

STONEFIELD

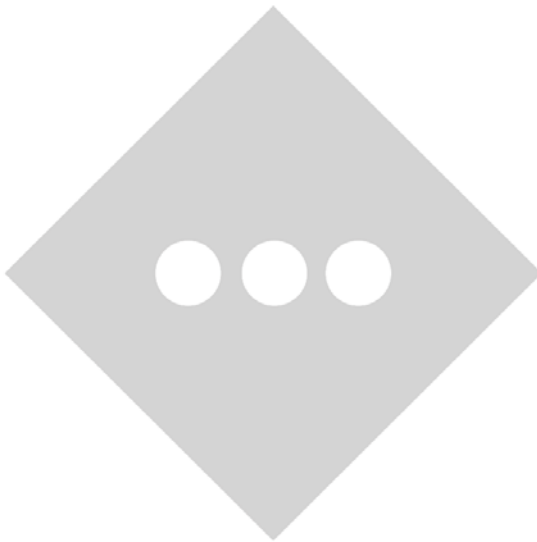
ENVIRONMENTAL IMPACT STATEMENT

**PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT
BLOCK 155, LOTS 40.02, 42.01, & 42.02
100 – 300 EXECUTIVE DRIVE
TOWNSHIP OF WEST ORANGE
ESSEX COUNTY, NEW JERSEY**

**PREPARED FOR:
GREEN ESSEX PARTNERS URBAN RENEWAL, LLC**

**PREPARED BY:
STONEFIELD ENGINEERING & DESIGN, LLC
584 BROADWAY, SUITE 310
NEW YORK, NEW YORK**

**REPORT DATE:
MARCH 19, 2021**





**ZACHARY E. CHAPLIN, PE
NEW JERSEY PROFESSIONAL ENGINEER LICENSE # 53605**

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1.0 PROJECT DESCRIPTION

Green Essex Partners Urban Renewal, LLC is proposing to redevelop Block 155, Lots 40.02, 42.01, & 42.02, commonly known as 100 – 300 Executive Drive West Orange, New Jersey and herein referred to as the “project site”, to accommodate three multi-family residential buildings (425 units total), a parking garage (567 spaces), an amenity area for residents, and a dog park that will be dedicated to the Township and available for public use. Additional improvements include off-street parking lots, stormwater management improvements, lighting, and landscaping. The properties neighboring the project site include single family residences to the south, a shopping center to the east, a commercial office building to the west, and Interstate 280 to the north. The total project area is 797,407 SF (18.31 acres). Project Figures can be found in Appendix A of this Report.

The project site is located off Rooney Circle and is serviced by a private road known as Executive Drive. The project site has been historically developed with office buildings since the 1980's. The existing development will be removed entirely as part of the proposed redevelopment, with the exception of the office building located at 300 Executive Drive. The proposed residential buildings contain a total of 425 dwelling units.

This Environmental Impact Statement has been prepared per Township requirements to investigate the existing conditions of the property, evaluate the potential impacts of the proposed redevelopment, and discuss the measures to mitigate environmental impacts, if any.

2.0 RELATIONSHIP TO LOCAL AND REGIONAL GUIDANCE DOCUMENTS

2.1 WEST ORANGE MASTER PLAN

The main policy of the West Orange Master Plan is to encourage appropriate residential development while maintaining the existing scale of the community and protecting natural features and environmental resources. There is an emphasis on sustainability and walkability throughout West Orange. The Master Plan also outlines the goal of improving connectivity within the Township, specifically between residential and commercial areas. The proposed development complies and meshes well with the existing Township Master Plan and the four Master Plan Principles which are outlined below:

2.1.1 ENCOURAGE APPROPRIATE RESIDENTIAL DEVELOPMENT

The Master Plan emphasizes the importance of appropriate residential development and how it is balanced with open space. The proposed use for the project site complies with all residential density requirements outlined in the Redevelopment Plan (Appendix D) and building coverage in order to ensure that the Township of West Orange

maintains their desired balance between residential development and preserving open space within the Township. The Planning Board agrees that certain multifamily residential buildings are more appropriate than traditional single-family detached dwellings in certain developed areas such as the proposed project site. As residents living within the proposed multifamily residential buildings will have access to a shuttle service, the proposed use will remain a part of the West Orange community and not be an isolated location.

2.1.2 PROPERLY LOCATE PUBLIC, COMMERCIAL, INDUSTRIAL, RESIDENTIAL AND SERVICE USES

The need to locate residential uses at certain sites and locations throughout the Township of West Orange that are suitable for their use environmentally, economically, and geographically was outlined as one of the core principles of the West Orange Master Plan. The Township of West Orange identified such an area and specifically created the Essex Green-Executive Drive Redevelopment Plan for the intended use of the project site, multifamily residential buildings. The Township identified and located an area that was best suited to be redeveloped into a multifamily residential area with a neighboring shopping center and municipal use area.

2.1.3 PROTECT NATURAL FEATURES AND ENVIRONMENTAL RESOURCES

The Master Plan has an emphasis on protecting the natural features and environmental features including, but not limited to, floodplains, wetlands, woodlands, steep slopes, ridgelines, and areas valuable as scenic, historical, cultural, or recreational resources. The proposed project implements several sustainability techniques to ensure the natural and environmental features are protected on site. In addition, the project will comply with NJ SESC Manual requirements and will be approved by both NJDEP and HEPSCD. The Township will remain apprised of the NJDEP and HEPSCD permitting status as the project moves forward.

2.1.4 MAINTAIN THE EXISTING SCALE OF THE COMMUNITY

The Township of West Orange has made clear that maintaining the community scale by limiting the intensity of the commercial/retail, industrial, and residential development within the Township to ensure compatibility with the already existing neighborhood character is a priority in the Master Plan. The proposed project and multifamily residential buildings are designed in a way to maintain that balance and meets the residential density requirements outlined within the Redevelopment Plan (Appendix D), ensuring that the Township of West Orange is not developing too quickly and growing larger than desired or outlined in the Master Plan.

3.0 SITE DESCRIPTION AND INVENTORY

3.1 SOILS

Soil mapping was obtained from the National Resource Conservation Service (NRCS) for the project site and immediate area. The project site is underlain by two major soil groups: silty loam within the historically undisturbed open space to the east of Mutton Hollow Road and urban fill / borrow material within the areas of existing development. Overall, the soils drain poorly, and runoff flows overland directly to the unnamed tributary. The table below provides a summary of the soils found on site. Additional information regarding the NRCS soil mapping can be found in Appendix B.

TABLE 1: ON-SITE SOIL GROUPS

Soil Unit Code	Soil Description	Approximate Project Coverage	Drainage Class	Hydrologic Soil Group
YaohEh	Yalesville, Holyoke Complex, 35 to 60 percent slopes	21.7%	Somewhat poorly drained	C
BogBc	Boonton Loam, 0 to 8 percent slopes	5.7%	Somewhat poorly drained	C
URBONB	Urban Land, Boonton Substratum, 0 to 8 percent slopes	50.6%	Somewhat poorly drained	D*

* URBONB does not have a pre-determined hydraulic soil group due to high variability in the historic fill material utilized. As such, these soils are analyzed as HSG D under pre-existing and post-development conditions.

3.2 TOPOGRAPHY

The existing topography of the site generally slopes from east to west with about a 75 FT grade change across the development area. The majority of the area within the northeast portion to the site drains to an existing ditch and retention pond which is ultimately tributary to the unnamed ditch which straddles the northerly property line. The area south of the central ditch and retention pond, generally drains to on-site conveyance systems, which are tributary to the northerly ditch. Grades on site generally range from 5% to 10% within the previously developed areas / open space and increases in slope as it approaches the ditch or perimeter areas, eventually reaching a 1:1 slope.

The proposed topography of the site will generally remain similar to the existing conditions. However due to the need for more residentially friendly and ADA accessible slopes, retaining walls and split-level buildings will be implemented throughout the development to make up for the changes in grade.

3.3 GEOLOGY

The project location is located within the Piedmont Physiographic Province of New Jersey, within the Brunswick Group. The project area is underlain by the Lower Triassic Aged, Orange Mountain Basalt which consists of basalt, fine grained to aphanitic, dark greenish gray, composed mostly of calcic plagioclase and augite. A total of seventeen (17) exploration borings were performed on site to obtain bedrock elevation information on site. The location of the borings and findings as well as bedrock contour plans can be found in the Geotechnical Report that was prepared by JZN Engineering.

3.4 VEGETATION

Portions of the project site are heavily vegetated and/or wooded, making up 44.90% (358,367 SF) of the site land cover. The vegetation is distributed across the entirety of the site but generally concentrated around the on-site open channels (one bisecting the site from east to west and another straddling the northerly property line). There is currently a total of 582 trees on site of varying species and ages spread throughout the site. Of those 582 trees, 142 of them are currently considered dead or dying due to being afflicted by the Emerald Ash Bore disease.

3.5 SURFACE WATER

The project site has two unnamed ditches, one of which traverses the center of the project site from east to west while the other straddles the northerly property line. Through a Flood Hazard Area Applicability Determination, it has been confirmed that both ditches are regulated and subject to a 50 FT riparian zone. Both have been classified as State Open Waterways and portions of the central ditch have been characterized as freshwater wetlands with a 50 FT transition area per a Letter of Interpretation from the NJDEP. The northerly ditch has also been classified as wetland but is an ordinary resource wetland with no associated transition area. The limits of these areas and associated buffer (where applicable) are shown on the Preliminary and Final Major Site Plans prepared by Stonefield Engineering, LLC in conjunction with this statement.

3.6 SUBSURFACE WATER

No groundwater was encountered in the geotechnical borings performed on site.

3.7 UNIQUE, SCENIC, AND / OR HISTORIC FEATURES

There are no portions of the site which would be considered to have unique, scenic, and/or historic qualities. The site currently contains two office buildings with separate parking lots.

3.8 EXISTING DEVELOPMENT FEATURES

Access to the site is provided via the private road, Executive Drive, that runs through the subject property and connects the proposed multifamily residential buildings and parking garage to the existing and to remain office building located at 300 Executive Drive and Rooney Circle to the north of the property. Existing power lines are directly adjacent to the south of the property but are not impacted by the development.

4.0 AREA AND REGIONAL DESCRIPTION

The project site is located off Rooney Circle and currently has three office buildings on site, only one of which is to remain. The land uses of the surrounding properties are residential and commercial. To the north of the project site is Essex Freeway (Interstate 280). To the east of the project site is an additional office building and a shopping center comprised of a ShopRite, AMC Dine-In Movie Theatre, TGI Fridays, and several other restaurants and outlet stores. Immediately adjacent to the property to the south and west are power lines with single family residential dwellings and the Essex Green Villas Condominium beyond them.

Existing stormwater management and drainage patterns are outlined in the Stormwater Management Report prepared by Stonefield Engineering & Design, LLC. All stormwater improvements will be reviewed and approved by the municipal engineer and the NJDEP in order to ensure that there will be no negative impacts downstream of the development. A Sanitary Analysis Exhibit (Appendix C) and Utility Plan (included in the Preliminary & Final Major Site Plan) have also been prepared to assess the capacity of the surrounding sanitary sewer network and its ability to service the proposed development.

5.0 IMPACT

5.1 SOIL EROSION AND SEDIMENTATION

A Soil Erosion & Sediment Control Plan has been prepared in accordance with the latest edition of the Standards for Soil Erosion and Sediment Control in New Jersey. This plan can be found within the Preliminary & Final Major Site Plans prepared by Stonefield Engineering & Design, LLC. Proposed temporary measures during construction include diversion swales, sediment basins, silt fencing, stabilized construction entrances, inlet filters, hay bales, street sweeping, and temporary seeding for soil stabilization in order to prevent any harmful environmental impacts on site, in the immediate area surrounding the project site, or downstream of the site. All plans must be reviewed and approved by the HEPSCD prior to commencement of construction.

5.2 FLOODING AND FLOODPLAIN DISRUPTION

The proposed redevelopment will disturb land within environmentally regulated areas (riparian zone, freshwater wetland ditch, freshwater wetland transition area, state open waters). These portions of the development will be reviewed and approved by the NJDEP prior to construction. This will include a flood study and additional plans and reports to be submitted to the Department in order to prove that no adverse impacts to the surrounding properties and areas downstream of the project site will occur.

5.3 DEGRADATION OF SURFACE WATER QUALITY

The proposed development will decrease the quantity of impervious groundcover on site. Therefore, water quality will naturally be enhanced as a result of the development.

5.4 GROUNDWATER POLLUTION

NJDEP and municipal guidelines will be observed in order to ensure the maintenance of groundwater quality. As the development proposes to reduce the amount of impervious coverage, water quality is naturally enhanced. Therefore, no negative impacts to groundwater are anticipated.

5.5 SEWAGE DISPOSAL

A Utility Plan has been included in the Preliminary & Final Major Site Plans prepared by Stonefield Engineering, LLC which provides an estimation of sewer flow calculations based on NJDEP standards. The Utility Plan outlines the sewer sanitary connection for the proposed multifamily residential buildings to the existing sanitary main on the southwesterly side of the property. Additionally, a Sanitary Analysis Exhibit predicting the downstream impact of the proposed use on the existing sanitary system in the residential neighborhood can be found in Appendix C. According to NJDEP projections of sewer flow, it has been determined that the existing pipe network will have capacity for the proposed development. Therefore, no adverse impacts are anticipated to the Township sewer system as a result of this development.

5.6 SOLID WASTE AND RECYCLABLES

All solid waste and trash is proposed to be collected internally of the three multifamily residential buildings. A solid waste disposal plan has been provided by the applicant.

5.7 LAND CLEARING

Due to the size and scope of the proposed project a number of existing trees and vegetation will be removed. A total of 397 existing trees will be removed with 185 existing trees set to remain. Of the 397 existing trees that are set to be removed, 142 of those trees are considered dead or dying due to being afflicted by the emerald ash bore disease. At the instruction of the Township Arborist, these 142 trees will be culled during construction in order to prevent the spread of this disease and protect the remaining trees in the area. A comprehensive Landscaping Plan, by a licensed landscape architect, has been included in the Preliminary & Final Major Site Plan prepared by Stonefield Engineering & Design. The plan proposes the planting of 288 trees of various species and a variety of shrubs and grasses. These plantings have been chosen to match the topography, climate, and environment to create a thriving, visually pleasing area.

5.8 DISRUPTION OF WILDLIFE HABITATS

As noted above, the ditches that traverse the site are classified both as State Open Waterways and wetlands. Any disturbance proposed within or adjacent to these areas will be minimized in order to maintain their value as ecologically sensitive habitats. Also, any areas within the proposed disturbance that can be will be revegetated with appropriate natural and endemic plantings advised by the landscape architect. Finally, all disturbance within these areas will be reviewed and permitted by the NJDEP, and no construction on site will begin without its approval.

5.9 IMPACTS TO SCENIC AND HISTORIC FEATURES

As there are no scenic or historic features on site, and therefore no negative impacts are anticipated.

5.10 AIR QUALITY DEGRADATION

The air quality of the project site and the immediately surrounding area is not anticipated to decrease or degrade in relation to the proposed development.

5.11 NOISE LEVELS

Noise levels are not anticipated to increase from existing conditions as the proposed development is residential in nature. In addition, the distance and natural buffers in the form of trees and other vegetation between the proposed development and neighboring properties is such that any noise levels will be screened.

5.12 ENERGY UTILIZATION

In order to reduce energy utilization, green building standards will be implemented. These measures will include electric car charging stations, energy star appliances and fixtures, and Dark Sky compliant LED light fixtures. These newer standards for energy efficiency should provide a measurable boost to the site relative to the older office buildings that exist today.

5.13 NEIGHBORHOOD IMPACTS

The proposed development is not anticipated to have any adverse effects on the existing surrounding neighborhood or sense of community within West Orange. The multi-family development poses an addition to the neighborhood that will blend well with the adjacent single-family residences and commercial shopping center. Further, the area to be dedicated and developed as a dog park provides the neighborhood with an additional park.

5.14 EFFECT ON PUBLIC SERVICES

Due to the change from office buildings to three multifamily residential buildings, it is anticipated that the need for public services will increase in the area surrounding the project site. The development will be coordinated with and reviewed by the fire department and police departments to ensure the accessibility and safety of the site.

5.15 TRAFFIC IMPACTS

The proposed development will provide sufficient parking, meeting the parking requirements as laid out in the Redevelopment Plan and RSIS. A shuttle will be provided to lessen traffic impacts on the surrounding area by reducing the quantity of cars coming and going from the site. A Traffic Engineering Evaluation has been provided by Bowman Consulting to address the traffic concerns resulting from the development.

5.16 HEALTH, SAFETY, AND WELFARE OF EXISTING RESIDENTS

It is not anticipated that the health, safety, and welfare of existing residents of West Orange will be impacted in any way with the addition of the three multifamily residential buildings. All necessary and required safety measures will be implemented during construction.

5.17 REGIONAL DEVELOPMENT POLICIES

All regional development policies will be adhered to during the approval and construction processes for the proposed development.

6.0 RECOMMENDATION TO MITIGATE ADVERSE ENVIRONMENTAL IMPACT

6.1 DRAINAGE PLANS

The proposed development has an extensive stormwater management plan which complies with all applicable stormwater management regulations and standards. Some of the sustainable elements proposed include the reduction of impervious surfaces, bio-swales within the parking area, rain gardens, and an underground detention basin to reduce peak flow rates. As demonstrated in the Stormwater Management Report, the increase in runoff flow rate and volume generated by the proposed redevelopment will be satisfactorily mitigated by the introduction of underground detention basins and the on-site stormwater conveyance system. Runoff water quality will be naturally enhanced due to the decrease in impervious surfaces.

6.2 SEWAGE DISPOSAL TECHNIQUES

The proposed development involves the removal of the existing on-site sanitary sewer system and in its place a new gravity system designed to meet the latest local and State requirements. A regional sanitary sewer study was performed by Stonefield Engineering & Design, to calculate the current usage downstream of the proposed development. Based on the analysis, it has been determined that no adverse impacts are anticipated as a result of the proposed development. Additionally, a will serve letter has been received by the Joint Meeting of Essex & Union Counties, as the local sewer lines are tributary to this treatment facility.

6.3 WATER SUPPLY AND WATER CONSERVATION PROPOSALS

The proposed development has an anticipated water demand of 79,929 gallons per day. Service of the development has been confirmed by New Jersey American Water. It should be noted that a Bureau of Water System Engineering (BWSE) permit will be required from the NJDEP due to the domestic demand over 12,000 gpd or 30 residential units. Additionally, the proposed development will incorporate water use efficient and energy star appliances and fixtures, as water conservations proposals.

6.4 SITE DESIGN TECHNIQUES

The project site has two unnamed ditches, one which traverses the center of the project site and the other straddles the northerly property line. Through a Flood Hazard Area Applicability Determination, it has been confirmed that both ditches are regulated and subject to a 50FT riparian buffer. Additionally, two freshwater wetland / State Open Water areas are located immediately adjacent to both ditches per a Letter of Interpretation

from NJDEP; the easterly portion of wetlands is subject to a 50FT transition area buffer. The other has been classified as an ordinary resource wetland with no associated transition area. To preserve these areas, the proposed development has been designed around the unnamed ditch and pond, with no permanent features proposed within, except for one road crossing.

The landscape is designed primarily with native plants in drifts and clusters as they might naturally occur in their environment. Several intimate courtyards and lawn spaces have been provided along with a series of plantings forming a natural border that blends the more structured landscape with the existing forest and wetlands on site. The project introduces over 200 trees which over time will form a new canopy over the site. The design also avoids a large forested area on site that will be preserved and replanted with native trees and shrubs in order to avoid the takeover of unwanted invasive species. Rain gardens have been designed in several locations to assist in ground water infiltration while also providing aesthetically pleasing backdrop for the new development. The majority of landscape is designed to be low maintenance and highly draught tolerant.

6.5 ENERGY CONSERVATION MEASURES

The proposed development will provide six electric charging stations for vehicles, energy star appliances and fixtures within the buildings, and LED light fixtures in an effort to conserve energy.

6.6 NOISE REDUCTION TECHNIQUES

No significant change to air quality is anticipated as part of the proposed development. The residential nature of the development is a similar noise generator to the existing offices in the surrounding area, with the primary impactor of vehicle traffic. The development will comply with all NJDEP requirements for noise as applicable. The development area is naturally buffered as well via woods and steep slopes to reduce noise.

6.7 CONSTRUCTION SCHEDULE

The Applicant will abide by all local, State, and Federal laws for the construction of the project. As the project is in a relatively isolated area with a dead-end private road and substantial buffering around the perimeter of the property, no adverse impacts are anticipated to the nearby community. To mitigate any potential impacts of the construction to the immediate neighbor of the development, the Applicant will work with the owner of 300 Executive Drive to ensure minimum disruption of cross access and utility service.

6.8 MISCELLANEOUS IMPROVEMENTS AND OFF-SITE PUBLIC IMPROVEMENTS

As part of the proposed development, the Applicant will build a dog park, which will be dedicated to the Township. Additionally, new sidewalk is proposed along Executive Drive to connect to Rooney Circle and the Essex Green Development.

7.0 ALTERNATIVES

7.1 NO BUILD

Under existing conditions, the site contains approximately 174,546 square feet of office space. In the no build condition, the existing buildings, parking areas, and supporting improvements would remain as-is. Over the past decade, occupancy rates of the office buildings have decreased. This is consistent with the trend in the office market over the past decade, in which suburban office space vacancy rates are approaching 30% in New Jersey. Ultimately, maintaining the existing use will result in a property that is underutilized at best and obsolete at worst, as a result of the changing office landscape.

In addition, the redevelopment will result in the reduction of 8,909 SF of impervious areas. In the no build condition, the property would not receive the benefits of a reduction in impervious coverage and an increase in vegetated areas on the subject property.

7.2 REDEVELOPMENT AS PERMITTED USE

As described above, the permitted office uses are not in keeping with the current trends in suburban development. Other permitted uses in the OB-I District include one family, detached dwellings, municipal buildings, golf courses, and other similar uses. The Redevelopment Plan was prepared by the Township to promote the development of multi-family residential buildings.

8.0 LICENSES, PERMITS, AND APPROVALS REQUIRED

The following licenses, permits, and approvals are anticipated in conjunction with this application:

- Township of West Orange
 - o Preliminary & Final Major Site Plan Approval
 - o Minor Subdivision Approval
 - o Building Permit
- Essex County

- o Site Plan and Subdivision Approval
- Hudson Essex Passaic Soil Conservation District
 - o Soil Erosion and Sediment Control Plan Certification
- New Jersey Department of Environmental Protection
 - o NJDEPS General Permit for Construction Activities (5G3)
 - o NJDEP Flood Hazard Area Verification
 - o NJDEP Flood Hazard Area Individual Permit
 - o NJDEP Treatment Works Approval
 - o NJDEP Water Main (BWSE) Permit

At the time of this Statement, all approvals are still pending.

9.0 REFERENCES

1. Revised General Ordinances of the Township of West Orange, last amended June 20, 2016
<https://www.westorange.org/DocumentCenter/View/550/Twp-of-WO-Zoning-Ordinance-Final-Revised--Adopted-6-26-2012?bidId=>
2. Essex Green-Executive Drive Redevelopment Plan, last amended May 1, 2019
Appendix D of this Statement
3. 2019 Master Plan Update – Reexamination Report and Plan Element Amendments, last amended December 2019
<https://www.westorange.org/DocumentCenter/View/6080/West-Orange-MP-Reexam---v10-Dec-2019-002>
4. New Jersey Administrative Code Title 7, Chapter 8 Stormwater Management, last amended June 20, 2016
https://www.nj.gov/dep/rules/rules/njac7_8.pdf
5. New Jersey Stormwater Best Management Practices Manual, last revised November 2018
https://www.njstormwater.org/bmp_manual2.htm

APPENDIX A

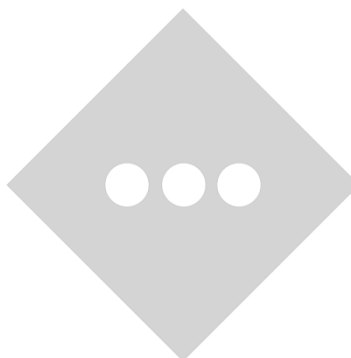
PROJECT FIGURES

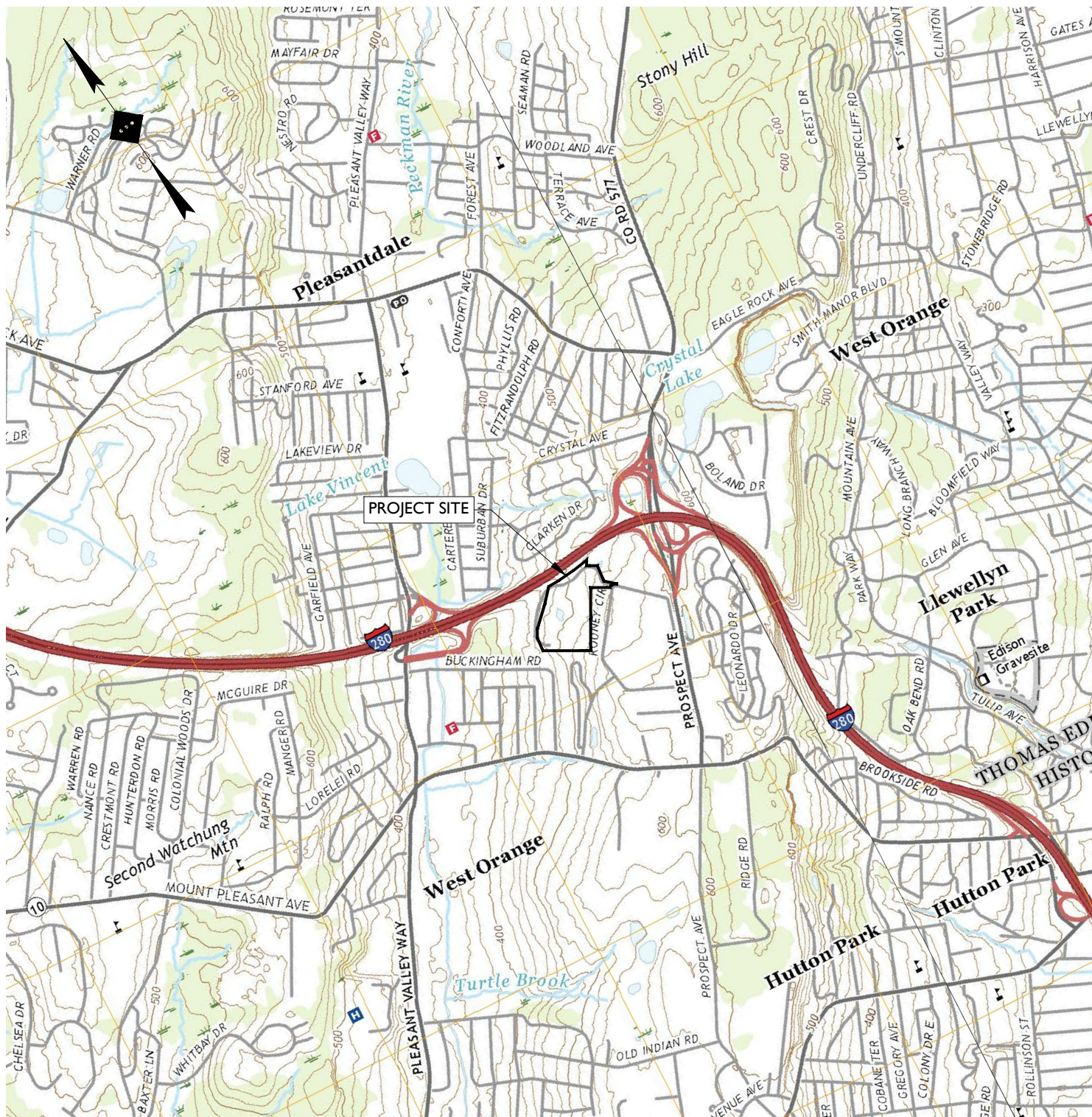
INVENTORY

TAX & ZONING MAP

AERIAL MAP

USGS MAP





USGS MAP

2000' 0' 2000' 4000'



GRAPHIC SCALE IN FEET

1" = 2000'

SOURCE: UNITED STATES GEOLOGICAL SURVEY MAP, CALDWELL & ORANGE QUADRANGLES, DATED 2016

GREEN ESSEX PARTNERS URBAN RENEWAL, LLC

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BLOCK 155, LOTS 40.02 & 42.02
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TOWNSHIP OF WEST ORANGE
ESSEX COUNTY, NEW JERSEY

DRAWN BY:

DD

CHECKED BY:

ZEC

DATE:

02/12/2020

SCALE:

1" = 2000'

PROJECT ID:

T-17554



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engineering & design

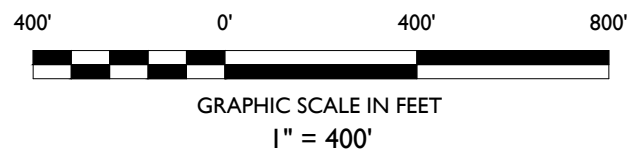
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STATE PLANE COORDINATES
OF PROJECT SITE CENTROID:
X: 558,952
Y: 714,885

AERIAL MAP



SOURCE: GOOGLE EARTH PRO

GREEN ESSEX PARTNERS URBAN RENEWAL, LLC

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

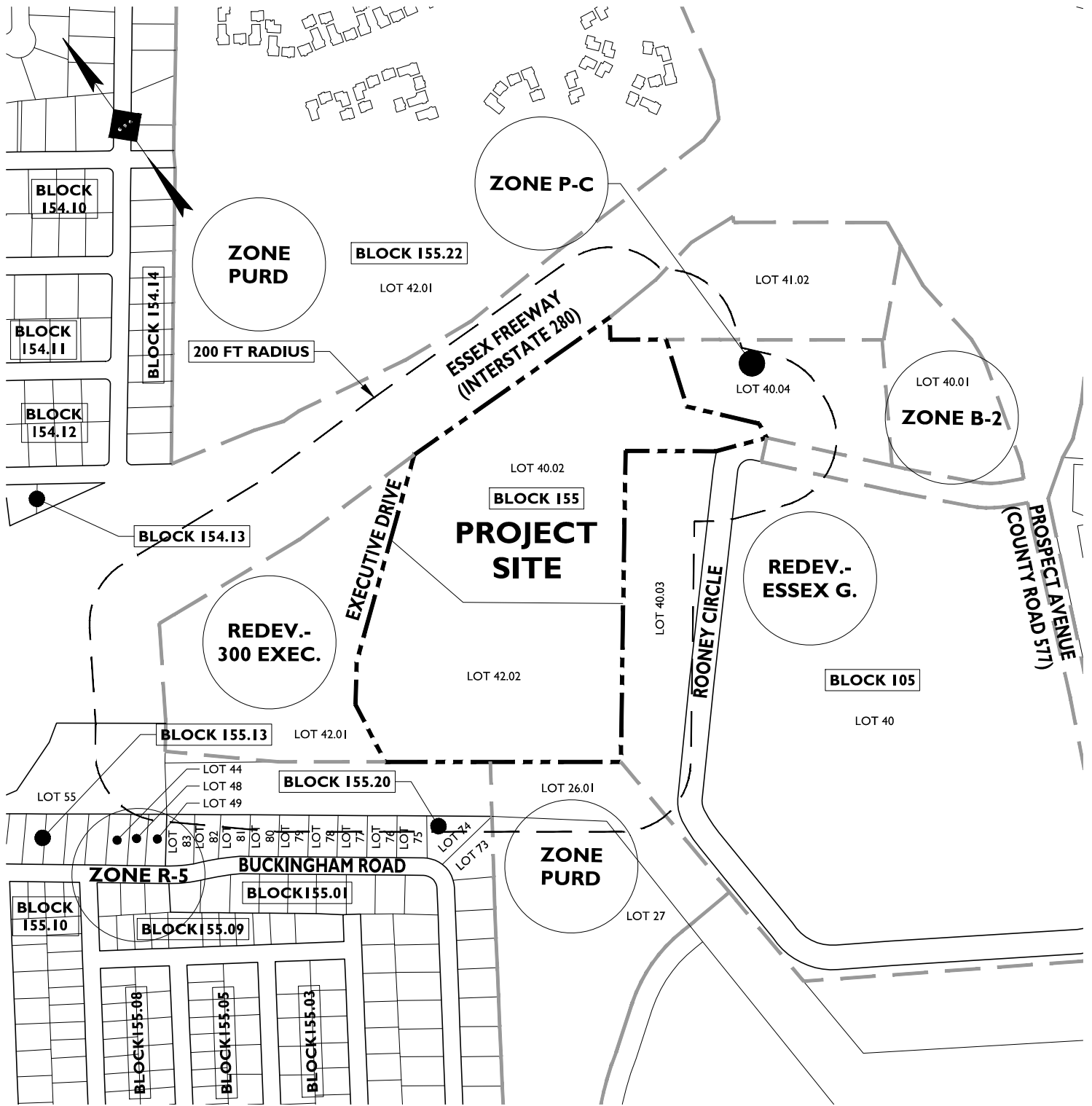
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SCALE:	1" = 400'
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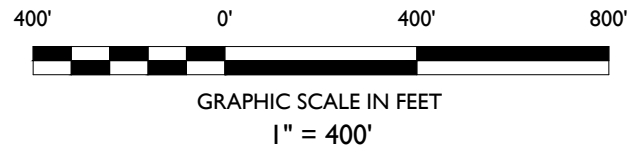


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TAX & ZONING MAP



SOURCE: TOWNSHIP OF WEST ORANGE TAX MAPS SHEETS 34, 85, 86, 86, 88, & 89;
TOWNSHIP OF WEST ORANGE ZONING MAP.

GREEN ESSEX PARTNERS URBAN RENEWAL, LLC

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

BLOCK 155, LOTS 40.02 & 42.02
100 - 200 EXECUTIVE DRIVE
TOWNSHIP OF WEST ORANGE
ESSEX COUNTY, NEW JERSEY

DRAWN BY:	DD
CHECKED BY:	ZEC
DATE:	02/12/2020
SCALE:	1" = 400'
PROJECT ID:	T-17554



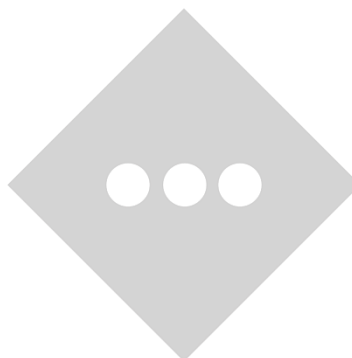
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APPENDIX B

NRCS COUNTY SOIL SURVEY





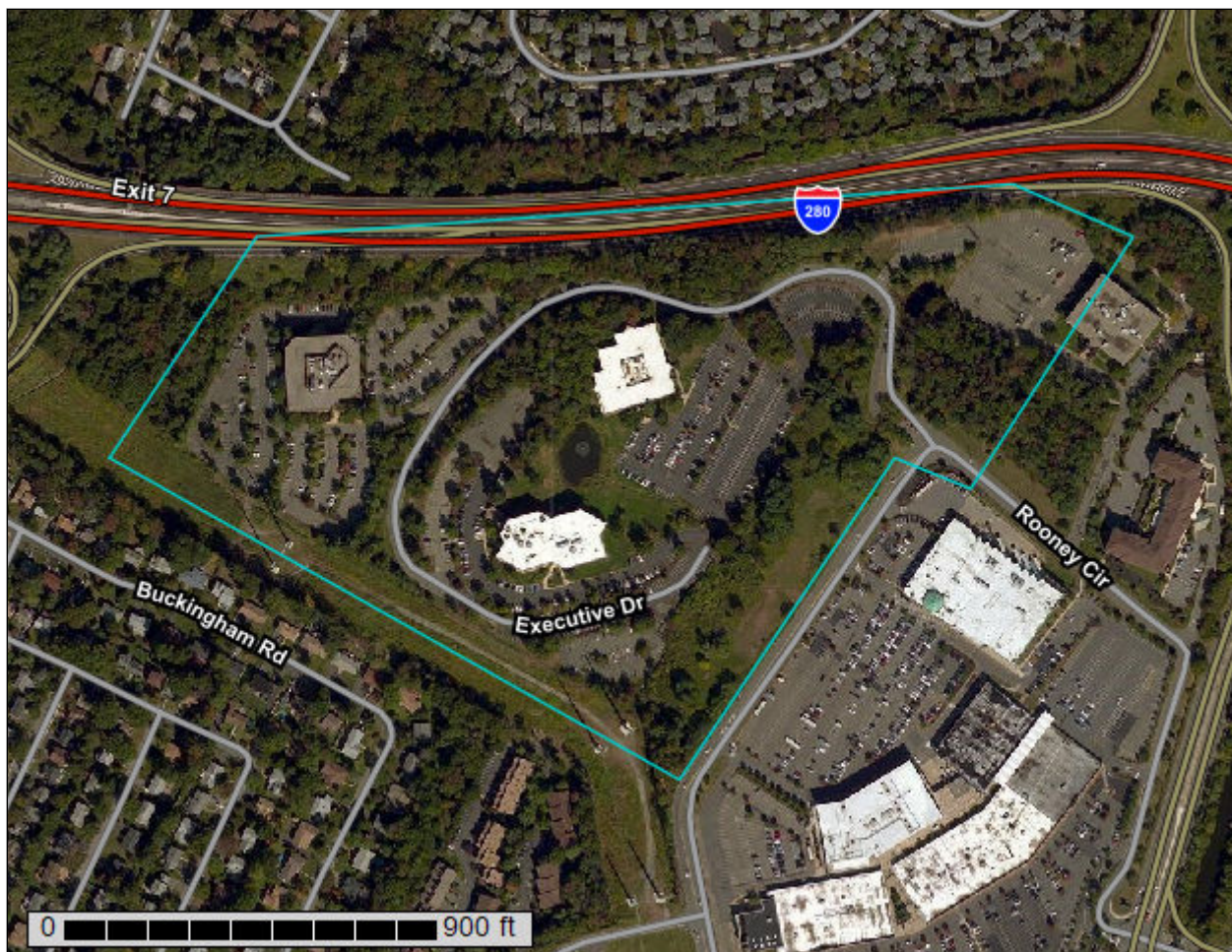
United States
Department of
Agriculture

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 **Essex County, New Jersey**



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.

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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

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

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.

Custom Soil Resource Report Soil Map



Map Scale: 1:4,140 if printed on A landscape (11" x 8.5") sheet.

0 50 100 200 300 Meters
0 200 400 800 1200 Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Custom Soil Resource Report

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 1:12,000.

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: Essex County, New Jersey
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Aug 25, 2014—Sep 27, 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
BogBc	Boonton loam, 0 to 8 percent slopes, extremely stony	18.4	39.7%
BouB	Boonton - Urban land, Boonton substratum complex, 0 to 8 percent slopes	2.5	5.4%
DunB	Dunellen sandy loam, 3 to 8 percent slopes	0.3	0.6%
URBONB	Urban land, Boonton substratum, 0 to 8 percent slopes	22.1	47.8%
YaohEh	Yalesville - Holyoke complex, 35 to 60 percent slopes, very rocky	3.0	6.5%
Totals for Area of Interest		46.3	100.0%

Map Unit Descriptions

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.

Essex County, New Jersey

BogBc—Boonton loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: b128
Elevation: 50 to 500 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Boonton, Extremely Stony

Setting

Landform: Ground moraines
Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy basal till derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oa - 1 to 3 inches: highly decomposed plant material
A - 3 to 5 inches: loam
BA - 5 to 8 inches: silt loam
BE - 8 to 17 inches: silt loam
Bt - 17 to 30 inches: silt loam
Btx1 - 30 to 40 inches: gravelly fine sandy loam
Btx2 - 40 to 47 inches: fine sandy loam
CBt1 - 47 to 58 inches: loamy sand
CBt2 - 58 to 72 inches: loamy sand

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

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Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Boonton, moderately well drained, extremely stony

Percent of map unit: 10 percent

Landform: Ground moraines

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Head slope, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Haledon, extremely stony

Percent of map unit: 5 percent

Landform: Ground moraines

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Side slope, head slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

BouB—Boonton - Urban land, Boonton substratum complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: b12f

Elevation: 50 to 500 feet

Mean annual precipitation: 30 to 64 inches

Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days

Farmland classification: Not prime farmland

Map Unit Composition

Boonton and similar soils: 50 percent

Urban land, boonton substratum: 40 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boonton

Setting

Landform: Ground moraines

Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy basal till derived from basalt

Custom Soil Resource Report

Typical profile

A - 0 to 5 inches: loam
BA - 5 to 8 inches: silt loam
BE - 8 to 17 inches: silt loam
Bt - 17 to 30 inches: silt loam
Btx1 - 30 to 40 inches: gravelly fine sandy loam
Btx2 - 40 to 47 inches: fine sandy loam
CBt1 - 47 to 58 inches: loamy sand
CBt2 - 58 to 72 inches: loamy sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

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

Description of Urban Land, Boonton Substratum

Setting

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank, upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

H1 - 0 to 12 inches: material
H2 - 12 to 47 inches: silt loam
2CBt1 - 47 to 58 inches: loamy sand
2CBt2 - 58 to 72 inches: loamy sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Udorthents, boonton substratum

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank, upper third of mountainflank, center third of mountainflank

Custom Soil Resource Report

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

DunB—Dunellen sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: njzd
Elevation: 50 to 2,000 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Dunellen

Setting

Landform: Outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy outwash derived from sandstone

Typical profile

A1 - 0 to 8 inches: sandy loam
A2 - 8 to 14 inches: sandy loam
BA - 14 to 20 inches: sandy loam
Bt - 20 to 31 inches: sandy loam
C - 31 to 42 inches: sandy loam
2C - 42 to 70 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

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Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Tunkhannock

Percent of map unit: 10 percent
Landform: Deltas, kames, outwash terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Udorthents, dunellen substratum

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

URBONB—Urban land, Boonton substratum, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: w9cn
Elevation: 50 to 500 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, boonton substratum: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Boonton Substratum

Setting

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

H1 - 0 to 12 inches: material
H2 - 12 to 47 inches: silt loam
2CBt1 - 47 to 58 inches: loamy sand
2CBt2 - 58 to 72 inches: loamy sand

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Minor Components

Boonton

Percent of map unit: 5 percent

Landform: Ground moraines

Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Udorthents, boonton substratum

Percent of map unit: 5 percent

Landform: Ground moraines

Landform position (three-dimensional): Lower third of mountainflank, upper third of mountainflank, center third of mountainflank

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

YaohEh—Yalesville - Holyoke complex, 35 to 60 percent slopes, very rocky

Map Unit Setting

National map unit symbol: w9g0

Elevation: 50 to 500 feet

Mean annual precipitation: 30 to 64 inches

Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days

Farmland classification: Not prime farmland

Map Unit Composition

Yalesville, very rocky, and similar soils: 50 percent

Holyoke, very rocky, and similar soils: 30 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yalesville, Very Rocky

Setting

Landform: Ground moraines

Landform position (three-dimensional): Mountaintop

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Coarse-loamy till derived from basalt

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 5 inches: loam
Bw1 - 5 to 19 inches: fine sandy loam
Bw2 - 19 to 31 inches: fine sandy loam
BC - 31 to 32 inches: fine sandy loam
R - 32 to 80 inches: bedrock

Properties and qualities

Slope: 35 to 60 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Holyoke, Very Rocky

Setting

Landform: Ground moraines, hills, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Loamy till derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oa - 1 to 3 inches: highly decomposed plant material
A - 3 to 5 inches: loam
Bw1 - 5 to 14 inches: loam
Bw2 - 14 to 18 inches: loam
R - 18 to 80 inches: bedrock

Properties and qualities

Slope: 35 to 60 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

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Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Boonton, very rocky

Percent of map unit: 10 percent

Landform: Ground moraines

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Rock outcrop

Percent of map unit: 10 percent

Landform: Ridges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: Unranked

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