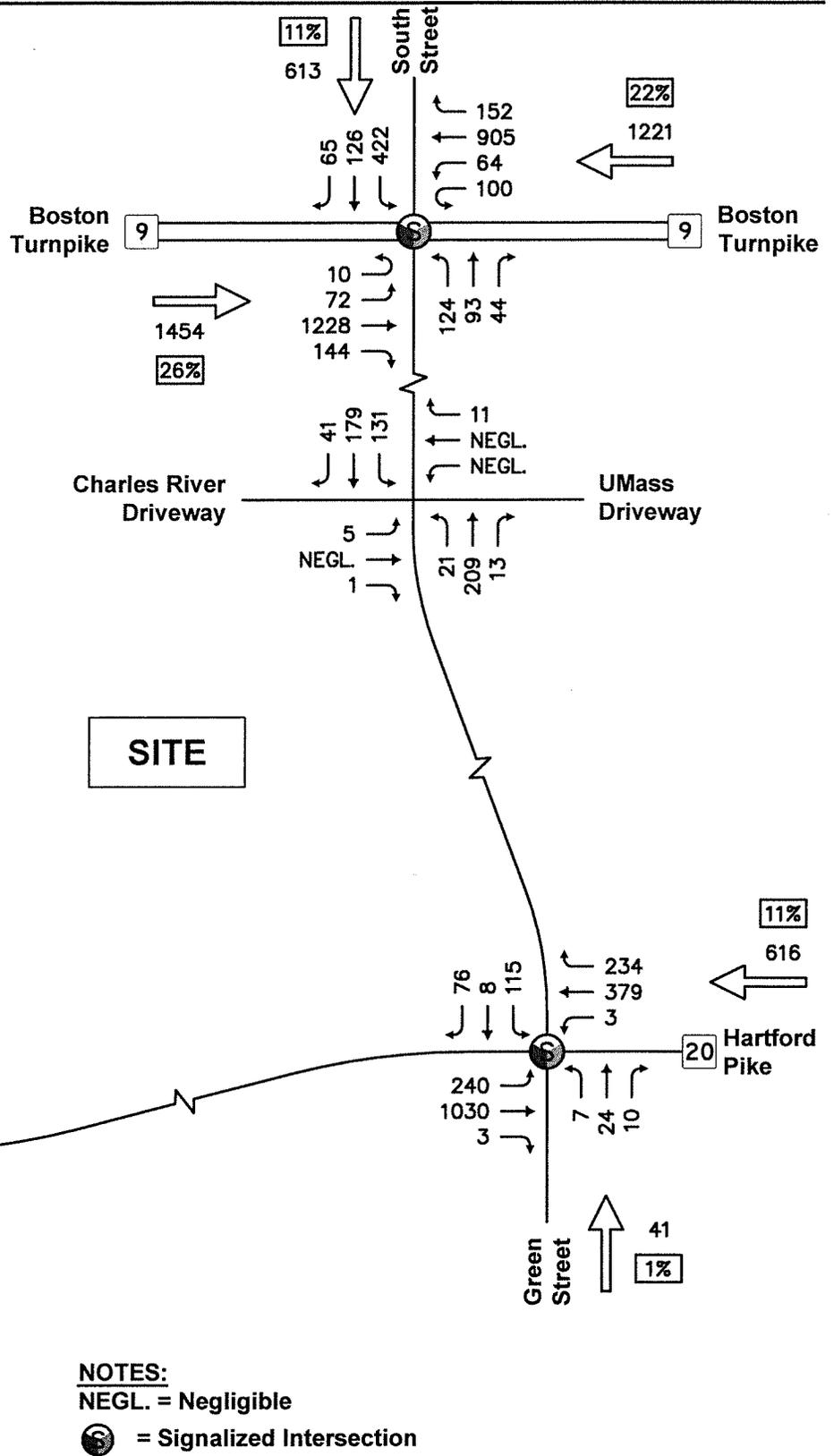
## TRIP-DISTRIBUTION PATTERNS – ADJUSTED FOR AREA INFRASTRUCTURE

Roadway Segment	Office Uses <sup>1</sup>	
	Enter	Exit
Route 20 (East)	25%	15%
Route 20 (West)	15%	50%
Route 9 (East)	5%	15%
Route 9 (West)	40%	10%
South Street (North)	10%	5%
Cherry Street (North)	NEGL	NEGL
Green Street (South)	NEGL.	NEGL.
<u>Centech Boulevard (South)</u>	<u>5%</u>	<u>5%</u>
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>

<sup>1</sup>Existing travel patterns and Journey to Work Census 2010 data for workers within Shrewsbury with adjustments for area infrastructure.

- Trip Distribution Calculations
  - Existing Patterns

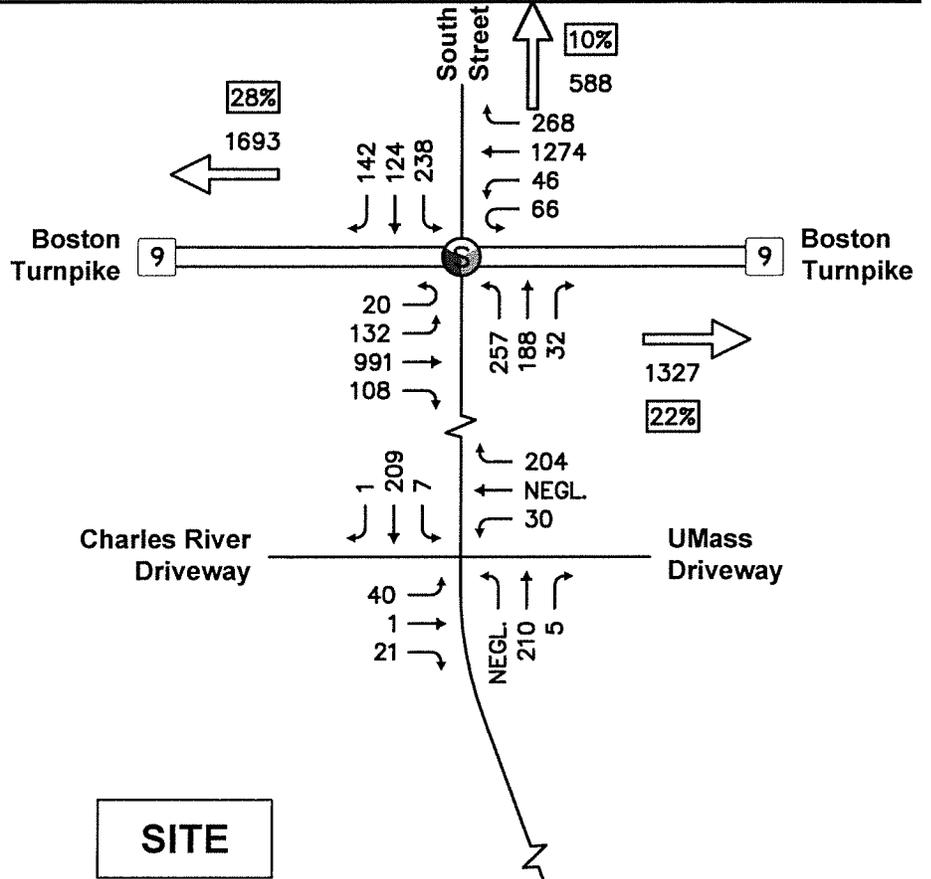
VOLUME	IN	%
1454		26%
1221		22%
613		11%
1190		21%
616		11%
180		3%
314		5%
41		1%
5629		100%



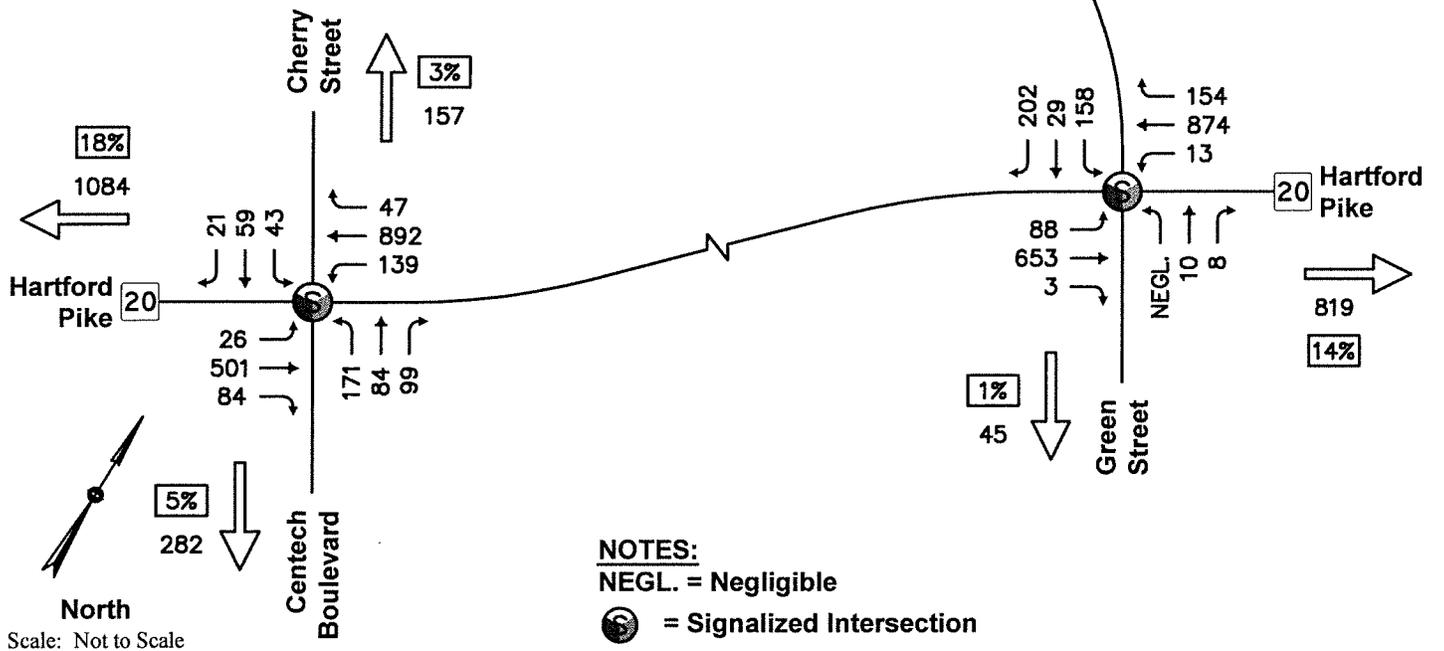
North  
 Scale: Not to Scale

**Trip Distribution Calculations  
 2018 Existing Condition  
 Weekday Morning Peak Hour Traffic Volumes**

VOLUME OUT	%
1693	28%
1327	22%
588	10%
1084	18%
819	14%
157	3%
282	5%
45	1%
5997	100%



SITE



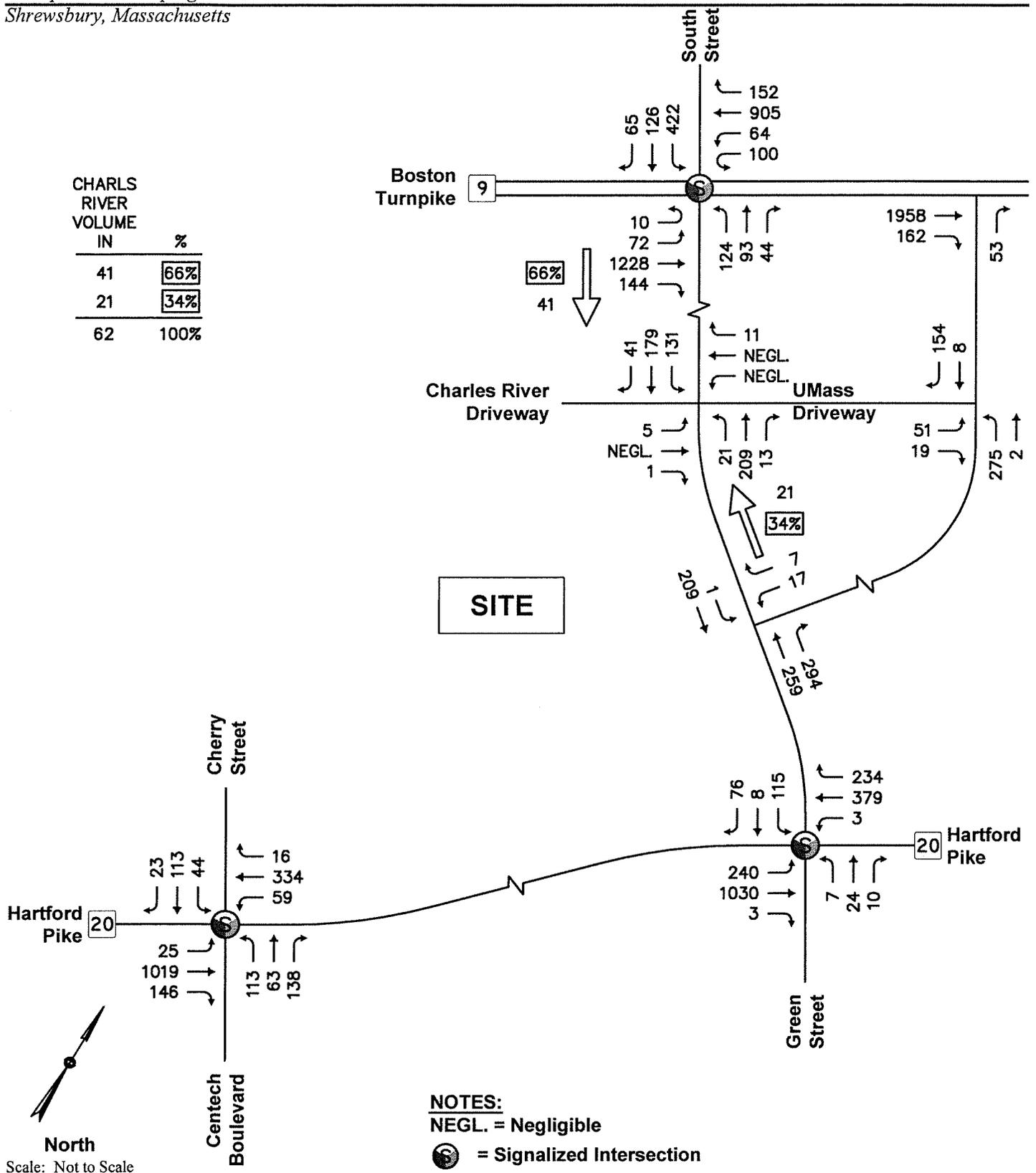
**NOTES:**  
NEGL. = Negligible  
● = Signalized Intersection

North  
Scale: Not to Scale

**Trip Distribution Calculations  
2018 Existing Condition  
Weekday Evening Peak Hour Traffic Volumes**

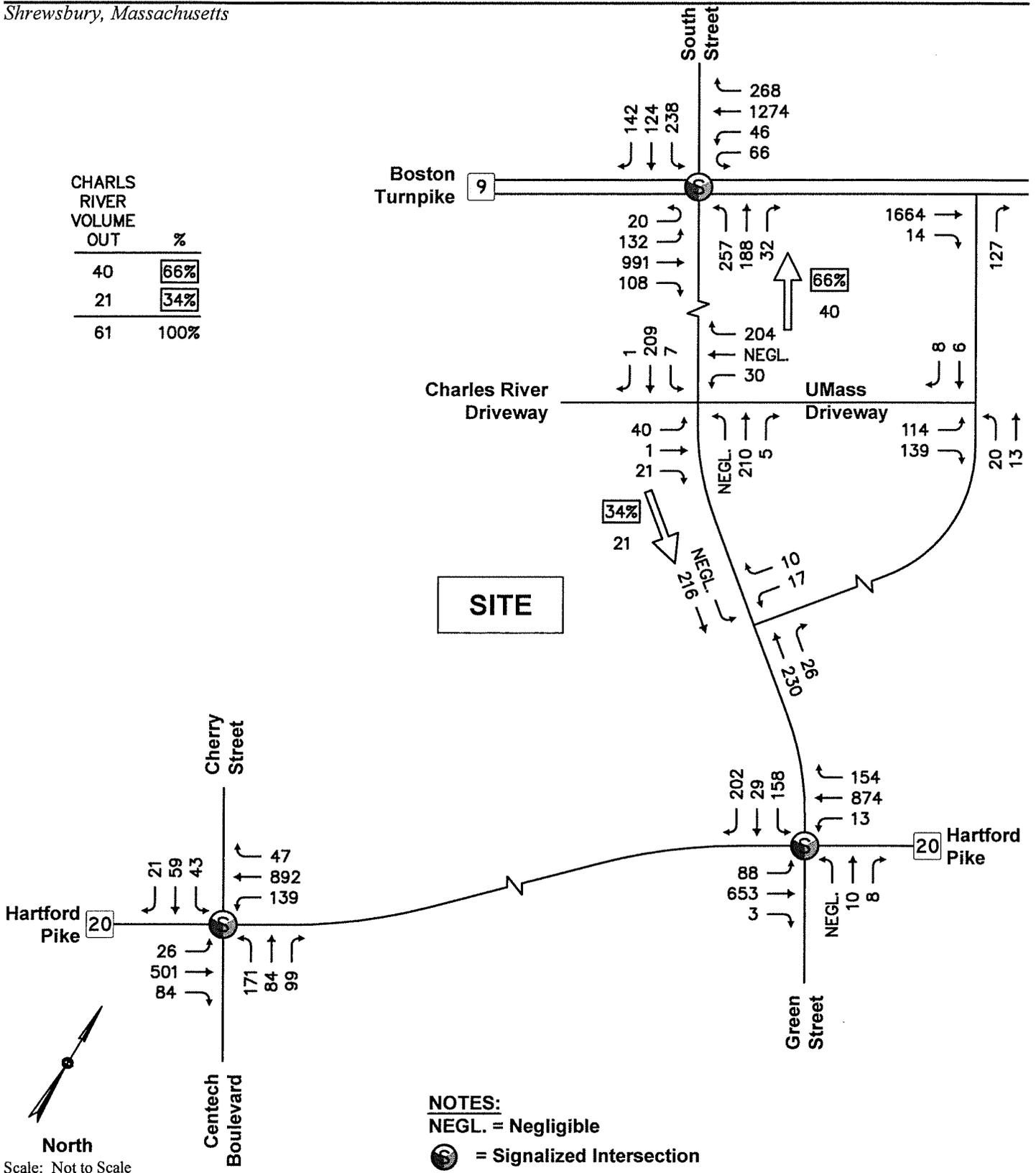
- Trip Distribution Calculations
  - Charles River Patterns

CHARLS RIVER VOLUME IN		%
41	66%	
21	34%	
62	100%	



**Trip Distribution Calculations  
2018 Existing Condition  
Weekday Morning Peak Hour Traffic Volumes**

CHARLS RIVER VOLUME OUT	%
40	66%
21	34%
61	100%

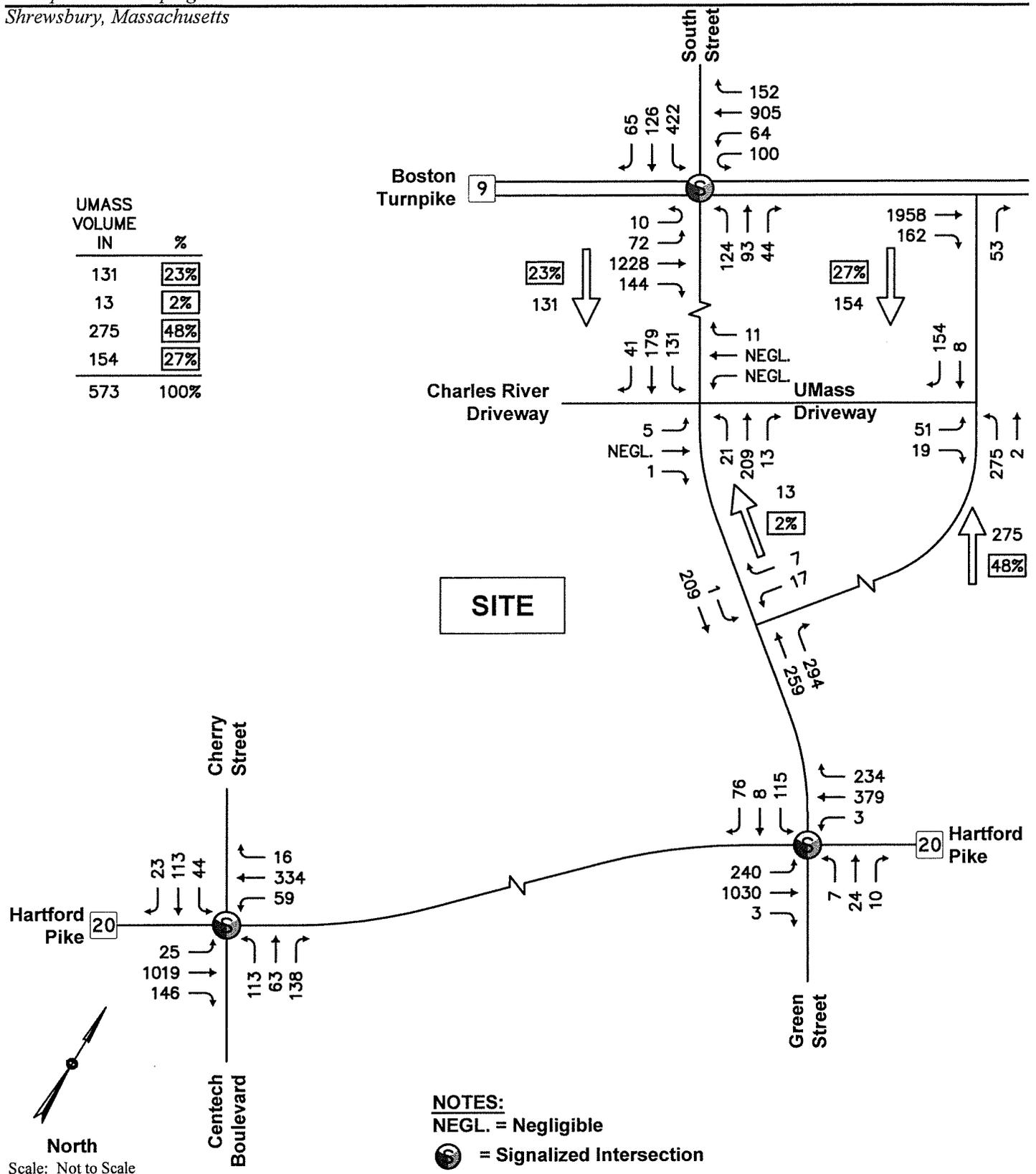


**NOTES:**  
 NEGL. = Negligible  
 = Signalized Intersection

**Trip Distribution Calculations  
 2018 Existing Condition  
 Weekday Evening Peak Hour Traffic Volumes**

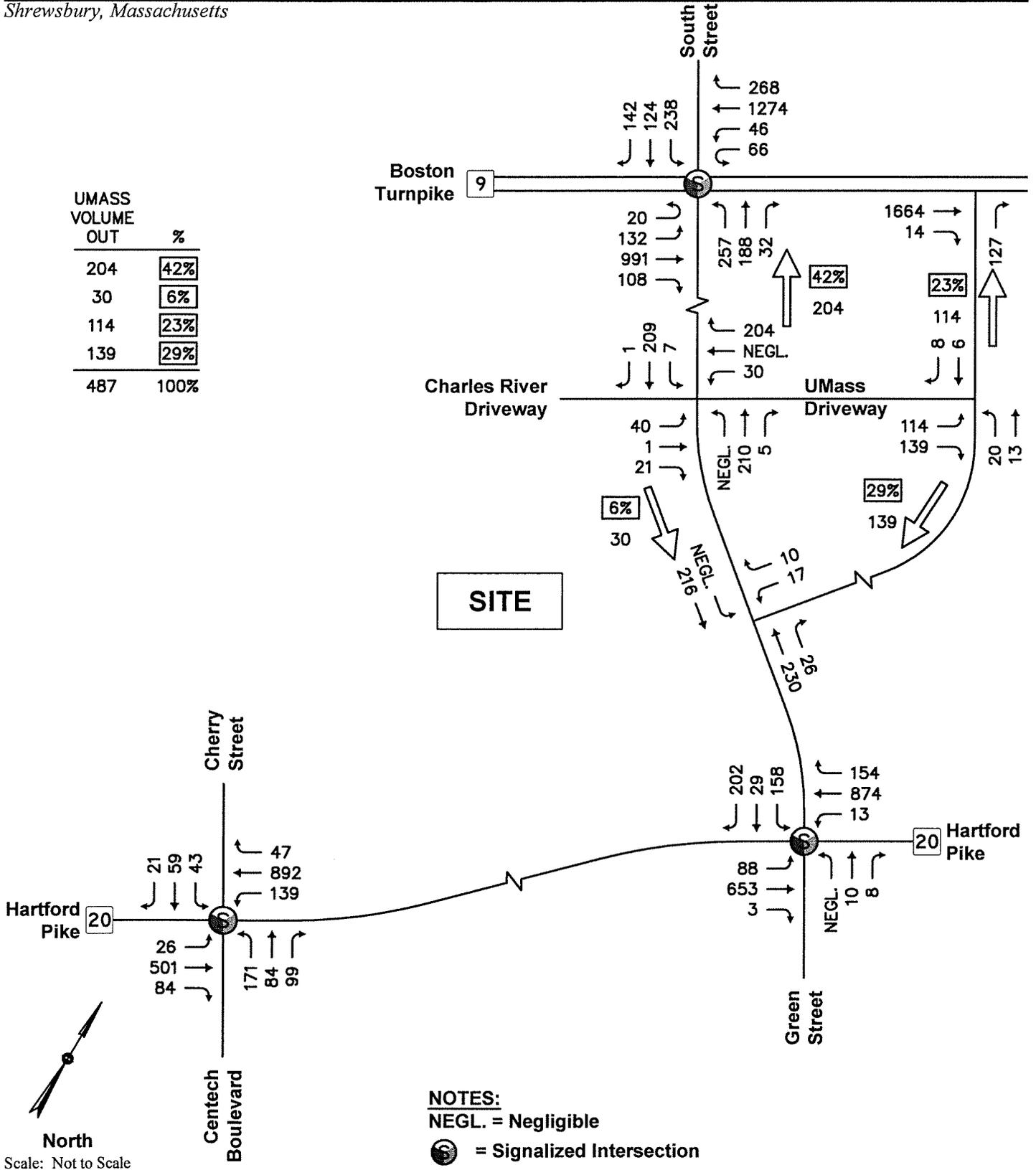
- Trip Distribution Calculations
  - UMass Patterns

UMASS VOLUME IN	%
131	23%
13	2%
275	48%
154	27%
573	100%



**Trip Distribution Calculations  
2018 Existing Condition  
Weekday Morning Peak Hour Traffic Volumes**

UMASS VOLUME OUT	%
204	42%
30	6%
114	23%
139	29%
487	100%



**Trip Distribution Calculations  
 2018 Existing Condition  
 Weekday Evening Peak Hour Traffic Volumes**

- Trip Distribution Calculations
  - Journey to Work Data

Residence-to-Work Distribution

US Census Journey-to-Work Data

Workplace Town	Residence Town	Residence State	All Workers	% of Total Rounded	To/From Routes										Total		
					Route 9 From West	Route 9 From East	Route 20 From West	Route 20 From East	Centech Blvd From South	Green Street From South	Cherry Street From North	South Street From North					
Shrewsbury	Worcester city	Massachusetts	3,405	26.0%	45%	11.7%	0.0%	0.0%	25%	6.5%	0.0%	0.0%	5%	1.3%	25%	6.5%	26.0%
Shrewsbury	Shrewsbury town	Massachusetts	3,150	24.1%	55%	13.2%	10%	2.4%	10%	2.4%	1.2%	5%	1.2%	10%	2.4%	22.5%	
Shrewsbury	Auburn town	Massachusetts	358	2.7%		0.0%	0.0%	50%	1.4%						1.4%	2.7%	
Shrewsbury	Holden town	Massachusetts	328	2.5%		0.0%	0.0%	0.0%	0.1%					100%	2.5%	2.5%	
Shrewsbury	Webster town	Massachusetts	280	2.1%		0.0%	0.0%	50%	0.9%					0.0%	0.9%	2.1%	
Shrewsbury	Leicester town	Massachusetts	244	1.9%		0.0%	0.0%	50%	0.9%					0.0%	0.9%	1.9%	
Shrewsbury	Oxford town	Massachusetts	239	1.8%		0.0%	0.0%	50%	0.9%					0.0%	0.9%	1.8%	
Shrewsbury	Grafton town	Massachusetts	226	1.7%		0.0%	0.0%	50%	0.9%					100%	1.7%	1.7%	
Shrewsbury	Northborough town	Massachusetts	211	1.6%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	1.6%	
Shrewsbury	West Boylston town	Massachusetts	207	1.6%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	1.6%	
Shrewsbury	Milbury town	Massachusetts	181	1.5%		0.0%	0.0%	100%	1.5%					0.0%	0.0%	1.5%	
Shrewsbury	Sutton town	Massachusetts	180	1.5%	25%	4.4%	0.0%	0.0%	50%	0.7%				25%	0.4%	1.5%	
Shrewsbury	Rutland town	Massachusetts	164	1.3%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	1.3%	
Shrewsbury	Sludge town	Massachusetts	161	1.2%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	1.2%	
Shrewsbury	Douglas town	Massachusetts	154	1.2%		0.0%	0.0%	0.0%	0.8%					0.0%	0.8%	1.3%	
Shrewsbury	Southbridge Town city	Massachusetts	138	1.1%		0.0%	0.0%	75%	0.8%					0.0%	0.3%	1.1%	
Shrewsbury	Charlton town	Massachusetts	130	1.0%		0.0%	0.0%	100%	1.0%					0.0%	0.0%	1.0%	
Shrewsbury	Leominster city	Massachusetts	118	0.9%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	0.9%	
Shrewsbury	Frammingham town	Massachusetts	112	0.9%		0.0%	25%	0.0%	0.0%					0.0%	0.0%	0.9%	
Shrewsbury	Fitchburg city	Massachusetts	103	0.8%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	0.8%	
Shrewsbury	Hudson town	Massachusetts	97	0.7%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	0.7%	
Shrewsbury	Northbridge town	Massachusetts	95	0.7%		0.0%	0.0%	0.0%	0.7%					0.0%	0.0%	0.7%	
Shrewsbury	Marlborough city	Massachusetts	90	0.7%		0.0%	25%	0.2%	0.0%					0.0%	0.0%	0.7%	
Shrewsbury	Boylston town	Massachusetts	88	0.7%		0.0%	0.0%	40%	0.0%					0.0%	0.0%	0.7%	
Shrewsbury	Milford town	Massachusetts	87	0.7%		0.0%	40%	0.3%	0.0%					0.0%	0.0%	0.7%	
Shrewsbury	Clinton town	Massachusetts	86	0.7%		0.0%	30%	0.2%	0.0%					0.0%	0.0%	0.7%	
Shrewsbury	Boston city	Massachusetts	85	0.6%		0.0%	40%	0.3%	0.0%					0.0%	0.0%	0.6%	
Shrewsbury	Franklin Town city	Massachusetts	82	0.6%		0.0%	40%	0.3%	0.0%					0.0%	0.0%	0.6%	
Shrewsbury	Blackstone town	Massachusetts	78	0.6%		0.0%	0.0%	0.0%	0.3%					0.0%	0.0%	0.6%	
Shrewsbury	Westborough town	Massachusetts	73	0.6%		0.0%	40%	0.2%	0.0%					0.0%	0.0%	0.6%	
Shrewsbury	Gardner city	Massachusetts	69	0.5%		0.0%	0.0%	0.0%	0.0%					100%	0.5%	0.5%	
Shrewsbury	Uxbridge town	Massachusetts	67	0.5%		0.0%	0.0%	100%	0.5%					0.0%	0.0%	0.5%	
Shrewsbury	Upton town	Massachusetts	66	0.5%		0.0%	0.0%	50%	0.3%					0.0%	0.0%	0.5%	
Shrewsbury	Dudley town	Massachusetts	65	0.5%		0.0%	0.0%	100%	0.5%					0.0%	0.0%	0.5%	
Shrewsbury	Springfield city	Massachusetts	64	0.5%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	0.5%	
Shrewsbury	Princeton town	Massachusetts	63	0.5%		0.0%	0.0%	0.0%	0.0%					0.0%	0.0%	0.5%	
Shrewsbury	Spencer town	Massachusetts	60	0.5%		0.0%	0.0%	50%	0.2%					0.0%	0.0%	0.5%	
	Sub-Total		11,422	87.3%		25.3%	4.0%		22.3%					1.7%		86.3%	
	Other		1,668	12.7%		3.7%			3.3%					0.0%		12.7%	
	Total		13,090	100%		29.0%	4.6%		25.6%					2.0%		99.0%	
					SAY	30%	5%		25%					5%		100%	

**EcoTec, Inc.**  
**ENVIRONMENTAL CONSULTING SERVICES**  
102 Grove Street  
Worcester, MA 01605-2629  
508-752-9666 – Fax: 508-752-9494

October 24, 2018

Michael Dryden  
Bohler Engineering  
352 Turnpike Road  
Southboro, MA 01772

RE: Wetland Resource Evaluation, Allen Farm, South Street, Shrewsbury, MA

Dear Mike:

On August 30, 31 & September 26, 2018, EcoTec, Inc. inspected the above-referenced property for the presence of wetland resources as defined by: (1) the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, § 40; the “Act”) and its implementing regulations (310 CMR 10.00 *et seq.*; the “Regulations”); and (2) the U.S. Clean Water Act (i.e., Section 404 and 401 wetlands). Arthur Allen, CPSS, CWS and Scott Morrison, PWS conducted the inspections.

The subject site consists of a 60-acre parcel located between the south side of South Street and the west side of Route 20. The upland portions of the site consist of a paved parking lot, two dilapidated farm structures, overgrown fields and woodlands. The wetland resources observed on the site are described below.

### **Methodology**

The site was inspected, and areas suspected to qualify as wetland resources were identified. The boundary of Bordering Vegetated Wetlands or, in the absence of Bordering Vegetated Wetlands, Bank was delineated in the field in accordance with the definitions set forth in the regulations at 310 CMR 10.55(2)(c) and 310 CMR 10.54(2). Section 10.55(2)(c) states that “The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.” Section 10.54(2)(c) states that “The upper boundary of Bank is the first observable break in the slope or the mean annual flood level, whichever is lower.” The methodology used to delineate Bordering Vegetated Wetlands is further described in: (1) the BVW Policy “*BVW: Bordering Vegetated Wetlands Delineation Criteria and Methodology*,” issued March 1, 1995; and (2) “*Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook*,” produced by the Massachusetts Department of Environmental Protection, dated March 1995. The plant taxonomy used in this

report is based on the *National List of Plant Species that Occur in Wetlands: Massachusetts* (Fish and Wildlife Service, U.S. Department of the Interior, 1988). Federal wetlands were presumed to have boundaries conterminous with the delineated Bordering Vegetated Wetlands and Bank. Two sets of DEP Bordering Vegetated Wetland Delineation Field Data Forms completed for observation plots located in the wetlands and uplands near flags AA-8 and AB-5 are attached. The table below provides the Flag Numbers, Flag Type, and Wetland Types and Locations for the delineated wetland resources.

Flag Numbers	Flag Type	Wetland Types and Locations
AA-1.6 to AA-87	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the southeasterly portion of the site that is associated with mapped and unmapped intermittent streams.
AB-1 to AB-44	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the northwesterly portion of the site that is associated with a mapped intermittent stream.
AC-1 to AC-69 (AC-1 connects to BA-116)	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the westerly portion of the site that is associated with a mapped intermittent stream.
BA-1.1 to BA-116 (BA-116 connects to AC-1)	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the north-central portion of the site that is associated with mapped and unmapped intermittent streams.

## Findings

Wetlands AA, AB & AC consist of contiguous, wooded and shrub swamps and marshes, located in the central portion of the site, that are associated with two mapped and one unmapped intermittent streams. Wetland AB consists of a wooded/shrub swamp, located in the northwesterly portion of the site, that is associated with a mapped intermittent stream. Plant species observed include red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), gray birch (*Betula populifolia*), swamp tupelo (*Nyssa sylvatica*), and American elm (*Ulmus americana*) trees and/or saplings; poison ivy (*Toxicodendron radicans*) climbing woody vines; highbush blueberry (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*), arrow-wood (*Viburnum dentatum*), withe-rod (*Viburnum cassinoides*), northern spicebush (*Lindera benzoin*), swamp rose (*Rosa palustris*), speckled alder (*Alnus rugosa*), silky dogwood (*Cornus amomum*), maleberry (*Lyonia ligustrina*), fetter-bush (*Leucothoe racemosa*), glossy buckthorn (*Rhamnus frangula*), sweet pepper-bush (*Clethra alnifolia*), swamp azalea (*Rhododendron viscosum*), and American elderberry (*Sambucus canadensis*) shrubs; and sheep-laurel (*Kalmia angustifolia*), bristly blackberry (*Rubus hispidus*), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), sensitive fern (*Onoclea sensibilis*), subarctic lady fern (*Athyrium filix-femina*), marsh fern (*Thelypteris thelypteroides*), Massachusetts fern (*Thelypteris simulata*),

spinulose woodfern (*Dryopteris spinulosa*), skunk-cabbage (*Symplocarpus foetidus*), swamp Jack-in-the-pulpit (*Arisaema triphyllum*), Alaska goldthread (*Coptis trifolia*), spotted touch-me-not (*Impatiens capensis*), shining clubmoss (*Lycopodium lucidulum*), and sphagnum moss (*Sphagnum sp.*) ground cover. Evidence of wetland hydrology, including hydric soils, high groundwater, saturated soils, pore linings, evidence of flooding, and drainage patterns, was observed within the delineated wetlands. These vegetated wetlands border intermittent streams; accordingly, the vegetated wetlands would be regulated as Bordering Vegetated Wetlands and the intermittent streams would be regulated as Bank under the Act. A 100-foot Buffer Zone extends horizontally outward from the edge of Bordering Vegetated Wetlands and Bank under the Act.

Bordering Land Subject to Flooding is an area that floods due to a rise in floodwaters from a bordering waterway or water body. Where flood studies have been completed, the boundary of Bordering Land Subject to Flooding is based upon flood profile data prepared by the National Flood Insurance Program. Section 10.57(2)(a)3. states that “The boundary of Bordering Land Subject to Flooding is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm.” The project engineer should evaluate the most recent National Flood Insurance Program flood profile data to determine if Bordering Land Subject to Flooding occurs on the site. Bordering Land Subject to Flooding would occur in areas where the 100-year flood elevation is located outside of or upgradient of the delineated Bordering Vegetated Wetlands or Bank boundary. Bordering Land Subject to Flooding does not have a Buffer Zone under the Act.

The Massachusetts Rivers Protection Act amended the Act to establish an additional wetland resource area: Riverfront Area. Based upon a review of the current USGS Map (attached) and observations made during the site inspection, three streams that are shown as intermittent on the USGS Map are located within the delineated wetlands. The watershed area for the largest stream complex at the site was determined to be 0.24 square miles, which is less than 0.5 square miles (see attached StreamStats watershed calculations). As such, the streams would be designated intermittent under the Massachusetts Wetlands Protection Act regulations. Furthermore, based upon a review of the current USGS Map and observations made during the site inspection, there are no other mapped or unmapped streams located within 200 feet of the site. Accordingly, Riverfront Area would not occur on the site. Riverfront Area does not have a Buffer Zone under the Act.

The Regulations require that no project may be permitted that will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures set forth at 310 CMR 10.59. Based upon a review of the *Massachusetts Natural Heritage Atlas*, 14<sup>th</sup> edition, Priority Habitats and Estimated Habitats from the NHESP Interactive Viewer, valid from August 1, 2017, and Certified Vernal Pools from MassGIS, there are no Estimated Habitats [for use with the Act and Regulations (310 CMR 10.00 *et seq.*)], Priority Habitats [for use with Massachusetts Endangered Species Act (M.G.L. Ch. 131A; “MESA”) and MESA Regulations (321

Wetland Resource Evaluation, Allen Farm, South Street, Shrewsbury, MA  
October 24, 2018  
Page 4.

CMR 10.00 *et seq.*]], or Certified Vernal Pools on or in the immediate vicinity of the site. A copy of this map is attached.

The reader should be aware that the regulatory authority for determining wetland jurisdiction rests with local, state, and federal authorities. A brief description of my experience and qualifications is attached. If you have any questions, please feel free to contact me at any time.

Cordially,  
ECOTEC, INC.

A handwritten signature in blue ink, appearing to read 'Arthur Allen', is written over a faint, light-colored signature line.

Arthur Allen, CWS, CPSS  
Vice President

Attachments (6, 13 pages)

AA/NOI/ShrewsburySouthCentechNorth Wet Report



## EcoTec, Inc.

### ENVIRONMENTAL CONSULTING SERVICES

102 Grove Street  
Worcester, MA 01605-2629  
508-752-9666 / Fax: 508-752-9494

**Arthur Allen, CPSS, CWS, CESSWI**  
**Vice President**  
**Soil & Wetland Scientist**

Arthur Allen is the Vice President of EcoTec, Inc. and has been a senior environmental scientist there since 1995. His work with EcoTec has involved wetland delineation, wildlife habitat evaluation, environmental permitting (federal, state and local), environmental monitoring, expert testimony, peer reviews, contaminated site assessment and the description, mapping and interpretation of soils. His clients have included private landowners, developers, major corporations and regulatory agencies. Prior to joining EcoTec, Mr. Allen mapped and interpreted soils in Franklin County, MA for the U.S.D.A. Natural Resources Conservation Service (formerly Soil Conservation Service) and was a research soil scientist at Harvard University's Harvard Forest. Since 1994, Mr. Allen has assisted the Massachusetts Department of Environmental Protection and the Massachusetts Association of Conservation Commissions as an instructor in the interpretation of soils for wetland delineation and for the Title V Soil Evaluator program.

Mr. Allen has a civil service rating as a soil scientist, an undergraduate degree in Natural Resource Studies and a graduate certificate in Soil Studies. His work on the Franklin County soil survey involved interpretation of landscape-soil-water relationships, classifying soils and drainage, and determining use and limitation of the soil units that he delineated. As a soil scientist at the Harvard Forest, Mr. Allen was involved in identifying the legacies of historical land-use in modern soil and vegetation at a number of study sites across southern New England. He has a working knowledge of the chemical and physical properties of soil and water and how these properties interact with the plants that grow on a given site. While at Harvard Forest he authored and presented several papers describing his research results which were later published. In addition to his aforementioned experience, Mr. Allen was previously employed by the Trustees of Reservations as a land manager and by the Town of North Andover, MA as a conservation commission intern.

#### **Education:**

1993-Graduate Certificate in Soil Studies, University of New Hampshire  
1982-Bachelor of Science in Natural Resource Studies, University of Massachusetts

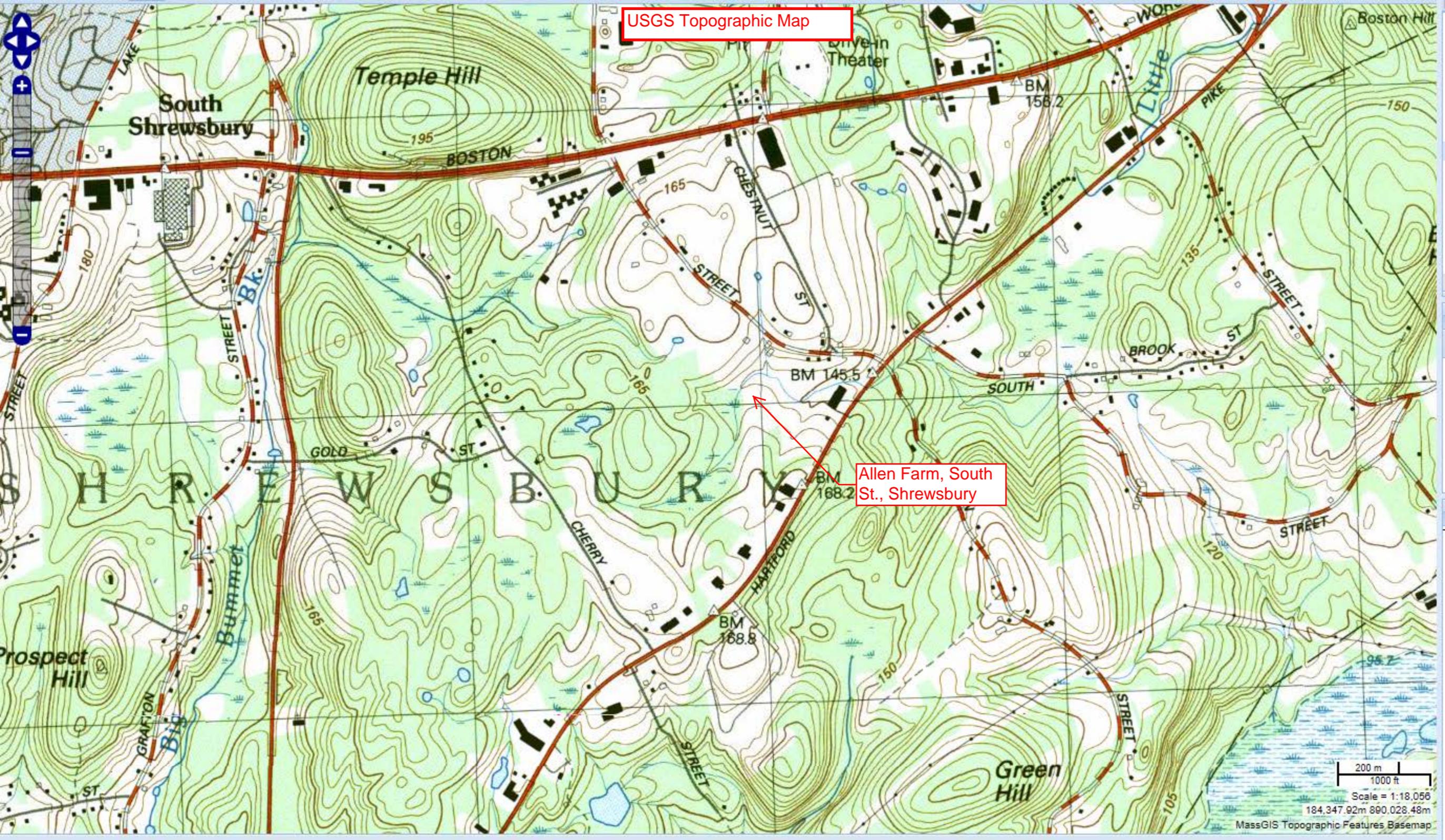
#### **Professional Affiliations:**

Certified Professional Soil Scientist (ARCPACS CPSS #22529)  
New Hampshire Certified Wetland Scientist (#19)  
Registered Professional Soil Scientist – Society of Soil Scientists of SNE [Board Member (2000-2006)]  
Certified Erosion, Sediment & Stormwater Inspector (#965)  
Massachusetts Approved Soil Evaluator (#13764)  
Massachusetts Arborists Association-Certified Arborist (1982 – 1998)  
New England Hydric Soils Technical Committee member  
Massachusetts Association of Conservation Commissions member  
Society of Wetland Scientists member

#### **Refereed Publications:**

*Soil Science and Survey at Harvard Forest.* A.Allen. In: Soil Survey Horizons. Vol. 36, No. 4, 1995, pp. 133-142.  
*Controlling Site to Evaluate History: Vegetation Patterns of a New England Sand Plain.* G.Motzkin, D.Foster, A.Allen, J.Harrold, & R.Boone. In: Ecological Monographs 66(3), 1996, pp. 345-365.  
*Vegetation Patterns in Heterogeneous Landscapes: The Importance of History and Environment.* G.Motzkin, P.Wilson, D.R.Foster & A.Allen. In: Journal of Vegetation Science 10, 1999, pp. 903-920.

USGS Topographic Map



Allen Farm, South St., Shrewsbury

200 m  
1000 ft

Scale = 1:18,056

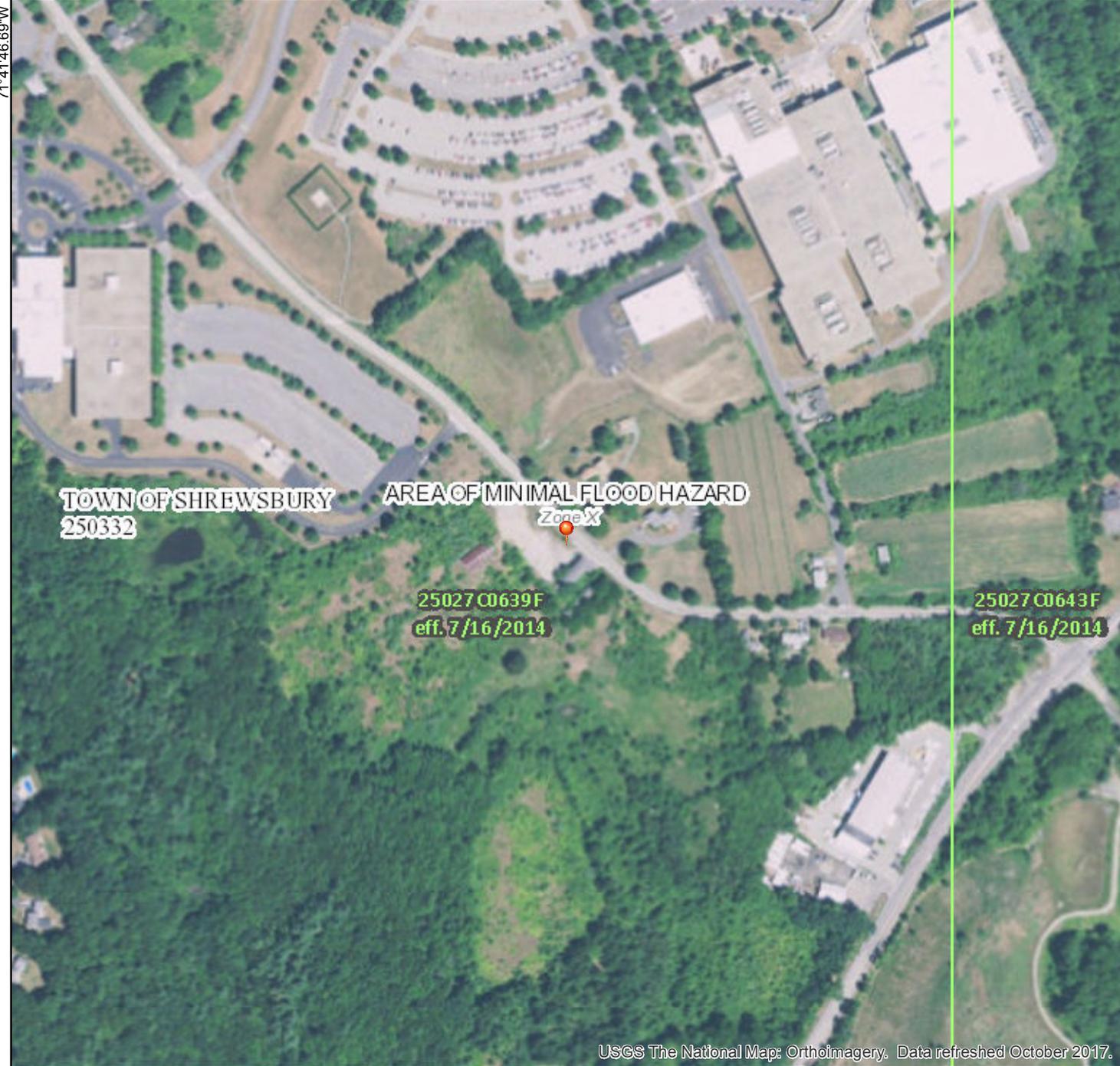
184,347.92m 890,028.48m

MassGIS Topographic Features Basemap

# National Flood Hazard Layer FIRMette



42°16'31.27"N



71°41'46.69"W

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- |                                    |  |   |
|------------------------------------|--|---|
| <b>SPECIAL FLOOD HAZARD AREAS</b>  |  | Without Base Flood Elevation (BFE)<br>Zone A, V, A99  |
|                                    |  | With BFE or Depth Zone AE, AO, AH, VE, AR   |
|                                    |  | Regulatory Floodway   |
| <b>OTHER AREAS OF FLOOD HAZARD</b> |  | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X |
|                                    |  | Future Conditions 1% Annual Chance Flood Hazard Zone X  |
|                                    |  | Area with Reduced Flood Risk due to Levee. See Notes. Zone X  |
|                                    |  | Area with Flood Risk due to Levee Zone D  |
| <b>OTHER AREAS</b>                 |  | NO SCREEN Area of Minimal Flood Hazard Zone X   |
|                                    |  | Effective LOMRs   |
| <b>GENERAL STRUCTURES</b>          |  | Area of Undetermined Flood Hazard Zone D  |
|                                    |  | Channel, Culvert, or Storm Sewer  |
|                                    |  | Levee, Dike, or Floodwall   |
| <b>OTHER FEATURES</b>              |  | 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation   |
|                                    |  | 17.5  |
|                                    |  | Coastal Transect  |
|                                    |  | Base Flood Elevation Line (BFE)   |
|                                    |  | Limit of Study  |
| <b>MAP PANELS</b>                  |  | Jurisdiction Boundary   |
|                                    |  | Coastal Transect Baseline   |
|                                    |  | Profile Baseline  |
|                                    |  | Hydrographic Feature  |
|                                    |  | Digital Data Available  |
|                                    |  | No Digital Data Available   |
|                                    |  | Unmapped  |
|                                    |  | The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.                              |



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

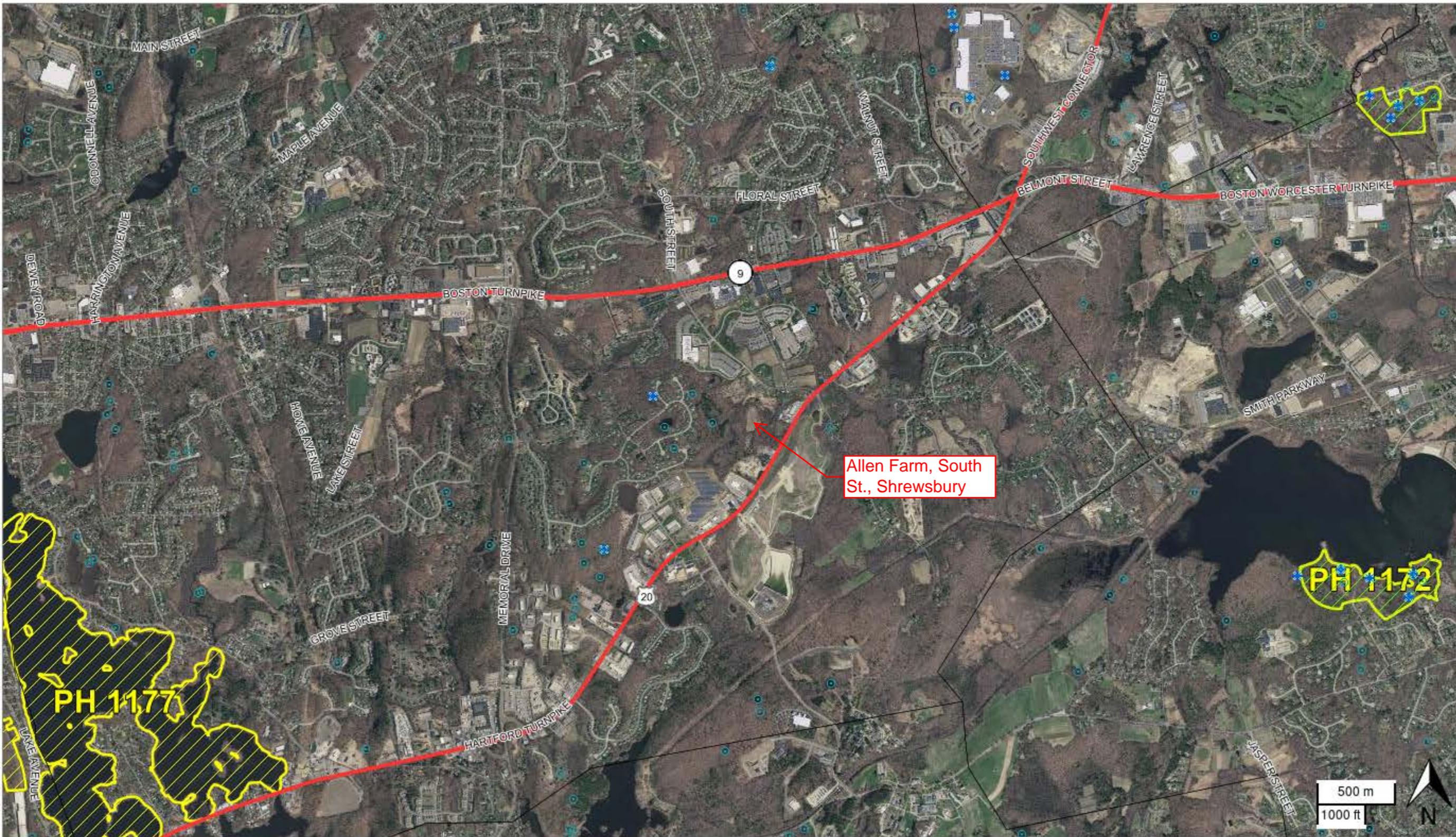
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **8/29/2018 at 3:55:24 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

USGS The National Map: Orthoimagery. Data refreshed October 2017.



71°41'9.23"W

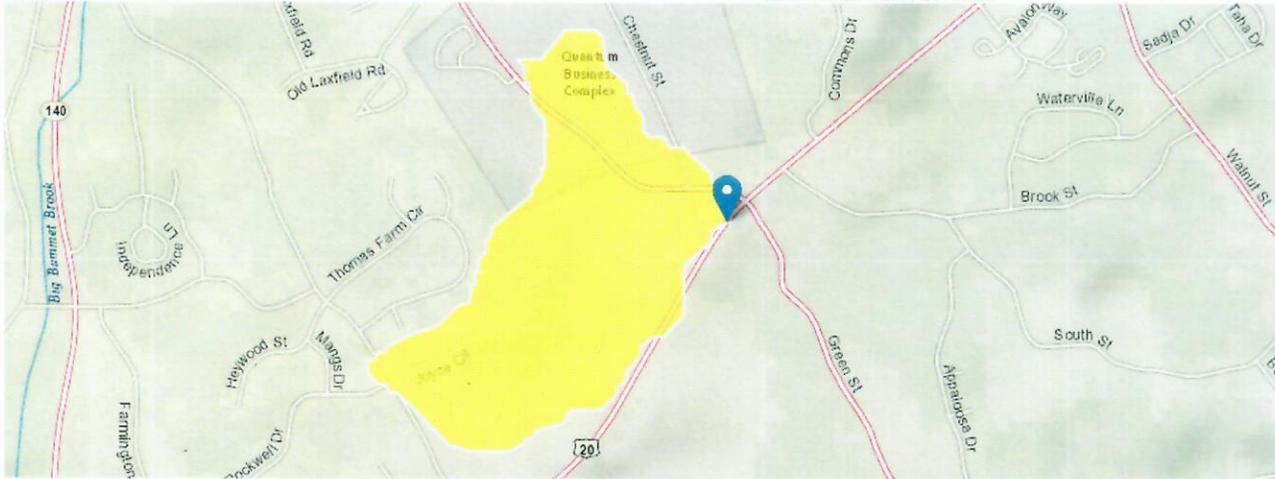


- Potential Vernal Pools
- NHESP Certified Vernal Pools
- MassDOT Roads Street Names
- Major MassDOT Routes
  - Interstate Highways
  - US Roads
  - State
- Massachusetts Towns
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
  - 
  -
- Orthos 2013-2014  
2013-2014 Color Orthos (USGS)

# StreamStats Report

Region ID:  
 Workspace ID:  
 Clicked Point (Latitude, Longitude):  
 Time:

MA  
 MA20180829200852750000  
 42.27016, -71.68712  
 2018-08-29 16:08:20 -0400



384-386 South Street, Shrewsbury MA

## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.24	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.241	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

## Low-Flow Statistics Parameters [Statewide Low Flow WRI00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.24	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.241	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

## Low-Flow Statistics Disclaimers [Statewide Low Flow WRI00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

## Low-Flow Statistics Flow Report [Statewide Low Flow WRI00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.00596	ft <sup>3</sup> /s
7 Day 10 Year Low Flow	0.00151	ft <sup>3</sup> /s

## Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

## DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant [REDACTED]

Prepared by: EcoTec, Inc

Project Location: South St, Shrewsbury

DEP File #

**Section I. Vegetation**

Number: TPU

Transect # AB-5

Date of Delin: 8/31/2018

A.	Sample layer and plant species (Enter largest to smallest % cover by layer)	Percent Cover (or basal area)	Percent Dominance	Dominant Plant?	Wetland Indicator Category
Tree	red oak <i>Quercus rubra</i>	20		20.0 YES	FACU-
	red maple <i>Acer rubrum</i>	80		80.0 YES	FAC *
Sapling	shagbark hickory <i>Carya ovata</i>	10		100.0 YES	FACU-
Shrub	white oak <i>Quercus alba</i>	20		40.0 YES	FACU-
	white/red spruce <i>Picea glauca/rubens</i>	10		20.0 YES	FACU
	black cherry <i>Prunus serotina</i>	10		20.0 YES	FACU
	lowbush blueberry <i>Vaccinium angustifolium</i>	10		20.0 YES	FACU-
Ground	sheep laurel <i>Kalmia angustifolia</i>	5		33.3 YES	FAC *
	bracken fern <i>Pteridium aquilinum</i>	5		33.3 YES	FACU
	canada mayflower <i>Maianthemum canadense</i>	5		33.3 YES	FAC-
Vine					

**Vegetation Conclusions**

Number of dominant wetland indicator plants

**2**

Number of dominant non-wetland indicator plants

**8**

Is the number of dominant wetland plants equal or greater than the number of dominant non-wetland plants?

NO

# DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant [redacted]

Prepared by: EcoTec, Inc

Project Location: South St, Shrewsbury

DEP File #

**Section II. Indicators of Hydrology**

Number: TPU

Transect # AB-5

Date of Delin: 8/31/2018

**1. Soil Survey**

Is there a published soil survey for this site? [redacted]

title/date [redacted]

map number [redacted]

soil type mapped [redacted]

hydric soil inclusions [redacted]

Are field observations consistent with soil survey? [redacted]

Remarks: [redacted]

**2. Soil Description**

Horizon	Depth (inches)	Matrix Color	Mottle Color
Leaf Litter	1	[redacted]	[redacted]
O	2-0	[redacted]	[redacted]
A	0-6	10YR 3/2	[redacted]
B <sub>w</sub>	6-14	10YR 5/6	[redacted]

Remarks stony fine sandy loam

**3. Other** [redacted]

**Conclusion: Is the soil hydric?**

No

**Other Indicators of hydrology (check all that apply):**

- Site Inundated [redacted]
- Depth to free water in observation hole [redacted]
- Depth to soil saturation in observation hole [redacted]
- Water marks [redacted]
- Drift lines [redacted]
- Sediment Deposits [redacted]
- Drainage patterns in BVWs [redacted]
- Oxidized rhizospheres [redacted]
- Water stained leaves [redacted]
- Recorded data (stream, lake, or tidal gauge; aerial photo; other): [redacted]
- Other: [redacted]

**Vegetation and Hydrology Conclusion**

	Yes	No
Number of wetland indicator plants ≥ number of non-wetland indicator plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Wetland hydrology present:		
Hydric soil present	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other indicators of hydrology present	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Location is in a BVW	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant [REDACTED]

Prepared by: EcoTec, Inc

Project Location: South St, Shrewsbury

DEP File #

**Section I. Vegetation**

Number: TPW

Transect # AA-8

Date of Delin: 8/30/2018

A. Sample layer and plant species (Enter largest to smallest % cover by layer)			Percent Cover (or basal area)	Percent Dominance	Dominant Plant?	Wetland Indicator Category
Tree	none					
Sapling	red maple	Acer rubrum	80		80.0 YES	FAC *
	eastern red cedar	Juniperus virginiana	20		20.0 YES	FACU
Shrub	panicled dogwood	Cornus foemina	30		60.0 YES	FAC *
	Northern arrow-wood	Viburnum dentatum	20		40.0 YES	FAC *
Ground	poison ivy	Toxicodendron radicans	5		50.0 YES	FAC *
	yellow sedge	Carex flava	5		50.0 YES	OBL *
Vine	Asiatic bittersweet	Celastrus orbiculata	10		100.0 YES	NL

**Vegetation Conclusions**

Number of dominant wetland indicator plants

5

Number of dominant non-wetland indicator plants

2

Is the number of dominant wetland plants equal or greater than the number of dominant non-wetland plants?

YES

# DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant [redacted]

Prepared by: EcoTec, Inc

Project Location: South St, Shrewsbury

DEP File #

**Section II. Indicators of Hydrology**

Number: TPW

Transect # AA-8

Date of Delin: 8/30/2018

**1. Soil Survey**

Is there a published soil survey for this site? [redacted]

title/date [redacted]

map number [redacted]

soil type mapped [redacted]

hydric soil inclusions [redacted]

Are field observations consistent with soil survey? [redacted]

Remarks: [redacted]

**2. Soil Description**

Horizon	Depth (inches)	Matrix Color	Mottle Color
A	0-12	10YR2/2	[redacted]
B <sub>g</sub>	12-15	10YR5/2	10% 7.5YR4/6

Remarks Stony loams

**3. Other** [redacted]

**Conclusion: Is the soil hydric?** Yes

**Other Indicators of hydrology (check all that apply):**

- Site Inundated [redacted]
- Depth to free water in observation hole [redacted]
- Depth to soil saturation in observation hole [redacted]
- Water marks [redacted]
- Drift lines [redacted]
- Sediment Deposits [redacted]
- Drainage patterns in BVWs [redacted]
- Oxidized rhizospheres [redacted]
- Water stained leaves [redacted]
- Recorded data (stream, lake, or tidal gauge; aerial photo; other): [redacted]
- Other: [redacted]

**Vegetation and Hydrology Conclusion**

	Yes	No
Number of wetland indicator plants ≥ number of non-wetland indicator plants	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Wetland hydrology present:		
Hydric soil present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other indicators of hydrology present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample Location is in a BVW	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant [REDACTED]

Prepared by: EcoTec, Inc

Project Location: South St, Shrewsbury

DEP File #

**Section I. Vegetation**

Number: TPW

Transect # AB-5

Date of Delin: 8/31/2018

A. Sample layer and plant species (Enter largest to smallest % cover by layer)			Percent Cover (or basal area)	Percent Dominance	Dominant Plant?	Wetland Indicator Category
Tree	red maple	Acer rubrum	100		100.0 YES	FAC *
	<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>		<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>			
Sapling	red maple	Acer rubrum	10		50.0 YES	FAC *
	gray birch	Betula populifolia	10		50.0 YES	FAC *
	<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>		<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>			
Shrub	swamp azalea	Rhododendron viscosum	20		50.0 YES	OBL *
	highbush blueberry	Vaccinium corymbosum	10		25.0 YES	FACW- *
	sweet pepperbush	Clethra alnifolia	10		25.0 YES	FAC *
	<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>		<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>			
Ground	sensitive fern	Onoclea sensibilis	20		80.0 YES	FACW *
	horsetail	Equisetum sp.	5		20.0 YES	FAC *
	<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>		<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>			
Vine	<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>		<span style="background-color: #e0f0ff; border: 1px solid black; padding: 2px;">[REDACTED]</span>			

**Vegetation Conclusions**

Number of dominant wetland indicator plants

**8**

Number of dominant non-wetland indicator plants

**0**

Is the number of dominant wetland plants equal or greater than the number of dominant non-wetland plants?

YES

# DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant [redacted]

Prepared by: EcoTec, Inc

Project Location: South St, Shrewsbury

DEP File #

**Section II. Indicators of Hydrology**

Number: TPW

Transect # AB-5

Date of Delin: 8/31/2018

**1. Soil Survey**

Is there a published soil survey for this site? [redacted]

title/date [redacted]

map number [redacted]

soil type mapped [redacted]

hydric soil inclusions [redacted]

Are field observations consistent with soil survey? [redacted]

Remarks: [redacted]

**2. Soil Description**

Horizon	Depth (inches)	Matrix Color	Mottle Color
Leaf Litter	2	[redacted]	[redacted]
O	3-0	[redacted]	[redacted]
A	0-12	10YR2/1	[redacted]
B <sub>g</sub>	12-16	10YR5/2	10% 10YR 4/6

Remarks stony fine sandy loams

**3. Other** [redacted]

**Conclusion: Is the soil hydric?** Yes [redacted]

**Other Indicators of hydrology (check all that apply):**

- Site Inundated [redacted]
- Depth to free water in observation hole [redacted]
- Depth to soil saturation in observation hole [redacted]
- Water marks [redacted]
- Drift lines [redacted]
- Sediment Deposits [redacted]
- Drainage patterns in BVWs [redacted]
- Oxidized rhizospheres [redacted]
- Water stained leaves [redacted]
- Recorded data (stream, lake, or tidal gauge; aerial photo; other): [redacted]
- Other: [redacted]

**Vegetation and Hydrology Conclusion**

	Yes	No
Number of wetland indicator plants ≥ number of non-wetland indicator plants	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Wetland hydrology present:		
Hydric soil present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other indicators of hydrology present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample Location is in a BVW	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant [REDACTED]

Prepared by: EcoTec, Inc

Project Location: South St, Shrewsbury

DEP File #

**Section I. Vegetation**

Number: TPU

Transect # AA-8

Date of Delin: 8/30/2018

A. Sample layer and plant species (Enter largest to smallest % cover by layer)			Percent Cover (or basal area)	Percent Dominance	Dominant Plant?	Wetland Indicator Category
Tree	none					
Sapling	common buckthorn	Rhamnus cathartica	60		66.7 YES	FAC *
	red maple	Acer rubrum	10		11.1 NO	FAC *
	eastern red cedar	Juniperus virginiana	10		11.1 NO	FACU
	basswood	Tilia americana	10		11.1 NO	FACU
Shrub	panicled dogwood	Cornus foemina	10		100.0 YES	FAC *
Ground	multi-flora rose	Rosa multiflora	5		25.0 YES	FACU
	Pennsylvania/upland sedge	Carex pensylvanica	5		25.0 YES	NL
	poison ivy	Toxicodendron radicans	10		50.0 YES	FAC *
Vine	asiatic bittersweet	Celastrus orbiculata	30		100.0 YES	NL

**Vegetation Conclusions**

Number of dominant wetland indicator plants

**3**

Number of dominant non-wetland indicator plants

**3**

Is the number of dominant wetland plants equal or greater than the number of dominant non-wetland plants?

YES

# DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant [redacted]

Prepared by: EcoTec, Inc

Project Location: South St, Shrewsbury

DEP File #

**Section II. Indicators of Hydrology**

Number: TPU

Transect # AA-8

Date of Delin: 8/30/2018

**1. Soil Survey**

Is there a published soil survey for this site? [redacted]

title/date [redacted]

map number [redacted]

soil type mapped [redacted]

hydric soil inclusions [redacted]

Are field observations consistent with soil survey? [redacted]

Remarks: [redacted]

**2. Soil Description**

Horizon	Depth (inches)	Matrix Color	Mottle Color
A	0-10	10YR3/2	[redacted]
B <sub>w</sub>	10-15	10YR5/4	5% 7.5YR4/6

Remarks very stony fine sandy loams

**3. Other** [redacted]

**Conclusion: Is the soil hydric?** No

**Other Indicators of hydrology (check all that apply):**

- Site Inundated [redacted]
- Depth to free water in observation hole [redacted]
- Depth to soil saturation in observation hole [redacted]
- Water marks [redacted]
- Drift lines [redacted]
- Sediment Deposits [redacted]
- Drainage patterns in BVWs [redacted]
- Oxidized rhizospheres [redacted]
- Water stained leaves [redacted]
- Recorded data (stream, lake, or tidal gauge; aerial photo; other): [redacted]
- Other: [redacted]

**Vegetation and Hydrology Conclusion**

	Yes	No
Number of wetland indicator plants ≥ number of non-wetland indicator plants	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Wetland hydrology present:		
Hydric soil present	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other indicators of hydrology present	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample Location is in a BVW	<input type="checkbox"/>	<input checked="" type="checkbox"/>

# REPORT OF GEOTECHNICAL INVESTIGATION

**PROPOSED RETAINING WALL AND ROADWAY  
CENTECH PARK NORTH  
MAP 42, LOT 11  
SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS**



*Prepared for:*

**BOHLER ENGINEERING MA, LLC  
352 Turnpike Road  
Suite 300  
Southborough, Massachusetts 01772**

*Prepared by:*

**WHITESTONE ASSOCIATES, INC.  
352 Turnpike Road  
Suite 320  
Southborough, Massachusetts 01772**



---

**Richard W.M. McLaren, P.E.  
Senior Consultant**



---

**Ryan R. Roy, P.E.  
Principal, New England Region**

**Whitestone Project No.: GM1815882.000  
November 12, 2018**

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November 12, 2018

*via email*

**BOHLER ENGINEERING MA, LLC**  
352 Turnpike Road  
Suite 105  
Southborough, Massachusetts 01772

Attention: Matthew Smith, P.E.  
Principal, New England

**Regarding: GEOTECHNICAL INVESTIGATION  
PROPOSED RETAINING WALL AND ROADWAY  
CENTECH PARK NORTH  
MAP 42, LOT 11  
SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS  
WHITESTONE PROJECT NO.: GM1815882.000**

Dear Mr. Smith:

Whitestone Associates, Inc. (Whitestone) is pleased to submit the attached *Report of Geotechnical Investigation* for the above-referenced project. The report presents the results of Whitestone's site visit and subsurface exploration, and includes design recommendations for the proposed foundations, pavement, and related earthwork associated with the proposed retaining wall and roadway.

Whitestone appreciates the opportunity to be of continued service to Bohler Engineering MA, LLC. Please contact us with any questions or comments regarding the enclosed report.

Sincerely,

**WHITESTONE ASSOCIATES, INC.**

Richard W.M. McLaren, P.E.  
Senior Consultant

Ryan R. Roy, P.E.  
Principal, New England Region

RWM/br N:\Job Folders\2018\1815882GM\Reports and Submittals\1815882 ROGI Shrewsbury MA.DOCX  
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Copy: Laurence W. Keller, P.E., Whitestone Associates, Inc.

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**REPORT OF  
 GEOTECHNICAL INVESTIGATION  
 PROPOSED RETAINING WALL AND ROADWAY  
 CenTech Park North  
 Map 42, Lot 11  
 Shrewsbury, Worcester County, Massachusetts**

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**REPORT OF  
GEOTECHNICAL INVESTIGATION  
PROPOSED RETAINING WALL AND ROADWAY  
CenTech Park North  
Map 42, Lot11  
Shrewsbury, Worcester County, Massachusetts**

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(Continued)**

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FIGURE 1      Boring Location Plan

**APPENDICES**

APPENDIX A    Records of Subsurface Exploration

APPENDIX B    Supplemental Information (USCS, Terms & Symbols)

## **SECTION 1.0**

### **Summary of Findings**

Whitestone has completed an exploration and evaluation of the subsurface conditions for the proposed retaining wall and roadway located at CenTech Park North, southwest of the intersection of South Street and Hartford Turnpike, in the Town of Shrewsbury, Worcester County, Massachusetts. The Town of Shrewsbury intends to develop the 60-acre CenTech Park property. Based on discussions with Bohler Engineering MA, LLC (Bohler) and an October 5, 2018 *Boring Location Plan*, the proposed development will include construction of a retaining wall and 2,400 lineal feet of roadway. New stormwater management facilities are proposed, but not included in this study.

The geotechnical investigation included performing a reconnaissance of the project site, advancing eight soil borings, and collecting soil samples for characterization. Site subsurface conditions consisted of topsoil/forest mat overlying intermittent existing fill, which is underlain by glacial till, which is in turn underlain by shallow bedrock. Bedrock outcrops were noted at various locations along the proposed roadway alignment. Groundwater was encountered in one of the soil borings at a depth of 3.5 feet below ground surface (fbgs) during the exploration.

The results of the investigation indicate that the proposed retaining wall may bear on the natural glacial till or structural fill placed on the glacial till, or bear on the weathered or competent bedrock or crushed stone placed on the bedrock. Additionally, the site conditions support the use of typical pavement sections using standard State of Massachusetts Department of Transportation (MassDOT) specified materials.

The above summary is intended to provide an overview of the geotechnical findings and recommendations and is not fully developed. Greater detail is presented in the following sections. The entire report must be read for comprehensive understanding of the information contained herein.

# **SECTION 2.0**

## **Introduction**

### **2.1 AUTHORIZATION**

Mr. Michael J. Dryden, Project Manager for Bohler, issued authorization to Whitestone to perform a geotechnical investigation on this site relevant to the construction of a proposed retaining wall and roadway at CenTech Park North in the Town of Shrewsbury, Worcester County, Massachusetts. The geotechnical investigation was performed in general accordance with Whitestone's revised proposal dated June 14, 2018.

### **2.2 PURPOSE**

The purpose of this exploration and analysis was to:

- ▶ ascertain the various soil profile components at test locations;
- ▶ estimate the engineering characteristics of the proposed foundation bearing and subgrade materials;
- ▶ provide geotechnical criteria for use by the design engineers in preparing the foundation and pavement design;
- ▶ provide lateral earth parameters for retaining wall design;
- ▶ provide recommendations for required earthwork and subgrade preparation;
- ▶ record groundwater and/or bedrock levels (if encountered) at the time of the investigation and discuss the potential impact on the proposed construction; and
- ▶ recommend additional investigation and/or analysis, if warranted.

### **2.3 SCOPE**

The scope of the exploration and analysis included the subsurface exploration, field testing and sampling, and a geotechnical engineering analysis and evaluation of the subsurface materials. This *Report of Geotechnical Investigation* is limited to addressing the site conditions related to the physical support of the proposed construction.

Field exploration of the project site was conducted by means of eight soil borings, identified as B-1 through B-8, which were advanced with an all terrain vehicle (ATV) mounted CME-55 drill rig equipped with hollow stem augers. The soil borings were advanced to termination depths that ranged from approximately 3.3 fbs to 6.5 fbs. Soil borings were backfilled with excavated soils generated from the investigation. Test locations are shown on the *Boring Location Plan* included as Figure 1.

Test locations were based on project information provided to Whitestone at the time of the investigation, including the *Boring Location Plan* from Bohler. The subsurface tests were conducted in the presence of a Whitestone representative, who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. Test locations were established and marked in the field by others prior to Whitestone mobilizing to the site.

Soil borings and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D1586. The Standard Penetration Resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthwork and foundations.

Groundwater level observations, where encountered, were recorded during and immediately following the completion of the field operations prior to backfilling the borings. Seasonal variations, temperature effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitoring wells may not be representative of true groundwater levels.

## SECTION 3.0 Site Description

### 3.1 LOCATION AND DESCRIPTION

The subject property is located southwest of South Street in Shrewsbury, Worcester County, Massachusetts, Latitude 42.2692 North, Longitude 71.6931 West. The property, which is identified further as Map 42, Lot 11, is undeveloped. The proposed retaining wall and roadway will extend to the southwest from South Street.

The site is irregularly shaped, bounded to the northeast by South Street and in other directions by undeveloped, wooded land. Access to the site is from South Street. The site of the proposed construction is shown on the *Boring Location Plan* included as Figure 1.

### 3.2 EXISTING CONDITIONS

**Existing Development:** At the time of Whitestone's investigation, the subject site was undeveloped and wooded.

**Topography:** Based on a review of the *USGS 7.5 Minute Series Shrewsbury Quadrangle, Massachusetts* (2018), the *Boring Location Plan* by Bohler, and Whitestone's visual observations, the site slopes down to the southeast from about 525 feet above National American Vertical Datum of 1988 (NAVD) to 510 feet above NAVD.

**Utilities:** The site is not serviced by underground utilities. The utility information contained in this report is presented for general discussion only and is not intended for construction purposes.

**Site Drainage:** Surface run-off generally consists of flow to the southeast towards the wetlands area adjacent to the site.

### 3.3 SITE GEOLOGY

From a review of the *Surficial Geologic Map of the Shrewsbury Quadrangle, Worcester County, Massachusetts* (1969), the site is underlain by glacial till. The *Geologic Map of Massachusetts* (1983), prepared by U.S. Geological Survey, indicates that the subject property is underlain by Ordovician or Proterozoic Z-aged Nashoba Formation, consisting of schist and gneiss, with minor calc-silicate rock, amphibolite, and marble, part of the Nashoba Zone.

### **3.4 PROPOSED CONSTRUCTION**

The Town of Shrewsbury intends to develop the 60-acre CenTech Park property. Based on the aforementioned *Boring Location Plan*, the proposed development will include construction of a retaining wall and 2,400 lineal feet of roadway. New stormwater management facilities are proposed, but not included in this study.

Whitestone anticipates the proposed retaining wall will be a mechanically stabilized earth (MSE) wall, up to about 10 feet in height, with masonry block facing and the retained earth reinforced with geogrid.

The scope of Whitestone's investigation and the professional advice contained in this report were generated based on the project details and loading noted herein. Revisions or additions to the design details enumerated in this report should be brought to the attention of Whitestone for additional evaluation as warranted.

## **SECTION 3.0**

### **Subsurface Conditions**

Details of the subsurface materials encountered are presented on the *Records of Subsurface Exploration* in Appendix A of this report. The subsurface soil conditions encountered in the test locations consisted of the following generalized strata in order of increasing depth.

#### **4.1 SUBSURFACE SOIL CONDITIONS**

**Surface Cover Materials:** The explorations encountered three inches to eight inches of topsoil or three inches to four inches of forest mat at the ground surface.

**Existing Fill (intermittent):** Beneath the surface cover materials, boring B-1, which is at the northeast end of the roadway alignment, encountered existing fill, consisting of brown, medium dense, poorly graded sand with gravel. The SPT N-value recorded within the existing fill was 18 blows per foot (bpf). A six-inch thick layer of former topsoil was encountered under the existing fill.

**Glacial Till:** Beneath the surface cover materials or existing fill, the borings encountered natural glacial till, consisting of brown, medium dense to very dense (surficially very loose to loose), silty sand with gravel (USCS: SM). SPT N-values recorded within the glacial till were variable, ranging from two bpf to 82 bpf.

**Apparent Bedrock:** The explorations encountered refusal on probable bedrock at depths ranging from 3.3 fbgs to 6.5 fbgs. Refusal materials were not sampled through rock coring efforts. Rock coring techniques would be required to further characterize the nature and extent of the refusal materials. Bedrock outcrops were noted at various locations along the roadway alignment.

#### **4.2 GROUNDWATER**

Static groundwater was encountered in one of the soil borings (B-7) at a depth of 3.5 fbgs during the exploration. However, static and perched/trapped water conditions generally will fluctuate seasonally and following periods of precipitation.

## SECTION 4.0

### Conclusions and Recommendations

#### 5.1 GENERAL

The results of the investigation indicate that the proposed retaining wall may bear on the natural glacial till or structural fill placed on the glacial till, or bear on the weathered or competent bedrock or crushed stone placed on the bedrock. The site conditions support the use of typical pavement sections using standard MassDOT-specified materials.

#### 5.2 SITE PREPARATION AND EARTHWORK

**Surface Cover Stripping:** Prior to stripping operations, utilities should be identified and secured. The organic material to be stripped should be removed from within and at least five feet beyond the limits of the proposed retaining wall and pavement areas. The contractor should be required to perform earthwork in accordance with the recommendations in this report, including backfilling any excavation with structural fill. Fill or backfill placed within areas requiring structural support should be placed as structural fill in accordance with Section 5.2, 5.3, and 5.10 of this report.

**Excavation Difficulties:** Shallow bedrock and cobbles and boulders typically encountered in glacial till may present excavation difficulties at marginal depths below the ground surface during proposed site excavations. Excavation difficulties will be affected by excavation size and depth. The speed and ease of excavation also will depend on the type of equipment used, the skill of the operator, and the geological structure of the bedrock, such as spacing between discontinuities and planes of weakness. Whitestone expects that the upper one foot to two feet of weathered bedrock may be removable with standard heavy excavation equipment. However, pneumatic hammers would likely be required to remove more resistant bedrock. Consideration could be given to blasting, depending on the depth of any excavation into the bedrock.

**Surface Preparation/Proofrolling:** Before placing fill or granular subbase materials to raise or restore grades to the desired subgrade elevations, the existing exposed soils should be compacted to a firm surface with several passes in two perpendicular directions of a minimum 10-ton vibratory roller. The surface should then be proofrolled with a loaded tandem axle truck in the presence of the geotechnical engineer to help identify soft or loose pockets that may require removal and replacement, or further evaluation. Proofrolling should be performed after a suitable period of dry weather to reduce the likelihood of degrading an otherwise stable subgrade. Fill or backfill should be placed and compacted in accordance with Section 5.3.

**Bedrock Subgrade Preparation:** Bedrock slopes should not be steeper than 4:1 (horizontal:vertical). Bedrock steeper than 4:1 (horizontal:vertical) should be stepped. Loose bedrock should be removed from the subgrade prior to placement of crushed stone. Bedrock fractures and joints should be tight. Bedrock

joints, fractures, or fissures greater than 0.25-inch in width should be filled with lean concrete. Only minus 0.75-inch crushed stone should be placed directly over the bedrock. Structural fill (sand and gravel) should not be placed directly on the bedrock surface to reduce the likelihood of migration of fines into the bedrock.

**Weather Performance Criteria:** Every effort should be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be performed during favorable weather conditions. Overexcavation of wet or disturbed soils and replacement with controlled structural fill per Section 5.3 of this report may be required prior to resuming work on subgrade soils.

**Subgrade Protection and Maintenance:** The site soils may degrade if exposed to inclement weather, freeze-thaw cycles, or repeated construction traffic. However, if properly protected and maintained as recommended herein, the site soils will provide adequate support for the proposed construction. The site contractors should employ appropriate means and methods to protect the subgrade including, but not limited to the following:

- ▶ sealing exposed subgrade soils on a daily basis with a smooth drum roller operated in static mode;
- ▶ regrading the site as needed to maintain positive drainage away from open earthwork construction areas and to prevent standing water;
- ▶ removing wet surficial soils immediately; and
- ▶ limiting exposure to construction traffic and precipitation especially following inclement weather and subgrade thawing.

### 5.3 STRUCTURAL FILL AND BACKFILL

**Imported Fill Material:** Imported material placed as structural fill or backfill to raise elevations or restore design grades should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and up to 15 percent, by weight, of material finer than a #200 sieve. Imported material should be free of silt, clay, organics, and deleterious material. Imported material should be approved by a qualified geotechnical engineer prior to delivery to the site.

**On-Site Material Reuse:** Whitestone anticipates that portions of the natural glacial till and the existing fill materials will be structurally suitable for selective reuse as fill/backfill material, provided that soil moisture contents are controlled within three percent of optimum moisture level, particles larger than three inches in diameter are either removed or crushed, and objectionable portions, such as organics, are segregated. Reuse of the glacial till and existing fill materials will be contingent on careful review in the field by the owner's geotechnical engineer by visual observation during construction as recommended herein.

**Compaction and Placement Requirements:** Fill and backfill should be placed in maximum eight-inch thick loose lifts and compacted using a vibratory drum roller during mass grading activities or a small

hand-held vibratory compactor within excavations. Structural fill and backfill should be compacted to at least 95 percent of the maximum dry density within three percent of the optimum moisture content, as determined by ASTM D1557 (Modified Proctor).

**Structural Fill Testing:** A sample of the imported fill material or on-site material proposed for reuse as structural fill or backfill should be submitted to the owner's geotechnical engineer for analysis and approval at least one week prior to its use. The placement of fill and backfill should be monitored by a qualified engineering technician, so that the specified material and lift thicknesses are properly installed. A sufficient number of in-place density tests should be performed, so that the specified compaction is achieved throughout the height of the fill or backfill.

#### **5.4 GROUNDWATER CONTROL**

Static groundwater was encountered within one of the soil borings during this investigation at a depth that may impact foundation construction and excavation for utilities. Water perched on the bedrock surface may be encountered during construction. As such, construction phase dewatering may consist of removing surface water runoff, infiltrating water, or trapped water. Whitestone anticipates that construction phase dewatering, if required, will include installing temporary sump pits and pumps within trenches and excavations.

Proper grading and drainage should be incorporated into the site design and construction phase grading to discourage ponding of surface runoff. Every effort should be made to maintain drainage of surface runoff away from construction areas by grading. The contractor should limit exposure of excavations and prepared subgrades to rainfall. Overexcavation of wet soils and replacement with controlled structural fill per Section 5.3 of this report may be required prior to resuming work on disturbed subgrade soils.

#### **5.5 FOUNDATIONS**

**Shallow Foundations:** Whitestone considers that the proposed retaining wall may bear on the natural glacial till or structural fill placed on the glacial till, or bear on the weathered or competent bedrock or crushed stone placed on the bedrock, provided these materials are properly evaluated, placed and compacted in accordance with Sections 5.2, 5.3, and 5.10 of this report. Sand and gravel fill should not be placed directly on the bedrock surface to reduce the likelihood of fine soils migrating into cracks and crevices in the bedrock. Following in-trench compaction of foundation subgrades, foundations bearing within these materials may be designed to impart a maximum net allowable bearing pressure of 5,000 pounds per square foot.

All footing excavation bottoms should be compacted in place by hand-operated compaction equipment in the presence of the geotechnical engineer to densify isolated loose zones and soil disturbed by excavation. Regardless of loading conditions, proposed foundations should be sized no less than a minimum width of 24 inches.

Footings should be designed such that the maximum toe pressure due to the combined effect of vertical loads (including soil weight) and overturning moment does not exceed the recommended maximum allowable bearing pressure. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete footing. Side friction should be neglected when proportioning the footings; lateral resistance should be provided by friction resistance at the base of the footings. A coefficient of friction (ultimate) against sliding of 0.4 is recommended for use in the design of the foundations bearing within the site soils or imported structural fill.

**Foundation Inspection:** Whitestone recommends that the suitability of the bearing soils along new footing bottoms be reviewed by a geotechnical engineer prior to constructing the footings. Special attention should be given to any areas of the site underlain by soft/loose conditions. In the event that isolated areas of unsuitable materials are encountered in footing excavations, overexcavation and replacement of the materials or deeper foundation embedment may be necessary to provide a suitable footing subgrade. Overexcavation to be restored with structural fill will need to extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation.

**Settlement:** Whitestone estimates post construction settlements of new retaining wall foundations will be on the order of less than one inch, if the recommendations outlined in this report are properly implemented. Differential settlements of new foundations should be less than one half inch along a horizontal distance of 50 feet.

**Frost Coverage:** Footings subject to frost action should be placed at least 48 inches below adjacent exterior grades, in accordance with the Commonwealth of Massachusetts *State Building Code (Ninth Edition)*, to provide protection from frost penetration.

**Foundation Inspection:** Whitestone recommends that the suitability of the bearing soils along footing bottoms be reviewed by a Whitestone geotechnical engineer prior to placing concrete for the footings. Special attention should be given to areas of the site underlain by any soft/loose conditions. Following review by the owner's geotechnical engineer, the exposed soil subgrade may be compacted.

## 5.6 PAVEMENT DESIGN CRITERIA

**General:** Whitestone anticipates that the properly inspected and approved glacial till or existing fill, and/or compacted structural fill or backfill placed to raise or restore design elevations, will be suitable for support of the proposed pavements, provided these materials are properly evaluated, compacted, and proofrolled in accordance with Sections 5.2, 5.3, and 5.10 of this report during favorable weather conditions.

**Design Criteria:** A California Bearing Ratio value of 8.0 has been assigned to the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loading to prepare a flexible pavement design per the *AASHTO Guide for the Design of Pavement Structures*.

Design traffic loading was assumed based on typical volumes for similar roadways and correlated with 18-kip equivalent single axle loads (ESAL) for a 20-year life. Estimated maximum pavement loading of 150,000 ESALs was used.

**Pavement Sections:** Pavement components should meet material specifications from MassDOT *Standard Specifications* specified below. The recommended flexible pavement section is tabulated below:

FLEXIBLE PAVEMENT SECTION		
Layer	Material	Thickness (Inches)
Asphalt Surface Course	MassDOT M3.11.03 Table A “Top Course”	2.0
Asphalt Binder Course	MassDOT M3.11.03 Table A “Binder Course”	2.5
Granular Subbase	MassDOT M2.01.7 Dense-graded Crushed Stone for Sub-Base	12.0

**Additional Design Considerations:** The pavement section thickness design presented in this report is based on the design parameters detailed herein and is contingent on proper construction, inspection, and maintenance. Additional pavement thickness may be required by local code. The design is contingent on achieving the minimum soil support value in the field. To accomplish this requirement, subgrade soil and supporting fill or backfill should be placed, compacted, and evaluated in accordance with Sections 5.2, 5.3, and 5.10 of this report. Proper drainage should be provided for the pavement structure, including appropriate grading and surface water control, and an edge drain on the uphill side of the roadway.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that MassDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials.

## 5.7 RETAINING WALLS/LATERAL EARTH PRESSURES

**General:** The following parameters may be used for design of the proposed site retaining wall, any below-grade walls, and other structures reliant on granular materials to provide adequate drainage.

**Lateral Earth Pressures:** Any retaining/below-grade walls should be capable of withstanding active and at-rest earth pressures. With an active earth pressure coefficient ( $K_a$ ) of 0.33 and assuming a level

backfill and an assumed maximum backfill soil unit weight of 140 pounds per cubic foot (pcf), an equivalent fluid pressure of 46 psf per foot of wall height should be used in design of retaining/below-grade walls which are free to rotate.

Retaining/below-grade walls and wall corners that are restrained from lateral movement should be designed using at-rest earth pressures. A coefficient of at-rest earth pressure ( $K_o$ ) of 0.50, for a level backfill, is recommended for retaining/below-grade walls designed to resist at-rest earth pressures, which assume no lateral movement. With an assumed maximum total unit weight of backfill of approximately 140 pcf, an equivalent fluid pressure of 70 pounds per square foot per foot of wall height should be used in design of restrained retaining/below-grade wall and wall corners. A coefficient of friction of 0.4 against sliding can be used for concrete on the existing site soils. Additional lateral earth pressures from a sloped backfill or any temporary or long term surcharge loads also should be included in the design. Retaining wall design should include a global stability analysis.

**Backfill Criteria:** Whitestone recommends that granular soils be used to backfill behind retaining walls. The granular backfill materials should consist of clean, relatively well graded sand or gravel. Whitestone recommends that backfill directly behind walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within a zone of influence measured at a 45-degree angle from the base of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

Positive drainage should be provided at the base of the below-grade walls. Where wall drainage is not provided, the wall should be designed to withstand full hydrostatic pressure.

Whitestone should be notified if any other retaining structures or design considerations requiring lateral earth pressure estimations are proposed. Specific recommendations for temporary retaining structures are beyond Whitestone's scope of services.

## **5.8 SEISMIC AND LIQUEFACTION CONSIDERATIONS**

The subsurface conditions are most consistent with a Site Class C, as defined by the Commonwealth of Massachusetts *State Building Code (Ninth Edition)*. The site soils are not susceptible to earthquake induced liquefaction.

## **5.9 EXCAVATIONS**

The existing fill materials and natural glacial till encountered during this investigation typically are, at a minimum, consistent with Type C Soil Conditions, as defined by 29 CFR Part 1926 (OSHA), which require a maximum unbraced excavation angle of 1.5:1 (horizontal:vertical). Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA), so that safe excavation methods and/or shoring and bracing requirements are implemented. Competent

bedrock may be excavated at an angle of 1:6 (horizontal:vertical). A steeper excavation angle in the bedrock may be feasible, if the exposed bedrock is reviewed by a professional engineer or geologist.

#### **5.10 SUPPLEMENTAL POST INVESTIGATION SERVICES**

**Construction Inspection and Monitoring:** The owner's geotechnical engineer with specific knowledge of the site subsurface conditions and design intent should perform inspection, testing, and consultation during construction as described in previous sections of this report. Monitoring and testing should also be performed to check that the existing surface cover materials are properly removed, any encountered underground structures are properly backfilled, and suitable materials, used for controlled fill, are properly placed and compacted over suitable subgrade soils. The proofrolling of all subgrades prior to foundation and pavement support should be witnessed and documented by the owner's geotechnical engineer.

## **SECTION 5.0**

### **General Comments**

Supplemental recommendations may be required upon finalization of construction plans or if significant changes are made in the characteristics or location of the proposed structure. Soil/rock bearing conditions should be checked at the appropriate time for consistency with those conditions encountered during Whitestone's geotechnical investigation.

The recommendations presented herein should be utilized by a qualified engineer in preparing the project plans and specifications. The engineer should consider these recommendations as minimum physical standards, which may be superseded by local and regional building codes and structural considerations. These recommendations are prepared for the sole use of Bohler Engineering MA, LLC for the specific project detailed and should not be used by any third party. These recommendations are relevant to the design phase and should not be substituted for construction specifications.

The possibility exists that conditions between borings may differ from those at specific test locations, and conditions may not be as anticipated by the designers or contractors. In addition, the construction process may alter soil and rock conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered.

Whitestone assumes that a qualified contractor will be employed to perform the construction work, and that the contractor will be required to exercise care to ensure excavations are performed in accordance with applicable regulations and good practice. Particular attention should be paid to avoiding damaging or undermining adjacent properties and maintaining slope stability.

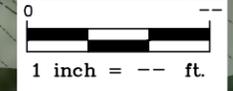
Whitestone recommends that the services of the geotechnical engineer be engaged to test and evaluate the soils in the footing excavations prior to concreting in order to determine that the soils will support the bearing pressures. Monitoring and testing also should be performed to check that suitable materials are used for controlled fills and that they are properly placed and compacted over suitable subgrade soils.

The exploration and analysis of the foundation conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation design. The recommendations submitted for the proposed construction are based on the available soil information and the design details furnished by Bohler Engineering MA, LLC. Deviations from the noted subsurface conditions encountered during construction should be brought to the attention of the geotechnical engineer.

*The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties, express or implied, are made.*

**FIGURE 1**  
**Boring Location Plan**

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**LEGEND**

B-1 BORING LOCATION (APPROX.)  
 TP-1 TEST PIT LOCATION (APPROX.)

**REFERENCE**

THIS PLAN IS BASED UPON AN OCTOBER 10, 2018 BORING LOCATION PLAN PREPARED BY BOHLER ENGINEERING MA, LLC



**WHITESTONE ASSOCIATES, INC.**  
 Environmental & Geotechnical Engineers & Consultants

352 TURNPIKE ROAD SUITE 320, SOUTHBOROUGH, MA 01772  
 508.485.0755 WHITESTONEASSOC.COM

<b>DRAWING TITLE:</b> BORING/TEST LOCATION PLAN	
<b>CLIENT:</b> BOHLER ENGINEERING MA, LLC	
<b>PROJECT:</b> CENTECH PARK NORTH ROADWAY SOUTH STREET AND HARTFORD TURNPIKE SHREWSBURY, WORCESTER COUNTY, MASSACHUSETTS	
<b>PROJECT #:</b> GM1815882.000	
<b>DESIGNED BY:</b> HZ	<b>PROJ. MGR.:</b> JRL
<b>DATE:</b> 11/09/2018	<b>FIGURE:</b> 1
<b>SCALE:</b> NTS	

**APPENDIX A**  
**Records of Subsurface Exploration**

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed Centech Park North Roadway		<b>WAI Project No.:</b> GM1815882.000	
<b>Location:</b> South Street and Hartford Turnpike, Shrewsbury, Worcester, Massachusetts		<b>Client:</b> Bohler Engineering MA, LLC	
<b>Surface Elevation:</b> ± <u>NS</u> feet above NAVD88	<b>Date Started:</b> <u>10/9/2018</u>	<b>Water Depth   Elevation</b> (feet bgs)   (feet NAVD88)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet NAVD88)
<b>Termination Depth:</b> <u>6.0</u> feet bgs	<b>Date Completed:</b> <u>10/9/2018</u>	<b>During:</b> --   -- ▾	<b>At Completion:</b> --   -- ▾
<b>Proposed Location:</b> <u>Retaining Wall</u>	<b>Logged By:</b> <u>DC</u>	<b>24 Hours:</b> --   -- ▾	<b>24 Hours:</b> --   -- ▾
<b>Drill / Test Method:</b> <u>HSA / SPT</u>	<b>Contractor:</b> <u>PG</u>		
	<b>Equipment:</b> <u>CME-55</u>		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0			
0 - 2	S-1	X	2 - 9 - 9 - 6	9	18	0.0 - 1.5	TS EXISTING FILL	3" Topsoil Brown, Medium Dense, Poorly Graded Sand with Gravel (FILL)	
2 - 2.2	S-2	X	50/2"	2	-	1.5 - 2.0	TS	6" Former Topsoil	
						2.0 - 5.0	GLACIAL TILL	Brown, Very Dense, Silty Sand with Gravel (SM)	
5 - 5.8	S-3	X	13 - 50/3"	8	-	5.0 - 6.0		As Above (SM)	
						6.0 - 25.0			Boring Log B-1 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 6.0 Feet Below Ground Surface.

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed Centech Park North Roadway		<b>WAI Project No.:</b> GM1815882.000	
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<b>Surface Elevation:</b> ± <u>NS</u> feet above NAVD88	<b>Date Started:</b> <u>10/9/2018</u>	<b>Water Depth   Elevation</b> (feet bgs)   (feet NAVD88)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet NAVD88)
<b>Termination Depth:</b> <u>3.3</u> feet bgs	<b>Date Completed:</b> <u>10/9/2018</u>	<b>During:</b> --   -- ▼	<b>At Completion:</b> --   -- ▼
<b>Proposed Location:</b> <u>Retaining Wall</u>	<b>Logged By:</b> <u>DC</u>	<b>24 Hours:</b> --   -- ▼	<b>At Completion:</b> --   -- ▼
<b>Drill / Test Method:</b> <u>HSA / SPT</u>	<b>Contractor:</b> <u>PG</u>		<b>24 Hours:</b> --   -- ▼
	<b>Equipment:</b> <u>CME-55</u>		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0			
0 - 2	S-1	X	10 - 7 - 8 - 7	11	15		TS	5" Topsoil	
2 - 2.3	S-2	X	50/4"	2	-		GLACIAL TILL	Brown, Medium Dense, Silty Sand with Gravel, Cobbles (SM) As Above, Very Dense (SM)	
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			
								Boring Log B-2 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 3.3 Feet Below Ground Surface.	

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# RECORD OF SUBSURFACE EXPLORATION

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<b>Location:</b> South Street and Hartford Turnpike, Shrewsbury, Worcester, Massachusetts		<b>Client:</b> Bohler Engineering MA, LLC	
<b>Surface Elevation:</b> ± <u>NS</u> feet above NAVD88	<b>Date Started:</b> <u>10/9/2018</u>	<b>Water Depth   Elevation</b> (feet bgs)   (feet NAVD88)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet NAVD88)
<b>Termination Depth:</b> <u>4.0</u> feet bgs	<b>Date Completed:</b> <u>10/9/2018</u>	<b>During:</b> --   -- ▼	<b>At Completion:</b> --   -- ▼
<b>Proposed Location:</b> <u>Retaining Wall</u>	<b>Logged By:</b> <u>DC</u>	<b>24 Hours:</b> --   -- ▼	<b>At Completion:</b> --   -- ▼
<b>Drill / Test Method:</b> <u>HSA / SPT</u>	<b>Contractor:</b> <u>PG</u>	<b>24 Hours:</b> --   -- ▼	<b>24 Hours:</b> --   -- ▼
	<b>Equipment:</b> <u>CME-55</u>		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
0 - 2	S-1	<del>X</del>	2 - 3 - 6 - 43	9	9	0.0 - 1.5	TS	4" Topsoil	Offset 10 Feet to SW - Auger Refusal at 4 Feet
2 - 2.7	S-2	<del>X</del>	14 - 50/2"	3	-	1.5 - 2.7	GLACIAL TILL	As Above, Very Dense (SM)	
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			
								Boring Log B-3 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 4.0 Feet Below Ground Surface.	

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# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed Centech Park North Roadway		<b>WAI Project No.:</b> GM1815882.000	
<b>Location:</b> South Street and Hartford Turnpike, Shrewsbury, Worcester, Massachusetts		<b>Client:</b> Bohler Engineering MA, LLC	
<b>Surface Elevation:</b> ± <u>NS</u> feet above NAVD88	<b>Date Started:</b> <u>10/9/2018</u>	<b>Water Depth   Elevation</b> (feet bgs)   (feet NAVD88)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet NAVD88)
<b>Termination Depth:</b> <u>4.5</u> feet bgs	<b>Date Completed:</b> <u>10/9/2018</u>	<b>During:</b> --   -- ▼	<b>At Completion:</b> --   -- ▼
<b>Proposed Location:</b> <u>Retaining Wall</u>	<b>Logged By:</b> <u>DC</u>	<b>24 Hours:</b> --   -- ▼	<b>At Completion:</b> --   -- ▼
<b>Drill / Test Method:</b> <u>HSA / SPT</u>	<b>Contractor:</b> <u>PG</u>		<b>24 Hours:</b> --   -- ▼
	<b>Equipment:</b> <u>CME-55</u>		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TS	5" Topsoil	
0 - 2	S-1	X	2 - 4 - 4 - 3	8	8	2.0	GLACIAL TILL	Brown, Loose, Silty Sand with Gravel (SM)	
2 - 3.3	S-2	X	16 - 21 - 50/4"	14	42			As Above, Dense (SM)	
						5.0		Boring Log B-4 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 4.5 Feet Below Ground Surface.	
						10.0			
						15.0			
						20.0			
						25.0			

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# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed Centech Park North Roadway		<b>WAI Project No.:</b> GM1815882.000	
<b>Location:</b> South Street and Hartford Turnpike, Shrewsbury, Worcester, Massachusetts		<b>Client:</b> Bohler Engineering MA, LLC	
<b>Surface Elevation:</b> ± <u>NS</u> feet above NAVD88	<b>Date Started:</b> <u>10/9/2018</u>	<b>Water Depth   Elevation</b> (feet bgs)   (feet NAVD88)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet NAVD88)
<b>Termination Depth:</b> <u>6.5</u> feet bgs	<b>Date Completed:</b> <u>10/9/2018</u>	<b>During:</b> --   -- ▾	<b>At Completion:</b> --   -- ▾
<b>Proposed Location:</b> <u>Retaining Wall</u>	<b>Logged By:</b> <u>DC</u>	<b>24 Hours:</b> --   -- ▾	<b>At Completion:</b> --   -- ▾
<b>Drill / Test Method:</b> <u>HSA / SPT</u>	<b>Contractor:</b> <u>PG</u>	<b>24 Hours:</b> --   -- ▾	<b>At Completion:</b> --   -- ▾
	<b>Equipment:</b> <u>CME-55</u>		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS	
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N					
						0.0	TS	7" Topsoil		
0 - 2	S-1	X	2 - 2 - 6 - 8	7	8		GLACIAL TILL	Brown, Loose, Silty Sand with Gravel (SM)  As Above, Medium Dense (SM)  As Above, Very Dense (SM)		
2 - 4	S-2	X	6 - 13 - 10 - 11	13	23	2.5				
5 - 6.1	S-3	X	36 - 43 - 25/1"	11	86	5.0				
						10.0		Boring Log B-5 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 6.5 Feet Below Ground Surface.		
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed Centech Park North Roadway		<b>WAI Project No.:</b> GM1815882.000	
<b>Location:</b> South Street and Hartford Turnpike, Shrewsbury, Worcester, Massachusetts		<b>Client:</b> Bohler Engineering MA, LLC	
<b>Surface Elevation:</b> ± <u>NS</u> feet above NAVD88	<b>Date Started:</b> <u>10/9/2018</u>	<b>Water Depth   Elevation</b> (feet bgs)   (feet NAVD88)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet NAVD88)
<b>Termination Depth:</b> <u>4.5</u> feet bgs	<b>Date Completed:</b> <u>10/9/2018</u>	<b>During:</b> <u>--</u>   <u>--</u> ▼	<b>At Completion:</b> <u>--</u>   <u>--</u> ▼
<b>Proposed Location:</b> <u>Retaining Wall</u>	<b>Logged By:</b> <u>DC</u>	<b>24 Hours:</b> <u>--</u>   <u>--</u> ▼	<b>At Completion:</b> <u>--</u>   <u>--</u> ▼
<b>Drill / Test Method:</b> <u>HSA / SPT</u>	<b>Contractor:</b> <u>PG</u>		<b>24 Hours:</b> <u>--</u>   <u>--</u> ▼
	<b>Equipment:</b> <u>CME-55</u>		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TS	8" Topsoil	
0 - 2	S-1	X	1 - 1 - 1 - 2	14	2		GLACIAL TILL	Brown, Very Loose, Silty Sand with Gravel (SM)	
2 - 3.4	S-2	X	2 - 11 - 50/5"	4	22	2.5		As Above, Medium Dense (SM)	
						5.0		Boring Log B-6 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 4.5 Feet Below Ground Surface.	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed Centech Park North Roadway		<b>WAI Project No.:</b> GM1815882.000	
<b>Location:</b> South Street and Hartford Turnpike, Shrewsbury, Worcester, Massachusetts		<b>Client:</b> Bohler Engineering MA, LLC	
<b>Surface Elevation:</b> ± <u>NS</u> feet above NAVD88	<b>Date Started:</b> <u>10/9/2018</u>	<b>Water Depth   Elevation</b> (feet bgs)   (feet NAVD88)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet NAVD88)
<b>Termination Depth:</b> <u>4.3</u> feet bgs	<b>Date Completed:</b> <u>10/9/2018</u>	<b>During:</b> <u>3.5</u>   --   ▼	<b>At Completion:</b> --   --   ▼
<b>Proposed Location:</b> <u>Retaining Wall</u>	<b>Logged By:</b> <u>DC</u>	<b>24 Hours:</b> --   --   ▼	<b>At Completion:</b> --   --   ▼
<b>Drill / Test Method:</b> <u>HSA / SPT</u>	<b>Contractor:</b> <u>PG</u>		<b>24 Hours:</b> --   --   ▼
	<b>Equipment:</b> <u>CME-55</u>		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0			
0 - 2	S-1	X	1 - 2 - 1 - 1	13	3	0.0 - 2.0	TS	3" Forest Mat	Offset 11 Feet to SW - Auger Refusal 4.3 Feet
2 - 3.8	S-2	X	5 - 5 - 9 - 100/4	14	14	2.0 - 3.8	GLACIAL TILL	Brown, Very Loose, Silty Sand with Gravel (SM)  As Above, Medium Dense (SM)	
						5.0		Boring Log B-7 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 4.3 Feet Below Ground Surface.	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

# RECORD OF SUBSURFACE EXPLORATION

<b>Project:</b> Proposed Centech Park North Roadway		<b>WAI Project No.:</b> GM1815882.000	
<b>Location:</b> South Street and Hartford Turnpike, Shrewsbury, Worcester, Massachusetts		<b>Client:</b> Bohler Engineering MA, LLC	
<b>Surface Elevation:</b> ± <u>NS</u> feet above NAVD88	<b>Date Started:</b> <u>10/9/2018</u>	<b>Water Depth   Elevation</b> (feet bgs)   (feet NAVD88)	<b>Cave-In Depth   Elevation</b> (feet bgs)   (feet NAVD88)
<b>Termination Depth:</b> <u>5.0</u> feet bgs	<b>Date Completed:</b> <u>10/9/2018</u>	<b>During:</b> --   -- ▼	<b>At Completion:</b> --   -- ▼
<b>Proposed Location:</b> <u>Retaining Wall</u>	<b>Logged By:</b> <u>DC</u>	<b>24 Hours:</b> --   -- ▼	<b>At Completion:</b> --   -- ▼
<b>Drill / Test Method:</b> <u>HSA / SPT</u>	<b>Contractor:</b> <u>PG</u>		<b>24 Hours:</b> --   -- ▼
	<b>Equipment:</b> <u>CME-55</u>		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0			
0 - 2	S-1	X	1 - 10 - 31 - 34	6	41		TS	4" Forest Mat	
2 - 4	S-2	X	27 - 6 - 12 - 13	9	18		GLACIAL TILL	Brown, Dense, Silty Sand with Gravel (SM) As Above, Medium Dense (SM)	
						5.0			Boring Log B-8 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 5.0 Feet Below Ground Surface.
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

**APPENDIX B**  
**Supplemental Information**  
**(USCS, Terms and Symbols)**



# UNIFIED SOIL CLASSIFICATION SYSTEM

## SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	
	MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	SM	SILTY SANDS, SAND-SILT MIXTURES	
		LIQUID LIMITS <u>GREATER</u> THAN 50	SC	CLAYEY SANDS, SAND-CLAY MIXTURES	
MORE THAN 50% OF MATERIAL IS <u>SMALLER</u> THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
		LIQUID LIMITS <u>GREATER</u> THAN 50	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
		LIQUID LIMITS <u>GREATER</u> THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
		LIQUID LIMITS <u>GREATER</u> THAN 50	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
HIGHLY ORGANIC SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
		LIQUID LIMITS <u>GREATER</u> THAN 50	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

**GRADATION\***

% FINER BY WEIGHT

TRACE..... 1% TO 10%  
LITTLE..... 10% TO 20%  
SOME..... 20% TO 35%  
AND..... 35% TO 50%

**COMPACTNESS\***  
Sand and/or Gravel

RELATIVE DENSITY

LOOSE..... 0% TO 40%  
MEDIUM DENSE.... 40% TO 70%  
DENSE..... 70% TO 90%  
VERY DENSE..... 90% TO 100%

**CONSISTENCY\***  
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250  
SOFT..... 250 TO 500  
MEDIUM..... 500 TO 1000  
STIFF..... 1000 TO 2000  
VERY STIFF..... 2000 TO 4000  
HARD..... GREATER THAN 4000

\* VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

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*Other Office Locations:*

WARREN, NJ  
908.668.7777

CHALFONT, PA  
215.712.2700

ROCKY HILL, CT  
860.726.7889

WALL, NJ  
732.592.2101

STERLING, VA  
703.464.5858

EVERGREEN, CO  
303.670.6905

## GEOTECHNICAL TERMS AND SYMBOLS

### SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

### SOIL PROPERTY SYMBOLS

- N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.  
 Qu: Unconfined compressive strength, TSF.  
 Qp: Penetrometer value, unconfined compressive strength, TSF.  
 Mc: Moisture content, %.  
 LL: Liquid limit, %.  
 PI: Plasticity index, %.  
 δd: Natural dry density, PCF.  
 ▽: Apparent groundwater level at time noted after completion of boring.

### DRILLING AND SAMPLING SYMBOLS

- NE: Not Encountered (Groundwater was not encountered).  
 SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.  
 ST: Shelby Tube - 3" O.D., except where noted.  
 AU: Auger Sample.  
 OB: Diamond Bit.  
 CB: Carbide Bit  
 WS: Washed Sample.

### RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>Term (Non-Cohesive Soils)</u>	<u>Standard Penetration Resistance</u>
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

<u>Term (Cohesive Soils)</u>	<u>Qu (TSF)</u>
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

### PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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**APPENDIX D: LIST OF REQUIRED PERMITS**

## **LIST OF REQUIRED PERMITS**

### LOCAL PERMITS

Preliminary and Definitive Subdivision – Shrewsbury Planning Board

Site Plan Approval – Shrewsbury Planning Board

Special Permits (Potentially Required) – Shrewsbury Planning Board

Order of Conditions – Shrewsbury Conservation Commission

### STATE PERMITS

Highway Access Permit - Massachusetts Department of Transportation

### FEDERAL PERMITS

Construction General Permit (CGP): National Pollutant Discharge Elimination System (NPDES)

**APPENDIX E: PUBLIC NOTICE OF ENVIRONMENTAL REVIEW**

***Commonwealth of Massachusetts  
Executive Office of Energy and Environmental Affairs***

***MEPA Office***

100 Cambridge St., Suite 900  
Boston, MA 02114  
Telephone 617-626-1020

The following should be completed and submitted to a local newspaper:

---

A. PUBLIC NOTICE OF ENVIRONMENTAL REVIEW

**PROJECT:** Centech Park North

**LOCATION:** 384-386 South Street, Shrewsbury, MA

**PROPONENT:** Town of Shrewsbury

**The undersigned is submitting an Environmental Notification Form ("ENF") to the Secretary of Energy & Environmental Affairs on or before November 30, 2018 (date)**

**This will initiate review of the above project pursuant to the Massachusetts Environmental Policy Act ("MEPA", M.G.L. c. 30, s.s. 61-621). Copies of the ENF may be obtained from:**

Bohler Engineering, Attn: Michael J. Dryden

352 Turnpike Road

Southborough MA 01772

(508) 480-9900: [mdryden@bohlereng.com](mailto:mdryden@bohlereng.com)

*(Name, address, phone number of proponent or proponent's agent)*

**Copies of the ENF are also being sent to the Conservation Commission and Planning Board of Shrewsbury (Municipality) where they may be inspected.**

The Secretary of Energy & Environmental Affairs will publish notice of the ENF in the Environmental Monitor, will receive public comments on the project for 20 days, and will then decide, within ten days, if an environmental Impact Report is needed. A site visit and consultation session on the project may also be scheduled. All persons wishing to comment on the project, or to be notified of a site visit or consultation session, should write to the Secretary of Energy & Environmental Affairs, 100 Cambridge St., Suite 900, Boston, Massachusetts 02114, Attention: MEPA Office, referencing the above project.

By Town of Shrewsbury

*(Proponent)*

**APPENDIX F: CIRCULATION LIST**

## CIRCULATION LIST

SECRETARY MATTHEW A. BEATON  
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS  
ATTENTION: MEPA OFFICE  
100 CAMBRIDGE STREET, SUITE 900 (9<sup>TH</sup> FLOOR)  
BOSTON, MA 02114

DEPARTMENT OF ENVIRONMENTAL PROTECTION  
COMMISSIONER'S OFFICE  
ATTENTION: MEPA COORDINATOR  
ONE WINTER STREET  
BOSTON, MA 02108

DEPARTMENT OF ENVIRONMENTAL PROTECTION  
CENTRAL REGIONAL OFFICE  
ATTENTION: MEPA COORDINATOR  
8 NEW BOND STREET  
WORCESTER, MA 01608

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH  
ATTENTION: MEPA COORDINATOR  
250 WASHINGTON STREET  
BOSTON, MA 02108

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION  
PUBLIC/PRIVATE DEVELOPMENT UNIT  
TEN PARK PLAZA #4150  
BOSTON, MA 02116

MASSDOT HIGHWAY DEPARTMENT – DISTRICT 3  
ATTENTION: MEPA COORDINATOR  
403 BELMONT STREET  
WORCESTER, MA 01604

MASSACHUSETTS HISTORICAL COMMISSION  
THE MA ARCHIVES BUILDING  
220 MORRISSEY BOULEVARD  
BOSTON, MA 02125

ENERGY FACILITIES SITING BOARD  
ATTENTION: MEPA COORDINATOR  
ONE SOUTH STATION  
BOSTON, MA 02110

MASSACHUSETTS DIVISION OF ENERGY RESOURCES  
ATTENTION: MEPA COORDINATOR  
100 CAMBRIDGE STREET, SUITE 1020 (10<sup>TH</sup> FLOOR)  
BOSTON, MA 02114

CENTRAL MASS REGIONAL PLANNING COMMISSION  
2 WASHINGTON SQUARE  
UNION STATION – 2<sup>ND</sup> FLOOR  
WORCESTER, MA 01604

SHREWSBURY BOARD OF SELECTMAN  
100 MAPLE AVENUE  
SHREWSBURY, MA 01545

SHREWSBURY PLANNING BOARD  
100 MAPLE AVENUE  
SHREWSBURY, MA 01545

SHREWSBURY CONSERVATION COMMISSION  
100 MAPLE AVENUE  
SHREWSBURY, MA 01545

SHREWSBURY BOARD OF HEALTH  
100 MAPLE AVENUE  
SHREWSBURY, MA 01545

SHREWSBURY PUBLIC LIBRARY  
609 MAIN STREET  
SHREWSBURY, MA 01545