IMPACT STATEMENT

Project: FIDC 163 LLC
Proposed Pharmacy with Drive-Thru
Block 5B3, Lot 50
290 Central Street (U.S. Route 202)
Town of Winchendon, Worchester County, Massachusetts

Dated: October 29, 2021

Reference: ***Preliminary & Final Major Site Plan***
(Prepared by Stonefield Engineering & Design, LLC, dated October 29, 2021)

EXISTING CONDITIONS

The subject property is designated at Block 5B3, Lot 50, commonly known as 290 Central Street located at the intersection of Central Street and Juniper Street. The site location is depicted in the USGS Quadrangle Map and Aerial Map within the **Appendix A.2**.

The project site is currently developed consisting of a paved lot with a small forested pervious area. Access is provided via Juniper Road with no formal driveway apron. There is a one-story Church to the northeast, a one-story Pharmacy to the northwest, Central Street (U.S. Route 202) to the southeast, and a parking lot to the southwest. The property drains to the west towards Juniper Road and has an average slope across the site of 4.14%. The site currently drains undetained and is collected via two inlets within Juniper Street which flow into the municipal stormwater system within Central Street.

PROPOSED DEVELOPMENT

FIDC 163 LLC is proposing the construction of a 2,502 SF Pharmacy with a drive-thru onsite. The redevelopment property is within the Planned Development District (PD). The proposed development has commercial developments to the north, east, south, and west of the site. Access to the subject property is proposed via one (1) full movement driveway and one (1) right out only driveway which exits the drive-thru lane.

Proposed Area Tabulation	
Site Area	24,679 SF (0.56 acres)
Distance to Wetlands	> 700 FT (Whitney Pond Wetlands)
Proposed impervious area	15,071 SF (0.35 acres)
Total Area of Disturbance	27,258 SF (0.63 acres)
Area Reserved for recreation, parks, and open land	9,857 SF (0.23 acres)

TRANSPORTATION

The subject property is located at the intersection of Juniper Street and Central Street (U.S. Route 202) which are both under Winchendon jurisdiction. There are currently no access driveways located along Central Street or formal access driveway along Juniper Street. The site has 5 on-street parking spaces along Central Street. Central Street is currently proposed to be redeveloped by the Massachusetts Department of Transportation for improvements including, grading, striping, utilities, sidewalks and other frontage improvements. A Traffic Analysis Report has been provided as a part of this submission package which includes all calculations for existing and proposed conditions within **Appendix B**.

CONSTRUCTION

The proposed development will consist of the demolition of existing pavement located on site as well as the removal of sidewalk and striping within the Central Street right-of-way. The contractor shall install a silt fence, tree protection fence, and construction entrance prior to any construction. The existing pavement and sidewalk shall be demolished, and all exposed soil areas shall be temporarily stabilized until next phase of construction begins. The contractor shall then perform 'rough' grading and install temporary seeding. Inlet filters will be installed prior to building construction and site improvements. Finally, the contractor shall install all landscaping improvements and final seeding and then remove silt fence and soil erosion measures. The contractor shall conform to all notes and construction practices as outlined in the towns zoning ordinance.

All existing and proposed stormwater drainage conditions are outlined in the Stormwater Management Statement that has been provided as a part of this submission package denoted **Appendix A.1.** There is no proposed alteration of shorelines, marshes or seasonal wet areas and the site is not located in a FEMA flood zone.

PUBLIC UTILITY

A water service connection is being proposed with a connection to the existing water main in central street. The proposed use does not anticipate generating any hazardous waste and the sewerage generated on site will be managed with a 4-inch SDR-35 PVC pipe that will connect to the existing 8-inch sanitary line within Juniper Street via a drop manhole. The proposed sanitary sewer connection and water service connection maintain the minimum horizontal clearance requirements. Water and Sewer demand calculations can be found in **Appendix C.** All pre- and post- development stormwater volumes and peak discharge volumes can be found in **Appendix A.1.** The solid waste generated on site will be managed with a garbage enclosure located on site and the collection and method of disposal shall be coordinated with the Town of Winchendon.

CONSERVATION AND RECREATION

The existing vegetation on site is concentrated to the northern corner of the property and consists of a mix of trees shrubs, and grasses. There are no wetlands or resource areas located on site. The existing vegetation on site shall be protected throughout construction and will remain. According to the Worchester County Soil Survey as issued by the Natural Resources Conservation Services, the soils on site consist of 100.0% Skerry Fine Sandy Loam complex (365B) which has a hydraulic soil rating of Type C/D. A copy of the NRCS soil survey has been provided as an appendix to the Stormwater Management Statement below as **Appendix A.1.** The construction of the proposed development shall conform to all Town of Winchendon standards for soil erosion and sediment control notes. The proposed landscaping on site is compatible to the local environment using native plantings and will provide shading and a visual buffer to the site.

SUSTAINABLE ENERGY

The proposed development reduces impervious coverage and proposes a combination of trees, shrubs, and grass planter areas. The proposed development will be increasing pervious coverage onsite and therefore increasing absorption of greenhouse gasses. The proposed landscaping will be aesthetically pleasing developed lot and will provide a buffer to the surrounding adjacent properties.

AESTHETICS

The proposed architectural style of the building is designed to be compatible with the local community while capturing the typical signage and site features of a Walgreens as seen throughout the country. An Architectural plan has been submitted as a part of this package inclusive of renderings, elevations, and floor plans. The lighting on site has been designed conform to all Municipal requirements as well as Walgreens standard security lighting requirements. The proposed pole mounted lights are designed with back shields to reduce the affect of light spillage onto adjacent properties. A minimum of 1.6 FC is provided in the parking area and the maximum lighting at the property line does not exceed 1.4 FC. Landscaping has been provided along the perimeter on site using a mix of shrubs, evergreen trees, and deciduous trees. The proposed landscaping conforms to all Municipal requirements and provides a natural buffer between the proposed development and the adjacent properties.

NEIGHBORHOOD AND COMMUNITY

The proposed development does not expect to have any significant impact on the local school system. The applicant shall work with the Police and Fire departments to determine the extents of emergency planning needed for the proposed use. There is an existing fire hydrant located east of the property frontage along Central Street. A truck turn exhibit has also been provided in this submission package and shows the accessibility of Winchendon fire apparatus and access to the building. The PD district allows small-scale retail with drive-thru uses and there is an existing pharmacy located to the southwest of the property today. The Town of Winchendon has also informed the applicant that there is a redevelopment project for Central Street proposed by the Massachusetts Department of Transportation (MassDOT) which will directly affect the project frontage along Central Street. The applicant shall work with the town and the MassDOT to coordinate all proposed improvements within the central street.

SOCIAL-ECONOMIC

The proposed development shall provide employment for a variety of people including but not limited to; store clerks, pharmacists, construction workers and other jobs related to the typical Walgreens operations. Further testimony shall be provided on the affect of the local Socio-economic environment at the time of the hearing.

MUNICIPAL BENEFIT AND COST

The proposed development will provide a new pharmacy with drive-thru to the downtown area. As part of the project the applicant has provided ADA access from the central Street public right of way and for patrons parking on-site. There are no adverse impacts to the community anticipated and additional information related to the benefits to the municipality will be provided in testimony.

WASTE GENERATION AND DISPOSAL

Recyclables and Solid Waste will be generated by the pharmacy and stored in a designated exterior enclosure. Materials will be moved manually by employees from the proposed Pharmacy to the trash enclosure. A trash enclosure is in the rear of the building which is for employee use only. Additionally, customers are responsible for removing anything that is brought onto the premise and are prohibited from disposing of furniture of any kind. Storage of hazardous materials within the units is also prohibited. The trash enclosure shall be screened with an 8-foot-high board on board fence as indicated by the detail on the Construction Details (sheet C-12) of the site plan set that was submitted as a part of this package. The enclosure will be screened with landscaping consisting of a mix of evergreen and deciduous plantings.

APPENDIX A

A.1: Stormwater Management Report
A.2: Project Maps
A.3: NRCS Soil Survey
A.4: Hydraulic Calculations & Analysis Results
A.5 Drainage Area Maps

STORMWATER MANAGEMENT STATEMENT

Project: FIDC 163 LLC
Proposed Pharmacy with Drive-Thru
Block 5B3, Lot 50
290 Central Street (U.S. Route 202)
Town of Winchendon, Worchester County, Massachusetts

Dated: October 29, 2021

Reference: ***Preliminary & Final Major Site Plan***
(Prepared by Stonefield Engineering & Design, LLC, dated October 29, 2021)

PROJECT DESCRIPTION

FIDC 163 LLC is proposing the construction of a 2,502 SF Pharmacy with a drive-thru onsite. The subject property is designated at Block 5B3, Lot 50, commonly known as 290 Central Street located at the intersection of Central Street and Juniper Street. The site location is depicted in the USGS Quadrangle Map and Aerial Map within the **Appendix A.2**.

The redevelopment property is within the Planned Development District (PD). The project site is currently developed consisting of a paved lot with a small forested pervious area. Access is provided via Juniper Road with no formal driveway apron. There is a one-story Church to the northeast, a one-story Pharmacy to the northwest, Central Street (U.S. Route 202) to the southeast, and a parking lot to the southwest.

The total project area is 24,679 SF (0.56 acres), the total area of impervious surfaces has decreased 4,976 SF (0.10 acres), and the total area of disturbance is 27,258 SF (0.63 acres).

This Stormwater Management Report has been prepared to analyze the drainage measures to be implemented for controlling and conveying runoff associated with the on-site improvements and has been prepared in accordance with the standards of the Town of Winchendon and the Massachusetts Department of Environmental Protection (MassDEP) Standards.

ON-SITE SOILS

According to the Worchester County Soil Survey as issued by the Natural Resources Conservation Services, the soils on site consist of 100.0% Skerry Fine Sandy Loam complex (365B) which has a hydraulic soil rating of Type C/D.

PRE-DEVELOPMENT DRAINAGE CONDITIONS

The project site is currently developed with as a paved parking area consisting of a paved lot with a small forested pervious area. Access is provided via Juniper Road with no formal driveway apron. There is a one-story Church to the northeast, a one-story Pharmacy to the northwest, Central Street (U.S. Route 202) southeast, and a parking lot to the southwest. The property drains to the west towards Juniper Road and has an average slope across the site of 4.14%. The site currently drains undetained and is collected via two inlets within Juniper Street which flow into the municipal stormwater system within Central Street.

TABLE 1: PRE-DEVELOPMENT DRAINAGE AREA

Drainage Area	*Description*	*Area Extents*	*Impervious Area*	*Time of Concentration*
E-1	Existing Drainage to Juniper Street	24,679 SF	20,067 SF	6.0*

**A minimum time of concentration of 6 minutes was assumed for the purposes of these calculations.*

Existing hydrologic calculations can be found in **Appendix A.4** of this Statement.

POST-DEVELOPED DRAINAGE CONDITIONS

The existing pavement parking area will be demolished along with the surrounding site features while protecting all features on adjacent properties and the undeveloped planted area at the northern corner of the property. Proposed improvements include the construction of a Pharmacy with a building footprint of 2,502 SF a drive-thru window, associated parking, utilities, landscaping, lighting, and stormwater management facilities. The majority of the site is collected and discharged into the existing 18" stormwater pipe along Juniper Street. The stormwater is collected via roof leaders, one stormwater inlet, and a yard inlet and is discharged into the proposed manhole along Juniper Street which is upstream of the existing municipal sewer system in Central Street. The stormwater in the northeastern corner of the site sheet flows off the property north undetained.

TABLE 2: POST-DEVELOPMENT DRAINAGE AREA

Drainage Area	*Description*	*Area Extents*	*Impervious Area*	*Time of Concentration*
P-1	Proposed Drainage to Juniper Street	24,679 SF	15,091 SF	6.0*

**A minimum time of concentration of 6 minutes was assumed for the purposes of these calculations.*

Proposed hydrologic calculations can be found in **Appendix A.4** of this Statement.

STORMWATER MANAGEMENT ANALYSIS

The project is designed to conform to the stormwater management requirements set forth by the Town of Winchendon and the Massachusetts Department of Environmental Protection (MassDEP). As such, the project is not required to comply with the applicable groundwater recharge, stormwater quality, and stormwater quantity requirements.

An analysis was performed to compare pre-development and post-development conditions on site to ensure that the post-development conditions match or do not exceed pre-development conditions in 1, 10, and 100-year storm events. The following table outlines the stormwater runoff peak discharge rate for each Point of Interest (POI).

TABLE 3: STORMWATER PEAK DISCHARGE ANALYSIS SUMMARY (POI-1)

Storm Event	*Pre-Development Peak Discharge*	*Post-Development Peak Discharge*
1-Year	1.17 CFS	0.94 CFS
10-Year	2.25 CFS	1.98 CFS
100-Year	4.15 CFS	3.88 CFS

TABLE 4: STORMWATER PEAK VOLUMES ANALYSIS SUMMARY (POI-1)

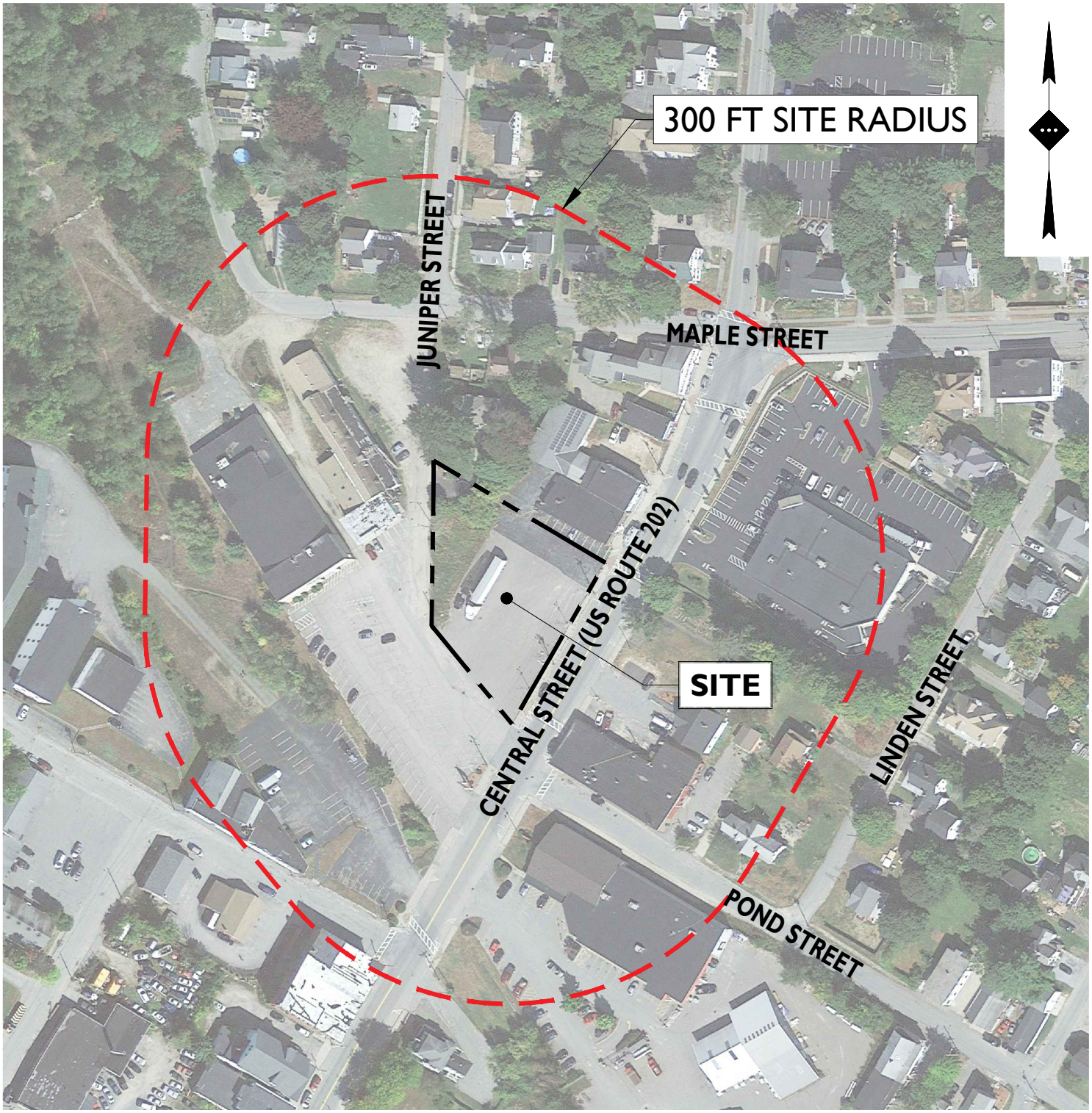
Storm Event	*Pre-Development Peak Volume*	*Post-Development Peak Volume*
1-Year	4,312 CF	3,484 CF
10-Year	8,450 CF	7,274 CF
100-Year	15,812 CF	14,374 CF

As indicated in the tables above, the proposed site will reduce peak runoff rates when compared to pre-development conditions. No adverse impacts to the municipal drainage system or adjacent properties are anticipated as a result of the project.

Prepared by:

Joshua Kline, PE, PP
RI PE License No. 13607
Stonefield Engineering and Design, LLC

APPENDIX A.2
PROJECT MAPS



AERIAL MAP

150' 0' 150' 300'

GRAPHIC SCALE IN FEET

1"= 150'

SOURCE: GOOGLE EARTH PRO, DATED 09/20/2019

PROPOSED PHARMACY WITH DRIVE-THRU

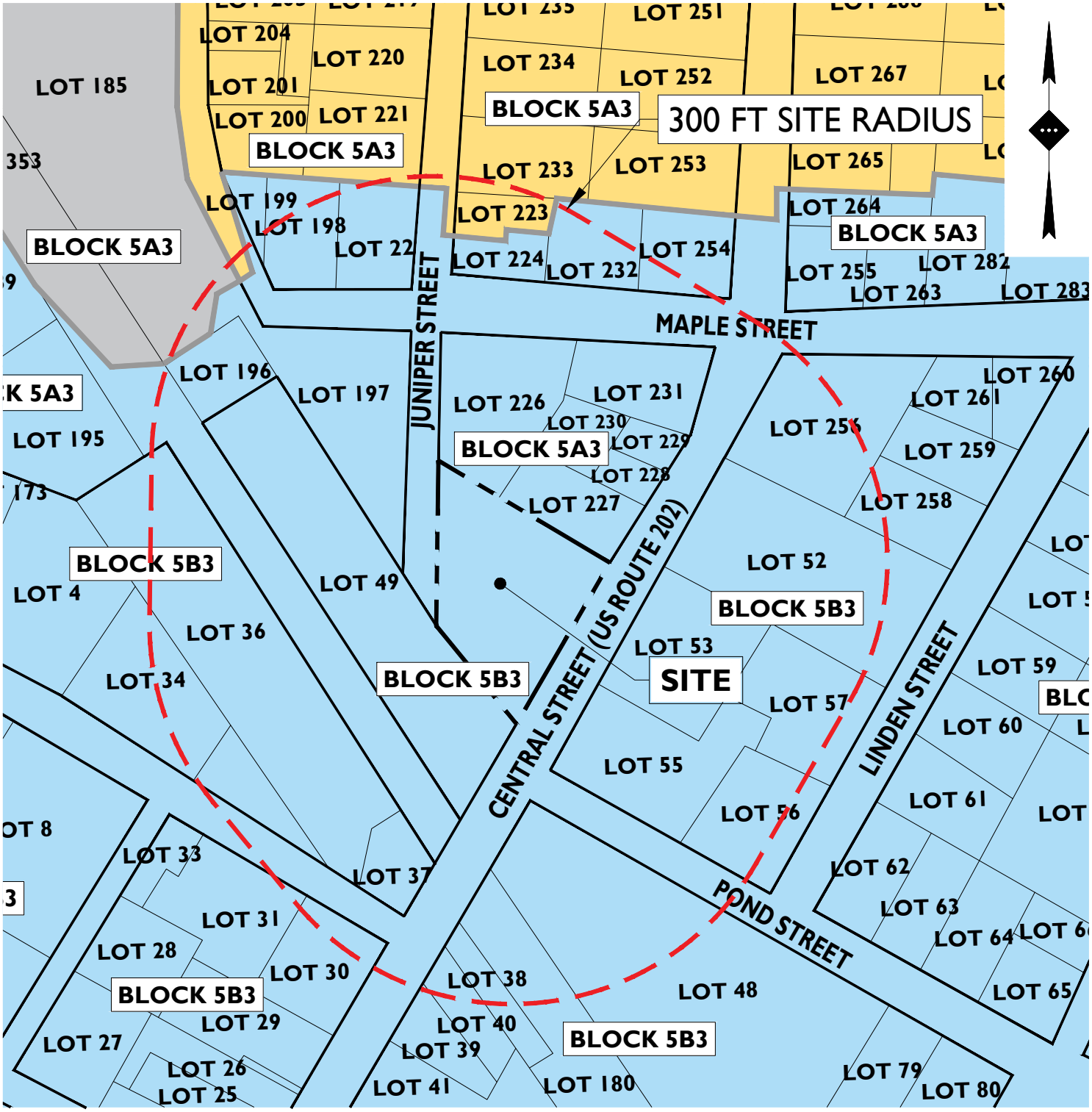
PARCEL ID: 5B3-0-50
290 CENTRAL STREET (U.S. ROUTE 202)
TOWN OF WINCHENDON, WORCESTER COUNTY, MASSACHUSETTS

DRAWN BY:	AKPM
CHECKED BY:	AS
DATE:	10/18/2021
SCALE:	1" = 150'
PROJECT ID:	BOS-210033

STONEFIELD engineering & design

Rutherford, NJ · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Detroit, MI
www.stonefieldeng.com

1 Beacon Street, 15 Floor, Boston, MA 02108
Phone 617.203.2076



TAX & ZONING MAP

150' 0' 150' 300'

GRAPHIC SCALE IN FEET

1"= 150'

SOURCE: TOWN OF WINCHENDON ZONING MAP DATED1/29/07 AND TOWN OF WINCHENDON GIS TAX MAP DATED 9/17/21

PROPOSED PHARMACY WITH DRIVE-THRU

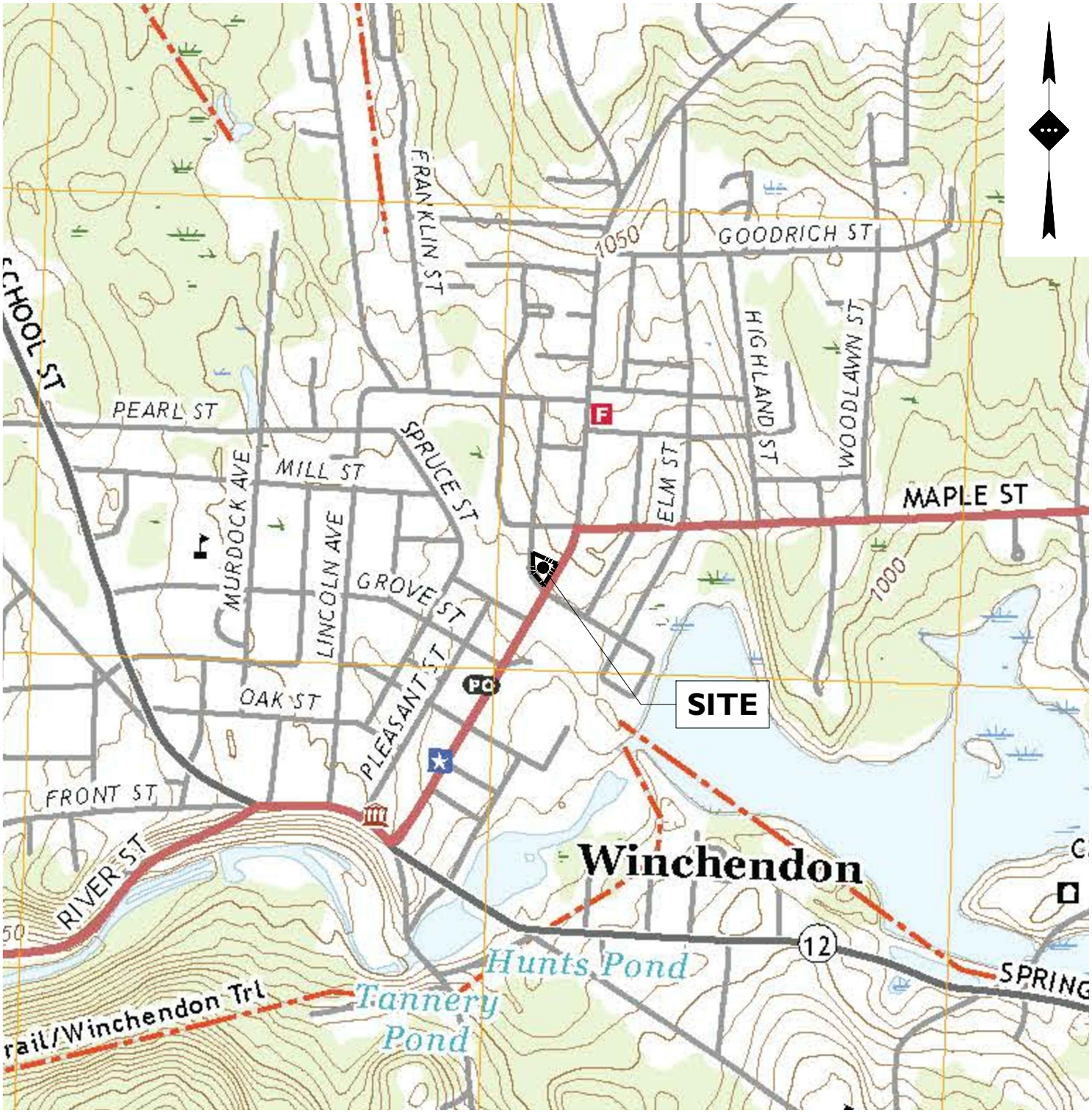
PARCEL ID: 5B3-0-50
290 CENTRAL STREET (U.S. ROUTE 202)
TOWN OF WINCHENDON, WORCESTER COUNTY, MASSACHUSETTS

DRAWN BY:	AKPM
CHECKED BY:	AS
DATE:	10/18/2021
SCALE:	1" = 150'
PROJECT ID:	BOS-210033

STONEFIELD engineering & design

Rutherford, NJ · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Detroit, MI
www.stonefieldeng.com

1 Beacon Street, 15 Floor, Boston, MA 02108
Phone 617.203.2076



1000' 0' 1000' 2000'

GRAPHIC SCALE IN FEET

1"= 1000'

USGS QUADRANGLE MAP

SOURCE: USGS QUADRANGLE MAP 7.5 MINUTE SERIES WINCHENDON, MA, DATED 2021

PROPOSED PHARMACY WITH DRIVE-THRU

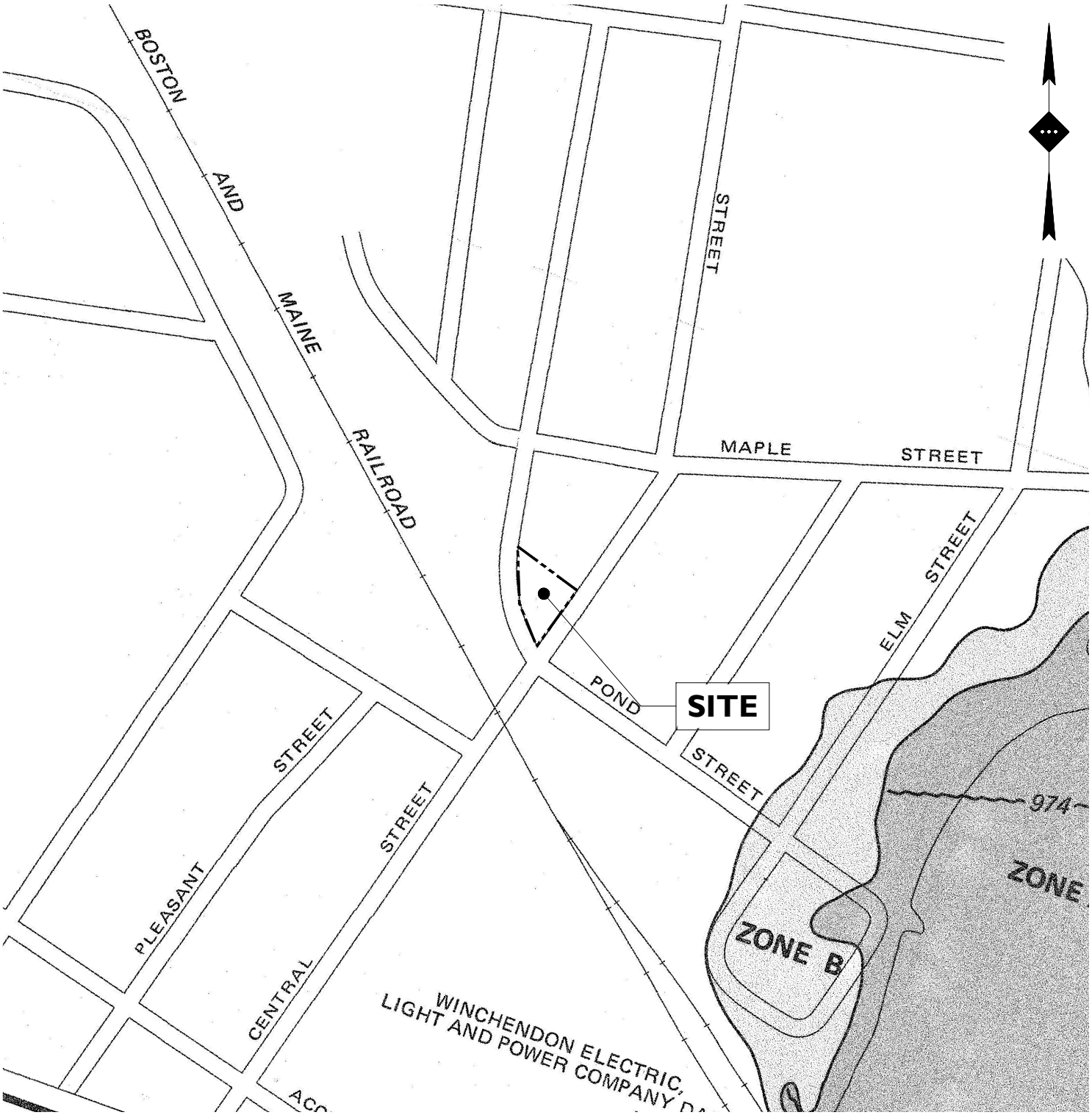
PARCEL ID: 5B3-0-50
290 CENTRAL STREET (U.S. ROUTE 202)
TOWN OF WINCHENDON, WORCESTER COUNTY, MASSACHUSETTS

DRAWN BY:	AKPM
CHECKED BY:	AS
DATE:	10/18/2021
SCALE:	1" = 1000'
PROJECT ID:	BOS-210033

STONEFIELD engineering & design

Rutherford, NJ · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Detroit, MI
www.stonefieldeng.com

1 Beacon Street, 15 Floor, Boston, MA 02108
Phone 617.203.2076



FEMA EFFECTIVE MAP

300' 0' 300' 600'

GRAPHIC SCALE IN FEET

1"= 300'

SOURCE: FEMA FLOOD INSURANCE MAP #FM25034800016B DATED 06/15/1982

PROPOSED PHARMACY WITH DRIVE-THRU

PARCEL ID: 5B3-0-50
290 CENTRAL STREET (U.S. ROUTE 202)
TOWN OF WINCHENDON, WORCESTER COUNTY, MASSACHUSETTS

DRAWN BY:	AKPM
CHECKED BY:	AS
DATE:	10/18/2021
SCALE:	1" = 300'
PROJECT ID:	BOS-210033

STONEFIELD engineering & design

Rutherford, NJ · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Detroit, MI
www.stonefieldeng.com

1 Beacon Street, 15 Floor, Boston, MA 02108
Phone 617.203.2076

APPENDIX A.3
NRCS SOIL SURVEY

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Worcester County, Massachusetts, Northwestern Part

September 15, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Map Scale: 1:499 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

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 1:25,000.

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, Northwestern Part
Survey Area Data: Version 14, Jun 10, 2020

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

Date(s) aerial images were photographed: May 18, 2019—Jul 9, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

Map Unit Legend (Mass)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
365B	Skerry fine sandy loam, 3 to 8 percent slopes	0.7	100.0%
Totals for Area of Interest		**0.7**	**100.0%**

Map Unit Descriptions (Mass)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Worcester County, Massachusetts, Northwestern Part

365B—Skerry fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w9p8
Elevation: 260 to 1,210 feet
Mean annual precipitation: 31 to 65 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Skerry and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Skerry

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainbase, interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

Typical profile

Ap - 0 to 6 inches: fine sandy loam
Bs1 - 6 to 20 inches: gravelly fine sandy loam
Bs2 - 20 to 25 inches: gravelly fine sandy loam
Cd1 - 25 to 34 inches: gravelly loamy sand
Cd2 - 34 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Colonel

Percent of map unit: 6 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase, interfluve
Microfeatures of landform position: Closed depressions, closed depressions
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: No

Becket

Percent of map unit: 4 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, interfluve
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Brayton

Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Mountainbase, interfluve
Microfeatures of landform position: Closed depressions, closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Hermon

Percent of map unit: 2 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, interfluve
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

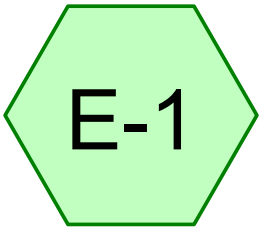
United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

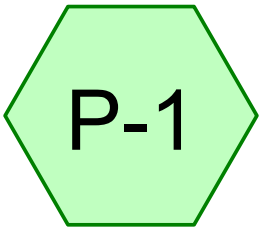
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

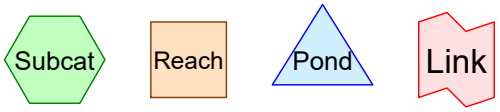
APPENDIX A.4
HYDROLOGIC CALCULATIONS & ANALYSIS RESULTS



DRAINAGE TO
JUNIPER ROAD



DRAINAGE TO
JUNIPER



Routing Diagram for 2021-09-15_HydroCAD
Prepared by Stonefield Engineering & Design, Printed 10/11/2021

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: DRAINAGE TO Runoff Area=24,679 sf 81.31% Impervious Runoff Depth=2.09"
Flow Length=179' Tc=6.0 min CN=80/98 Runoff=1.17 cfs 0.099 af

Subcatchment P-1: DRAINAGE TO Runoff Area=24,679 sf 61.15% Impervious Runoff Depth=1.69"
Tc=6.0 min CN=74/98 Runoff=0.94 cfs 0.080 af

Total Runoff Area = 1.133 ac Runoff Volume = 0.178 af Average Runoff Depth = 1.89"
28.77% Pervious = 0.326 ac 71.23% Impervious = 0.807 ac

Summary for Subcatchment E-1: DRAINAGE TO JUNIPER ROAD

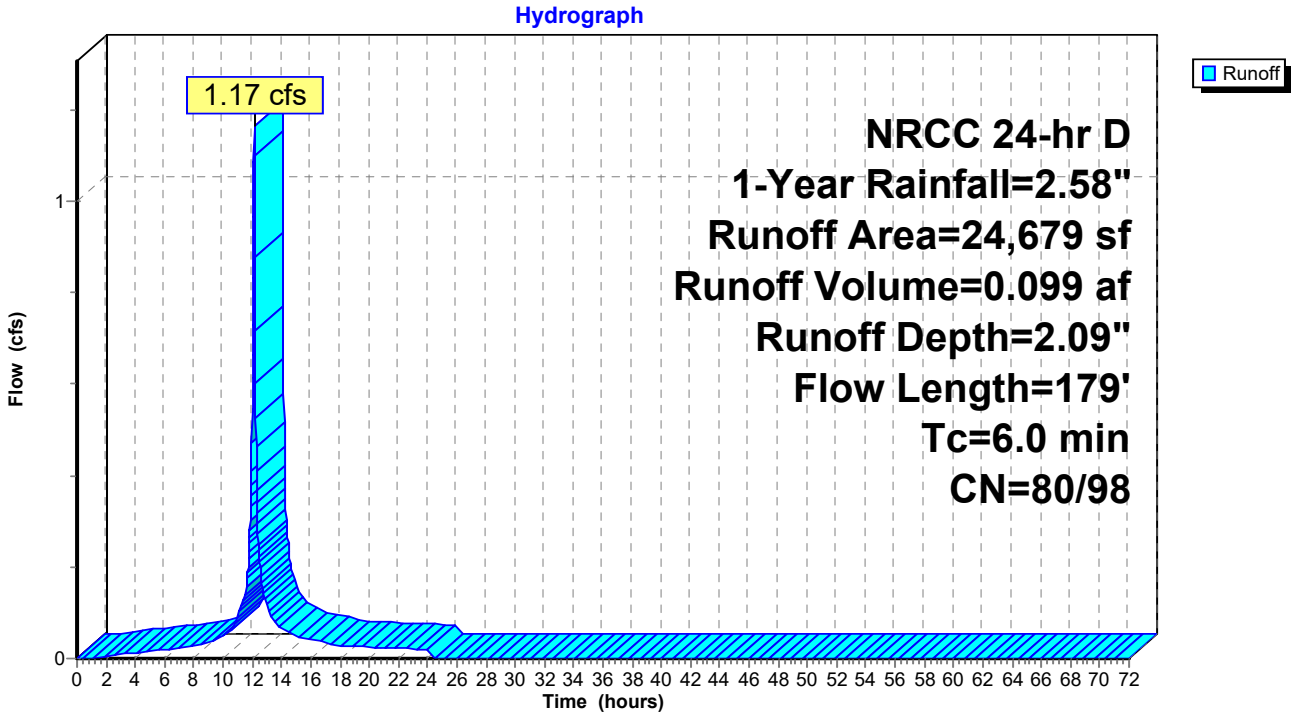
Runoff = 1.17 cfs @ 12.13 hrs, Volume= 0.099 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NRCC 24-hr D 1-Year Rainfall=2.58"

	Area (sf)	CN	Description
*	20,067	98	Impervious Areas
	4,612	80	>75% Grass cover, Good, HSG D
	24,679	95	Weighted Average
	4,612	80	18.69% Pervious Area
	20,067	98	81.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	46	0.0258	1.29		**Sheet Flow, 1A-1B** Smooth surfaces n= 0.011 P2= 3.13"
0.6	50	0.0040	1.28		**Shallow Concentrated Flow, 1B-1C** Paved Kv= 20.3 fps
0.1	22	0.0476	4.43		**Shallow Concentrated Flow, 1C-1D** Paved Kv= 20.3 fps
0.1	32	0.0625	5.08		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.1	16	0.0625	5.08		**Shallow Concentrated Flow, 1E-1F** Paved Kv= 20.3 fps
0.0	13	0.0461	4.36		**Shallow Concentrated Flow, 1F-1G** Paved Kv= 20.3 fps
4.5					**Direct Entry, TO MEET MINIMUM**
6.0	179	Total			

Subcatchment E-1: DRAINAGE TO JUNIPER ROAD



Summary for Subcatchment P-1: DRAINAGE TO JUNIPER

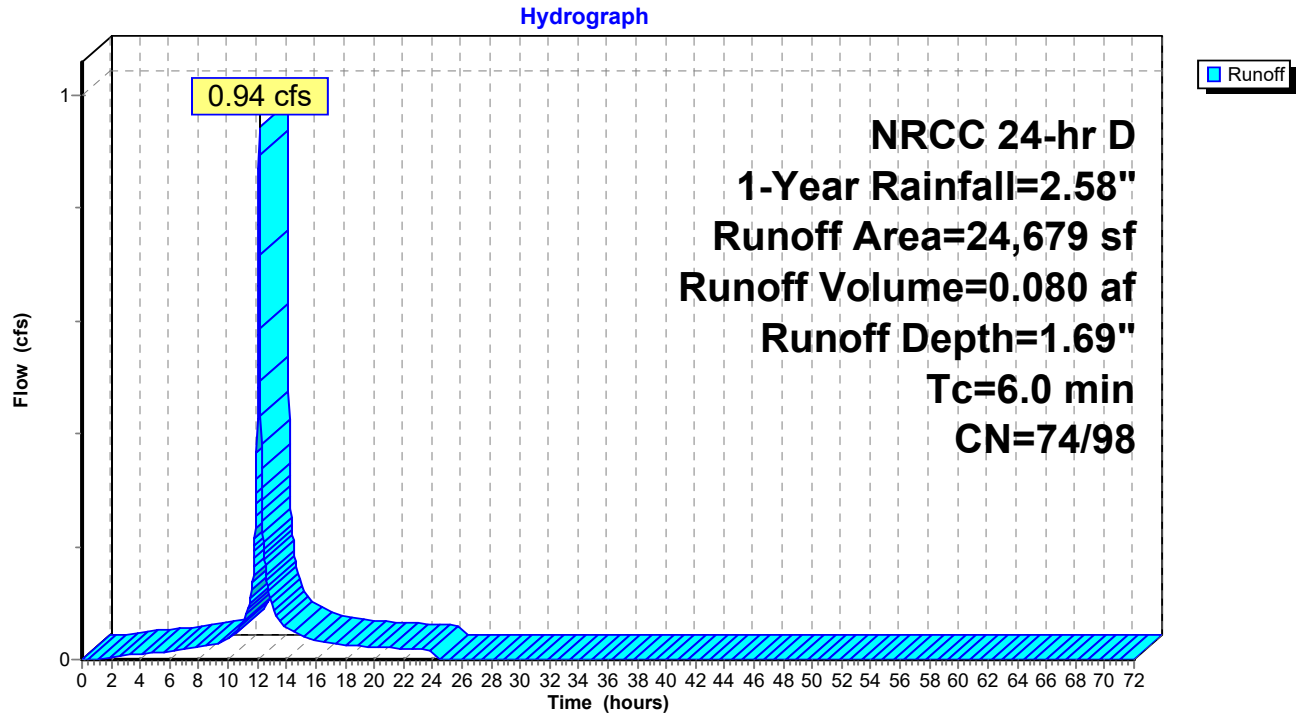
Runoff = 0.94 cfs @ 12.13 hrs, Volume= 0.080 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NRCC 24-hr D 1-Year Rainfall=2.58"

Area (sf)	CN	Description
15,091	98	Paved parking, HSG C
9,588	74	>75% Grass cover, Good, HSG C
24,679	89	Weighted Average
9,588	74	38.85% Pervious Area
15,091	98	61.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, MIN TOC**

Subcatchment P-1: DRAINAGE TO JUNIPER



Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: DRAINAGE TO Runoff Area=24,679 sf 81.31% Impervious Runoff Depth=4.10"
Flow Length=179' Tc=6.0 min CN=80/98 Runoff=2.25 cfs 0.194 af

Subcatchment P-1: DRAINAGE TO Runoff Area=24,679 sf 61.15% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=74/98 Runoff=1.98 cfs 0.167 af

Total Runoff Area = 1.133 ac Runoff Volume = 0.361 af Average Runoff Depth = 3.82"
28.77% Pervious = 0.326 ac 71.23% Impervious = 0.807 ac

Summary for Subcatchment E-1: DRAINAGE TO JUNIPER ROAD

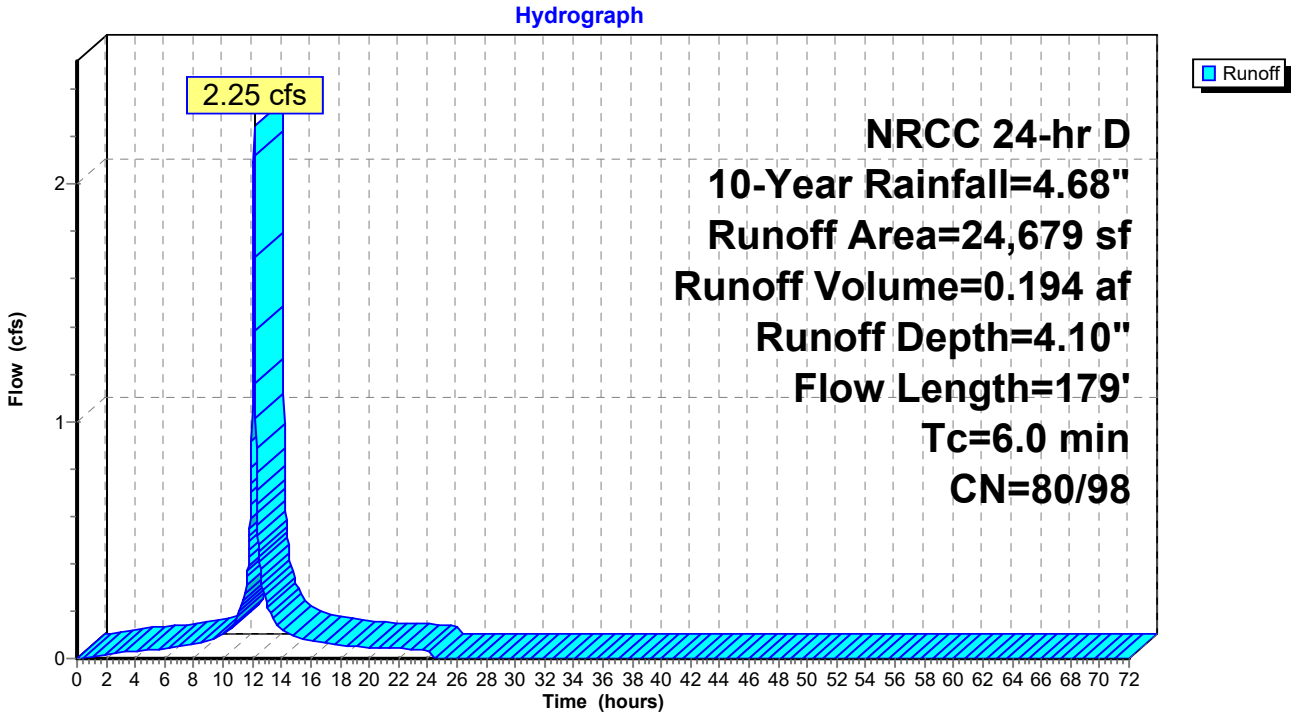
Runoff = 2.25 cfs @ 12.13 hrs, Volume= 0.194 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

	Area (sf)	CN	Description
*	20,067	98	Impervious Areas
	4,612	80	>75% Grass cover, Good, HSG D
	24,679	95	Weighted Average
	4,612	80	18.69% Pervious Area
	20,067	98	81.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	46	0.0258	1.29		**Sheet Flow, 1A-1B** Smooth surfaces n= 0.011 P2= 3.13"
0.6	50	0.0040	1.28		**Shallow Concentrated Flow, 1B-1C** Paved Kv= 20.3 fps
0.1	22	0.0476	4.43		**Shallow Concentrated Flow, 1C-1D** Paved Kv= 20.3 fps
0.1	32	0.0625	5.08		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.1	16	0.0625	5.08		**Shallow Concentrated Flow, 1E-1F** Paved Kv= 20.3 fps
0.0	13	0.0461	4.36		**Shallow Concentrated Flow, 1F-1G** Paved Kv= 20.3 fps
4.5					**Direct Entry, TO MEET MINIMUM**
6.0	179	Total			

Subcatchment E-1: DRAINAGE TO JUNIPER ROAD



Summary for Subcatchment P-1: DRAINAGE TO JUNIPER

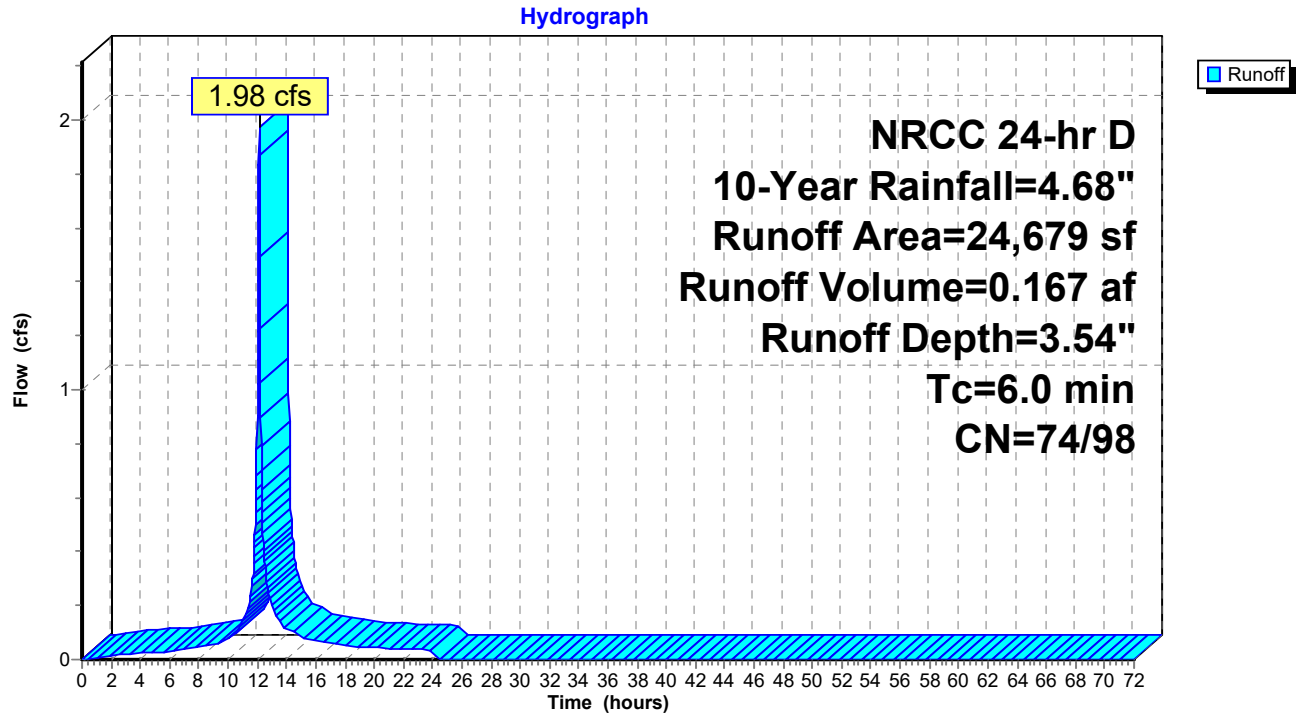
Runoff = 1.98 cfs @ 12.13 hrs, Volume= 0.167 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
15,091	98	Paved parking, HSG C
9,588	74	>75% Grass cover, Good, HSG C
24,679	89	Weighted Average
9,588	74	38.85% Pervious Area
15,091	98	61.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, MIN TOC**

Subcatchment P-1: DRAINAGE TO JUNIPER



Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: DRAINAGE TO Runoff Area=24,679 sf 81.31% Impervious Runoff Depth=7.70"
Flow Length=179' Tc=6.0 min CN=80/98 Runoff=4.15 cfs 0.363 af

Subcatchment P-1: DRAINAGE TO Runoff Area=24,679 sf 61.15% Impervious Runoff Depth=6.99"
Tc=6.0 min CN=74/98 Runoff=3.88 cfs 0.330 af

Total Runoff Area = 1.133 ac Runoff Volume = 0.693 af Average Runoff Depth = 7.34"
28.77% Pervious = 0.326 ac 71.23% Impervious = 0.807 ac

Summary for Subcatchment E-1: DRAINAGE TO JUNIPER ROAD

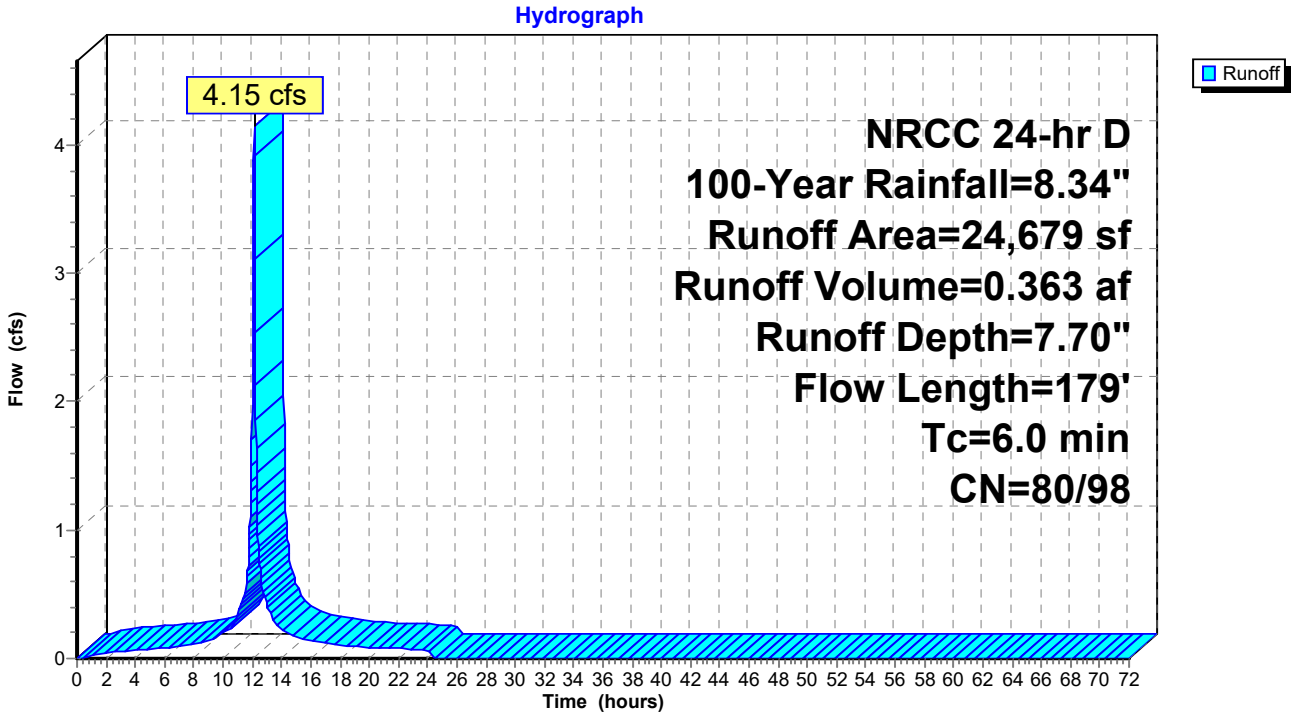
Runoff = 4.15 cfs @ 12.13 hrs, Volume= 0.363 af, Depth= 7.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

	Area (sf)	CN	Description
*	20,067	98	Impervious Areas
	4,612	80	>75% Grass cover, Good, HSG D
	24,679	95	Weighted Average
	4,612	80	18.69% Pervious Area
	20,067	98	81.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	46	0.0258	1.29		**Sheet Flow, 1A-1B** Smooth surfaces n= 0.011 P2= 3.13"
0.6	50	0.0040	1.28		**Shallow Concentrated Flow, 1B-1C** Paved Kv= 20.3 fps
0.1	22	0.0476	4.43		**Shallow Concentrated Flow, 1C-1D** Paved Kv= 20.3 fps
0.1	32	0.0625	5.08		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.1	16	0.0625	5.08		**Shallow Concentrated Flow, 1E-1F** Paved Kv= 20.3 fps
0.0	13	0.0461	4.36		**Shallow Concentrated Flow, 1F-1G** Paved Kv= 20.3 fps
4.5					**Direct Entry, TO MEET MINIMUM**
6.0	179	Total			

Subcatchment E-1: DRAINAGE TO JUNIPER ROAD



Summary for Subcatchment P-1: DRAINAGE TO JUNIPER

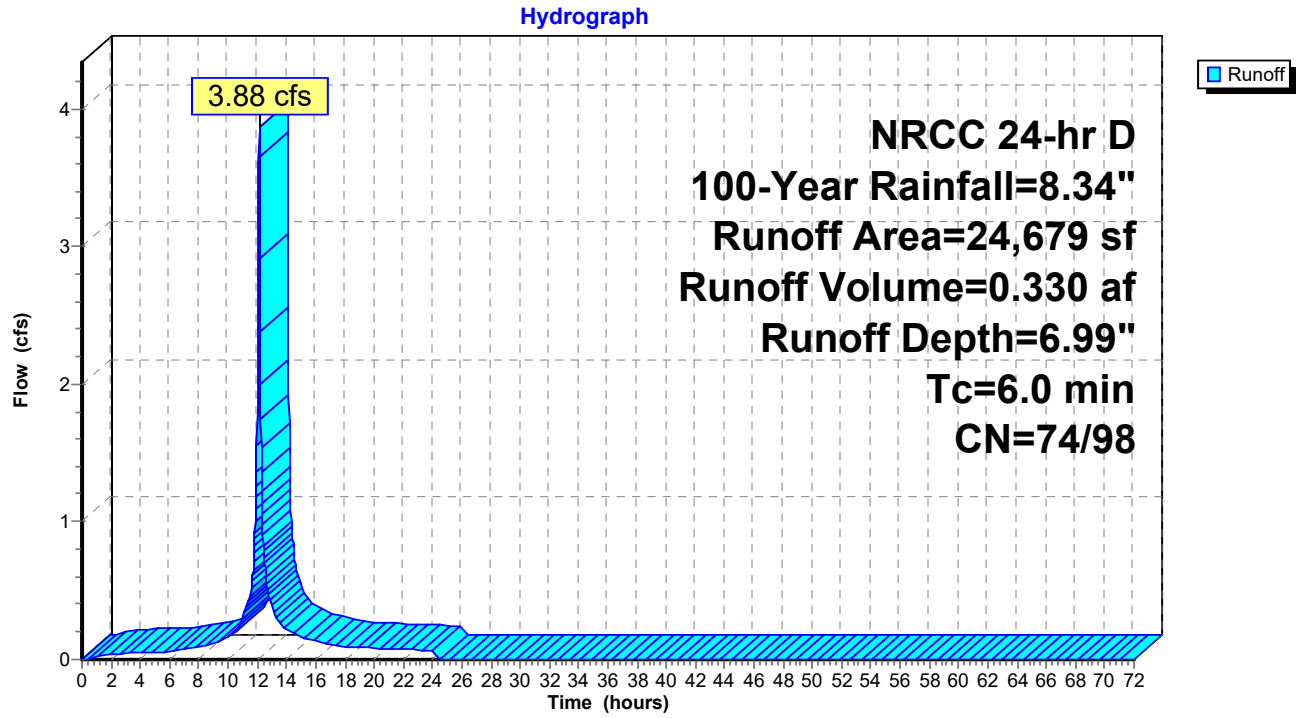
Runoff = 3.88 cfs @ 12.13 hrs, Volume= 0.330 af, Depth= 6.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

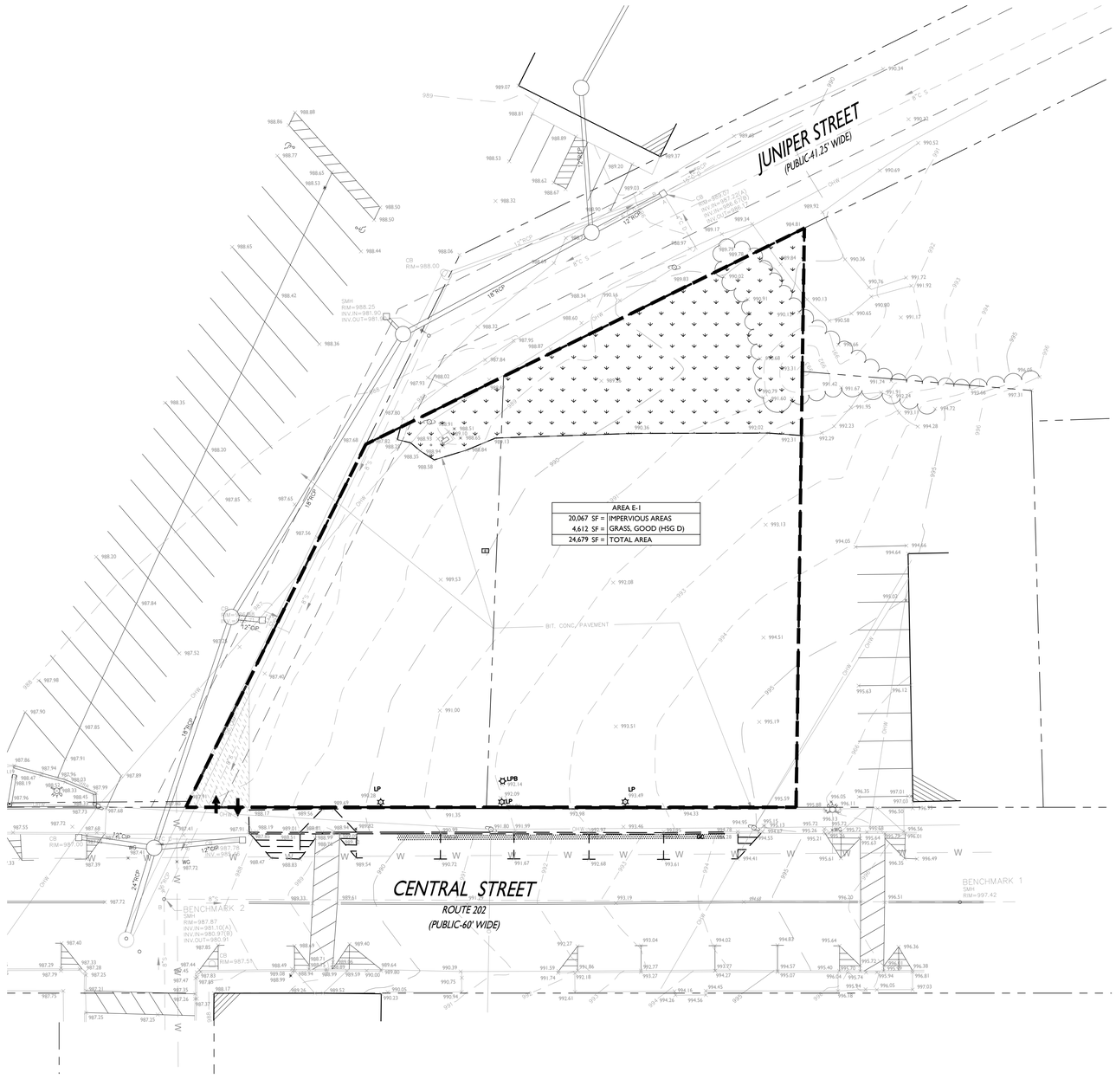
Area (sf)	CN	Description
15,091	98	Paved parking, HSG C
9,588	74	>75% Grass cover, Good, HSG C
24,679	89	Weighted Average
9,588	74	38.85% Pervious Area
15,091	98	61.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, MIN TOC**

Subcatchment P-1: DRAINAGE TO JUNIPER



APPENDIX A.5
DRAINAGE AREA MAPS



SYMBOL	DESCRIPTION
	PROPERTY LINE
	EXISTING SITE DRAINAGE AREA
	EXISTING PERVIOUS AREA

NOTE:

MINIMUM TIME OF CONCENTRATION - 6.0 MINUTES

20' 0' 20' 40'

GRAPHIC SCALE IN FEET
1" = 20'

ISSUE	DATE	BY	DESCRIPTION
01	10/29/2021	SPM	FOR MUNICIPAL SUBMISSION

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Rutherford, NJ • New York, NY • Boston, MA
Princeton, NJ • Tampa, FL • Detroit, MI
www.stonefieldeng.com
1 Beacon Street, 15 Floor, Boston, MA 02108
Phone 617.203.2076

SITE PLAN SET

FIDC 163 LLC
PROPOSED PHARMACY WITH DRIVE-THRU

BLOCK 583, LOT 60
290 CENTRAL STREET (U.S. ROUTE 202)
TOWN OF WINCHENDON
WORCESTER COUNTY, MASSACHUSETTS

JOSHUA H. KLINE, P.E.
MASSACHUSETTS LICENSE No. 53936
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

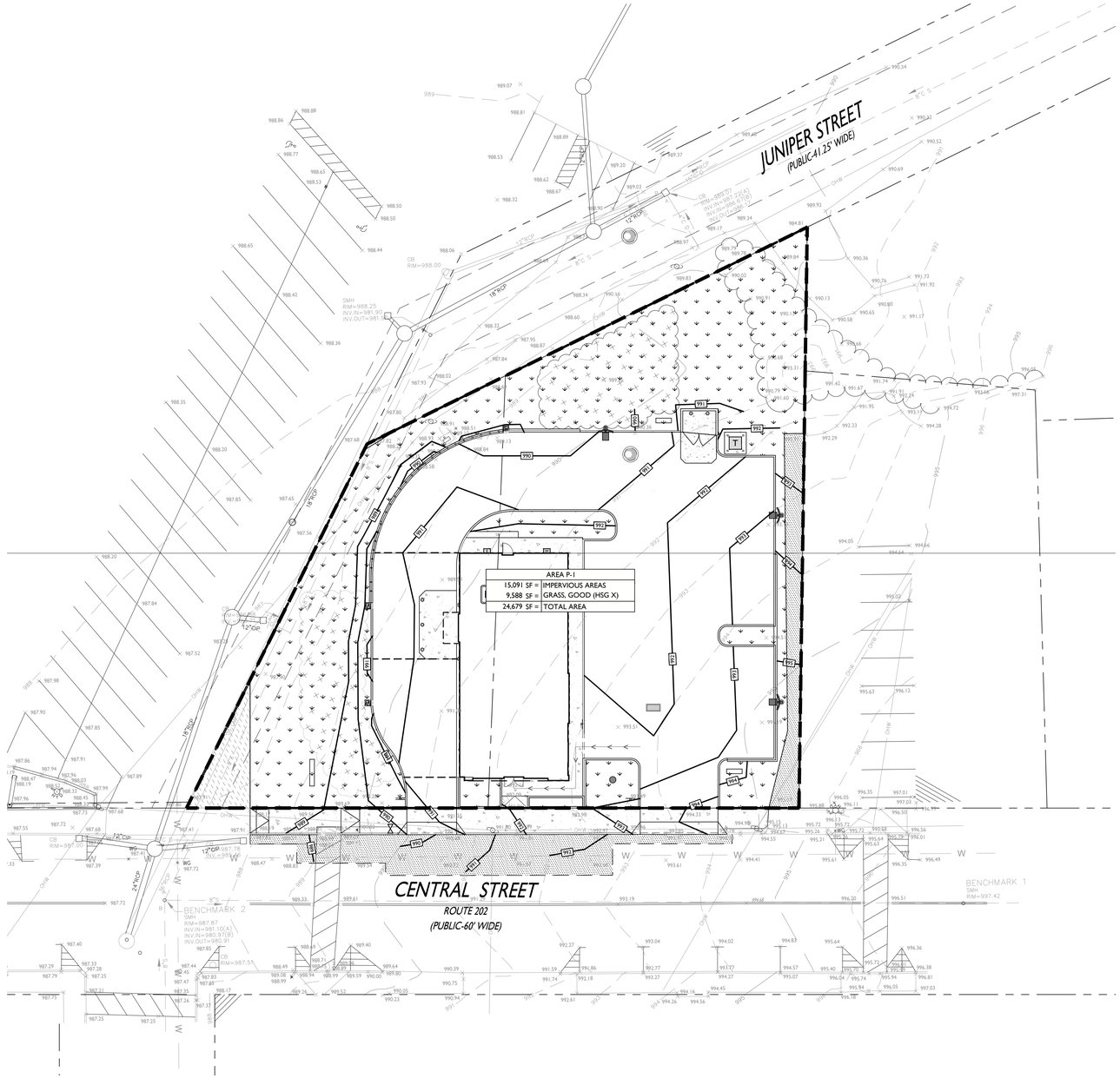
SCALE: 1" = 20' | PROJECT ID: BOS-210033

TITLE:

EXISTING DRAINAGE AREA MAP

DRAWING:

1 OF 2



SYMBOL	DESCRIPTION
	PROPERTY LINE
	PROPOSED SITE DRAINAGE AREA
	PROPOSED PERVIOUS AREA

NOTE:

MINIMUM TIME OF CONCENTRATION - 6.0 MINUTES

20' 0' 20' 40'

GRAPHIC SCALE IN FEET
1" = 20'

ISSUE	DATE	BY	DESCRIPTION
01	10/29/2021	SPM	FOR MUNICIPAL SUBMISSION

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Rutherford, NJ · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Detroit, MI
www.stonefieldeng.com
1 Beacon Street, 15 Floor, Boston, MA 02108
Phone 617.203.2076

SITE PLAN SET

FIDC 163 LLC
PROPOSED PHARMACY WITH DRIVE-THRU

BLOCK 583, LOT 60
290 CENTRAL STREET (U.S. ROUTE 202)
TOWN OF WINCHENDON
WORCESTER COUNTY, MASSACHUSETTS

JOSHUA H. KLINE, P.E.
MASSACHUSETTS LICENSE No. 53936
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 20' | PROJECT ID: BOS-210033

TITLE:

PROPOSED DRAINAGE AREA MAP

DRAWING:

2 OF 2

APPENDIX B

TRAFFIC ANALYSIS REPORT

STONEFIELD

October 29, 2021

Town Of Winchendon
Planning Board
109 Front Street, Dept 10
Winchendon, MA, 014575

RE: Traffic & Parking Assessment Report
Proposed Pharmacy with Drive-Through
290 Central Street
Block 5B3, Lot 50
Town of Winchendon, Worcester County, Massachusetts
SE&D Job No. BOS-210033

Dear Board Members:

Stonefield Engineering and Design, LLC ("Stonefield") has prepared this analysis to examine the potential traffic and parking impacts of the proposed pharmacy with drive-through on the adjacent roadway network. The subject property is located along the westerly side of Central Street in the Town of Winchendon, Worcester County, Massachusetts. The subject property is designated as Block 5B3, Lot 50 as depicted on the Town of Winchendon Tax Map. The site has approximately 197 feet of frontage along Central Street. The existing site contains a concrete lot which is informally utilized by neighboring properties for ancillary parking. Please note that formal access along Central Street is not presently provided for the subject property; however, informal cross-access occurs between the north and south adjacent properties via unimproved access along the northern and southern property borders.

Under the proposed development program, a 2,502 square-foot pharmacy with drive-through would be constructed. Access is proposed via one (1) full-movement driveway and one (1) egress-only driveway along Central Street.

Existing Conditions

The property is located along the westerly side of Central Street in the Town of Winchendon, Worcester County, Massachusetts. The subject property is designated as Block 5B3, Lot 50 as depicted on the Town of Winchendon Tax Map. The site has approximately 197 feet of frontage along Central Street. Land uses in the area are predominantly commercial and residential.

Central Street (U.S. 202) is classified as an urban minor arterial roadway with a general north-south orientation, and is under the jurisdiction of the Town of Winchendon. Along the site frontage, the roadway provides one (1) lane in each direction and has a posted speed limit of 25 mph. The roadway carries approximately 3,870 vehicles daily within the site vicinity. Along the site frontage, curb and sidewalk are provided along both sides of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is permitted intermittently along both sides of the roadway. Central Street connects Forristall Road at its northerly terminus to Front Street at its southerly terminus for predominantly commercial and residential uses along its length. It should be noted that the Massachusetts Department of Transportation (MassDOT) currently has a roadway improvement project planned for Central Street between Maple Street and Front Street, estimated to be completed by the summer of 2022 (Project File #608548). As part of this project, Central Street will be upgraded with ADA-accessible sidewalk, curb ramps, crosswalks, pavement marking and sign improvements, and the addition of bike lanes along both sides of the roadway.

Trip Generation

Trip generation projections for the proposed pharmacy with drive-through were prepared utilizing the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition. Trip generation rates associated with Land Use 881 "Pharmacy with Drive-Through Window" were cited for the 2,502-square-foot development. **Table 1** provides the weekday morning, weekday evening, and Saturday midday peak hour trip generation volumes associated with the proposed development.

TABLE 1 – PROJECTED TRIP GENERATION

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
2,502 SF Pharmacy with Drive-Through Window *ITE Land Use 881*	5	4	9	13	13	26	11	11	22

As stated within Chapter 10 of ITE's Trip Generation Handbook, 3rd Edition, there are instances when the total number of trips generated by a site is different from the amount of new traffic added to the street system by the generator. Pharmacies with drive-through windows are specifically located on or adjacent to busy streets to attract motorists already on the roadway. Therefore, the proposed site would be expected to attract a portion of its trips from the traffic passing the site on the way from an origin to an ultimate destination. These trips do not add new traffic to the adjacent roadway system and are referred to as pass-by trips.

Based upon the published ITE data for Land Use 881 "Pharmacy with Drive-Through Window," approximately 49% of site-generated traffic during the weekday evening peak hour is expected to be comprised of pass-by traffic. Please note that ITE does not publish pass-by data for Land Use 881 "Pharmacy with Drive-Through Window" during the weekday morning or Saturday midday peak hours; however, a portion of the site-generated trips during the weekday morning and Saturday midday peak hours are anticipated to be comprised of pass-by trips. Therefore, pass-by credits equivalent to the weekday evening peak hour were applied to the weekday morning and Saturday midday peak hours. **Table 2** provides a summary of the trip generation volumes associated with the proposed development in terms of new and pass-by trips.

TABLE 2 – PROJECTED TRIP GENERATION (NEW & PASS-BY TRIPS)

	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
"New" Trips	3	2	5	7	7	13	6	6	11
Pass-by Trips	2	2	4	6	6	13	5	5	11
Total Trips	**5**	**4**	**9**	**13**	**13**	**26**	**11**	**11**	**22**

As shown in **Table 2** above, the proposed development is expected to generate a total of five (5) new trips during the weekday morning peak hour, 13 new trips during the weekday evening peak hour, and 11 new trips during the Saturday midday peak hour. Based on Transportation Impact Analysis for Site Development published by ITE, a trip increase of less than 100 vehicle trips would likely not change the level of service of the adjacent roadway system or appreciably increase the volume-to-capacity ratio of an intersection approach. As such, the proposed development is not anticipated to significantly impact the operations of the adjacent roadway network.

Site Circulation/Parking Supply

A review was conducted of the proposed pharmacy with drive-through using the Site Plan prepared by Stonefield, dated October 8, 2021. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Vehicular access is proposed via one (1) full-movement driveway to the north and one (1) egress only driveway to the south along Central Street. The proposed 2,502-square-foot pharmacy will be located in the center of the property, with parking stalls provided along the northerly building façade and in the northern portion of the site. Two (2)-way vehicular circulation will be facilitated via a 25-foot drive-aisle and a counterclockwise 12-foot drive-through lane and 13-foot bypass lane will be located along the westerly and southerly building facades. The proposed drive-through throat length provides adequate space for six (6) vehicles without impacting parking maneuverability or on-site circulation, which meets the Town's minimum stacking requirement for drive-through pharmacies.

Regarding the parking requirements for the proposed development, the Town of Winchendon utilizes parking guidelines set forth by the ITE as outlined in Table 8.3 within the Town Ordinance. For properties located within the Planned Development (PD) District, the Town requires a parking supply equivalent to 75% of the parking demand per ITE guidelines, with an allowed variance of plus or minus 10%. Please note that parking rates for a pharmacy with drive-through use are not provided within the Ordinance, and hence parking rates for a similar "Shopping Center" land use were applied. For the proposed 2,502-square-foot development, this equates to 12 required spaces. The site would provide 17 total parking spaces, inclusive of one (1) ADA accessible parking space, which exceeds the maximum allowable parking supply per the Town Ordinance and therefore a variance is requested. The spaces would be 9 feet wide by 18 feet deep in accordance with industry standards.

Conclusions

This report was prepared to examine the potential traffic impact of the proposed pharmacy with drive-through. The analysis findings, which have been based on industry standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The site driveways and on-site layout have been designed to provide for effective access to and from the subject property, and the parking supply would be sufficient to support this project.

Please do not hesitate to contact our office if there are any questions.

Best regards,

Joshua H. Kline, PE
Stonefield Engineering and Design

Charles D. Olivo, PE, PTOE
Stonefield Engineering and Design

cc: Julio A Williams, PE, CPESC – FIDC 163 LLC

APPENDIX C

WATER AND SEWER DEMAND CALCULATIONS

SANITARY SEWER AND DOMESTIC WATER DEMAND SPREADSHEET

(SPREADSHEET UPDATED: AUGUST 13, 2018)

PROJECT:	Proposed Pharacy with Drive-thru			**LAST REVISED:**	10/11/2021
PERFORMED BY:	SPM	**CHECKED BY:**	AS	**JOB REFERENCE:**	BOS-210033
SIGNATURE:					

NJDEP SANITARY SEWER PROJECTED DEMAND

USE TYPE	*UNIT TYPE*	*GPD PER UNIT*	*UNITS*	*GPD*
Miscellaneous: Stores / Shopping Center	Square Footage	0.1	2,502	250

All flow values are based on N.J.A.C. Title 5, Chapter 21, Subchapter 5.2 "Projected Flow Criteria"

TOTAL:	**250 GPD**

NJDEP DOMESTIC WATER PROJECTED DEMAND

USE TYPE	*UNIT TYPE*	*GPD PER UNIT*	*UNITS*	*GPD*
Store, office building	Square Footage	0.125	2,502	313

All flow values are based on N.J.A.C. Title 7, Chapter 10, Subchapter 12.6 "Water Volume Requirementsa"

TOTAL:	**313 GPD**