



BOROUGH OF
OAKLAND
NEW JERSEY

*PROJECT PLANNING DOCUMENT
LEVEL 2 ENVIRONMENTAL REVIEW*

OAKLAND SANITARY SEWER IMPROVEMENTS



TABLE OF CONTENTS

| | |
|---|-----------|
| I. PROJECT DESCRIPTION | 1 |
| II. ELIGIBILITY FOR LEVEL 2 ENVIRONMENTAL REVIEW | 2 |
| III. COMPLIANCE WITH N.J.A.C. 7:22-10.5 | 3 |
| IV. PUBLIC INVOLVEMENT | 46 |
| V. CONCLUSIONS | 47 |

FIGURES

| | |
|--------------------|---------------------------------------|
| FIGURE I..... | AERIAL LOCATION MAP |
| FIGURE II | TAX MAP |
| FIGURE III..... | STREET LOCATION MAP |
| FIGURE IV | STATE PLANNING AREA MAP |
| FIGURE V..... | HYDROLOGIC SOIL RATING MAP |
| FIGURE VI..... | PHYSIOGRAPHIC PROVINCES MAP |
| FIGURE VII | USGS TOPOGRAPHIC MAP |
| FIGURE VIII..... | HIGHLANDS STEEP SLOPES MAP |
| FIGURE IX..... | BEDROCK GEOLOGY MAP |
| FIGURE X..... | PURVEYOR AND WELL SUPPLY MAP |
| FIGURE XI..... | SOLE-SOURCE AQUIFER MAP |
| FIGURE XII | SOILS MAP |
| FIGURE XIII..... | SOIL SEWAGE DISPOSAL RATING MAP |
| FIGURE XIV | AIR QUALITY FACILITIES MAP |
| FIGURE XV | FRESHWATER WETLAND MAP |
| FIGURE XVI..... | THREATENED AND ENDANGERED SPECIES MAP |
| FIGURE XVII..... | ZONING MAP |
| FIGURE XVIII | LAND USE MAP |
| FIGURE XIX | CRITICAL ENVIRONMENTAL MAP |
| FIGURE XX..... | VERNAL POOL LOCATION MAP |
| FIGURE XXI..... | FEMA FLOOD MAP |
| FIGURE XXII..... | GROUNDWATER RECHARGE MAP |
| FIGURE XXIII..... | SURFACE WATER QUALITY STANDARDS MAP |
| FIGURE XXIV | PRESERVED PARKS AND FARMLAND MAP |
| FIGURE XXV..... | HIGHLANDS BOUNDARY MAP |
| FIGURE XXVI | SEWER SERVICE AREA MAP |
| FIGURE XXVII..... | ENVIRONMENTAL OVERLAY MAP |
| FIGURE XXVIII..... | HISTORICAL PROPERTIES MAP |
| FIGURE XXIX | WASTEWATER CONVEYANCE MAP |

APPENDICES

APPENDIX ANEW JERSEY AND NATIONAL REGISTERS OF HISTORIC PLACES

APPENDIX B..... WATER ALLOCATION MINOR MODIFICATION APPLICATION

Special Note

The following environmental planning document has been prepared in accordance with N.J.A.C. 7:22 “Financial Assistance Programs for Environmental Infrastructure Facilities”, Subchapter 10, Environmental Assessment Requirements for State Assisted Environmental Infrastructure Facilities. Due to the nature of the proposed activities, the project qualifies for a Level 2 Environmental Review as detailed in N.J.A.C. 7:22, subsection 10.5.

The proposed project involves the improvements to the sanitary sewer system between Oakwood Knolls, Chapel Hill and Skyview/Hibrook in the Borough of Oakland. The project will **not** (i) create a new discharge, (ii) reduce the level of treatment, (iii) result in an increase in quantity of flow of an existing discharge, (iv) involve an increase in water allocation, or (v) involve the construction of a new water tower.

In an effort to clearly present the project’s compliance with the Department’s Level 2 Requirements, the remainder of the document is formatted in accordance with N.J.A.C. 7:22-10.5 (b). Sections 1 through 18 will correspond to sub-sections 1-18 of the administrative code. The relevant project information is provided as required under the aforementioned rule.

I. Project Description

The proposed project is located within the Borough of Oakland, New Jersey. The Borough lies within the north-west portion of the Bergen County, with an approximate land area of 8.782 square miles. Based on the 2010 Census, the population estimate for 2018 is 13,021 and approximately 4,319 households (U.S. Census Bureau, 2010).

The Borough of Oakland currently owns and operates three (3) Wastewater Treatment Plants (WWTPs) serving 258 residential units (domestic wastewater), namely Oakwood Knolls (166 households), Chapel Hill (24 households), and Skyview-Hibrook (68 households). Additionally, there is one (1) WWTP owned by The Oakland Board of Education.

During 2016-2017, Boswell Engineering performed an assessment of the three (3) Borough owned WWTPs and concluded that they were at the end of their useful life, which makes any repair efforts not feasible. Consequently, it was recommended the decommissioning of the three (3) WWTPs and replacing them with pumping stations so their corresponding wastewater flows are conveyed to a manhole located on Franklin Avenue. From that manhole, wastewater gravity flows to the Northwest Bergen County Utilities Authority (NBCUA) Pumping Station and is finally conveyed to the NBCUA WWTP located at 30 Wyckoff Avenue, Waldwick, NJ.

The project also encompasses the decommissioning and demolition of both Hibrook and Skyview Pumping Stations which currently pump to Skyview-Hibrook WWTP. Their flow will be redirected to the proposed gravity pipe that will run on Monhegan Ave, Ramapo Hills Blvd, and Lakeside Blvd to finally discharge into the proposed Lakeside Pumping Station. The three (3) newly proposed pumping stations are: Oakwood Knolls (conveying flow from Oakwood Knolls WWTP), Chapel Hill (conveying flow from Chapel Hill WWTP), and Lakeside (conveying flow from Chapel Hill and Skyview-Hibrook WWTPs)

II. Eligibility for Level 2 Environmental Review

Based on the information presented in this report, the project is eligible for a Level 2 Environmental Review, as it does not meet the criteria of a Level 1 or Level 3 review since the project meets the following criteria:

1. The project is not expected to have a permanent adverse or a significant temporary adverse effect on the human environment;
2. The project is not expected to have a permanent adverse or a significant temporary adverse direct or indirect impact on cultural resources, endangered and/or threatened species or their designated habitats, wetlands, floodplains, important farmlands or other environmentally critical areas;
3. The project is not expected to result in significant adverse public comment;
4. The project is not expected to have significant adverse effects on the pattern and type of land use or growth and distribution of population in the project area;
5. The construction of the project is not expected to directly displace a significant amount of population or have a significant adverse effect on a residential area;
6. The project is not expected to directly or indirectly conflict significantly with Federal, State, regional, or local land use plans or policies;
7. The project is not expected to have significant adverse effects on environmentally critical areas either directly or indirectly or as the result of cumulative effects with other related projects; and
8. The project will not directly or indirectly have a significant adverse effect upon local ambient air quality, local ambient noise levels, surface water or groundwater quality or quantity, water supply, fish, shellfish, wildlife, or their natural habitats.

III. Compliance with N.J.A.C. 7:22-10.5

1. *A geographical, geological and topographical description of the planning area;*

The Borough of Oakland is located in Bergen County, NJ and is bordered by the Township of Mahwah to the north, the Borough of Franklin Lakes to the east, the Township of Wayne to the south, the Borough of Pompton Lakes to the southeast, the Borough of Wanaque to the west, and the Borough of Ringwood to the northeast. The Borough is approximately 8.45 square miles and is roughly evenly divided north to south by the Ramapo River. The proposed project is located to the east of the Ramapo River near the eastern town boundary (**Figures I, II, and III**).

The proposed project location lies within the Metropolitan Planning Area (PA1) (**Figure IV**). PA1 covers 840,276 acres within New Jersey (17.5% of the State's overall land area), of this area 611,539 acres are developed, 104,861 acres are unprotected and undeveloped, 46,254 acres are preserved, and 77,622 are unsuitable.

The State Plan adopted by the New Jersey State Planning Commission in 2001 utilizes the following definitions for these land classifications:

- Developed (urban):

Includes all residential, commercial, industrial, and similar developed areas. Portions of these areas are available for redevelopment.

- Unprotected and Undeveloped:

Includes land classified as agricultural, forest, bare exposed rock, and transitional areas in this mapping series that is not otherwise classified as Preserved or Unsuitable. This area is considered to be generally available for development, although not necessarily recommended for development in the State Development and Redevelopment Plan, the Pinelands Comprehensive Management Plan, or the Hackensack Meadowlands Development Commission Master Plan. This estimate does not take into account land that is prevented by easements or other deed restrictions from development, or land that may have been developed since 1995.

- Preserved:

Includes federal and state parks, wildlife preserves, state owned conservation easements, watershed management areas, utility land, and tax exempt open space mapped by the Department of Environmental Protection; preserved farmland mapped by the Department of Agriculture, New Jersey Conservation Foundation land, and county and municipal parks and open space mapped through State Plan Cross-acceptance.

- Unsuitable:

Includes wetlands, beaches, water, and other areas considered not generally suitable for development.

Areas within PA1 are delineated as having a density of more than 1,000 people per square mile; existing public water and sewer systems, or physical accessibility to those systems, and access to public transit systems; land area greater than one square mile; population of no less than 25,000 people; and being surrounded by land areas that meet the criteria of a Metropolitan Planning area, are geographically interrelated with the Metropolitan Planning Area, and meet the intent of this Planning Area.

The intent of PA1 within the State Plan is to provide for much of the State's future redevelopment, revitalize cities and towns, promote growth in compact forms, stabilize older suburbs, redesign areas of sprawl, and protect the character of existing stable communities.

In addition to being within PA1, the Borough of Oakland is situated within two physiographic provinces (**Figure V**). Roughly the western half of the Borough lies in the Highlands Province while the eastern half lies within the Piedmont Province. The proposed project is located within the eastern half of the Borough and lies within the Piedmont Province. The Piedmont Province is characterized by gently rolling hills with rocks aged within the Late Triassic and Early Jurassic periods.

The elevation in Oakland ranges from approximately elevation 918 (NAVD 88) at the northwestern edge of the Borough to approximately elevation 262 (NAVD 88) along the banks of the Ramapo River. The elevation in the area of proposed work ranges from 264 (NAVD 88; at the intersection of Franklin Avenue and Ramapo Valley Road) to 506 (NAVD 88; on Hiawatha Boulevard between Iroquois Avenue and Ithaca Place) (**Figure VI**). Additionally, portions of the proposed project are located within areas classified to have steep slopes by the New Jersey Highlands Council (**Figure VII**).

The majority of the bedrock underlying the project area is within the Feltville Formation with the northern portions stretching into areas underlain by Preakness Basalt (**Figure VIII**). The Feltville Formation is the second most prevalent bedrock type in Oakland (19%) and is characterized as a sedimentary layer mostly consisting of course-grained sandstone. The Preakness Basalt is the most prevalent bedrock type in Oakland (25%) and is characterized as being very fine grained and dense.

2. *An 8 1/2 inch by 11-inch map of the planning area which depicts the location of the proposed activity, and an 8 1/2 inch by 11-inch site plan showing areas of proposed construction. The USGS quadrangle maps are an acceptable base map, if the scale allows for a clear depiction of the project;*

Please see attached **Figures IV** and **I** depicting the planning area with the location of the proposed activity and a site plan showing areas of proposed construction respectively.

3. A description of and mapping, where applicable, of existing environmental conditions and features including:

- i. Existing water quality and uses including a comparison to New Jersey water quality standards and uses established in accordance with N.J.A.C. 7:9-4, 5 or 6;

As per N.J.A.C. 7:9 and the Administrative Consent Order (ACO) issued to the municipality by the New Jersey Department of Environmental Protection (NJDEP), the Borough of Oakland meets all of the interim limits within the ACO. However, several Discharge Monitoring Reports (DMRs) have exhibited exceedances of effluent limitations set forth in their New Jersey Pollutant Discharge Elimination System (NJPDES) permits. These violations, outlined in **Tables 1, 2, and 3**, below are due to system failure and require improvements as outlined within this report.

Table 1. Effluent Violations of the Oakwood Knolls NJPDES Permit

| Monitoring Period | Parameter | Permit Limit | Results |
|---|------------|----------------|----------------|
| June 2018 | Ammonia | 2.0 mg/l | 12.60 mg/l |
| July 2018 | Phosphorus | 0.76 mg/l | 1.21 mg/l |
| October 2018 | Phosphorus | 0.76 mg/l | 1.24 mg/l |
| November 2018 | E. Coli | 126 per 100 ml | 609 per 100 ml |
| December 2018 | Phosphorus | 0.76 mg/l | 1.25 mg/l |
| The following abbreviations have been used in the above table: mg/l = milligrams per liter kg/d = kilograms per day per 100 ml = Colonies of E. coli bacteria per 100 milliliters of sample volume | | | |

Table 2. Effluent Violations of the Chapel Hill NJPDES Permit

| Monitoring Period | Parameter | Permit Limit | Results |
|--|------------|--------------|------------|
| June 2018 | Copper | 7.57 ug/l | 20.80 ug/l |
| June 2018 | Copper | 0.29 gr/d | 0.90 gr/d |
| July 2018 | Phosphorus | 0.76 mg/l | 1.76 mg/l |
| September 2018 | Copper | 7.57 ug/l | 32.73 ug/l |
| October 2018 | Copper | 7.75 ug/l | 13.42 ug/l |
| December 2018 | Copper | 7.75 ug/l | 9.59 ug/l |
| January 2019 | Copper | 7.75 ug/l | 12.1 ug/l |
| May 2019 | Copper | 7.75 ug/l | 15.35 ug/l |
| August 2019 | Copper | 7.75 ug/l | 11.48 ug/l |
| September 2019 | Copper | 7.75 ug/l | 12.46 ug/l |
| October 2019 | Copper | 7.75 ug/l | 10.55 ug/l |
| The following abbreviations have been used in the above table: mg/l = milligrams per liter ug/l = micrograms per liter gr/d = grams per day | | | |

Table 3. Effluent Violations of the Skyview-Hibrook NJPDES Permit

| Monitoring Period | Parameter | Permit Limit | Results |
|---|----------------|----------------|------------------|
| May 2017 | Oil and Grease | 10 gm/l | 176 mg/l |
| June 2018 | Copper | 8.05 ug/l | 26.20 ug/l |
| June 2018 | Copper | 0.7 gr/d | 0.95 gr/d |
| June 2018 | Phosphorus | 0.03 kg/d | 0.05 kg/d |
| June 2018 | E. Coli | 126 per 100 ml | 2,420 per 100 ml |
| July 2018 | Phosphorus | 0.03 mg/l | 0.06 mg/l |
| September 2018 | Copper | 8.05 ug/l | 14.9 ug/l |
| October 2018 | Copper | 8.05 ug/l | 15 ug/l |
| November 2018 | Copper | 8.05 ug/l | 11.10 ug/l |
| November 2018 | Ammonia | 3.50 mg/l | 5.66 mg/l |
| December 2018 | Copper | 8.05 ug/l | 8.35 ug/l (SNC) |
| December 2018 | Ammonia | 3.50 mg/l | 7.43 mg/l |
| January 2019 | Copper | 8.05 ug/l | 15.2 ug/l |
| January 2019 | Ammonia | 3.05 mg/l | 5.8 mg/l |
| February 2019 | Ammonia | 3.05 mg/l | 12.22 mg/l |
| February 2019 | Copper | 8.05 ug/l | 16.40 ug/l |
| March 2019 | Ammonia | 2 mg/l | 12.7 mg/l |
| March 2019 | Ammonia | 0.17 kg/d | 0.35 kg/d |
| March 2019 | IC25 | 61% | 18% |
| March 2019 | Copper | 8.05 ug/l | 20.7 ug/l |
| April 2019 | Copper | 8.05 ug/l | 21.4 ug/l |
| May 2019 | Copper | 0.7 gr/d | 0.96 gr/d |
| May 2019 | Copper | 8.05 ug/l | 25.29 ug/l |
| June 2019 | Copper | 8.05 ug/l | 9.20 ug/l |
| July 2019 | Copper | 8.05 ug/l | 36.55 ug/l |
| July 2019 | Copper | 0.7 gr/d | 1.25 gr/d |
| August 2019 | Copper | 8.05 ug/l | 13.23 ug/l |
| September 2019 | Copper | 8.05 ug/l | 15.05 ug/l |
| October 2019 | Copper | 8.05 ug/l | 8.8 ug/l |
| <p>The following abbreviations have been used in the above table:</p> <p>mg/l = milligrams per liter</p> <p>ug/l = micrograms per liter</p> <p>kg/d = kilograms per day</p> <p>gr/d = grams per day</p> <p>per 100 ml = Colonies of E. Coli bacteria per 100 milliliters of sample volume</p> | | | |

ii. *Hydrologic characteristics;*

Oakland is mostly characterized by slow or very slow infiltration rates due to the underlying Highlands bedrock or Triassic-Jurassic basalt. However, the soils in the area of the proposed improvements are characterized by a very slow to high infiltration rate as seen in **Figure IX**.

iii. *Water supply source, current demand, and current reliable supply. Identify any designated sole source aquifer or critical water supply areas located in the planning area, if applicable;*

The Oakland Water Department is the primary water supply source for the area of proposed work (**Figure X**). The public water supply is provided seven wells owned by the municipality which are sourced mainly by the Passaic bedrock aquifer. The Borough of Oakland sits atop the Ramapo Sole Source Aquifer (**Figure XI**) and is not situated within a critical water supply area.

iv. *Geology, topography and soils types and limitations with respect to the use of on-site systems or land application of effluent or residuals. Soil information shall be taken from the Natural Resources Conservation Service county soils maps and interpretations unless more accurate field evaluation of the specific project area is available;*

As previously stated, the elevation in Oakland ranges from approximately elevation 918 (NAVD 88) at the northwestern edge of the Borough to approximately elevation 262 (NAVD 88) along the banks of the Ramapo River. The elevation in the area of proposed work ranges from 264 (NAVD 88; at the intersection of Franklin Avenue and Ramapo Valley Road) to 506 (NAVD 88; on Hiawatha Boulevard between Iroquois Avenue and Ithaca Place). Additionally, portions of the proposed project are located within areas classified to have steep slopes by the New Jersey Highlands Council (**Figure VII**).

The majority of the bedrock underlying the project area is within the Feltville Formation with the northern portions stretching into areas underlain by Preakness Basalt (**Figure VIII**). The Feltville Formation is the second most prevalent bedrock type in Oakland (19%) and is characterized as a sedimentary layer mostly consisting of course-grained sandstone. The Preakness Basalt is the most prevalent bedrock type in Oakland (25%) and is characterized as being very fine grained and dense.

As indicated on the SSURGO Soil Survey Map of Bergen County (**Figure XII**). These soils are characterized as follows:

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

Component: Boonton (50%)

The Boonton component makes up 50 percent of the map unit. Slopes are 0 to 8 percent. This component is on ground moraines on till plains. The parent material consists of coarse-loamy basal till derived from basalt. Depth to a root restrictive layer, fragipan, is 20 to 36

inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Urban land, Boonton substratum (40%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Udorthents, Boonton substratum (10%)

Generated brief soil descriptions are created for major components. The Udorthents soil is a minor component.

Map Unit Setting

- *National map unit symbol:* 1kgys
- *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

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

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
- *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 capacity:* Low (about 4.4 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 2e
- *Hydrologic Soil Group:* C
- *Ecological site:* F144AY037MA - Moist Dense Till Uplands
- *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
- *Down-slope shape:* Convex
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

BouC—Boonton-Urban land complex, 8 to 15 percent slopes

Component: Boonton (50%)

The Boonton component makes up 50 percent of the map unit. Slopes are 8 to 15 percent. This component is on till plains, ground moraines. The parent material consists of coarse-loamy basal till derived from basalt. Depth to a root restrictive layer, fragipan, is 20 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Component: Urban land, Boonton substratum (40%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Udorthents, Boonton substratum (10%)

Generated brief soil descriptions are created for major components. The Udorthents soil is a minor component.

Map Unit Setting

- *National map unit symbol:* 1kgyv
- *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

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

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:* 8 to 15 percent
- *Depth to restrictive feature:* 20 to 36 inches to fragipan
- *Drainage class:* Well drained
- *Runoff class:* Medium
- *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 capacity:* Low (about 4.4 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3e
- *Hydrologic Soil Group:* C
- *Ecological site:* F144AY037MA - Moist Dense Till Uplands
- *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
- *Down-slope shape:* Convex
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

BouD—Boonton-Urban land complex, 15 to 25 percent slopes**Component:** Boonton (60%)

The Boonton component makes up 60 percent of the map unit. Slopes are 15 to 25 percent. This component is on ground moraines on till plains. The parent material consists of coarse-loamy basal till derived from basalt. Depth to a root restrictive layer, fragipan, is 20 to 36 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Component: Urban land, Boonton substratum (30%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Udorthents, Boonton substratum (10%)

Generated brief soil descriptions are created for major components. The Udorthents soil is a minor component.

Map Unit Setting

- *National map unit symbol:* 1kgyw
- *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

Description of Boonton

Setting

- *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
- *Parent material*: Coarse-loamy basal till derived from basalt

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*: 15 to 25 percent
- *Depth to restrictive feature*: 20 to 36 inches to fragipan
- *Drainage class*: Well drained
- *Runoff class*: High
- *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 capacity*: Low (about 4.4 inches)

Interpretive groups

- *Land capability classification (irrigated)*: None specified
- *Land capability classification (nonirrigated)*: 4e
- *Hydrologic Soil Group*: C
- *Ecological site*: F144AY037MA - Moist Dense Till Uplands
- *Hydric soil rating*: No

Description of Urban Land, Boonton Substratum

Setting

- *Landform*: Ground moraines
- *Landform position (two-dimensional)*: Summit, shoulder
- *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 (two-dimensional):* Summit, shoulder
- *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

DuuB—Dunellen-Urban land complex, 3 to 8 percent slopes

Component: Dunellen (60%)

The Dunellen component makes up 60 percent of the map unit. Slopes are 3 to 8 percent. This component is on outwash plains on outwash plains. The parent material consists of coarse-loamy outwash derived from sandstone. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Urban land, Dunellen substratum (30%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Udorthents, Dunellen substratum (10%)

Generated brief soil descriptions are created for major components. The Udorthents soil is a minor component.

Map Unit Setting

- *National map unit symbol:* b0rt
- *Elevation:* 50 to 150 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

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:* stratified gravelly sand to sand to loamy sand

Properties and qualities

- *Slope:* 3 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *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 capacity:* Moderate (about 7.7 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 2e
- *Hydrologic Soil Group:* A
- *Ecological site:* F144AY023CT - Well Drained Outwash
- *Hydric soil rating:* No

Description of Urban Land, Dunellen Substratum**Setting**

- *Landform:* Outwash plains
- *Landform position (three-dimensional):* Lower third of mountainflank
- *Down-slope shape:* Linear
- *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 31 inches:* sandy loam
- *2C - 31 to 42 inches:* sandy loam
- *3C - 42 to 70 inches:* loamy sand

Interpretive groups

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

Minor Components**Udorthents, dunellen substratum**

- *Percent of map unit:* 10 percent
- *Landform:* Outwash plains
- *Landform position (three-dimensional):* Lower third of mountainflank
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

DuuC—Dunellen-Urban land complex, 8 to 15 percent slopes

Component: Dunellen (60%)

The Dunellen component makes up 60 percent of the map unit. Slopes are 8 to 15 percent. This component is on outwash plains on outwash plains. The parent material consists of coarse-loamy outwash derived from sandstone. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Component: Urban land, Dunellen substratum (30%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Udorthents, Dunellen substratum (10%)

Generated brief soil descriptions are created for major components. The Udorthents soil is a minor component.

Map Unit Setting

- *National map unit symbol:* b0rv
- *Elevation:* 50 to 150 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

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:* stratified gravelly sand to sand to loamy sand

Properties and qualities

- *Slope:* 8 to 15 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Runoff class:* Medium
- *Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 6.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Moderate (about 7.7 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3e
- *Hydrologic Soil Group:* A
- *Ecological site:* F144AY023CT - Well Drained Outwash
- *Hydric soil rating:* No

Description of Urban Land, Dunellen Substratum

Setting

- *Landform:* Outwash plains
- *Landform position (three-dimensional):* Lower third of mountainflank
- *Down-slope shape:* Linear
- *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 31 inches:* sandy loam
- *2C - 31 to 42 inches:* sandy loam
- *3C - 42 to 70 inches:* loamy sand

Interpretive groups

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

Minor Components

Udorthents, dunellen substratum

- *Percent of map unit:* 10 percent
- *Landform:* Outwash plains
- *Landform position (three-dimensional):* Lower third of mountainflank
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

DuuD—Dunellen-Urban land complex, 15 to 25 percent slopes

Component: Dunellen (55%)

The Dunellen component makes up 55 percent of the map unit. Slopes are 15 to 25 percent. This component is on outwash plains on outwash plains. The parent material consists of coarse-loamy outwash derived from sandstone. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Component: Urban land (25%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Riverhead (5%)

Generated brief soil descriptions are created for major components. The Riverhead soil is a minor component.

Component: Birdsboro (5%)

Generated brief soil descriptions are created for major components. The Birdsboro soil is a minor component.

Component: Boonton, extremely stony (5%)

Generated brief soil descriptions are created for major components. The Boonton soil is a minor component.

Component: Udorthents, Dunellen substratum (5%)

Generated brief soil descriptions are created for major components. The Udorthents soil is a minor component.

Map Unit Setting

- *National map unit symbol:* b0rw
- *Elevation:* 50 to 1,200 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

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

- *A - 0 to 2 inches:* loam
- *Bt1 - 2 to 15 inches:* loam
- *Bt2 - 15 to 33 inches:* loam
- *2C - 33 to 66 inches:* stratified gravelly sand to sand to loamy sand

Properties and qualities

- *Slope:* 15 to 25 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Runoff class:* Low
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 6.00 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Moderate (about 7.1 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 4e
- *Hydrologic Soil Group:* A
- *Ecological site:* F144AY023CT - Well Drained Outwash
- *Hydric soil rating:* No

Description of Urban Land

Setting

- *Landform:* Outwash plains
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

- *C - 0 to 60 inches*: variable

Interpretive groups

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

Minor Components**Birdsboro**

- *Percent of map unit*: 5 percent
- *Landform*: Stream terraces
- *Landform position (two-dimensional)*: Backslope
- *Landform position (three-dimensional)*: Tread
- *Down-slope shape*: Linear
- *Across-slope shape*: Linear
- *Hydric soil rating*: No

Riverhead

- *Percent of map unit*: 5 percent
- *Landform*: Outwash fans
- *Landform position (three-dimensional)*: Base slope
- *Down-slope shape*: Linear
- *Across-slope shape*: Linear
- *Hydric soil rating*: No

Boonton, extremely stony

- *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, 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

HasB—Haledon-Urban land complex, 3 to 8 percent slopes**Component: Haledon (60%)**

The Haledon component makes up 60 percent of the map unit. Slopes are 3 to 8 percent. This component is on ground moraines on till plains. The parent material consists of coarse-loamy basal till derived from basalt. Depth to a root restrictive layer, fragipan, is 24 to 36 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 8 inches during January, February, March, April, May, December. Organic matter content in the surface horizon is about 81 percent. Below this thin organic horizon the organic matter content is about 3 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria.

Component: Urban land, Haledon substratum (30%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Udorthents, Haledon substratum (10%)

Generated brief soil descriptions are created for major components. The Udorthents soil is a minor component.

Map Unit Setting

- *National map unit symbol:* b0s0
- *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

- *Haledon and similar soils:* 60 percent
- *Urban land, haledon substratum:* 30 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Haledon

Setting

- *Landform:* Ground moraines
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Coarse-loamy basal till derived from basalt

Typical profile

- *Oe - 0 to 2 inches:* moderately decomposed plant material
- *Ap - 2 to 8 inches:* silt loam
- *Bt - 8 to 15 inches:* silt loam
- *Btg - 15 to 22 inches:* silt loam
- *2Bt1 - 22 to 27 inches:* loam
- *2Bt2 - 27 to 30 inches:* loam
- *BCtx - 30 to 60 inches:* gravelly fine sandy loam

Properties and qualities

- *Slope:* 3 to 8 percent
- *Depth to restrictive feature:* 24 to 36 inches to fragipan
- *Drainage class:* Somewhat poorly drained
- *Runoff class:* Medium
- *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:* About 7 to 18 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Low (about 5.2 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3w
- *Hydrologic Soil Group:* C
- *Ecological site:* F144AY037MA - Moist Dense Till Uplands
- *Hydric soil rating:* No

Description of Urban Land, Haledon Substratum

Setting

- *Landform:* Ground moraines
- *Landform position (three-dimensional):* Tread
- *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 30 inches:* silt loam
- *2CB - 30 to 60 inches:* gravelly fine sandy loam

Properties and qualities

- *Slope:* 0 to 3 percent
- *Runoff class:* Very high
- *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:* About 7 to 48 inches
- *Available water capacity:* Low (about 5.4 inches)

Interpretive groups

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

Minor Components

Udorthents, haledon substratum

- *Percent of map unit:* 10 percent
- *Landform:* Ground moraines
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Hydric soil rating:* No

UdktbB—Udorthents, loamy, 0 to 8 percent slopes, frequently flooded

Component: Udorthents, loamy fill substratum (85%)

The Udorthents, loamy fill substratum component makes up 85 percent of the map unit. Slopes are 0 to 8 percent. This component is on low hills on uplands, fills, cuts (road, railroad, etc.). The parent material consists of loamy material transported by human activity. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 72 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria.

Component: Loamy fill (10%)

Generated brief soil descriptions are created for major components. The Loamy fill soil is a minor component.

Component: Parsippany (5%)

Generated brief soil descriptions are created for major components. The Parsippany soil is a minor component.

Map Unit Setting

- *National map unit symbol:* 1kgz2
- *Elevation:* 0 to 870 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

- *Udorthents, loamy fill substratum, and similar soils:* 85 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Udorthents, Loamy Fill Substratum**Setting**

- *Landform:* Low hills
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Loamy material transported by human activity

Typical profile

- *A - 0 to 12 inches:* loam
- *C - 12 to 60 inches:* silty clay

Properties and qualities

- *Slope:* 0 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Well drained
- *Runoff class:* Medium
- *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:* About 48 to 122 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Moderate (about 8.4 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3w
- *Hydrologic Soil Group:* D
- *Hydric soil rating:* No

Minor Components**Loamy fill**

- *Percent of map unit:* 10 percent
- *Landform:* Flats
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

Parsippany

- *Percent of map unit:* 5 percent
- *Landform:* Outwash plains
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* Yes

UdwuB—Udorthents, wet substratum-Urban land complex

Component: Udorthents, wet substratum (68%)

The Udorthents, wet substratum component makes up 68 percent of the map unit. Slopes are 0 to 8 percent. This component is on fills, flats on uplands. The parent material consists of loamy lateral spread deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during January, February, March, April. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria.

Component: Urban land (30%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Pawcatuck, very frequently flooded (1%)

Generated brief soil descriptions are created for major components. The Pawcatuck soil is a minor component.

Component: Transquaking, very frequently flooded (1%)

Generated brief soil descriptions are created for major components. The Transquaking soil is a minor component.

Map Unit Setting

- *National map unit symbol:* 1kgz3
- *Elevation:* 0 to 570 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

Description of Udorthents, Wet Substratum

Setting

- *Landform:* Flats
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Loamy lateral spread deposits

Typical profile

- *A - 0 to 36 inches:* sand
- *2O - 36 to 60 inches:* muck

Properties and qualities

- *Slope:* 0 to 8 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Moderately well drained
- *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:* About 18 to 42 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3w
- *Hydrologic Soil Group:* D
- *Hydric soil rating:* No

Description of Urban Land

Setting

- *Landform*: Tidal marshes
- *Down-slope shape*: Linear
- *Across-slope shape*: Linear
- *Parent material*: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

- *C - 0 to 60 inches*: variable

Interpretive groups

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

Minor Components

Pawcatuck, very frequently flooded

- *Percent of map unit*: 1 percent
- *Landform*: Tidal marshes
- *Landform position (three-dimensional)*: Talf
- *Down-slope shape*: Linear
- *Across-slope shape*: Linear
- *Hydric soil rating*: Yes

Transquaking, very frequently flooded

- *Percent of map unit*: 1 percent
- *Landform*: Tidal marshes
- *Landform position (three-dimensional)*: Talf
- *Down-slope shape*: Linear
- *Across-slope shape*: Linear
- *Hydric soil rating*: Yes

UR—Urban land

Component: Urban land (95%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Udorthents (5%)

Generated brief soil descriptions are created for major components. The Udorthents soil is a minor component.

Map Unit Setting

- *National map unit symbol*: b0ss
- *Elevation*: 0 to 170 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

Description of Urban Land

Setting

- *Parent material*: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Interpretive groups

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

Minor Components

Udorthents

- *Percent of map unit:* 5 percent
- *Landform:* Low hills
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Hydric soil rating:* No

These soils range in sewage disposal rating from very limited to not limited as seen in **Table 4** below and in **Figure XIII**.

Table 4. Sewage Disposal Rating Summary by Map Unit

| Map unit symbol | Map unit name | Rating | Component name (percent) | Rating reasons (numeric values) |
|-----------------|--|------------------|---|---|
| BouB | Boonton-Urban land complex, 0 to 8 percent slopes | Very limited | Boonton (50%) | Restrictive horizon (1.00) |
| | | | | Restrictive substratum (1.00) |
| BouC | Boonton-Urban land complex, 8 to 15 percent slopes | Very limited | Boonton (50%) | Restrictive horizon (1.00) |
| | | | | Restrictive substratum (1.00) |
| BouD | Boonton-Urban land complex, 15 to 25 percent slopes | Very limited | Boonton (60%) | Restrictive horizon (1.00) |
| | | | | Restrictive substratum (1.00) |
| DuuB | Dunellen-Urban land complex, 3 to 8 percent slopes | Not limited | Dunellen (60%) | |
| | | | Udorthents, Dunellen substratum (10%) | |
| DuuC | Dunellen-Urban land complex, 8 to 15 percent slopes | Not limited | Dunellen (60%) | |
| | | | Udorthents, Dunellen substratum (10%) | |
| DuuD | Dunellen-Urban land complex, 15 to 25 percent slopes | Not limited | Dunellen (55%) | |
| | | | Udorthents, Dunellen substratum (5%) | |
| HasB | Haledon-Urban land complex, 3 to 8 percent slopes | Very limited | Haledon (60%) | Depth to apparent zone of saturation (1.00) |
| | | | | Restrictive horizon (1.00) |
| | | | | Restrictive substratum (1.00) |
| | | | Udorthents, Haledon substratum (10%) | Depth to apparent zone of saturation (1.00) |
| Udktb | Udorthents, loamy, 0 to 8 percent slopes, frequently flooded | Not limited | Udorthents, loamy fill substratum (85%) | |
| | | | Loamy fill (10%) | |
| UdwuB | Udorthents, wet substratum-Urban land complex | Somewhat limited | Udorthents, wet substratum (68%) | Depth to apparent zone of saturation (0.84) |
| UR | Urban land | Not rated | Urban land (95%) | |

- v. *Regional air quality and comparison to New Jersey Air Quality Standards established pursuant to N.J.S.A. 26:2C-1 et seq. Address conformance with the State Implementation Plan for air quality (prepared pursuant to the Federal Clean Air Act, 42 U.S.C. §§ 7401 et seq.);*

The New Jersey Air Quality Standards (N.J.S.A. 26:2C-1) established pursuant to the Air Pollution Control Act (1954) are as presented in **Table 5** below. The nearest monitoring stations for the 10 parameters issued in the standards are located in the Borough of Fort Lee, the City of Newark, and the City of Elizabeth. These results are not representative of the Borough as they are from densely populated and heavily developed areas.

Table 5. Air Contaminant Thresholds Outlined in N.J.S.A. 26:2C-1

| Air Contaminant | Threshold Level (tons per year) |
|------------------------------|------------------------------------|
| Carbon Monoxide | 100 |
| Particulate Matter (PM-10) | 100 |
| Total Suspended Particulates | 100 |
| Sulfur Dioxide | 100 |
| Oxides of Nitrogen | 25 |
| VOC | 25 |
| Lead | 10 |
| Any HAP | 10 |
| All HAPs collectively | 25 |
| Any other air contamination | 100 |

There are four (4) Air Quality Permitted Facilities within the immediate vicinity of the proposed project area as seen in **Figure XIV**. However, the project will have no impact on these facilities.

- vi. *A general description of plant and animal communities existing in the planning area and a map of habitat types in the project's direct impact area;*

The activities associated with the proposed sanitary sewer improvements will occur within urban areas, along existing roadways, and will have no significant impact on the existing plant and animal communities in the surrounding area. Portions of the proposed project lie within Rank 1 habitats which contain species that have habitat specific requirements and is at times bordered by Rank 2 and 4 habitats (**Figure XV**).

- vii. *Existing land use and zoned use permitted for undeveloped areas in the planning area;*

The proposed project is located within a developed portion of the Borough, which is zoned for multifamily residences, local businesses, and single-family residences (**Figure XVI**). Additionally, the proposed force mains will pass through areas largely classified as urban with small segments passing through forested areas as identified by the 2015 NJDEP Land Use/Land Cover data (**Figure XVII**).

viii. *Environmentally critical areas within the planning area, including, but not limited to, wetlands, vernal habitats, floodplains, important farmlands, Agricultural Development Areas, important aquifer recharge areas, coastal areas, stream corridors, parks and preserves, steep slopes, and locations of endangered or threatened species or designated habitats; and*

The proposed project location is not located within but is in the vicinity of a designated Critical Environmental Site (CES) and a designated Historic and Cultural Site (HCS) (**Figure XVIII**) under the New Jersey State Plan. Additionally, the following environmental constraints are present within or within the vicinity of the proposed project:

Wetlands and Vernal Habitats

The project is in the vicinity of but not located within any wetland areas (**Figure XIX**). However, the project is not located in or within the vicinity of a vernal habitat area or potential vernal habitat area (**Figure XX**).

Floodplains

A portion of the project transects a small span of the 100-year floodplain along Pond Brook. The 100-year and 500-year floodplain boundaries have been included in **Figure XXI**.

Important Farmlands and Agricultural Development Areas

The Borough of Oakland does not contain any designated important farmlands or Agricultural Development Areas.

Important Aquifer Recharge Areas

The proposed project is located largely within areas designated under Groundwater Recharge Rank B (12 to 17 inches of recharge per year) with portions within Rank E (0 inches of recharge per year) as shown in **Figure XXII**. The proposed project will take place beneath existing roadways and therefore will not impact groundwater recharge within the region.

Coastal Areas

Non-applicable. The Borough of Oakland is not located within the coastal region of the State.

Stream Corridors

The proposed improvements will be jacked below and placed over culverts along

Pond Brook and an Unnamed Tributary of Pond Brook. These watercourses are both classified as FW2-NT as defined by the NJDEP surface water quality standards but are not classified as watercourses with fishery resources (**Figure XXIII**).

FW2 waters are Class 2 Freshwaters that do not originate entirely within Federal or State Parks, Forests, Fish and Wildlife Lands, or other special holdings that are to be maintained in their natural state of quality and are subject to man-made waste water discharge as designated in N.J.A.C. 7:9-4.15.

The NT designation indicates that the waters are non-trout freshwaters and have not been designated for trout production or trout maintenance. The waters are generally not suitable for trout because of their physical, chemical, or biological characteristics, which are suitable for a variety of other fish.

Parks and Preserves

Non-applicable. The proposed project is not located in the vicinity of any parks or preserves as depicted in **Figure XXIV**.

Steep Slopes

Portions of the proposed project are located within areas classified to have steep slopes by the New Jersey Highlands Council (**Figure VII**). However, runoff and erosion will not be increased by the proposed improvements as they will be placed below existing paved surfaces.

Threatened and Endangered Species and Designated Habitats

Figure XV depicts the areas with potential to support threatened/endangered species. The proposed activities are not located within an area designated for threatened or endangered species. Therefore, no rare plants, wildlife species, or their associated habitats will be affected during the project.

- ix. *Areas subject to the jurisdiction of the Pinelands Commission, the Coastal Area Facility Review Act, the New Jersey Meadowlands Commission, the Delaware and Raritan Basin Commission, the Delaware and Raritan Canal Commission, or the New Jersey Highlands Water Protection and Planning Council.*

The Borough of Oakland falls within both the Highlands Planning and Preservation Areas (**Figure XXV**) and is therefore subject to the jurisdiction of the New Jersey Highlands Water Protection and Planning Council. The area of proposed work lies solely within the limits of the Highlands Planning Area to the east of the Ramapo River.

4. *The purpose and need for the project in terms of surface water or groundwater pollution or depletion, drinking water quality or public health problems to be addressed by the project;*

The proposed project is needed to maintain the integrity of both surface water and groundwater within the region. If failure of the system continues it will result in prolonged discharge and leaking of wastewater into the groundwater and surface water resources in the service area.

5. *A description of the future environment without the proposed project (that is, no action);*

During 2016-2017, Boswell Engineering performed an assessment of the three (3) Borough owned WWTPs (Oakwood Knolls, Chapel Hill, and Skyview-Hibrook) within the above-described SSA and concluded that they were at the end of their useful life, which makes any repair efforts not feasible. If no action is taken the system will fail and result in further environmental and public health hazards.

6. *A description and map of existing environmental infrastructure facilities, their service areas and population served; the design and permitted capacity; treatment type and level; current wastewater or stormwater flow or water supply demand by type (residential, commercial, industrial) and, for wastewater treatment facilities, infiltration and inflow.*

The project involves the three (3) Borough owned WWTPs, as seen on the attached maps. Within the Sewer Service Area (SSA) there is also a WWTP owned by the Oakland Board of Education which is not involved in the proposed project (**Figure XXVI**). These WWTPs are summarized in **Table 6** below.

Table 6. Location of WWTPs Within the Sewer Service Area

| Owner | WWTP Name | Geographical Coordinates | |
|----------------------------|--------------------------|--------------------------|-----------|
| | | North | West |
| Borough of Oakland | Oakwood Knolls | 41.023542 | 74.240001 |
| | Chapel Hill | 41.036746 | 74.226775 |
| | Skyview-Hibrook | 41.031410 | 74.215851 |
| Oakland Board of Education | Indian Hills High School | 41.022430 | 74.231325 |

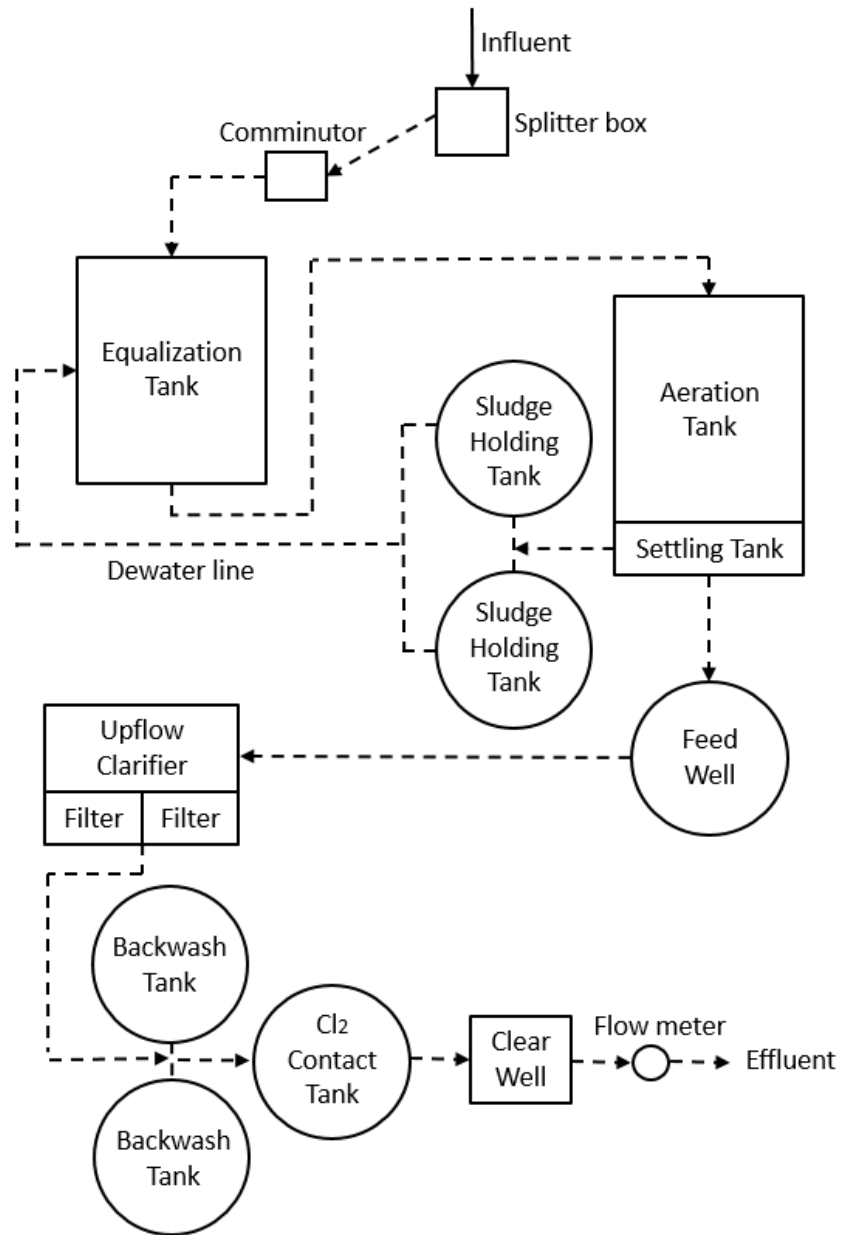
The three (3) WWTPs to be decommissioned as part of this project serve 221 residential and commercial units (domestic wastewater), namely Oakwood Knolls (123 units), Chapel Hill (23 units), and Skyview-Hibrook (75 units). Each of these WWTPs are categorized as C1 under N.J.A.C. 7:10A-1.14.

Table 7 and the subsequent diagrams compile information on the various facility components of the three (3) Borough owned WWTPs to be decommissioned and dismantled.

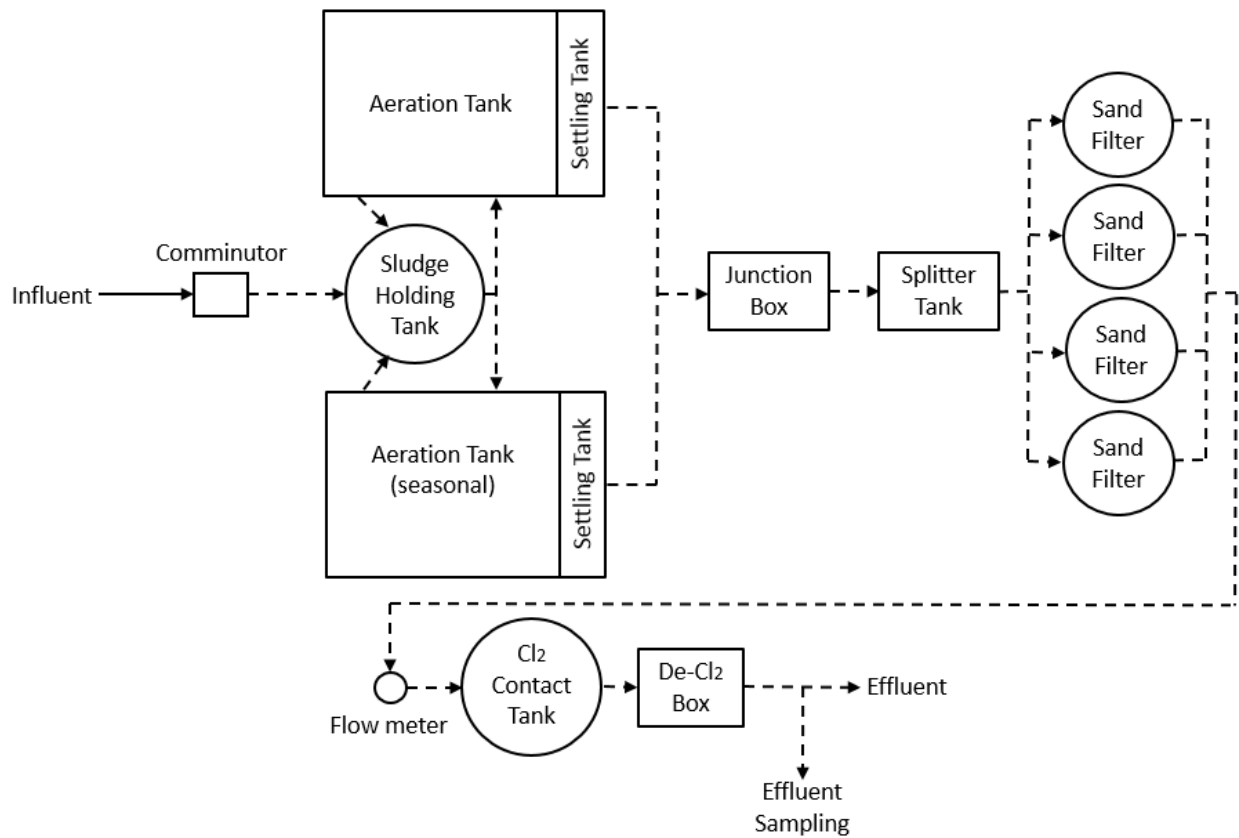
Table 7. Summary of the Borough Owned WWTPs Components and Current Conditions

| WWTP Facility | Approximate Year Built | Treatment Level | NJPDES Permit # | WWTP Components and Unit Processes & Operations | Facility Current Conditions |
|----------------------|-------------------------------|------------------------|------------------------|---|---|
| Oakwood Knolls | 1967 | S2 | NJ0027774 | <ul style="list-style-type: none"> • Influent splitter box. • Influent comminutor. • An equalization tank. • An aeration and settling tank. • A feed well. • An upflow clarifier. • A filter tank. • Two (2) backwash tanks. • A chlorine contact tank. • A denitrification well. • A flow meter. • An outfall sewer. • Two (2) sludge holding tanks. | <p>Based on the findings of the conducted field survey, it was determined that the facility is in poor condition.</p> <p>Action recommended: Decommission.</p> <p>Power: 240 V (no backup generator onsite).</p> <p>Influent pipe diam.: 8 inches</p> |
| Chapel Hill | 1986 | S2 | NJ0053112 | <ul style="list-style-type: none"> • Influent bar screen and comminutor. • An aeration and settling tank. • A feed well. • An upflow clarifier. • A flocculation tank. • Tube filters. • Two (2) media filters. • A clear well. • UV disinfection system. • A flow meter. • An outflow sewer. • A waste sludge storage tank. • A media filter backwash mud well. • A 30-kw backup generator. • Diesel fuel storage tank. | <p>Based on the findings of the conducted field survey, it was determined that the facility is in poor condition.</p> <p>Action recommended: Decommission.</p> <p>Power: 208 V (backup generator onsite (3 Phase 120/208V. Installed in 1984). To be decommissioned.</p> <p>Influent pipe diam.: 8 inches</p> |
| Skyview–Hibrook | 1968 | S2 | NJ0021342 | <ul style="list-style-type: none"> • Influent comminutor. • Two (2) aeration and settling tanks. • A junction and splitter box. • Four (4) sand filters. • A flow meter. • A chlorine tank. • A dechlorination chamber. • An outfall sewer. • Blower building. • A sludge storage tank. • A chlorination building. • Backup generator (29kW, 3 Phase, 120/240V). Installed in 2019. | <p>Based on the findings of the conducted field survey, it was determined that the facility is in poor condition.</p> <p>Action recommended: Decommission.</p> <p>Power: 208 V (backup generator onsite).</p> <p>Influent pipe diam.: 6 inches</p> |

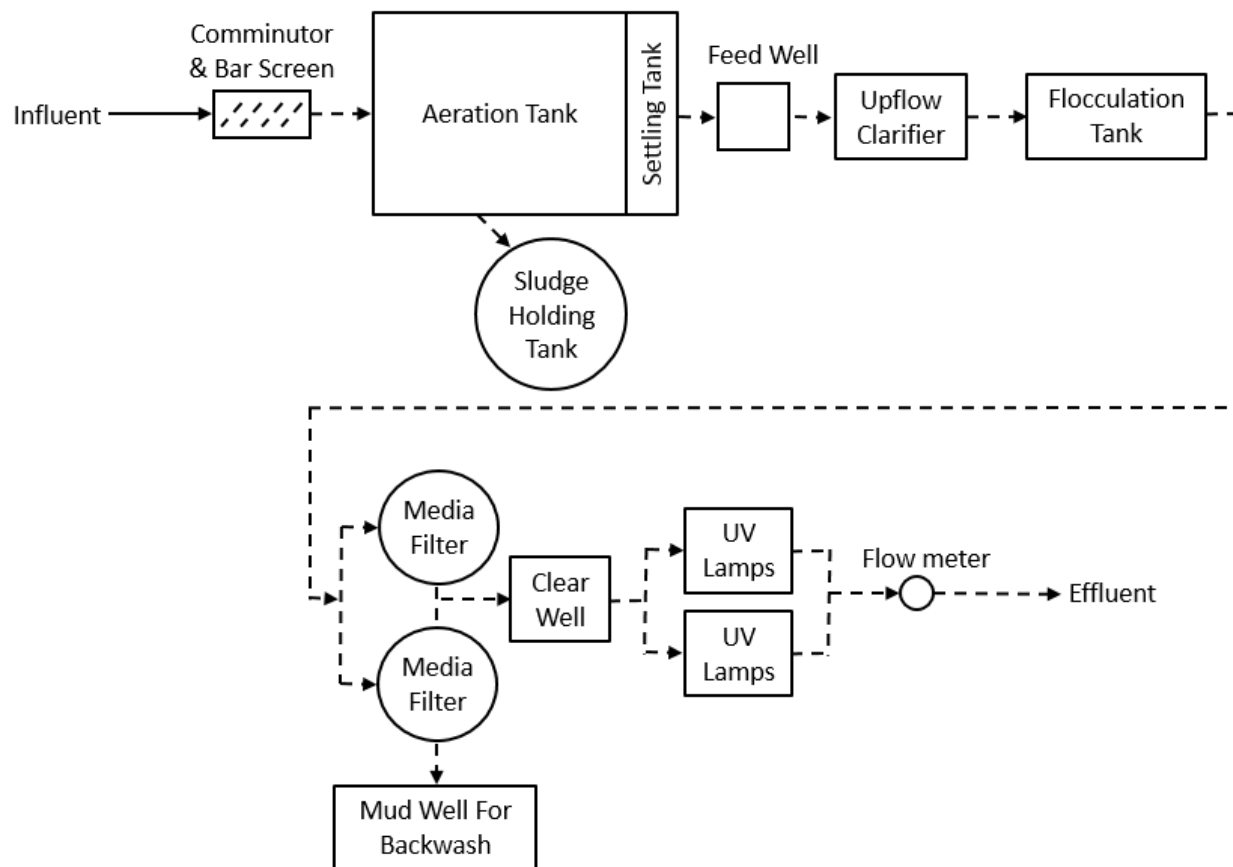
Oakwood Knolls WWTP Unit Processes and Operations Flow Chart



Skyview-Hibrook WWTP Unit Processes and Operations Flow Chart



Chapel Hill WWTP Unit Processes and Operations Flow Chart



The system classifications of the WWTPs were calculated based on the guidelines outlined in N.J.A.C. 7:10A-1.14 (b)1 and (c)1 as displayed in **Table 8** below. As per these standards the system classes are as follows: systems classified as S1 have 30 or fewer points, systems classified as S2 are within the range of 31 to 55 points, systems classified as S3 are within the range of 56-75 points, and systems classified as S4 have 76 or more points. Under these parameters the three Borough owned WWTPs are all classified as S2 systems.

Table 8. Borough Owned WWTPs Registered and Permitted Flows

| Category | Item | Points | | |
|-------------------------------|--|----------------|--------------|-----------------|
| | | Oakwood Knolls | Chapel Hill | Skyview-Hibrook |
| Design Flow | 2 Points Per MGD | 0.07 | 0.02 | 0.046 |
| Effluent Discharge | Surface Water Discharge | 2 | 2 | 2 |
| Variations in Raw Waste | Variations Do Not Exceed Those Normally or Typically Expected | 0 | 0 | 0 |
| Pretreatment | Screening, Comminution, Grinder | 3 | 3 | 3 |
| | Equalization | 3 | | |
| Primary Treatment | Primary Clarifiers | 5 | 5 | 5 |
| | Combination Sedimentation/Digestion | 5 | 5 | 5 |
| | Chemical Addition (except chlorination, enzymes, etc.) | | 4 | |
| Secondary Treatment | Activated Sludge with Secondary Clarifiers (including extended aeration and oxidation ditches) | 20 | 20 | 20 |
| Advanced Wastewater Treatment | Sand Filters | | 5 | 5 |
| Disinfection | Chlorination or Comparable Treatment | 6 | 6 | 6 |
| Total: | | 44.07 | 50.02 | 46.046 |

The average wastewater flow of each of the three (3) WWTPs is represented in **Table 9** which shows both the average (2012 through 2018) and the permitted flows. The three (3) WWTPs are subject to both infiltration and inflow (I/I) as a result of system deterioration.

Table 9. Borough Owned WWTPs Registered and Permitted Flows

| WWTP Name | Reported Average Flow 2012 through 2018 (MGD) | Permitted Flow (MGD) | Mov. Avg. Flow as a percentage of the Permitted Flow |
|-----------------|---|----------------------|--|
| Oakwood Knolls | 0.020790 | 0.035 | 59.4% |
| Chapel Hill | 0.006283 | 0.010 | 62.8% |
| Skyview-Hibrook | 0.014460 | 0.023 | 62.9% |
| Total | 0.041533 | 0.068 | |

The 2012-2017 average flows reported for each of the three (3) WWTPs were updated with the 2018 flow data available (**Table 10**). The estimated 2012-2018 flow data for Oakwood Knolls, Chapel Hill, and Skyview-Hibrook are, respectively, 0.021 MGD, 0.006 MGD, and 0.014 MGD.

Table 10. Borough Owned WWTPs 2018 Flow Data

| Year | Month | Monthly Average Flow (MGD) | | |
|--------------------|-------|----------------------------|-----------------|-----------------|
| | | Chapel Hill | Skyview-Hibrook | Oakwood Knolls |
| 2018 | Jan | 0.006900 | 0.01539 | 0.02313 |
| | Feb | 0.006857 | 0.01509 | 0.02228 |
| | Mar | 0.006871 | 0.01600 | 0.02265 |
| | Apr | 0.006900 | 0.01580 | 0.02290 |
| | May | 0.006897 | 0.01552 | 0.02342 |
| | Jun | 0.006237 | 0.00727 | 0.01788 |
| | Jul | 0.005858 | 0.01151 | 0.00962 |
| | Aug | 0.005397 | 0.01180 | 0.01079 |
| | Sep | 0.004837 | 0.01190 | 0.00985 |
| | Oct | 0.003768 | 0.01157 | 0.01337 |
| | Nov | 0.006613 | 0.01127 | 0.02262 |
| | Dec | 0.005658 | 0.00664 | 0.02744 |
| Annual Avg: | | 0.006066 | 0.012478 | 0.018829 |

7. *For wastewater treatment and water supply projects, where new or expanded facilities are involved in the scope of the project, an environmental constraints analysis shall be prepared according to (b)7i and ii below, unless specifically exempted by the Department. A project shall be exempted from the requirement to complete an environmental constraints analysis if the Department determines that the proposed project will not enable development in environmentally constrained areas.*

i. *Overlay mapping of environmentally constrained areas, which include wetlands, vernal habitats, floodplains, endangered species sites or designated habitats, parks and preserves, and Agricultural Development Areas, in the planning area with mapping of existing land use and permitted zoning for currently undeveloped areas. Areas not yet developed which are not environmentally constrained are considered developable. Environmentally constrained, developed, and developable areas shall be clearly depicted on the mapping to be submitted.*

Environmentally constrained areas are outlined above in section 7:22-10.5 (b)3-viii. An overlay map of environmental constraints is presented in **Figure XXVII**.

ii. *Identify existing population and current wastewater flow or water supply demand by source. Determine the extent of development which could occur according to permitted zoning in developable areas. This should be represented as a number of dwelling units and population for residential areas and area coverage for commercial and industrial*

areas. Information regarding existing wastewater flows and flow projections must be calculated in accordance with N.J.A.C. 7:14A-23.3 and 7:15-5.18. Current and projected water supply demand shall be calculated in accordance with N.J.A.C. 7:10-11 or 7:10-12, as applicable. These figures must be presented in a table and used in calculating the maximum wastewater flow or water supply demand projections that may be considered in planning environmental infrastructure facilities. All assumptions used in calculating wastewater flow or water supply demand from units and coverage must be explained.

Utilizing the data provided in **Table 9** in section 7:22-10.5 (b)6 above the estimation of the peaking factors was performed by means of the Federov equation (below) given that the WWTPs average wastewater flows were available. The flow values in **Table 9** were converted into liters per second (L/s) (1MGD = 43.81 L/s) in order to apply the Federov equation.

$$\text{Peaking Factor (PF)} = \frac{2.69}{Q^{0.121}} \quad (Q \text{ is the average flow in L/s})$$

Table 5 compiles the different peaking factors and peak design flows obtained. A peaking factor of three (3) was selected for the estimation of the peak design flow for each of the pumping stations. The selected peaking factor is in agreement with the value recommended by both the NJAC, Subchapter 23, 7:14A-23.10 Wastewater pumping stations and the NJAC–Department of Community Affairs.

Table 11. Peaking Factors and Peak Design Flows

| WWTP Name | Estimated Peaking Factor For Average Flow | | Peak Design Flow with a PF = 3.0 | |
|--|--|--------------|----------------------------------|--------------|
| | | | MGD | gpm |
| Oakwood Knolls | 2.7 | | 0.062370 | 43.31 |
| Chapel Hill | 3.1 | | 0.018849 | 13.09 |
| Skyview– Hibrook | 2.8 | | 0.043380(*) | 30.12(*) |
| PF Avg. | 2.9 | Total | 0.825 | 86.52 |
| (Note: <i>Peak Design Flow</i> = PF*Average Daily Flow. 1MGD = 694.44 gpm). (*) Skyview-Hibrook design flow will also include the flow from Chapel Hill for a total of 0.062229 MGD or 43.21 gpm (the newly proposed Lakeside Blvd pumping station will handle Chapel Hill and Skyview-Hibrook flows). The estimated PF for the combined flow is 3.03. | | | | |

8. *A description of the alternatives considered, including the no action alternative;*

The proposed activities will include the decommissioning of three (3) existing WWTPs (Oakwood Knolls, Chapel Hill, and Skyview-Hibrook) and replacing them with pumping stations to redirect wastewater to the NBCUA WWTP.

The three (3) existing facilities have been inspected and it has been concluded that they are at the end of their useful life, which makes repair efforts not feasible. Therefore, the alternative to the proposed plan would require the reconstruction of the existing WWTPs

to restore compliance with the NJPDES permits issued to the Borough.

The No-Build alternative would allow the Borough's sanitary facilities to continue to deteriorate. The adverse public and environmental effects of this alternative include continued failure of the system leading to prolonged discharge and leaking of wastewater into the groundwater and surface water resources.

9. *A cost comparison of alternatives, including capital costs, operation and maintenance costs, user cost and total project cost on a present worth basis;*

Replacement of the existing facilities would entail the following costs:

Table 12. Capital Cost of WWTP Replacement

| Item | Construction* |
|--|--------------------|
| Sky View – HiBrook | \$765,000 |
| Chapel Hill | \$1,200,000 |
| Oakwood Knolls | \$1,355,000 |
| Total Manufacturer's Cost: | \$3,320,000 |
| Contingency (15%) | \$500,000 |
| Engineering/Inspection (15%) | \$664,000 |
| Total: | \$4,484,000 |
| *Includes demolition of existing, furnishing, and installing new equipment | |

Table 13. Annual Operating and Maintenance Cost of WWTP Replacement

| Operating Costs | 3 Year Average Costs |
|-------------------------------------|----------------------|
| Maintenance (3 sites) | \$56,540 |
| Purchased Services Testing | \$46,975 |
| Contracted Services/Operator/Salary | \$178,042 |
| Supplies | \$25,212 |
| Capital & Debt Service | \$51,439 |
| Fees, Permits, Penalties | \$40,084 |
| Utilities | \$34,949 |
| Insurance | \$21,508 |
| Misc. (Water, Equip., etc.) | \$26,096 |
| Total Cost: | \$480,845 |

Decommissioning WWTPs and rerouting wastewater flow to NBCUA WWTP would entail the following costs:

Table 15. Capital Cost of Decommissioning Treatment Plants

| Item | Construction* |
|--|--------------------|
| Total Cost: | \$3,800,000 |
| Contingency (5%) | \$190,000 |
| Engineering/Inspection | \$680,000 |
| Other – Connection Fee | \$820,000 |
| Total: | \$5,490,000 |
| *Includes demolition of existing, furnishing, and installing new equipment | |

Table 17. User Cost

| Item | Cost |
|----------|---------|
| Proposed | \$1,758 |
| Existing | \$1,758 |

10. *A description of the environmental impacts for each alternative including beneficial and adverse direct, indirect (or secondary impacts) and cumulative effects with other projects. Include an assessment of such impacts associated with each alternative on the following:*
- i. Surface water and groundwater quality and quantity and hydrology (including new or increased depletive uses of water resources and, where new development is projected, increased nonpoint source pollution);*
 - ii. Plant and animal communities or other natural resources. Quantify by type the extent of such resources anticipated to be disturbed as a result of project construction;*
 - iii. Environmentally critical areas, as identified in (b)3viii above. Quantify by type the extent of such resources anticipated to be disturbed as a result of project construction;*
 - iv. Air quality, especially with respect to consistency with the New Jersey State Implementation Plan prepared pursuant to the Federal Clean Air Act, 42 U.S.C. §§ 7401 et seq., and the New Jersey Air Pollution Control Act, N.J.S.A. 26:2C-1 et seq.;*
 - v. Social and economic factors including, but not limited to, dust, noise, odors, nuisances, traffic or hazards; and*
 - vi. Where significant increases in wastewater treatment or water supply capacity will be provided, effects of induced growth on the environment and social infrastructure.*

Both alternatives will occur along existing roadways and therefore shall minimize impacts to plant and animal communities and environmentally critical areas. Additionally, both plans will have significant beneficial impacts on surface water and groundwater quality.

Either alternative may cause short-term noise impacts and traffic disruption during construction. Generators, gas powered equipment, backhoes, bucket loaders and dump trucks may temporarily increase noise levels in the project area to 80 or 90 decibels (dba). All necessary precautions will be taken by the Borough of Oakland to ensure public safety and minimize traffic disruptions during the time of construction. A Maintenance and Protection of Traffic (MPT) plan will be specifically designed for during the water system improvements.

The minor temporary disturbances created during the implementation of the improvements are insignificant compared to the resulting public benefit. Implementation of the improvements will ensure proper conveyance and treatment of wastewater.

All work will be performed in accordance with the New Jersey Standards for Soil Erosion and Sediment Control and approved soil erosion and sediment control practices will be followed during all construction activities. To minimize any potential long-term impacts, the project's contract and specifications will require that all material removed from the project area will be disposed of lawfully upon completion of the job.

Additionally, the sanitary sewer improvements will have no effect on any prehistoric or historic districts, sites, buildings, structures, or objects. The NJDEP Historic Preservation Office identifies several historic features within the Borough of Oakland, which can be found in **Figure XXVII** and **Appendix A**. As previously mentioned, the proposed improvements occur in-place and will not disturb or alter the aesthetic value, integrity or character of these documented historic resources.

11. A description of the selected plan. For wastewater treatment, water supply and stormwater management facilities permitted as a municipal separate storm sewer system, the selected plan must be the most economical, environmentally sound and implementable alternative which addresses the identified water quality or water supply need (for other environmental infrastructure facilities, the provisions with respect to cost effectiveness are not applicable). Include, where applicable, the following:

- i. Environmental infrastructure facility treatment processes, treatment level, design flow (as included in the NJPDES permit, water supply allocation or other permit and on an annual average basis), capacity of units, effluent quality, discharge or water supply withdrawal location and receiving water body or treatment system. Include a site plan of the construction area. Design wastewater flow or water supply demand shall be broken down into residential, commercial and industrial, and for wastewater treatment facilities, infiltration/inflow components;*

The proposed project will entail the decommissioning of the three (3) WWTPs and replacing them with pumping stations so their corresponding wastewater flows are conveyed to a manhole located on Franklin Avenue. From that manhole, wastewater gravity flows to the Northwest Bergen County Utilities Authority (NBCUA) Pumping Station and is finally conveyed to the NBCUA WWTP located at 30 Wyckoff Avenue, Waldwick, NJ.

The project also encompasses the decommissioning and demolition of both Hibrook and Skyview Pumping Stations which currently pump to Skyview-Hibrook WWTP. Their flow will be redirected to the proposed gravity pipe that will run along Monhegan Ave, Ramapo Hills Blvd, and Lakeside Blvd to finally discharge into the proposed Lakeside Pumping Station. The three (3) newly proposed pumping stations are: Oakwood Knolls (conveying flow from Oakwood Knolls WWTP), Chapel Hill (conveying flow from Chapel Hill WWTP), and Lakeside (conveying flow from Chapel Hill and Skyview-Hibrook WWTPs).

The characteristics of each of the proposed pumping stations are given in the following sub-sections.

Oakwood Knolls pumping station

Pumping Station Location Description

The proposed pumping station is located at 101 East Oak Street, Oakland, NJ 07436. The property, owned by the Borough of Oakland (New Jersey), is identified with Tax Parcel ID #02-42-3903-89 (County-District-Block Number-Lot Number). According to the FEMA Flood Map #34003C0063H (effective 28 Aug 2019), the property is within an area of minimal flood hazard (Zone X).

Pumping Station Characteristics

The packaged pumping station will be a 6-ft internal diameter chamber, with their corresponding vent, hatches, ladders for access, floor-mounted adjustable pipe supports (in valve vault), pump lifting chain and guiderail, and other components. The wet well volume between the pump-on and pump-off switches is 69.6 gallons. The pump will operate at a duty point of 46.4 gpm. For the average flow of 14.44 gpm, the hydraulic detention time (HDT) will be 4.82 min. The area surrounding pumping station should be graded to direct storm runoff away from the structure.

The two 8-inch wastewater inflow pipes will remain as well as the 8-inch pipe that currently conveys the two inflows into the existing WWTP. One of the existing 8-inch pipes that currently goes into the existing manhole will be intercepted by a new proposed doghouse manhole. The rest of this existing pipe will be the existing manhole new outlet, and the old outlet will be grouted. The other two inflow pipes will remain. The proposed location for the pumping station was selected so as to avoid interference among the decommissioning, construction, and connection activities. The pumping station inlet pipe from the new manhole will be through 5 ft of 8-inch PVC pipe Schedule 80. The outlet pipe from the pumping station is a 3-inch PVC pipe Schedule 80. The proposed connection is between the existing pipes that convey the wastewater flow into the existing manhole and the pumping station. A 16-kW gas generator will be installed.

Chapel Hill pumping station

Pumping Station Location Description

The proposed fiber glass pumping station is located at 145 Hiawatha Blvd, Oakland, NJ 07436. The property, owned by the Borough of Oakland (New Jersey), is identified with Tax Parcel ID #02-42-5204-25 (County-District-Block Number-Lot Number). According to the FEMA Flood Map #34003C0061H (effective 28 Aug 2019), the property is within an area of minimal flood hazard (Zone X).

Pumping Station Characteristics

The packaged fiber glass pumping station will be a 6-ft internal diameter chamber, with their corresponding vent, hatches, ladders for access, floor-mounted adjustable pipe supports (in valve vault), pump lifting chain and guiderail, and other components. The wet well volume between pump-on and pump-off switch is 34.6 gallon. The pump will operate at a duty point of 27.7 gpm. For the average flow of 4.4 gpm, the hydraulic detention time (HDT) will be 7.94 min. The area surrounding pump station should be graded to direct storm runoff away from the structure.

The proposed location for the pumping station was selected so as to avoid interference among the decommissioning, construction, and connection activities. The pumping station inlet pipe (from new manhole) is an 8-inch PVC pipe Schedule 80. The pumps operating characteristics are presented in the specifications. The outlet pipe from the pumping station is a 2-inch PVC pipe Schedule 80. The proposed connection is between the existing pipe that conveys the wastewater flow from the existing manhole on Mountain Lakes Rd and the pumping station. A 17-kW gas generator will be installed.

Lakeside Blvd pumping station

Pumping Station Location Description

The proposed pumping station is located at 115 Lakeside Blvd, Oakland, NJ 07436. The property, owned by CRYSTAL LK FRST, PK CLB C/O J.HUBER (as of Jan 10, 2019), is identified with Tax Parcel ID #02-42-5002-38 (County-District-Block Number-Lot Number), with a total area of 0.675 acres. According to the FEMA Flood Map #34003C0064H (effective 28 Aug 2019), the property is within an area of minimal flood hazard (Zone X).

Pumping Station Characteristics

The packaged pumping station will be a 4-ft internal diameter chamber, with their corresponding vent, hatches, ladders for access, floor-mounted adjustable

pipe supports (in valve vault), pump lifting chain and guiderail, and other components. The wet well volume between pump-on and pump-off switch is 72.4 gallons. The pump will operate a duty point flow of 72.4 gpm. For the average flow of 14.4 gpm, the hydraulic detention time (HDT) will be 5.0 min. The area surrounding pump station should be graded to direct storm runoff away from the structure.

The outlet pipe from the pumping station is a 3-inch PVC pipe Schedule 80. The existing generator at the Skyview-Hibrook WWTP will be used for this newly proposed pumping station. The backup generator will be enclosed in a prefabricated building.

Since the project is necessary to properly maintain the existing wastewater collection system and all adverse environmental impacts have been minimized to the greatest extent practical, the project is in compliance with the requirements of N.J.A.C. 7:22 Subchapter 10.

- ii. *A map of the location and service area of each environmental infrastructure facility. Unless otherwise directed by the Department, this map shall be at a scale of one inch equal to 2,000 feet. Include on the map the environmentally constrained areas and indicate that no environmental infrastructure services shall be provided to environmentally constrained areas, except where development requiring wastewater treatment or water supply services is specifically permitted by the Department;*

The proposed improvements will strictly be utilized to replace the existing infrastructure and ensure proper conveyance and treatment of wastewater within the area. The proposed project shall not provide services to environmentally constrained areas that are not currently developed.

- iii. *For wastewater and water supply projects, location, size, and capacity of the collection, conveyance or transmission facilities. Unless otherwise directed by the Department, the location shall be mapped at a scale of one inch equal to 2,000 feet;*

The proposed improvements including location, size, and capacity of the conveyance pipes can be seen in **Figure XXIX**.

- iv. *A summary of costs, including capital, operation and maintenance, present worth of total project cost and anticipated user cost;*

Please refer to section 7:22-10.5 (b)9 for cost summary including capital, operation and maintenance, present worth of total project and anticipated user cost.

- v. *For wastewater and water supply projects, the user cost at the time of the application, the proposed increase in user cost as a result of the project and the median annual household income in the planning area. The median annual household income shall be derived from the current United States Census income data updated to the present using*

the "Consumer Price Index for All Urban Consumers (CPI-U) for the U.S. City Average for All Items, 1982-84 = 100," which can be obtained from the United States Department of Labor, Bureau of Labor Statistics;

The 2019 median household income is \$127,764, utilizing CPI information. The proposed user rate is \$1,758, which is 1.38% of the median household income. This is less than 1.75%.

vi. A summary of environmental impacts of the selected alternative, as discussed in (b)10 above;

The selected alternative includes the decommissioning of two (2) existing pump stations which have reached the end of their useful life and the installation of a single new facility. Since the project is necessary to ensure continued collection and treatment of wastewater and all adverse environmental impacts have been minimized to the greatest extent practical, the project is in compliance with the requirements of N.J.A.C. 7:22 Subchapter 10.

The alternative will occur along existing roadways and therefore will minimize impacts to plant and animal communities and environmentally critical areas and have significant beneficial impacts on surface water and groundwater quality.

The alternative may cause short-term noise impacts and traffic disruption during construction. Generators, gas powered equipment, backhoes, bucket loaders and dump trucks may temporarily increase noise levels in the project area to 80 or 90 decibels (dba). All necessary precautions will be taken by the Borough of Oakland to ensure public safety and minimize traffic disruptions during the time of construction. A Maintenance and Protection of Traffic (MPT) plan will be specifically designed for during the water system improvements.

The minor temporary disturbances created during the implementation of the improvements are insignificant compared to the resulting public benefit. Implementation of the improvements will ensure proper conveyance and treatment of wastewater.

All work will be performed in accordance with the New Jersey Standards for Soil Erosion and Sediment Control and approved soil erosion and sediment control practices will be followed during all construction activities. To minimize any potential long-term impacts, the project's contract and specifications will require that all material removed from the project area will be disposed of lawfully upon completion of the job.

vii. Adverse impacts that cannot be avoided;

The proposed activities will occur along existing roadways. The project may cause short-term noise impacts and traffic disruption during construction as detailed in section N.J.A.C. 7:22-10.5 (b)11-vi above.

viii. The relationship between short term uses of the environment and enhancement of long term benefit;

The minor temporary disturbances created during the project are insignificant compared to the public benefit that will result from the proposed infrastructure improvements. Implementation of the project will ensure continued proper wastewater transfer and treatment within the area.

All work will be performed in accordance with the New Jersey Standards for Soil Erosion and Sediment Control and approved soil erosion and sediment control practices will be followed during all construction activities. To minimize any potential long-term impacts, the project's contract and specifications will require that all material removed from the project area will be disposed of lawfully upon completion of the job.

ix. Irreversible and irretrievable commitments of resources to the project; and

The Borough of Oakland recognizes that the diversion of 1.8 million gpd to the NBCUA from the Ramapo basin could affect downstream conditions. The Borough will transfer 0.065 mgd (65,000 gallons per day) to address the most significant concerns with community systems.

As previously noted, the Borough derives its water from seven wells. The Water Department was granted Water Allocation Permit 5199, which allows the diversion of 124 million gallons per month (mgm) and 759 million gallons per year (mgy) of groundwater from these wells. To compensate for the transfer of wastewater to NBCUA, the Borough applied to reduce its diversions by an equal volume of 0.065 mgd. This is equivalent to a monthly maximum decrease of 2.015 mgm and an annual decrease in permitted allocation of 23.725 mgy.

The Borough of Oakland has applied for a minor modification by the New Jersey Department of Environmental Protection, Bureau of Water Allocation and Well Permitting for the reduce the Oakland Water Department's monthly and annual allocation limits to 121.985 mgm and 735.275 mgy to compensate for the transfer of 0.065 mgd from the Ramapo River basin to the Saddle River basin and the NBCUA facility (**Appendix B**).

x. Mitigating measures to be incorporated during design, construction, and/or the life of the project.

Non-applicable. The proposed project does not include mitigation efforts.

12. A description of steps needed and time frame for implementation of the project;

As per the Administrative Consent Order (NEA 190001-46717, 46718, 46719) the Borough of Oakland shall comply with the WPCA, the regulations promulgated pursuant

thereto, N.J.A.C. 7:14A-1 et seq., and any permit or approval issued pursuant thereto, in operation and management of the above noted sewage systems, and shall take whatever actions that are necessary to achieve and maintain compliance with its NJPDES Permits and Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., on or before April 1, 2022, including but not limited to the following:

- a. On or before June 1, 2020, Oakland Borough shall submit to the Department a Minor Permit Modification request for Water Allocation Permit number 5199. The Minor Modification request will address the projects to decommission the Oakland Borough's sewage treatment plants as described below and to request the reduction in the monthly and annual allocation limits specified in Permit number 5199 in amounts commensurate with the NJPDES permitted sewage treatment plant design flow for the three plants identified herein in accordance with N.J.A.C. 7:19-1.5(b)4. No additional sewer extensions or connections are permitted without a New Jersey Highland Council Consistency Determination and a Major Modification of Oakland Borough's Water Allocation Permit (see paragraph twenty-seven (27) below).
- b. On or before July 1, 2020, Oakland Borough shall submit an administratively complete Treatment Works Approval ("TWA") application to the Department for the construction of facilities necessary for the conveyance of wastewater flow from the Borough's sewage systems to the Northwest Bergen County Utilities Authority's sanitary sewage collection system ("the project").
- c. On or before January 1, 2021, Oakland Borough shall award a contract for construction of the project.
- d. On or before February 17, 2021, Oakland Borough shall commence construction of the project.
- e. On or before February 15, 2022, Oakland Borough shall complete construction of the project and place into operation the facilities necessary for the conveyance of wastewater flow from the Oakland Borough's sewage systems to the Northwest Bergen County Utilities Authority's sanitary sewage collection system. Oakland Borough shall also submit to the Department form WQM005-Certificaton approval by a Professional Engineer for the TWA referenced in paragraph 26.b.
- f. On or before April 1, 2022, Oakland Borough shall properly decommission the Chapel Hill, Oakwood Knolls, and Skyview-Hibrook sewage treatment plants and submit Certification of Closure certificates to the Department for the three (3) sewage treatment plants noted in this section.

13. The identity of the owner or operator of the proposed facilities;

The proposed facilities will be operated and maintained by the Borough of Oakland.

- 14. A list of the permits needed to implement the project and the status of obtaining the applicable permits;*

The Borough of Oakland has applied for an New Jersey Department of Environmental Protection (NJDEP) Treatment Works Approval (Application # 20-0284, submitted 8/3/2020, review engineer: Jerome Parker). The project qualifies for an NJDEP Flood Hazard Area Permit-By-Rule 36 “placement of an underground utility line using directional drilling or jacking” as it meets all requirements under N.J.A.C. 7:13-7.36 and will not require an NJDEP Freshwater Wetlands General Permit 2 “underground utility lines” as per N.J.A.C. 7:7A-7.2(b) as the pipes will be jacked or open cut above an existing culvert and will result in no surface disturbance of any freshwater wetlands, transition areas, or State open waters and there will be no draining or dewatering of freshwater wetlands. However, the project will require a Bergen County Soil Conservation District Permit and a Highlands Exemption.

- 15. A summary of the results of the coordination with affected Federal, State, regional, or local agencies and the public, carried out in accordance with N.J.A.C. 7:22-10.9 and 10.10;*

The Borough of Oakland has coordinated with the NJDEP and the New Jersey Highlands Council to ensure proper notice and obtain all proper approvals necessary to perform the proposed tasks.

- 16. For wastewater treatment and stormwater management projects, identification and assessment of consistency of the proposed project with the areawide Water Quality Management Plan which would apply to the planning area, and an assessment of whether or not the proposed project would trigger preparation of a wastewater management plan or a water quality management plan amendment in accordance with N.J.A.C. 7:15;*

The proposed improvements do not require an amendment to the Wastewater Management Plan (WMP) in accordance with N.J.A.C. 7:15. The only requirement was a minor modification to the Water Allocation Permit, which was submitted.

- 17. For water supply facilities, assessment of consistency of the proposed project with the recommendations of the New Jersey Statewide Water Supply Plan; and*

Non-applicable. The proposed project is not related to any water supply facilities.

- 18. An assessment of the consistency of the proposed project with the Stormwater Management Rules, N.J.A.C. 7:8.*

Non-applicable. The proposed project involves the replacement of existing municipally owned WWTPs with pumping stations to convey wastewater to redirect wastewater to the NBCUA WWTP.

IV. Public Involvement

The public was not directly involved in the design of the proposed improvements. However, the project will address specific areas of concern, including proper conveyance and treatment of wastewater.

The Borough will provide public notice regarding the scope of the proposed project via legal notice in the local newspaper within two (2) weeks of the date of the Department's decision statement. It is our understanding from the NJDEP, that pursuant to N.J.A.C. 7:22-10, a public hearing is required for the proposed infrastructure improvements because of the project's qualification for a Level 2 environmental review.

Since the public will directly benefit from the various infrastructure improvements, while incurring no increase in existing user costs, the Borough does not anticipate any negative public response during the above referenced public comment period.

V. Conclusions

The project's Level 2 Environmental Review concludes that the proposed project will have little or no adverse impact on the environment. The activities associated with the proposed sanitary sewer improvements will occur within urban areas along existing roadways. The proposed project area does not contain any known historic or archaeological sites and will not adversely affect any of the Borough's existing cultural, man-made, or human resources.

The short-term adverse effects to the environment are those associated with the temporary noise disturbances resulting from the use of heavy equipment, disruption to local traffic patterns and potential dust impacts during construction activities. These impacts will be minimized by incorporating the standard environmental protection measures contained in the New Jersey Soil Erosion and Sediment Control Standards into the design and implementation of the project.

Overall, the proposed infrastructure improvements are consistent with the New Jersey Office of Smart Growth's State Development and Redevelopment Plan since it promotes the ongoing viability of a highly developed urban area. The entire project area is located in a Metropolitan Planning Area (PA-1) or within existing facilities detailed by the New Jersey State Planning Management Map (**Figure IV**), which is given to areas that are best suited for future growth and revitalization. By performing the necessary improvements to an existing sewer system, the Borough is ensuring the proper functionality of wastewater treatment and conveyance. This type of activity is an integral part of the State Plan, which encourages local utility authorities to regularly maintain their existing infrastructure.

FIGURES

| | |
|--------------------|---------------------------------------|
| FIGURE I..... | AERIAL LOCATION MAP |
| FIGURE II | TAX MAP |
| FIGURE III | STREET LOCATION MAP |
| FIGURE IV | STATE PLANNING AREA MAP |
| FIGURE V | HYDROLOGIC SOIL RATING MAP |
| FIGURE VI..... | PHYSIOGRAPHIC PROVINCES MAP |
| FIGURE VII | USGS TOPOGRAPHIC MAP |
| FIGURE VIII..... | HIGHLANDS STEEP SLOPES MAP |
| FIGURE IX..... | BEDROCK GEOLOGY MAP |
| FIGURE X | PURVEYOR AND WELL SUPPLY MAP |
| FIGURE XI..... | SOLE-SOURCE AQUIFER MAP |
| FIGURE XII | SOILS MAP |
| FIGURE XIII..... | SOIL SEWAGE DISPOSAL RATING MAP |
| FIGURE XIV | AIR QUALITY FACILITIES MAP |
| FIGURE XV | FRESHWATER WETLAND MAP |
| FIGURE XVI..... | THREATENED AND ENDANGERED SPECIES MAP |
| FIGURE XVII | ZONING MAP |
| FIGURE XVIII..... | LAND USE MAP |
| FIGURE XIX..... | CRITICAL ENVIRONMENTAL MAP |
| FIGURE XX | VERNAL POOL LOCATION MAP |
| FIGURE XXI..... | FEMA FLOOD MAP |
| FIGURE XXII | GROUNDWATER RECHARGE MAP |
| FIGURE XXIII..... | SURFACE WATER QUALITY STANDARDS MAP |
| FIGURE XXIV | PRESERVED PARKS AND FARMLAND MAP |
| FIGURE XXV | HIGHLANDS BOUNDARY MAP |
| FIGURE XXVI..... | SEWER SERVICE AREA MAP |
| FIGURE XXVII | ENVIRONMENTAL OVERLAY MAP |
| FIGURE XXVIII..... | HISTORICAL PROPERTIES MAP |
| FIGURE XXIX..... | WASTEWATER CONVEYANCE MAP |

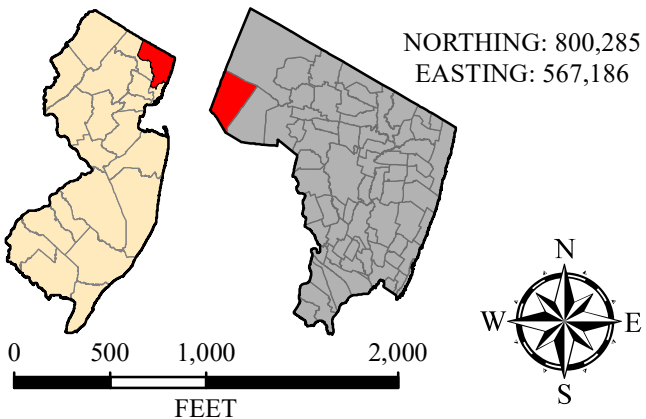


Boswell **ENGINEERING**

ENGINEERS - SURVEYORS - PLANNERS - SCIENTISTS
330 PHILLIPS AVENUE, SOUTH HACKENSACK, N.J. 07606
TEL: (201) 641-0770 • FAX: (201) 641-1831



SOURCE: 2020 NEARMAP AERIAL IMAGERY



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

AERIAL LOCATION MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

BERGEN COUNTY

NEW JERSEY

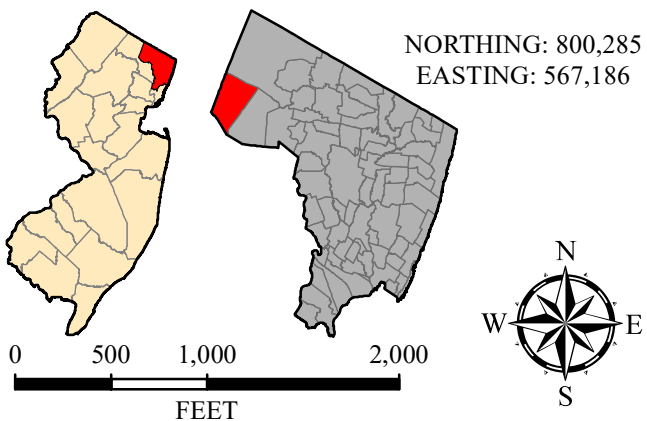
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE I



SOURCE: NJ OFFICE OF GEOGRAPHIC INFORMATION SYSTEMS PARCELS/MOD-IV COMPOSITE LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

TAX MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

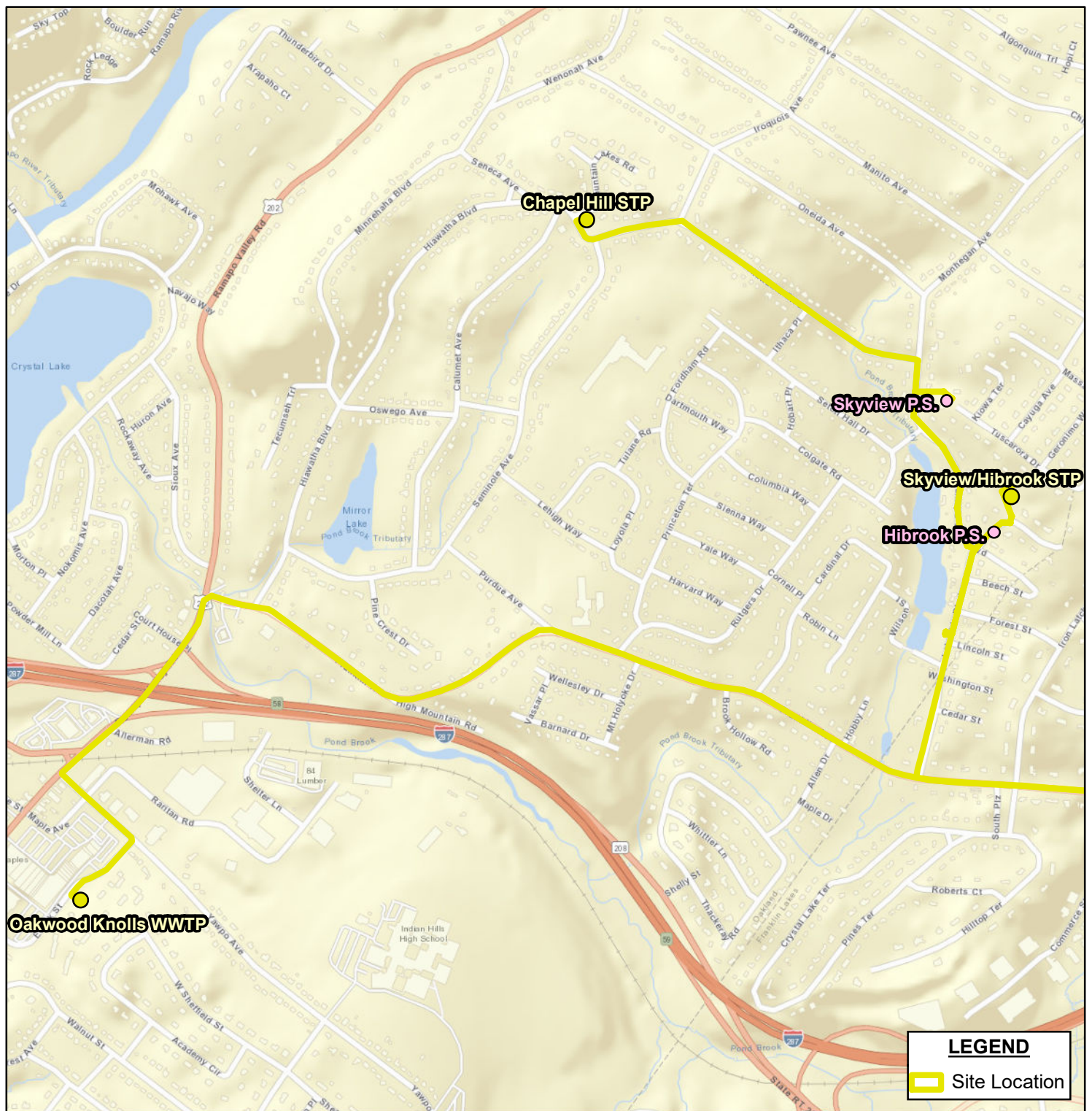
BERGEN COUNTY

NEW JERSEY

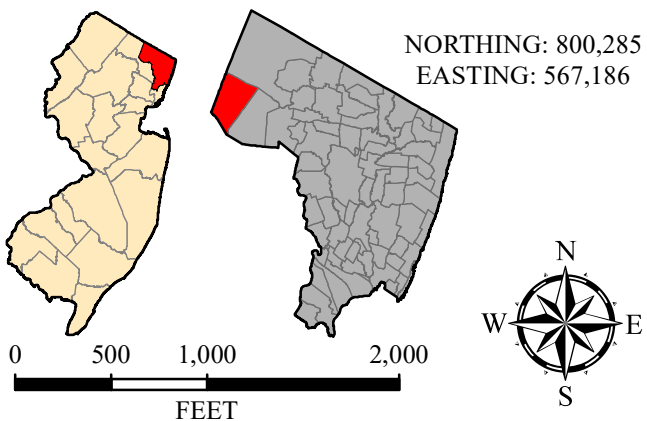
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE II



SOURCE: ESRI OPEN STREET MAP BASELAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

STREET LOCATION MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

BERGEN COUNTY

NEW JERSEY

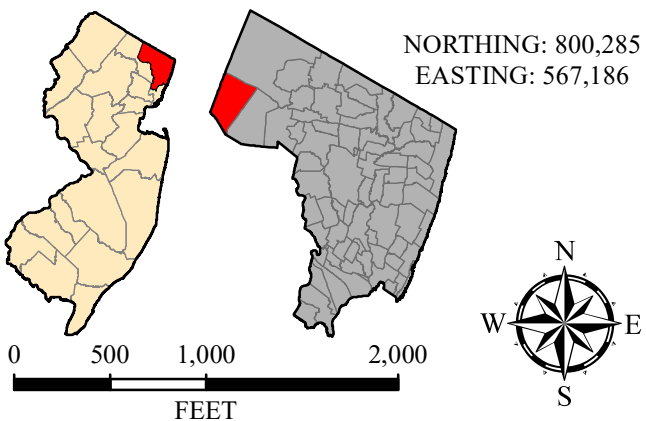
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE III



SOURCE: NEW JERSEY PLANNING MANAGEMENT AREAS



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

STATE PLANNING AREA MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

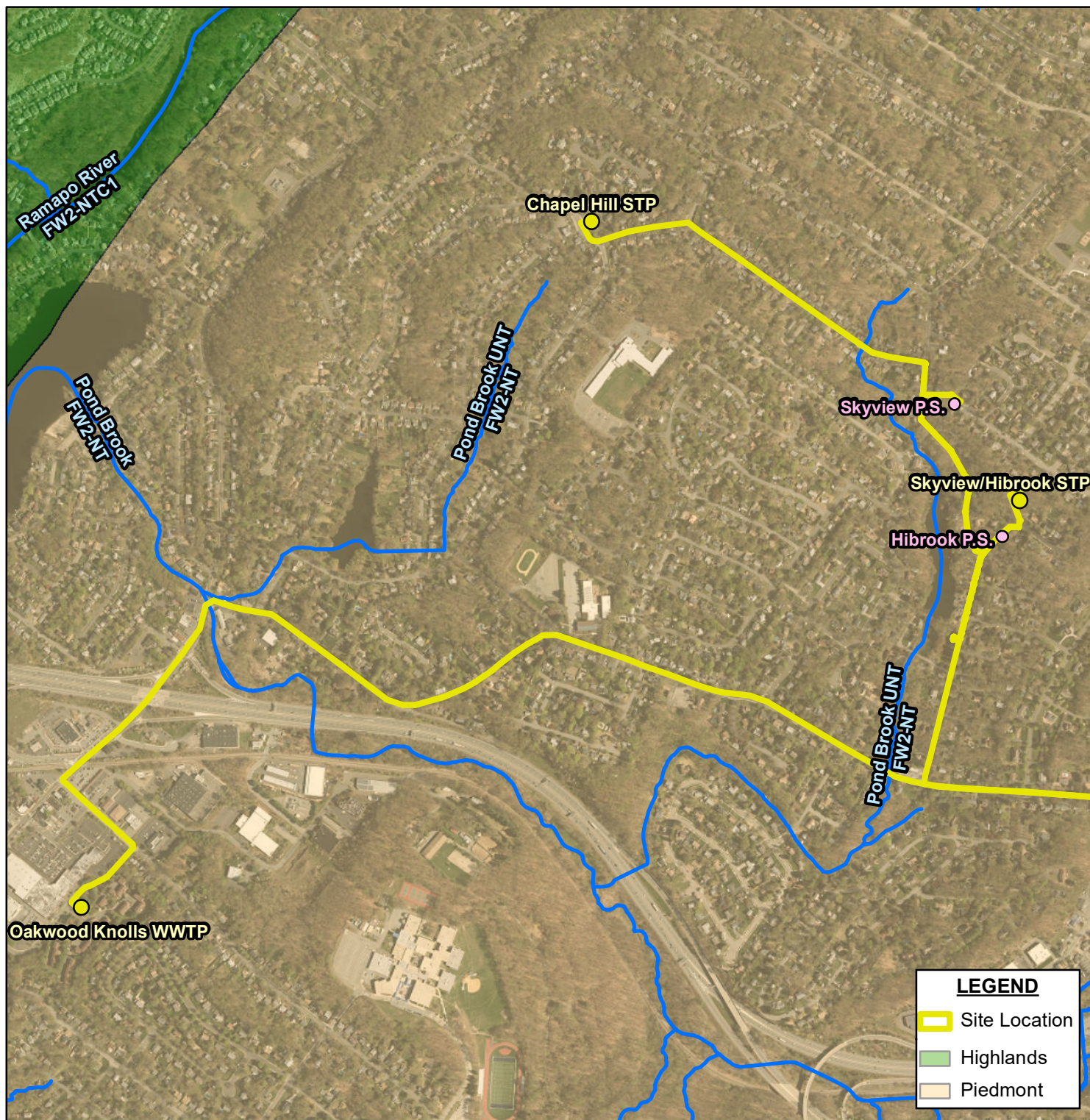
BERGEN COUNTY

NEW JERSEY

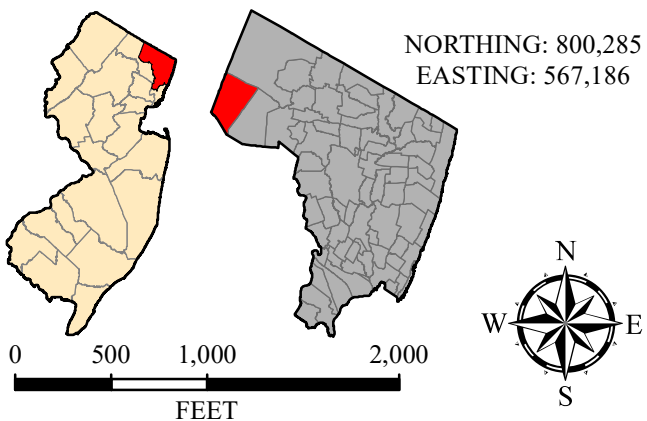
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE IV



SOURCE: NJDEP PHYSIOGRAPHIC PROVINCES DATALAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

PHYSIOGRAPHIC PROVINCES MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

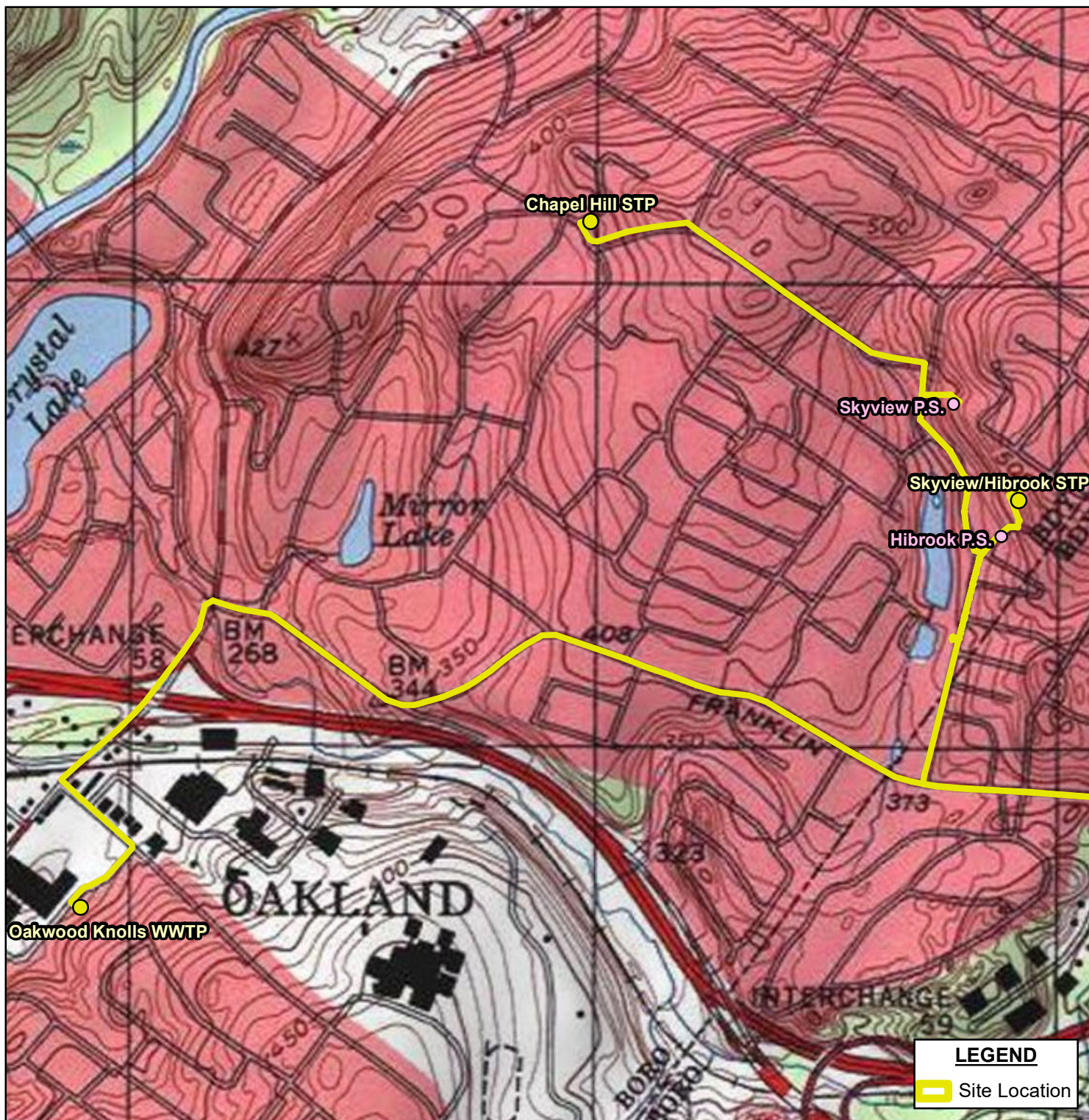
BERGEN COUNTY

NEW JERSEY

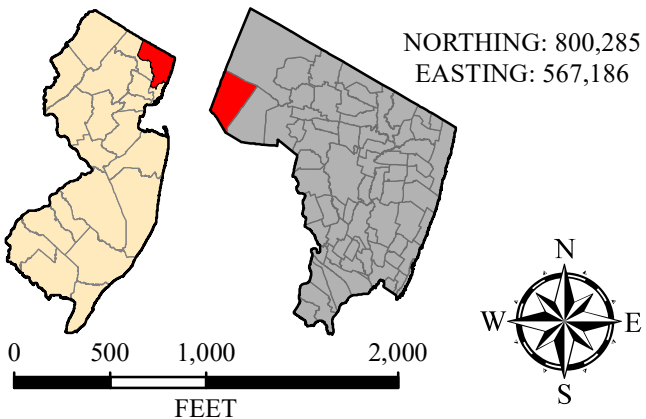
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE V



SOURCE: UNITED STATES GEOLOGICAL SURVEY (USGS) RAMSEY QUADRANGLE



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

USGS TOPOGRAPHIC MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

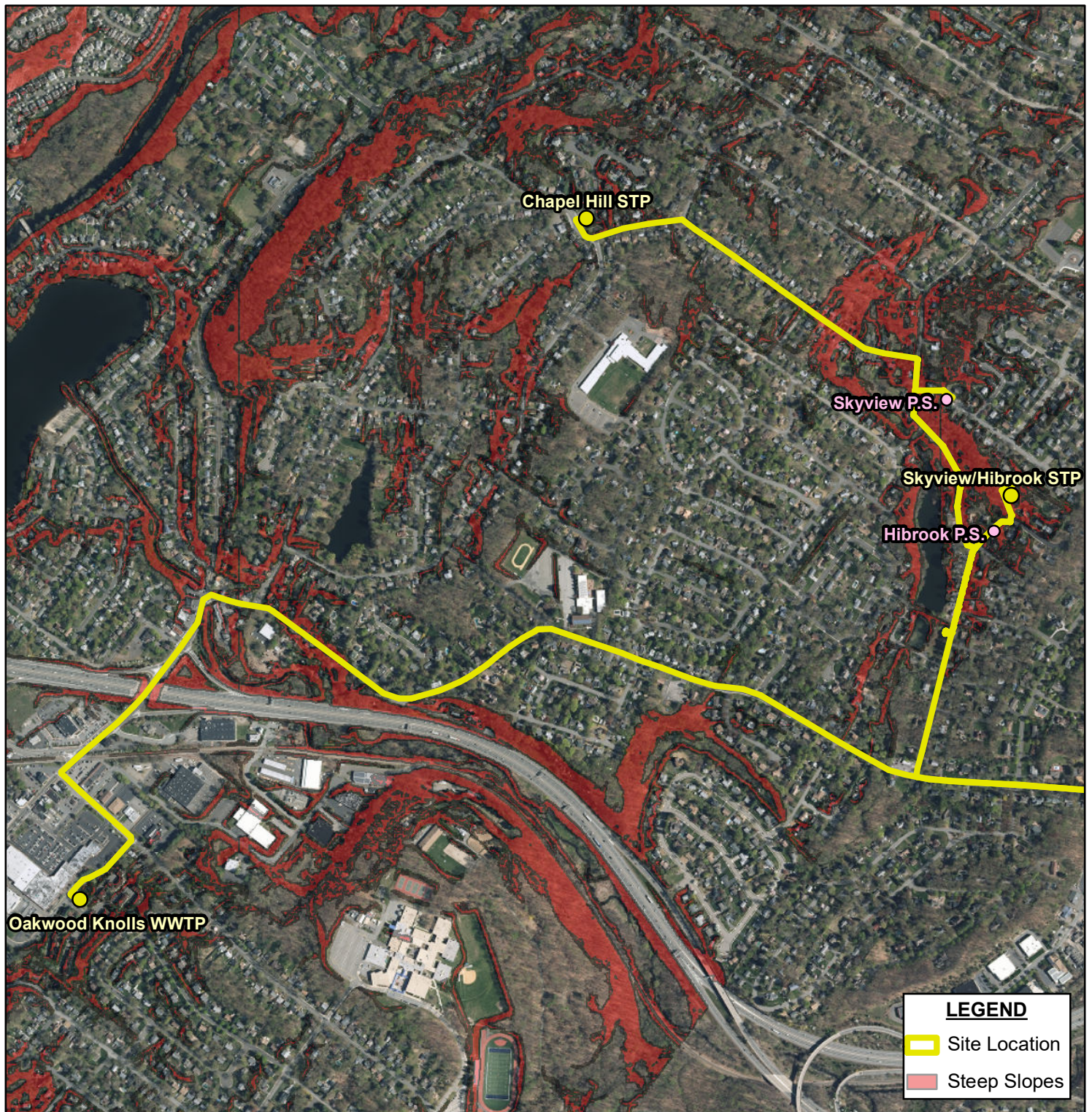
BERGEN COUNTY

NEW JERSEY

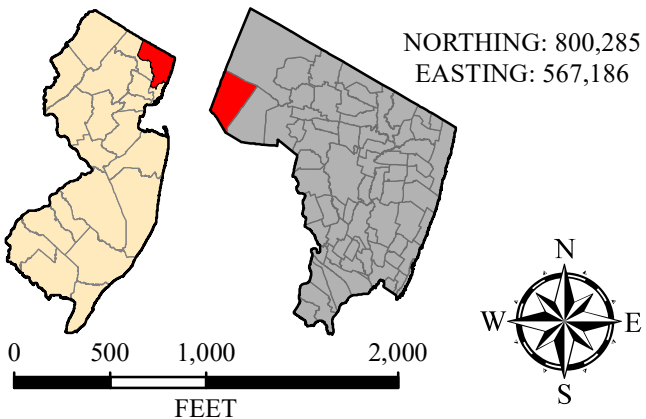
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE VI



SOURCE: NJ HIGHLANDS COUNCIL STEEP SLOPES DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

HIGHLANDS STEEP SLOPES MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

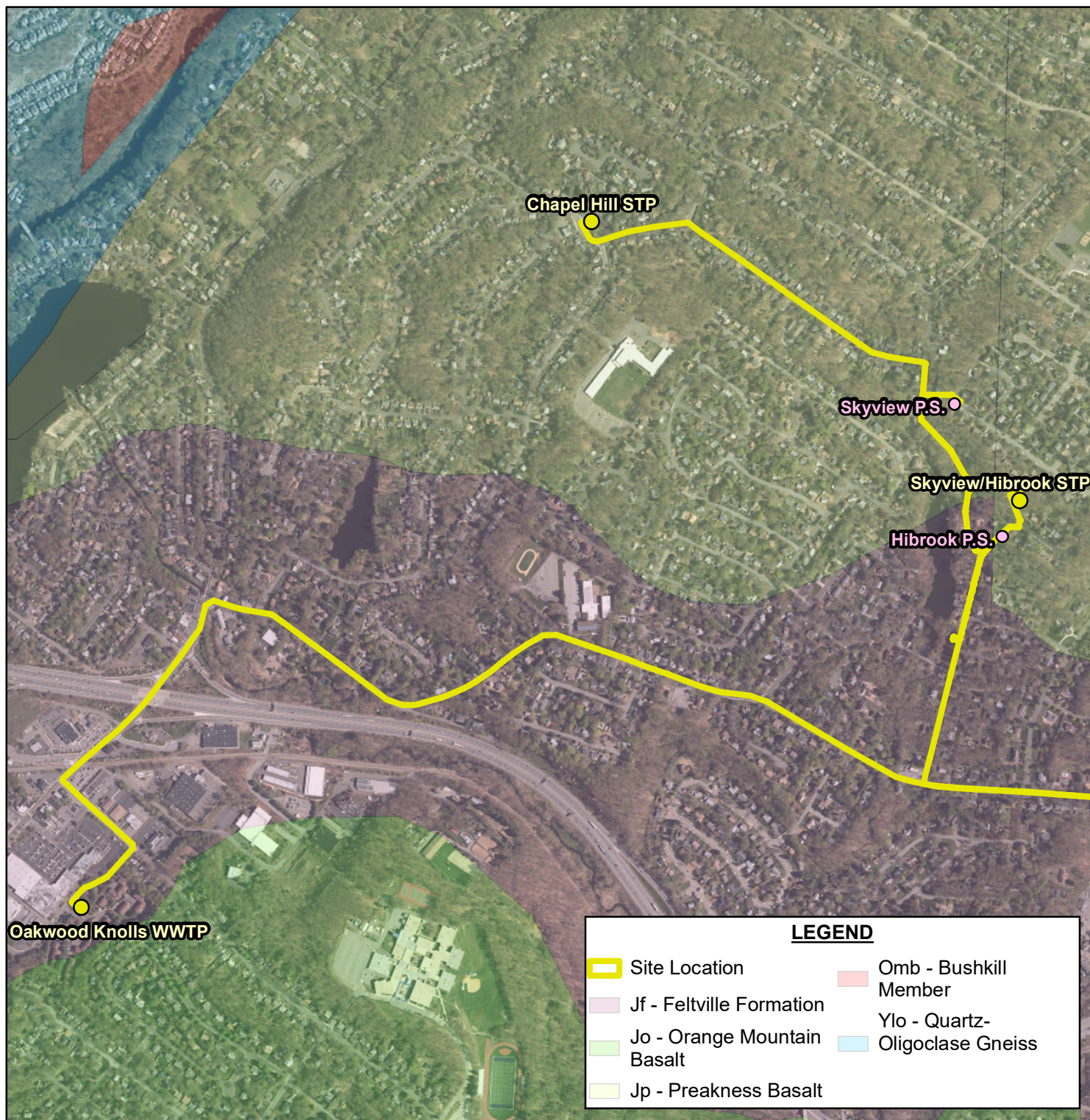
BERGEN COUNTY

NEW JERSEY

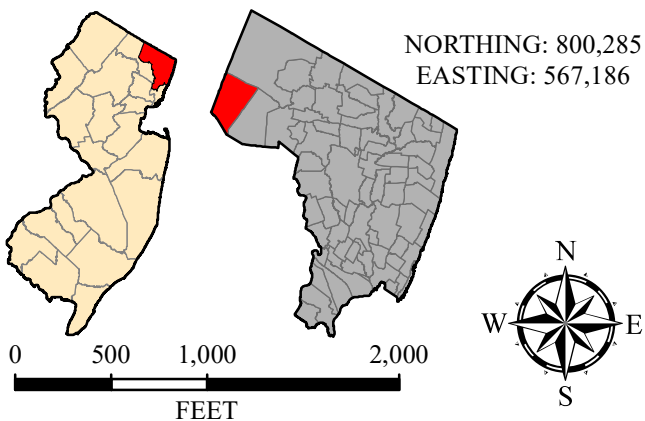
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE VII



SOURCE: NJDEP BEDROCK GEOLOGY DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

BEDROCK GEOLOGY MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

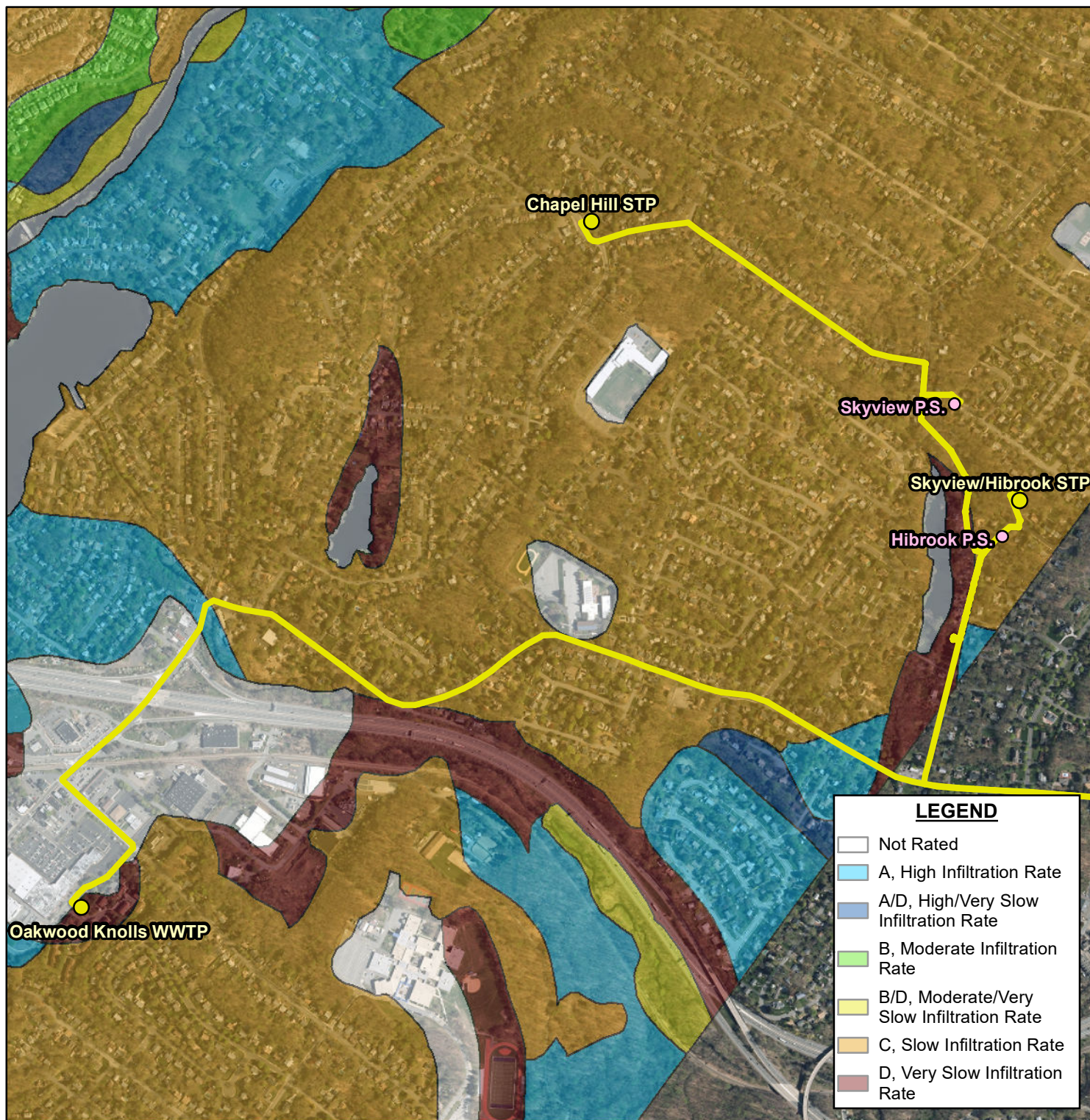
BERGEN COUNTY

NEW JERSEY

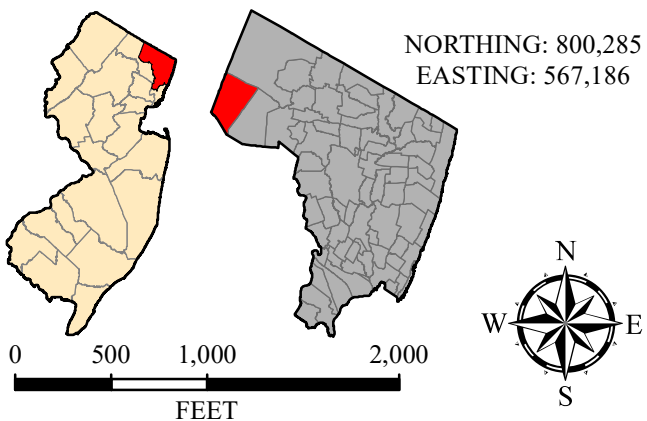
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE VIII



SOURCE: USDA WEB SOIL SURVEY HYDROLOGIC SOIL GROUP DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

HYDROLOGIC SOIL RATING MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

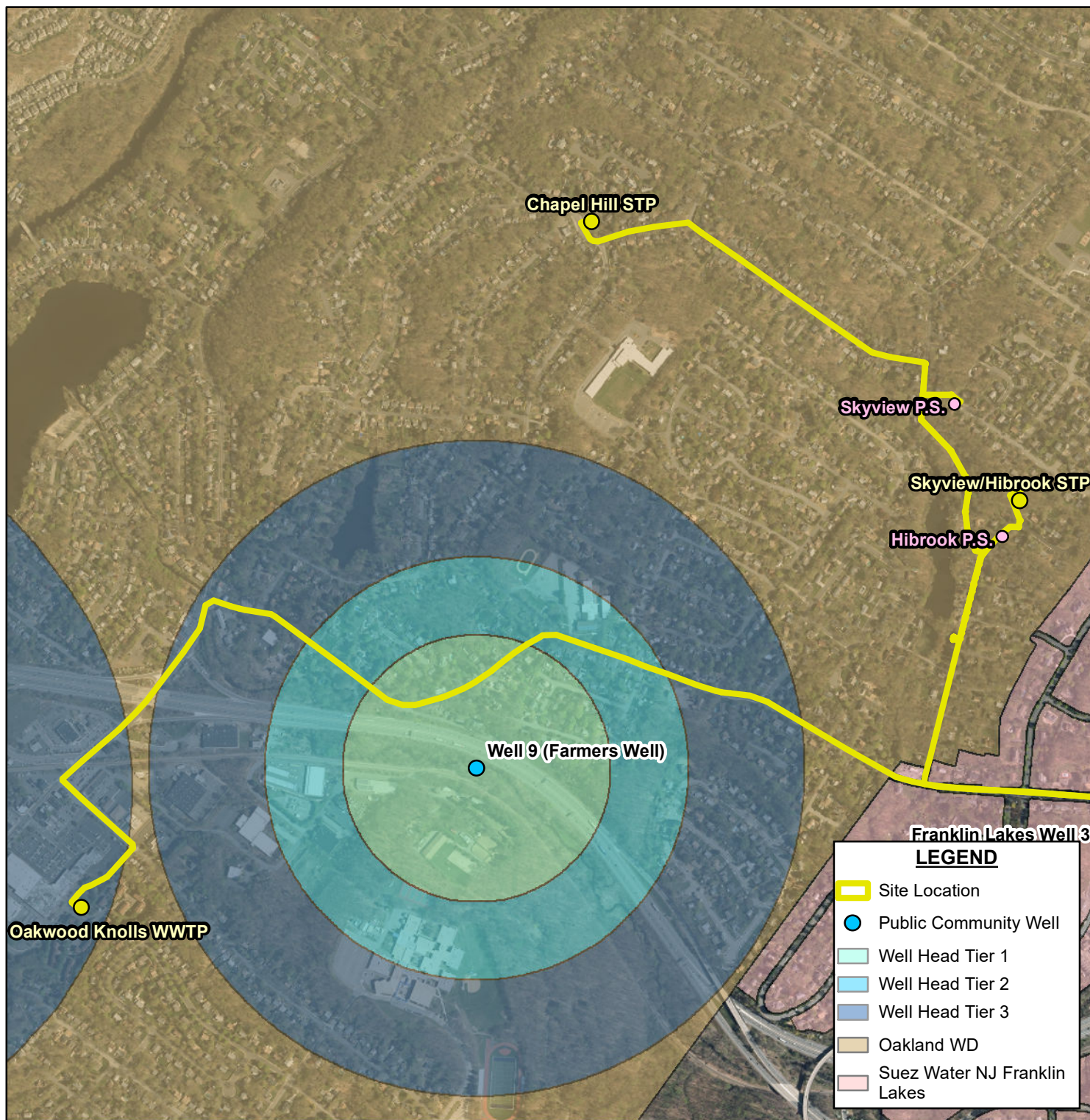
BERGEN COUNTY

NEW JERSEY

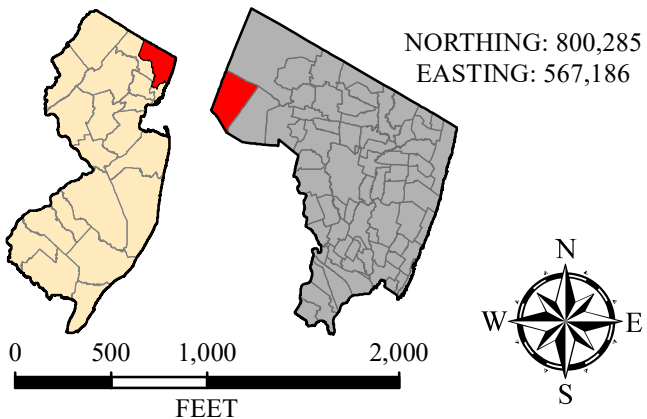
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE IX



SOURCE: NJDEP WELL HEAD PROTECTION AREAS AND WATER PURVEYORS DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

PURVEYOR AND WELL SUPPLY MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

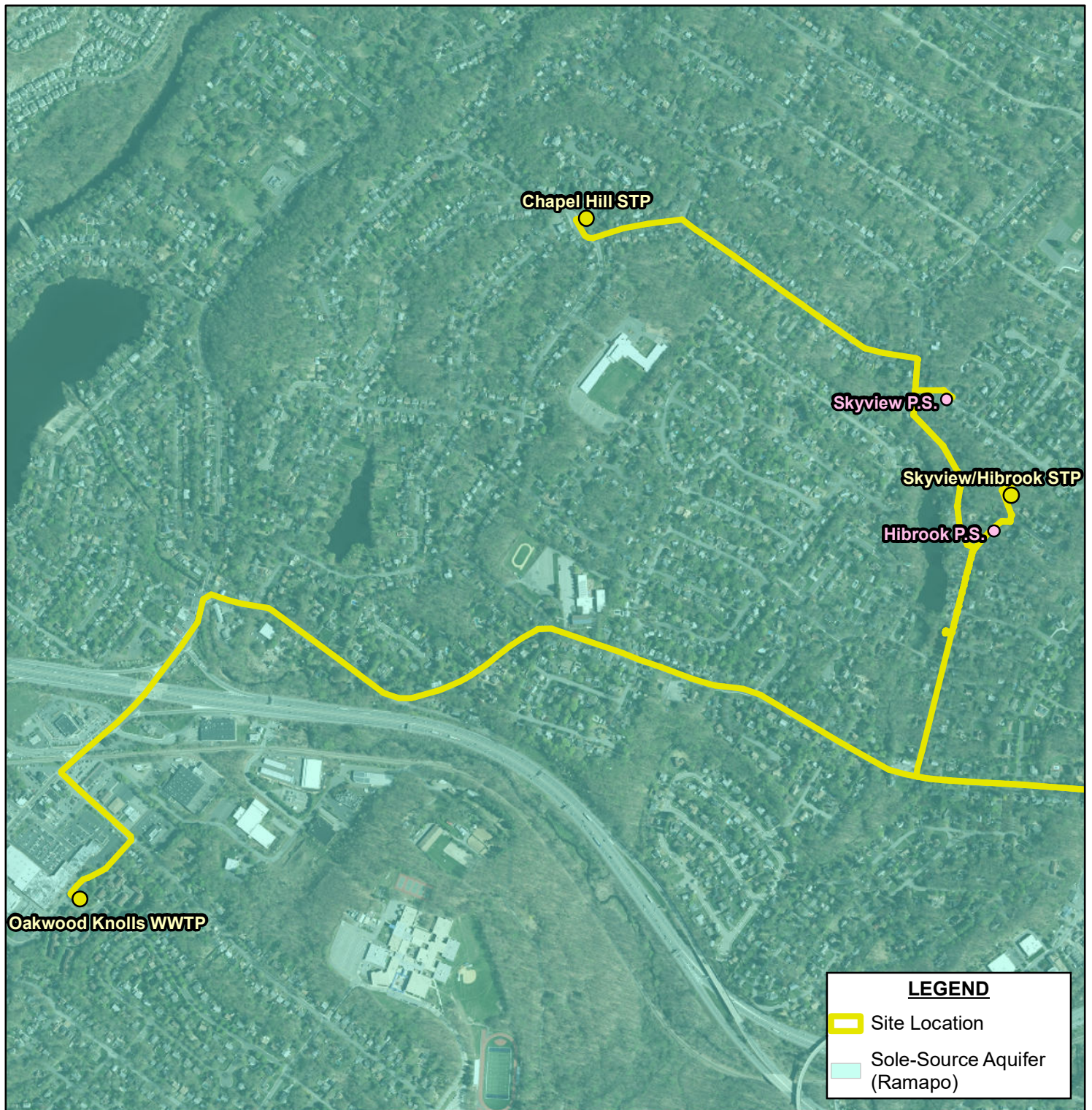
BERGEN COUNTY

NEW JERSEY

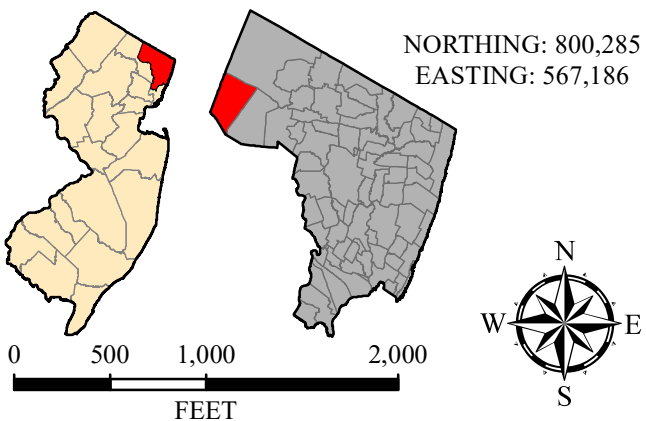
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE X



SOURCE: NJDEP SOLE SOURCE AQUIFER DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

SOLE-SOURCE AQUIFER MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

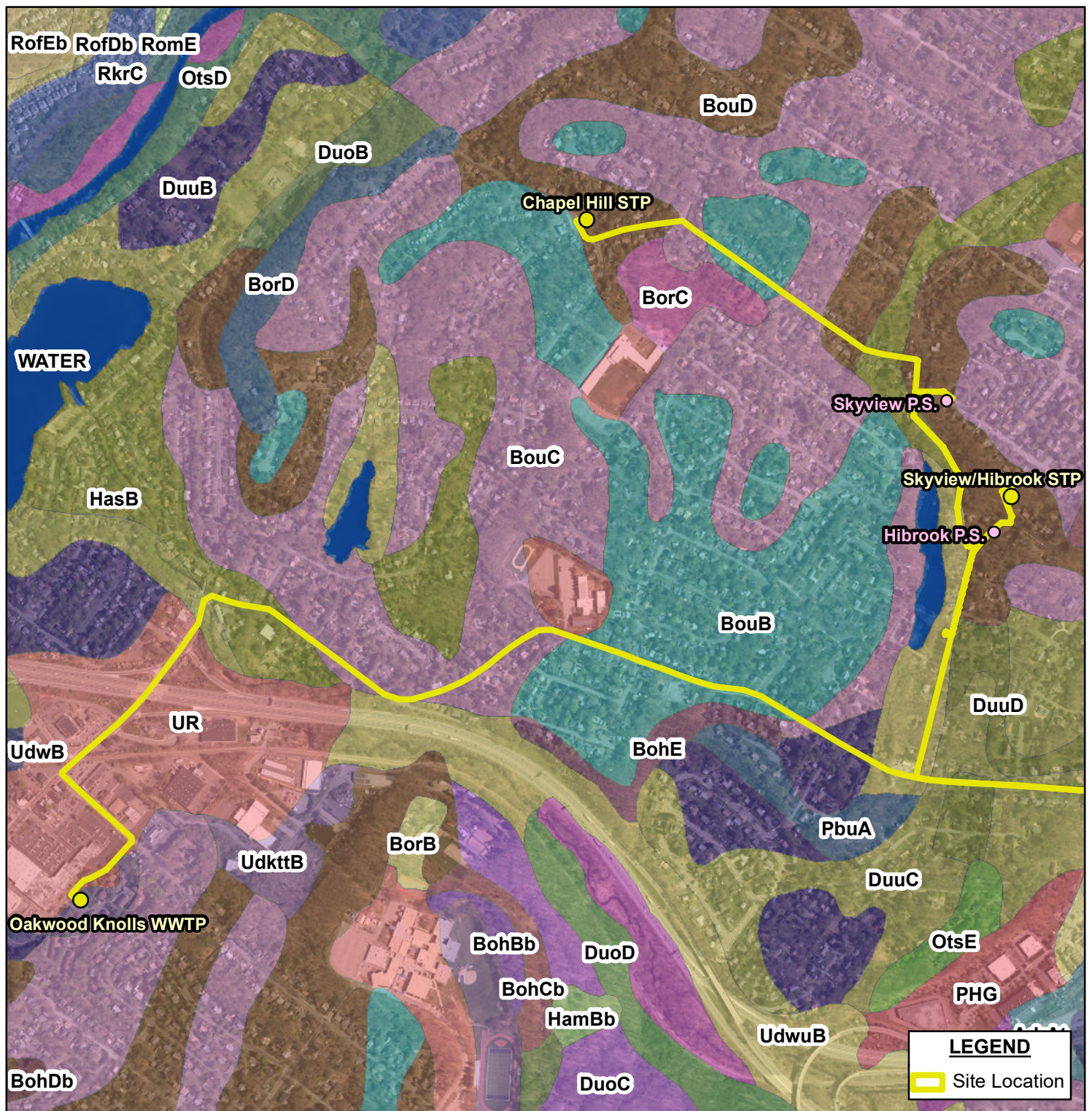
BERGEN COUNTY

NEW JERSEY

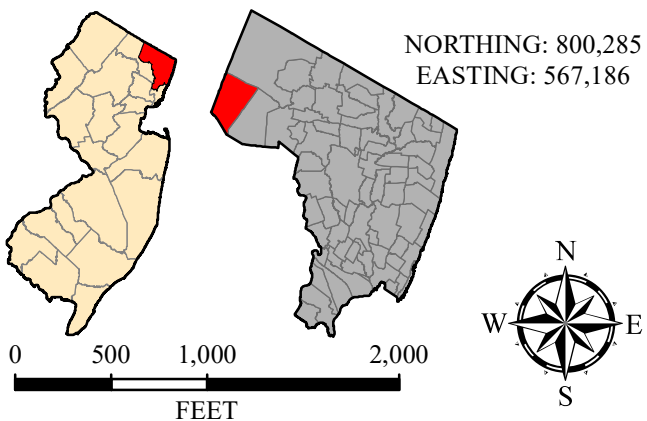
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE XI



SOURCE: : SSURGO SOIL SURVEY OF BERGEN COUNTY



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

SOILS MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

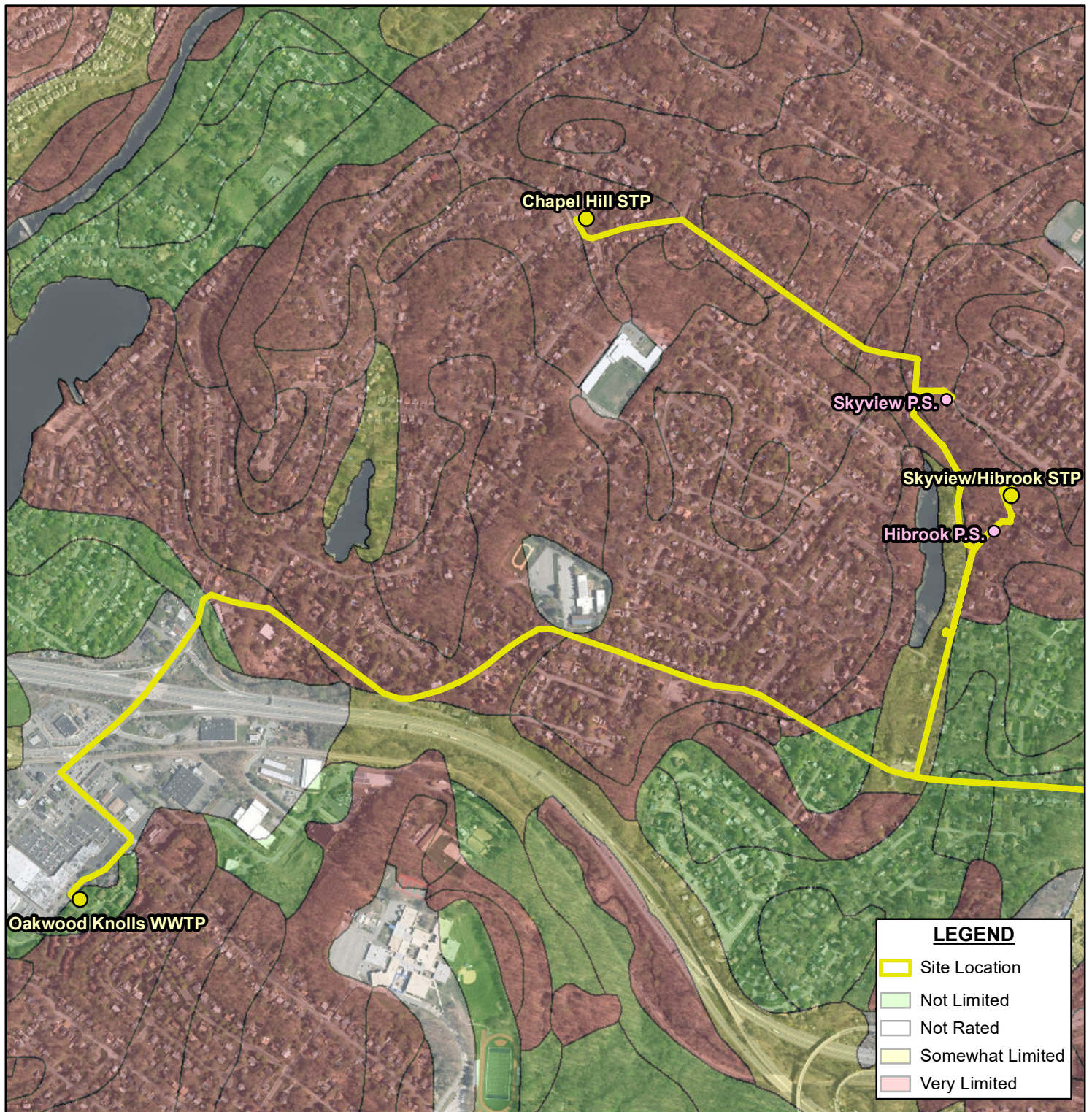
BERGEN COUNTY

NEW JERSEY

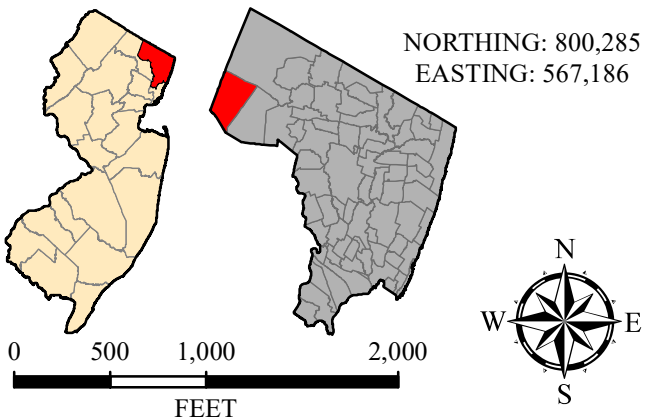
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XII



SOURCE: USDA WEB SOIL SURVEY-SEWAGE DISPOSAL (NJ)



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

SOIL SEWAGE DISPOSAL RATING MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

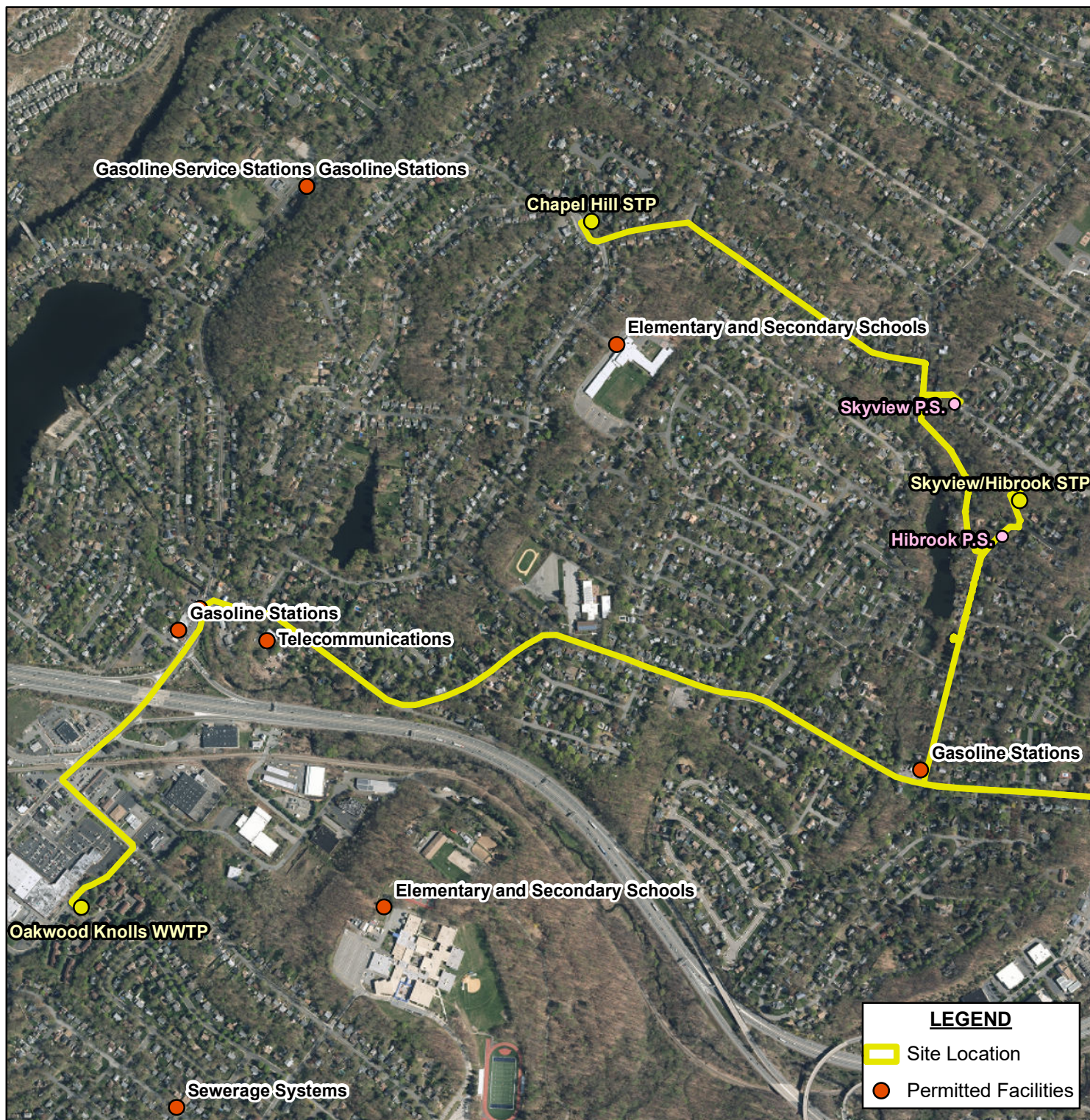
BERGEN COUNTY

NEW JERSEY

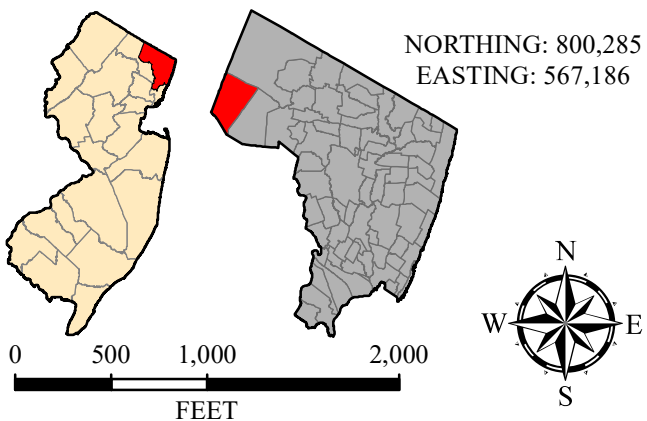
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XIII



SOURCE: NJDEP AIR QUALITY PERMITTED FACILITIES DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

AIR QUALITY FACILITIES MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

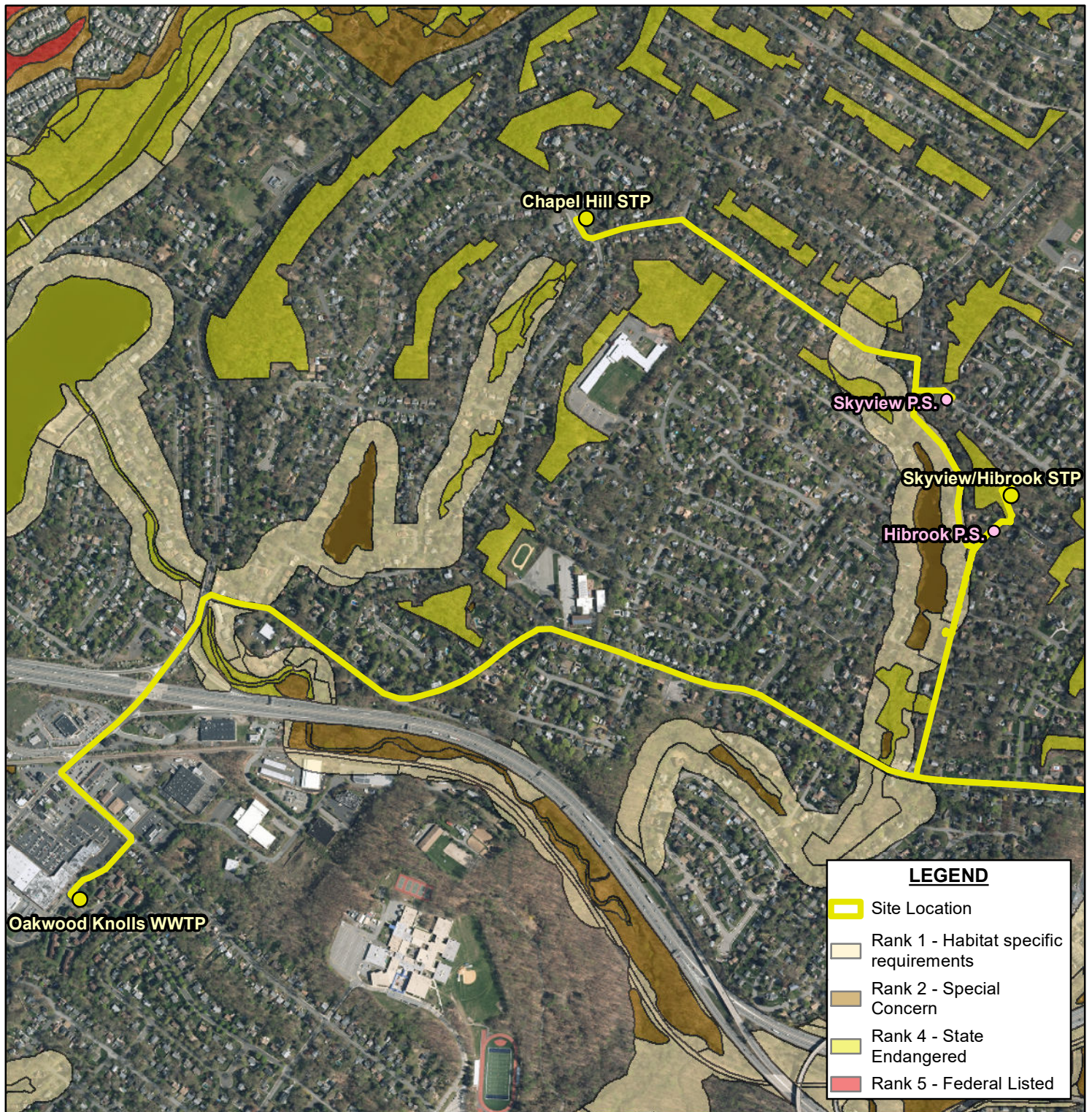
BERGEN COUNTY

NEW JERSEY

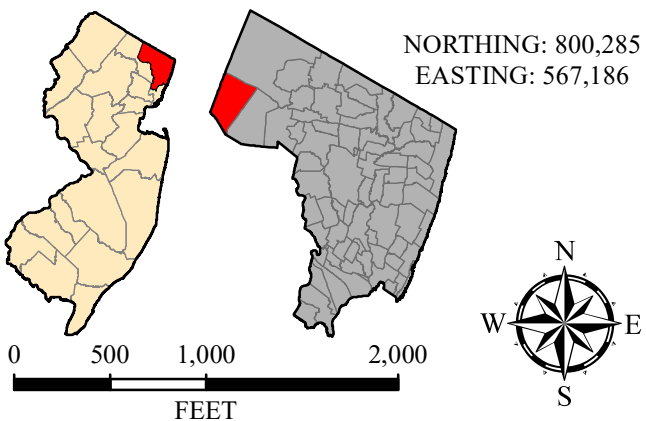
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE XIV



SOURCE: NJ NATURAL HERITAGE DATABASE, THREATENED AND ENDANGERED SPECIES (VERSION 3.3)



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

THREATENED AND ENDANGERED SPECIES
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

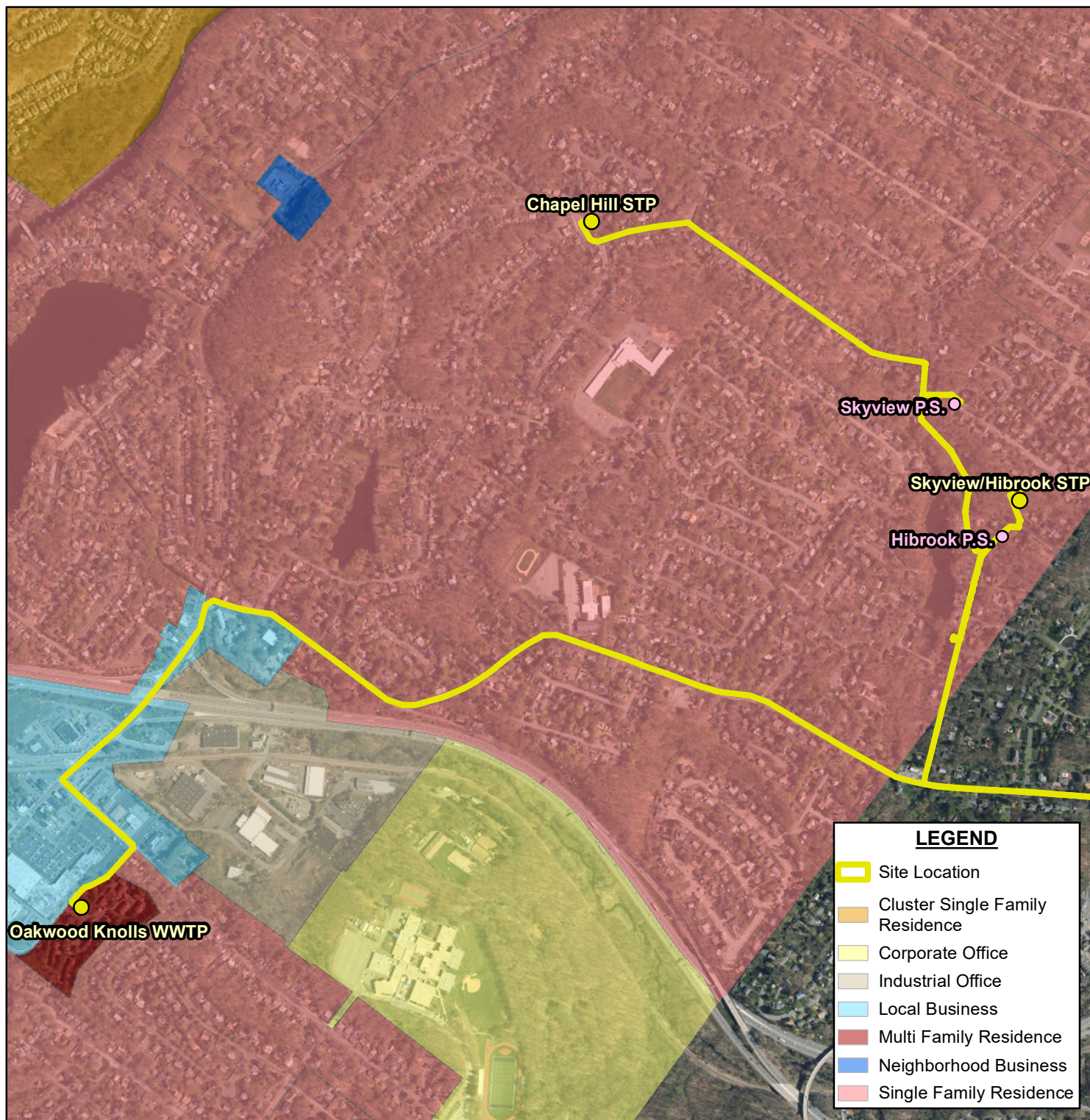
BERGEN COUNTY

NEW JERSEY

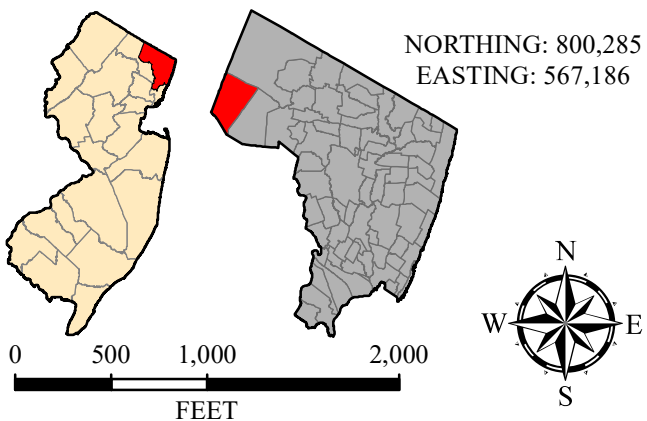
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XV



SOURCE: OAKLAND ZONING DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

ZONING MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

BERGEN COUNTY

NEW JERSEY

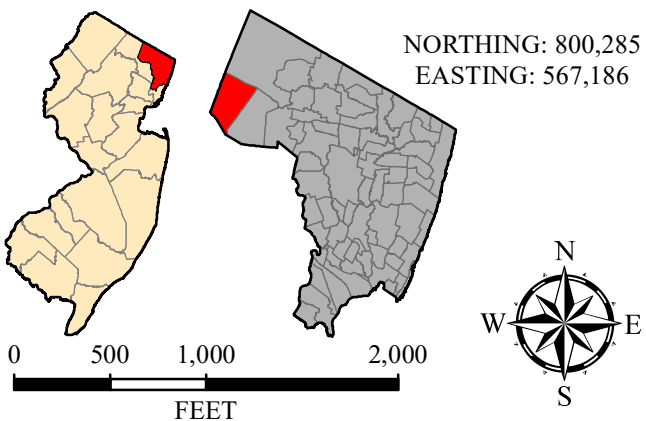
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE XVI



SOURCE: NJDEP LAND USE/ LAND COVER 2015 DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

LAND USE MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

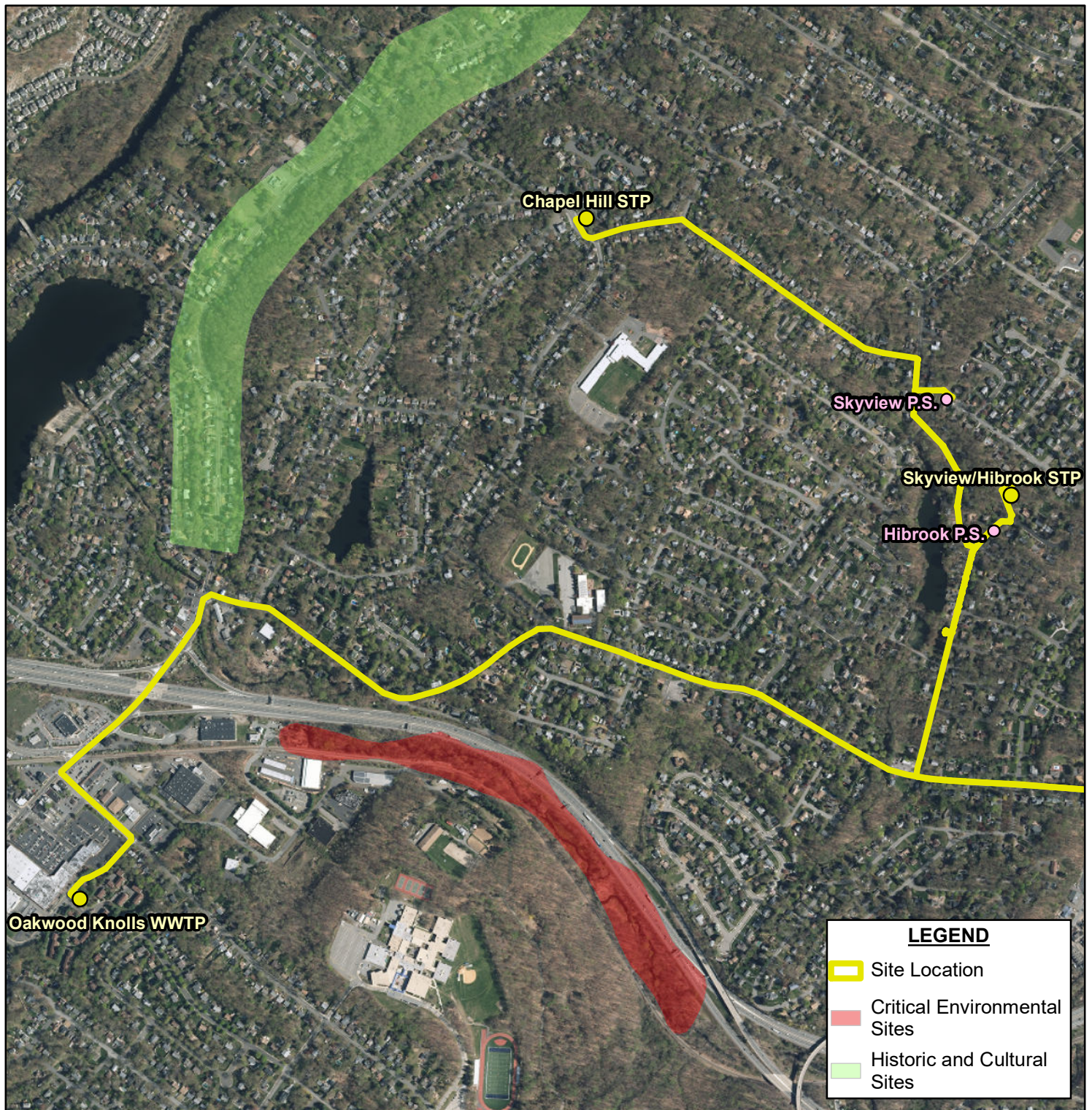
BERGEN COUNTY

NEW JERSEY

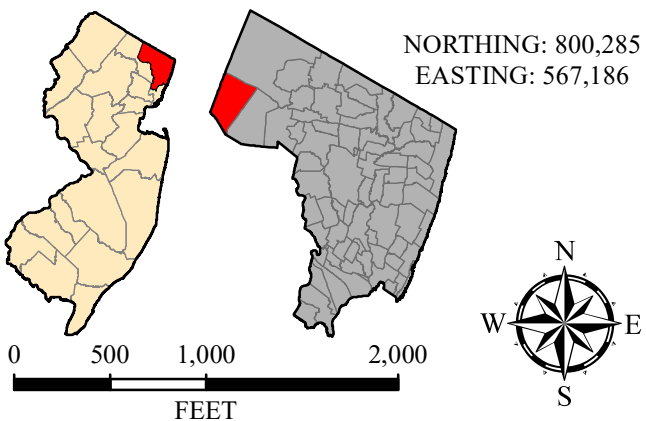
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE XVII



SOURCE: NJOPA CRITICAL ENVIRONMENTAL AND HISTORIC SITES DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

CRITICAL ENVIRONMENTAL MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

BERGEN COUNTY

NEW JERSEY

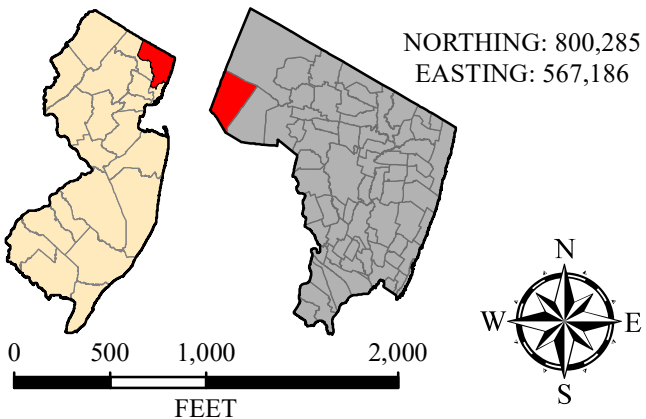
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XVIII



SOURCE: NJDEP FRESHWATER WETLANDS DATALAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

FRESHWATER WETLAND MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

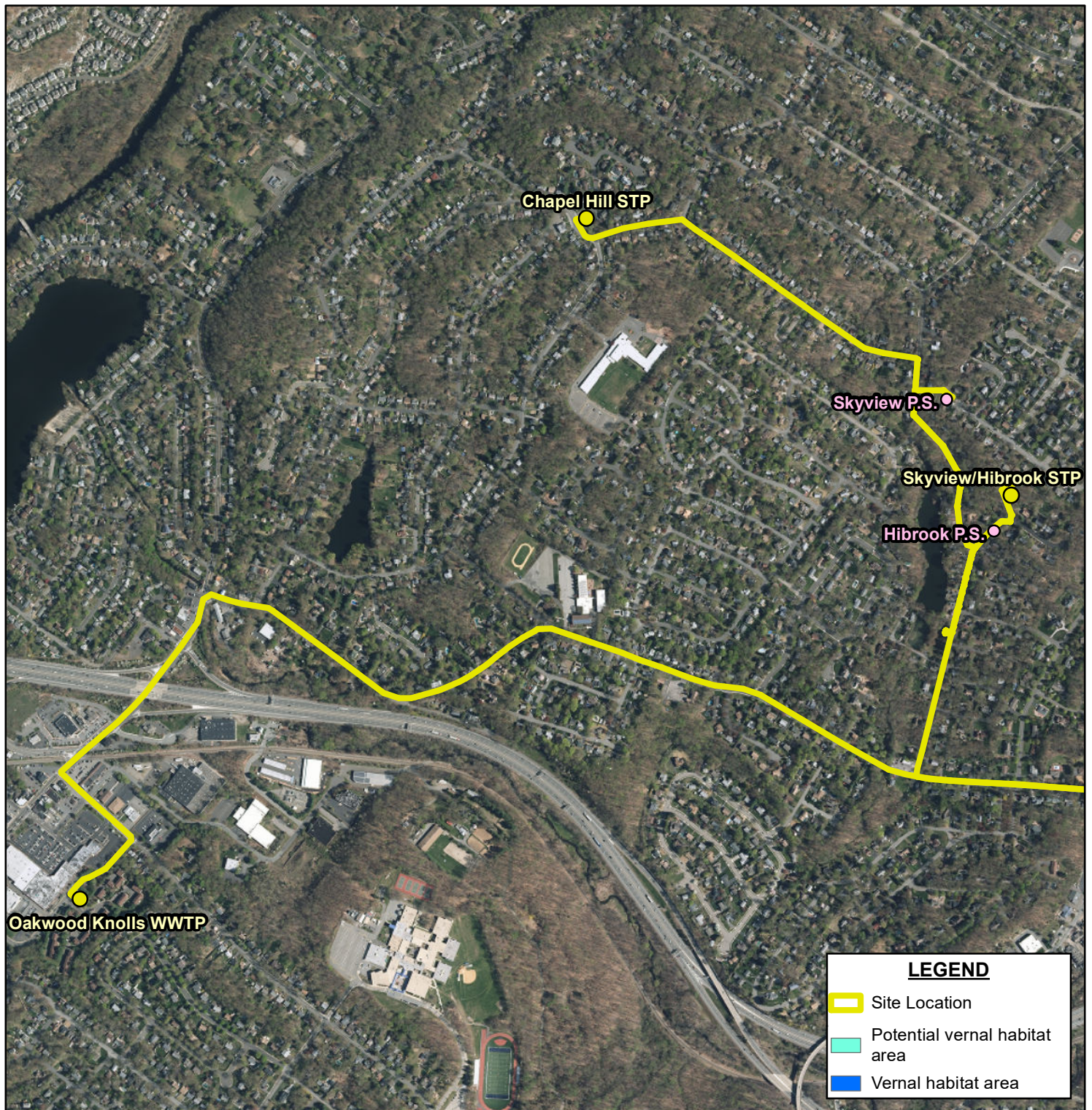
BERGEN COUNTY

NEW JERSEY

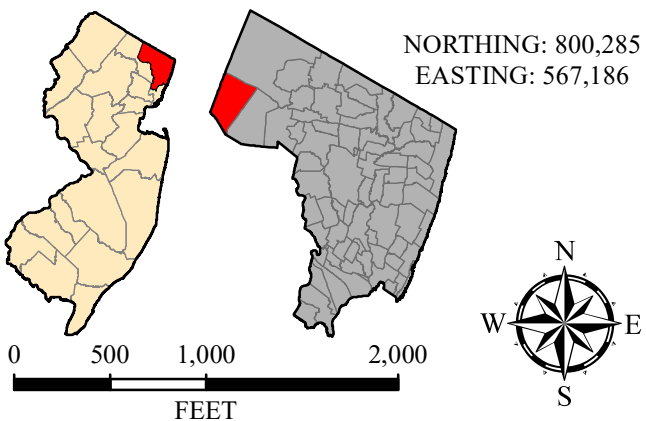
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE XIX



SOURCE: NJDEPBGIS LANDSCAPE VERNAL POOL DATA LAYER (VERSION 3.3)



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

VERNAL POOL LOCATION MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

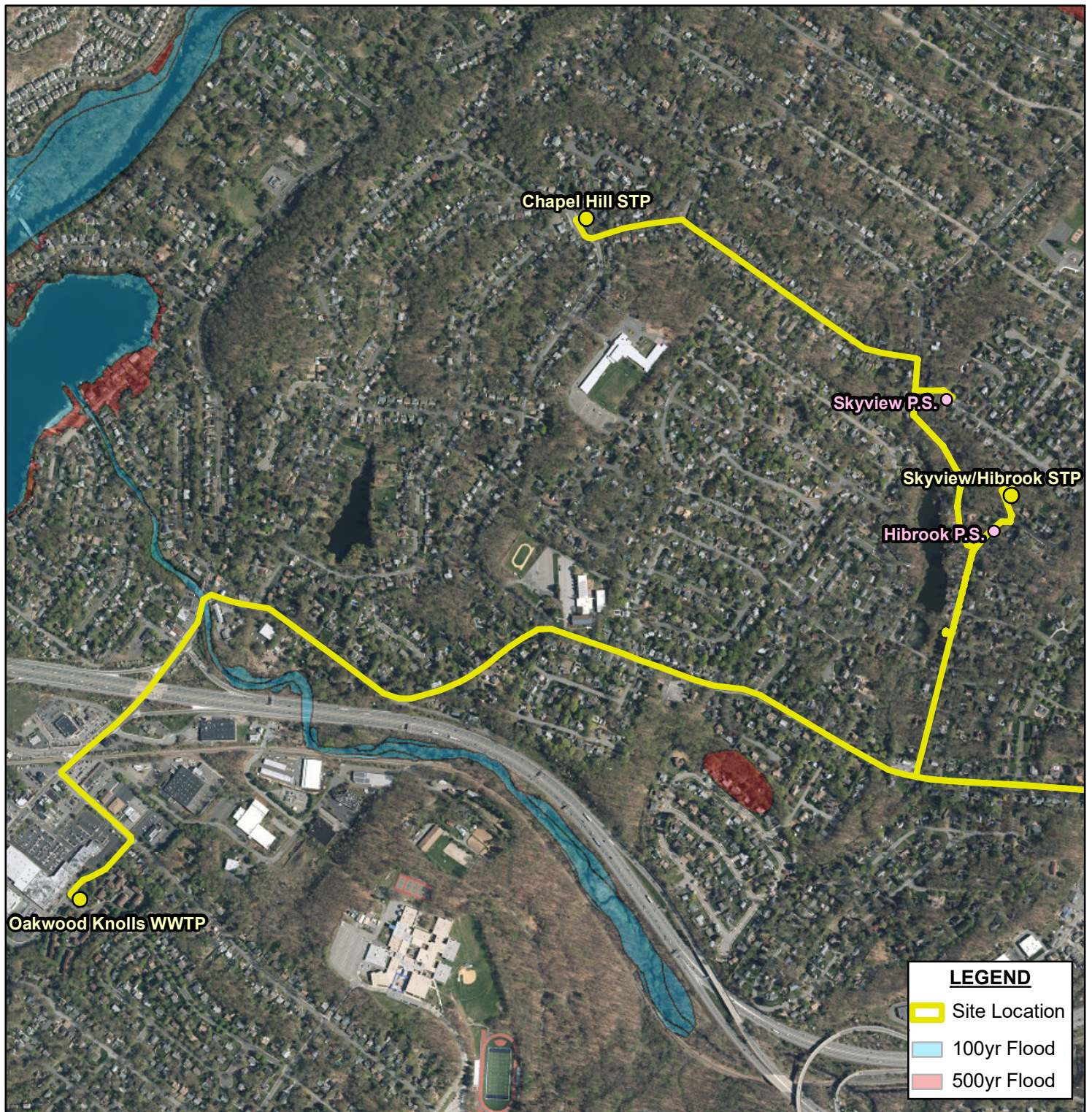
BERGEN COUNTY

NEW JERSEY

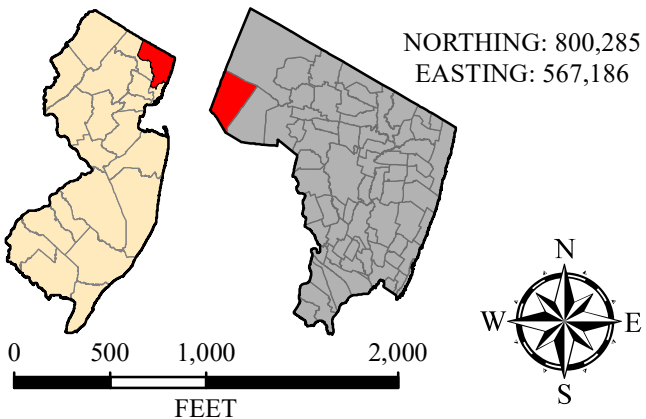
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XX



SOURCE: BERGEN COUNTY FEMA FLOOD DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

FEMA FLOOD MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

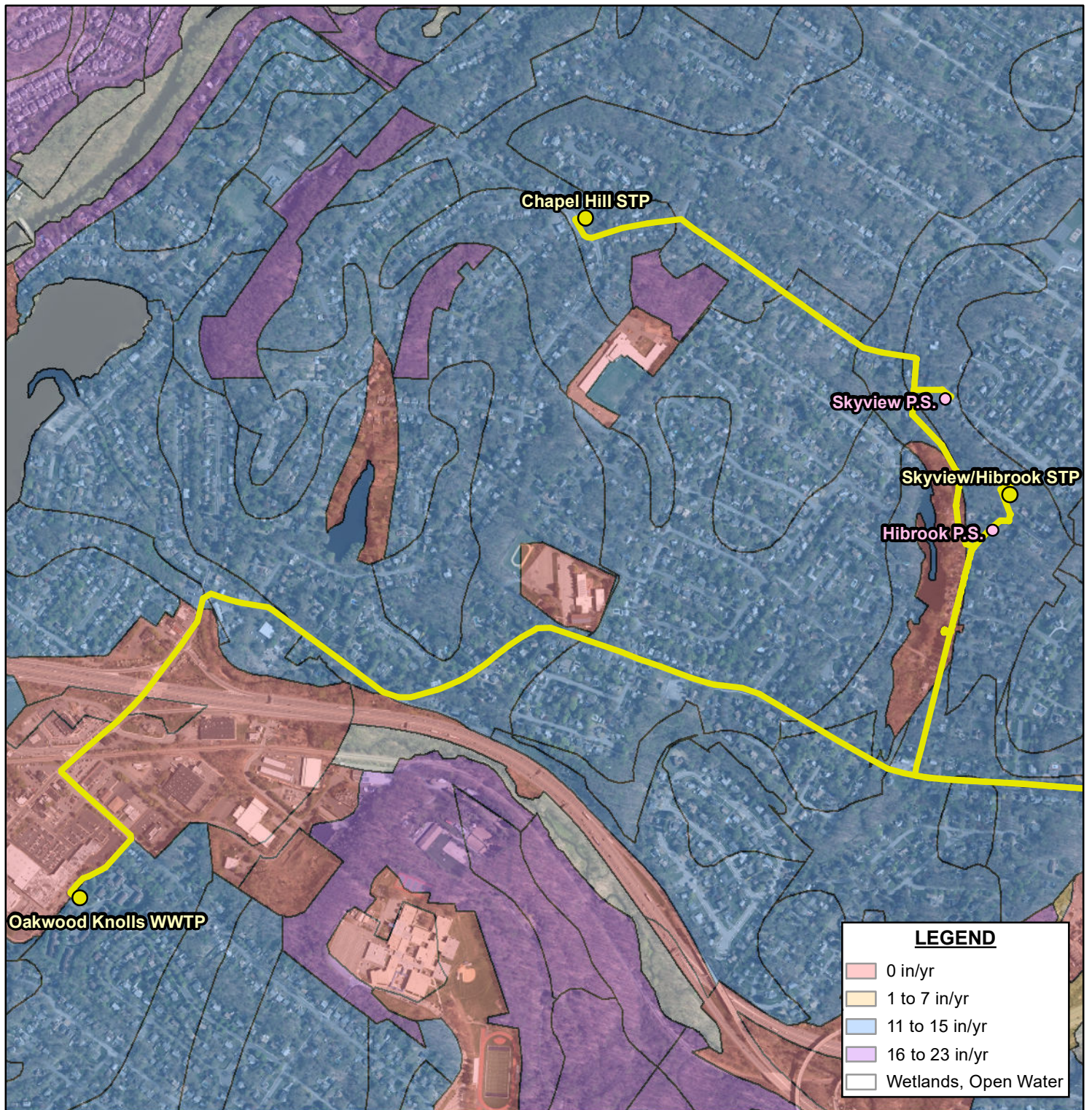
BERGEN COUNTY

NEW JERSEY

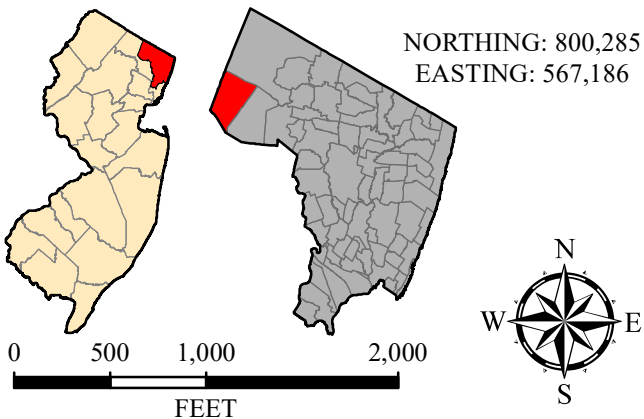
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XXI



SOURCE: NJDEPBGIS GROUNDWATER RECHARGE AREA DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

GROUNDWATER RECHARGE MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

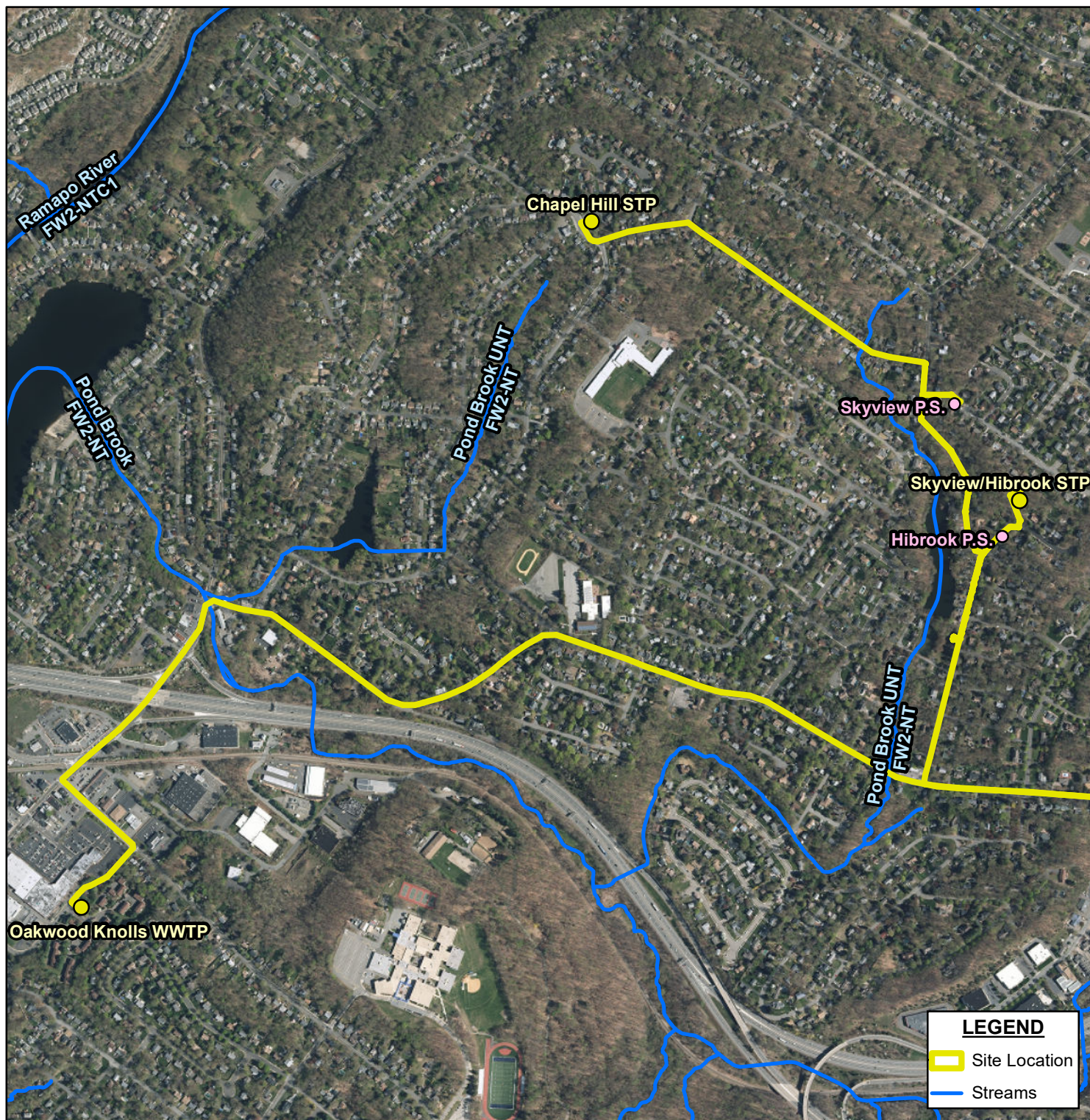
BERGEN COUNTY

NEW JERSEY

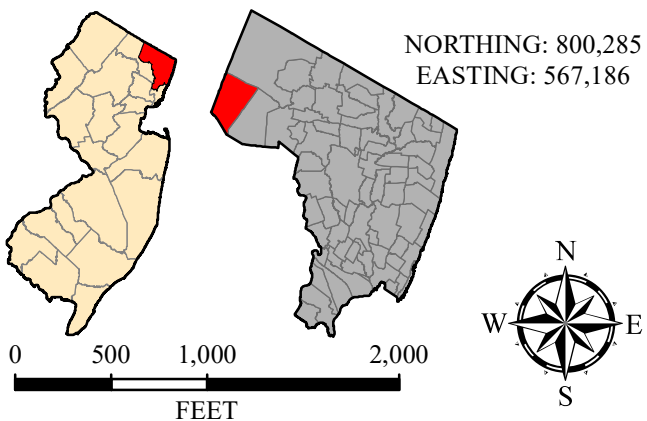
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XXII



SOURCE: NJDEP SURFACE WATER QUALITY STANDARD DATALAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

SURFACE WATER QUALITY STANDARDS MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

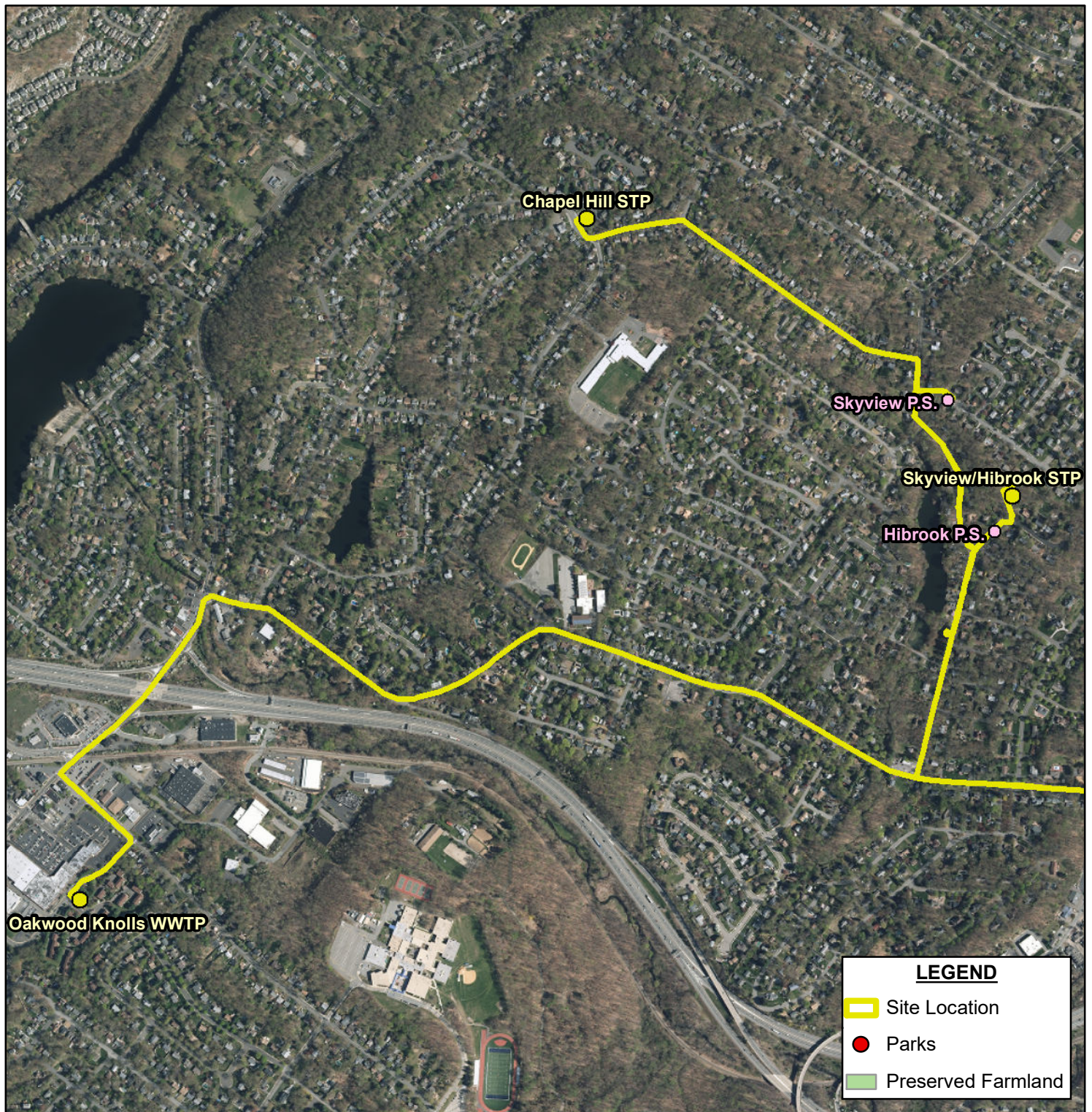
BERGEN COUNTY

NEW JERSEY

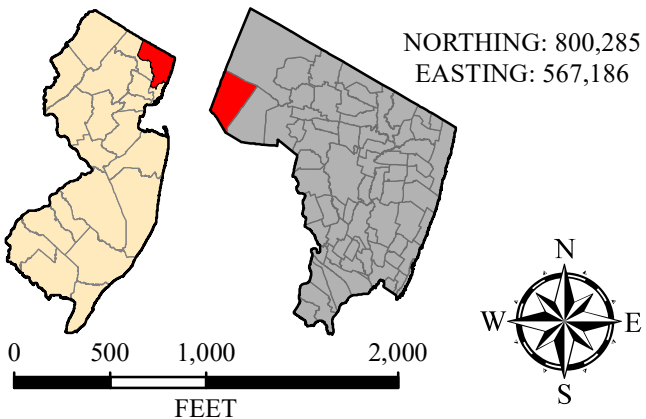
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XXIII



SOURCE: NJDEP PRESERVED FARMLAND AND PARKS DATA LAYERS



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

PRESERVED PARKS AND FARMLAND MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

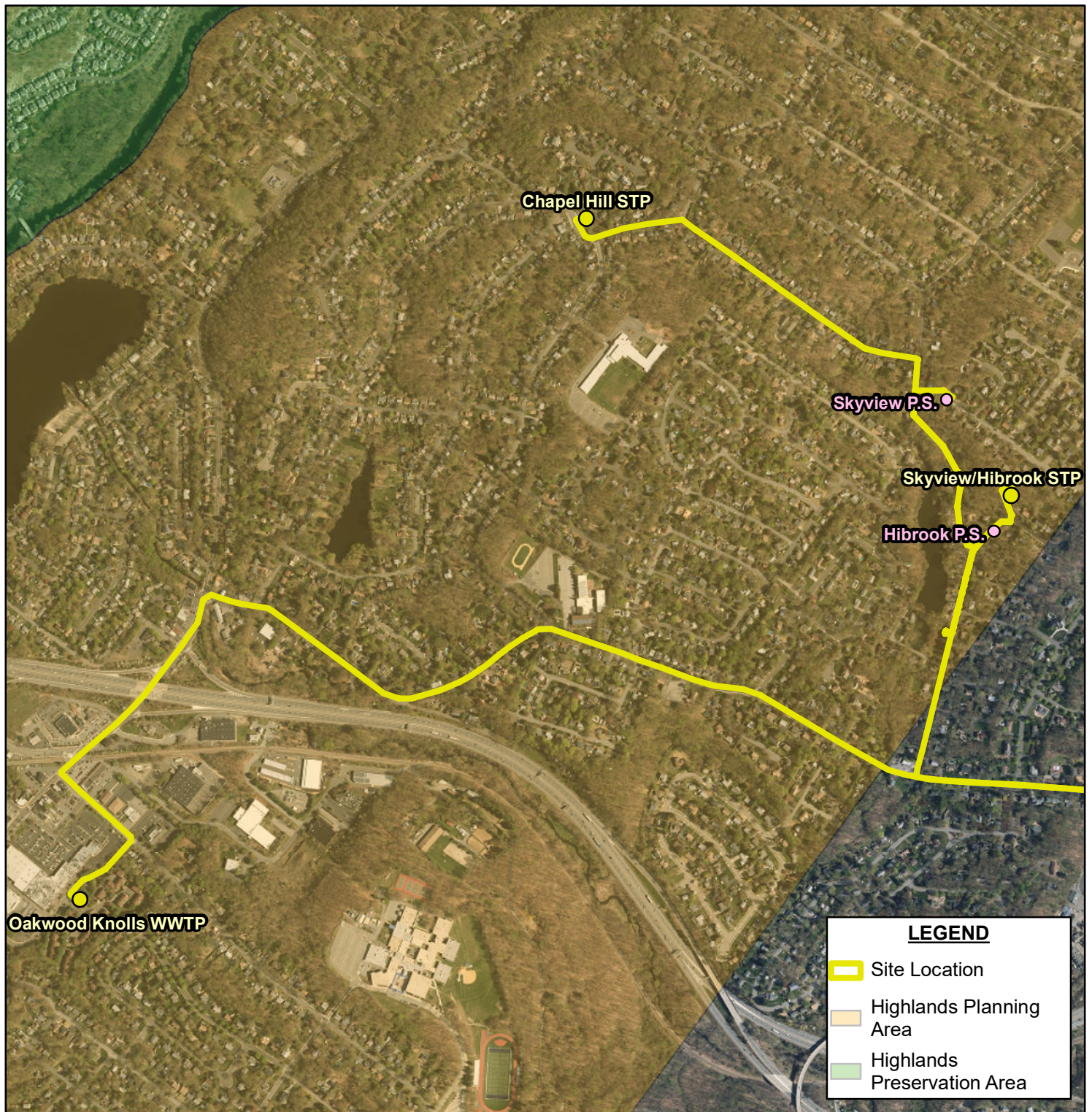
BERGEN COUNTY

NEW JERSEY

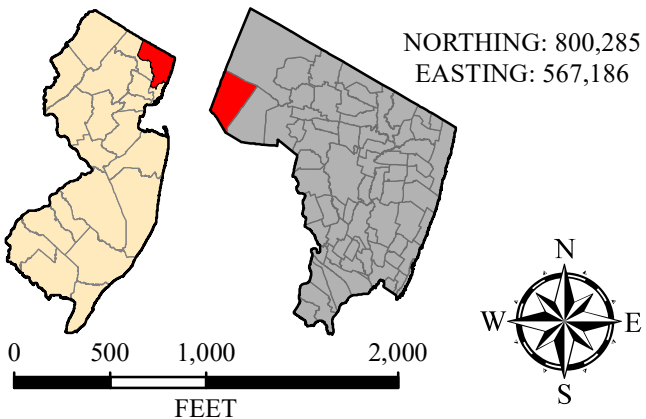
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XXIV



SOURCE: NJ HIGHLANDS COUNCIL PLANNING AND PRESERVATION DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

HIGHLANDS BOUNDARY MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

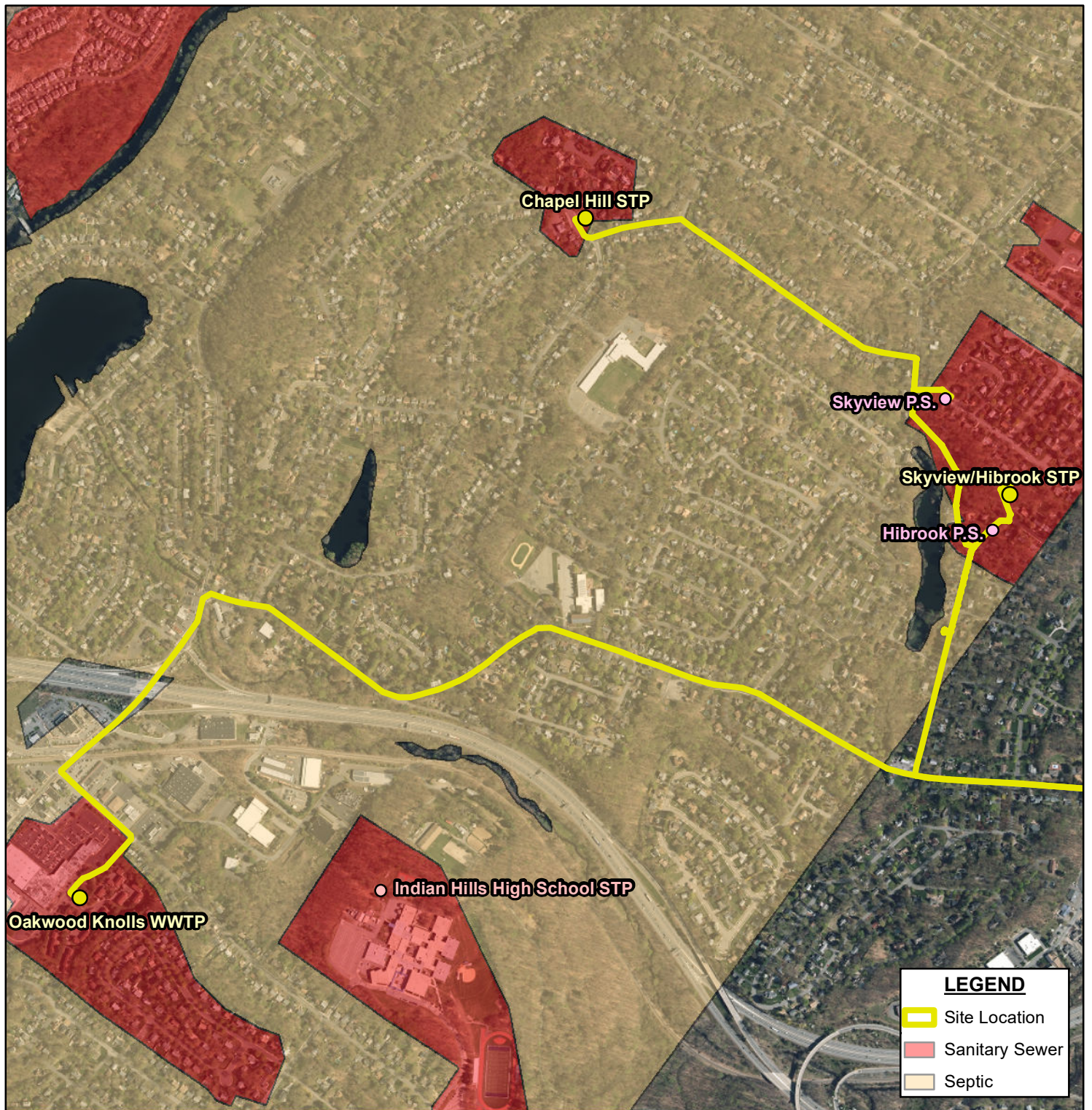
BERGEN COUNTY

NEW JERSEY

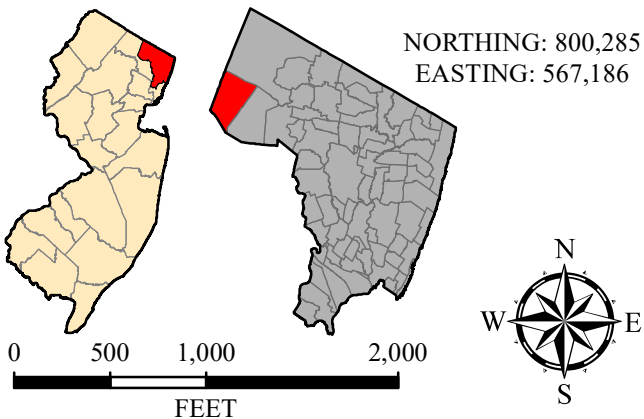
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE XXV



SOURCE: NJDEP SEWER SERVICE AREAS DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

SEWER SERVICE AREA MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

BERGEN COUNTY

NEW JERSEY

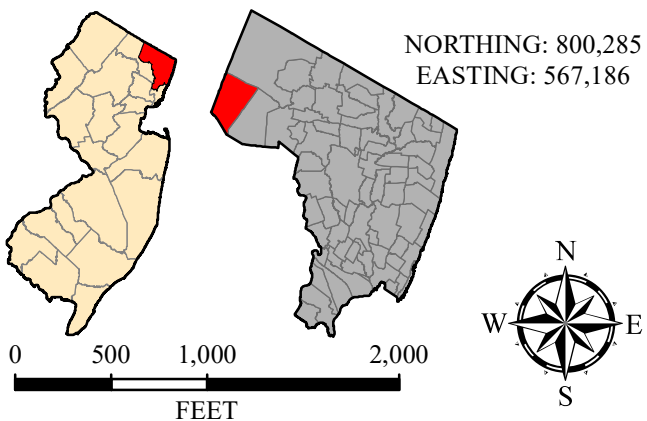
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XXVI



SOURCE: VARIOUS NJDEP ENVIRONMENTAL CONSTRAINT DATALAYERS



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

ENVIRONMENTAL OVERLAY MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
NEW JERSEY INFRASTRUCTURE BANK APPLICATION
BOROUGH OF OAKLAND

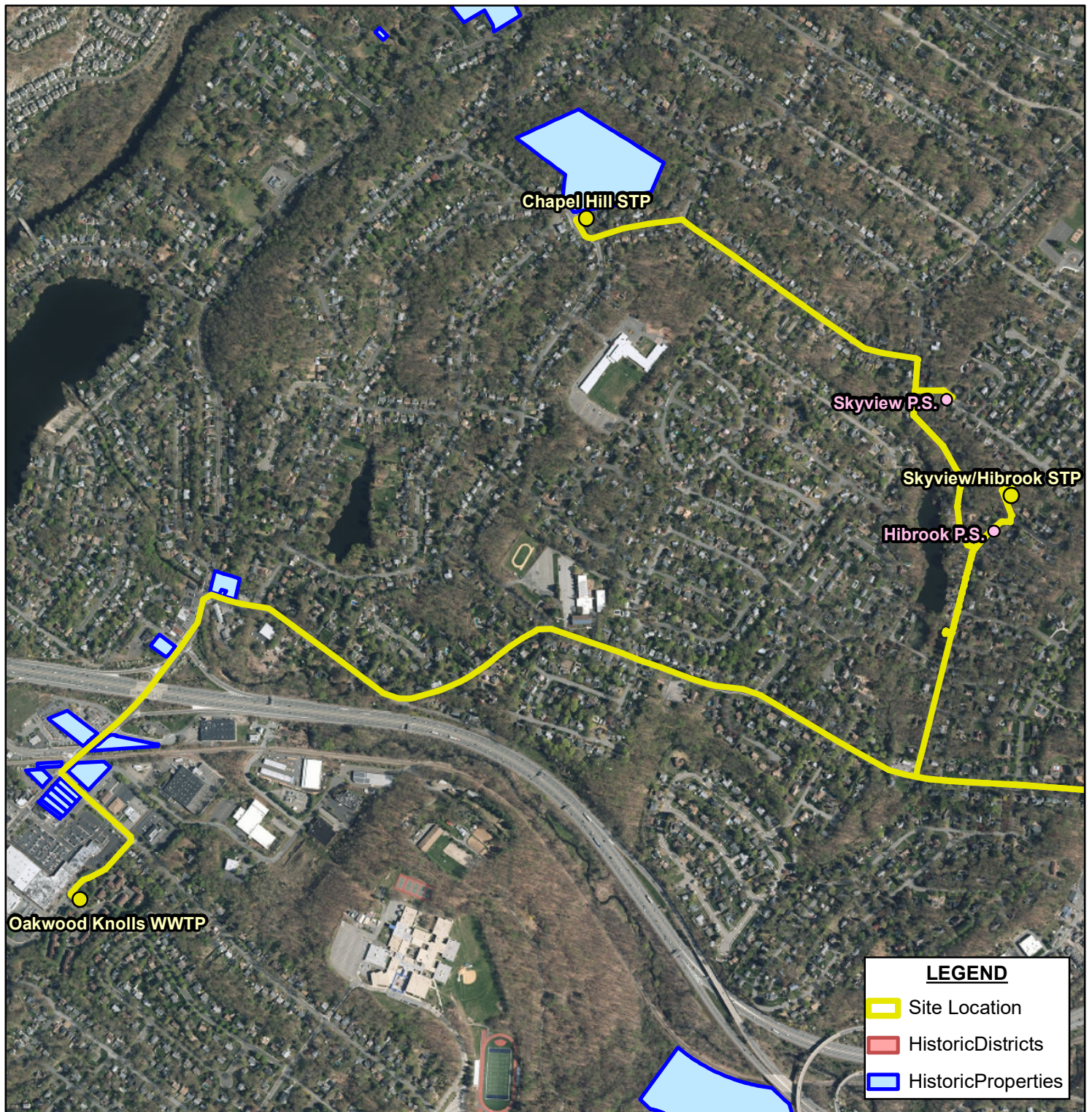
BERGEN COUNTY

NEW JERSEY

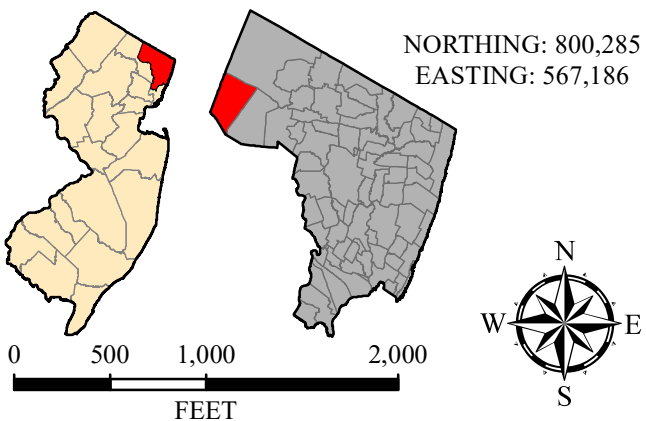
DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 1,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE XXVII



SOURCE: NJDEP HISTORIC PROPERTIES DATA LAYER



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

HISTORICAL PROPERTIES MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

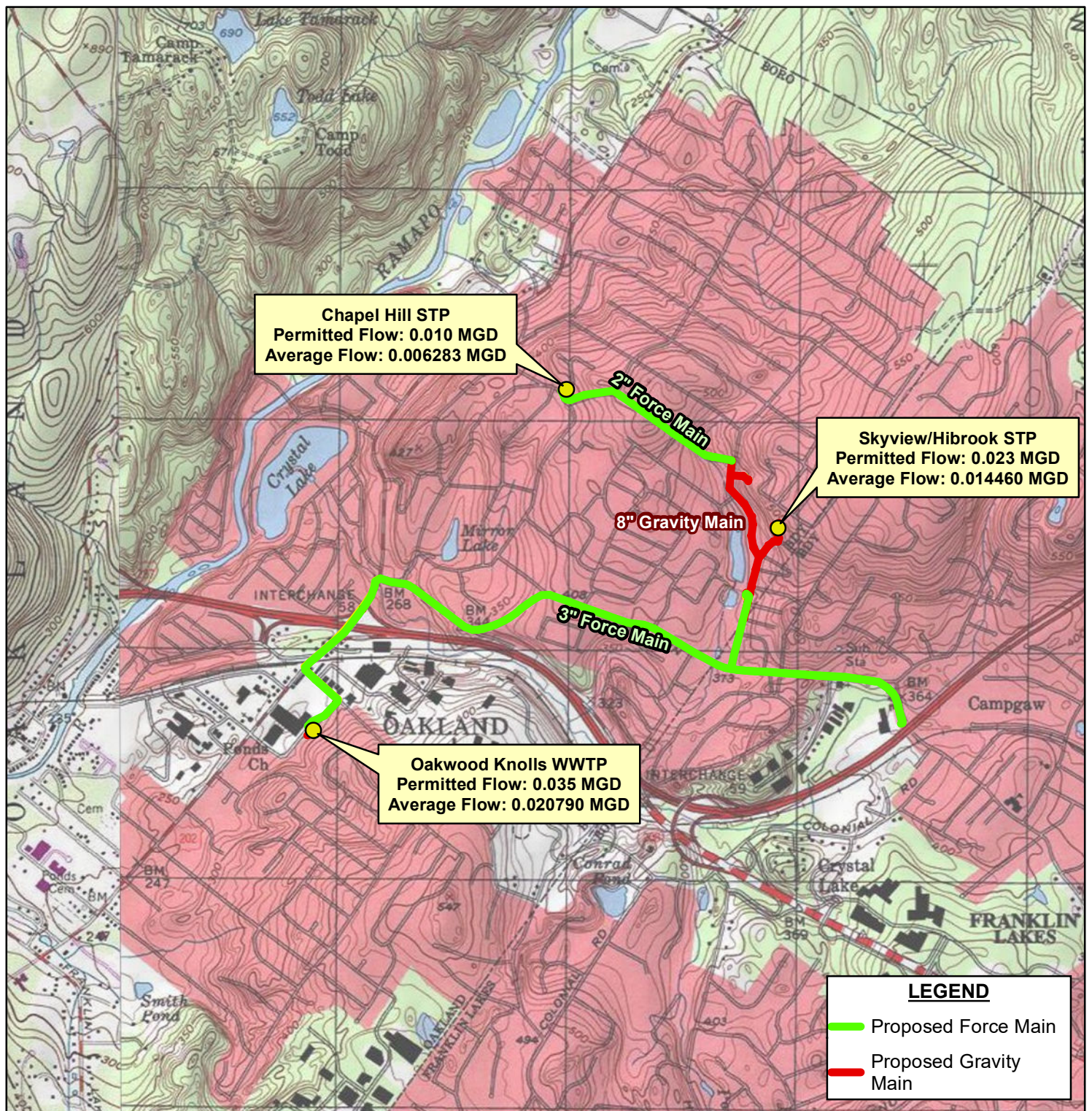
BERGEN COUNTY

NEW JERSEY

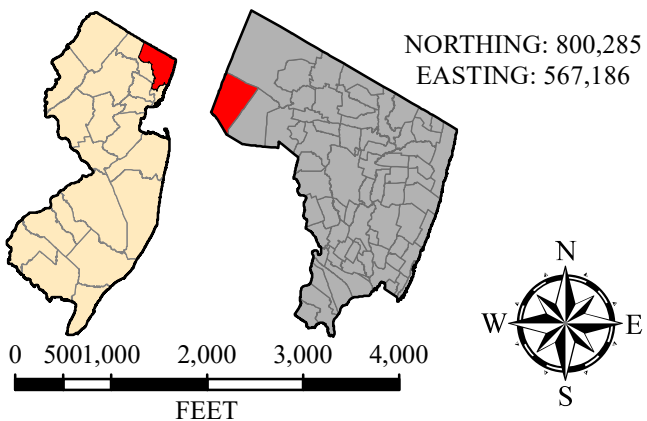
DR. BY: JMW
 CKD. BY: GD

SCALE: 1 IN = 1,000 FT
 DATE: SEPTEMBER 2020

JOB NO. OK-1653
 FIGURE XXVIII



SOURCE: UNITED STATES GEOLOGICAL SURVEY (USGS) RAMSEY QUADRANGLE



BOSWELL ENGINEERING

330 PHILLIPS AVE., SOUTH HACKENSACK, N.J. 07606

WASTEWATER CONVEYANCE MAP
OAKLAND SANITARY SEWER IMPROVEMENTS
 NEW JERSEY INFRASTRUCTURE BANK APPLICATION
 BOROUGH OF OAKLAND

BERGEN COUNTY

NEW JERSEY

DR. BY: JMW
CKD. BY: GD

SCALE: 1 IN = 2,000 FT
DATE: SEPTEMBER 2020

JOB NO. OK-1653
FIGURE XXIX

Appendix A

1. New Jersey and National Registers of Historic Places



BOSWELL ENGINEERING

ENGINEERS - SURVEYORS - PLANNERS - SCIENTISTS
330 PHILLIPS AVENUE, SOUTH HACKENSACK, N.J. 07606
TEL: (201) 641-0770 • FAX: (201) 641-1831



Haring-Blauvelt House (ID#589)

454 Tappan Road
NR: 1/10/1983 (NR Reference #: 83001511)
SR: 10/3/1980
(#105-Thematic Nomination of Early Stone Houses of Bergen County)

Norwood Borough

Captain Thomas Blanch House (ID#590)

130 Tappan Road
NR: 1/10/1983 (NR Reference #: 83001470)
SR: 10/3/1980
(#106 - Thematic Nomination of Early Stone Houses of Bergen County; Destroyed by fire May 26, 1997)

Blauvelt House (ID#591)

54 Tappan Road
NR: 1/10/1983 (NR Reference #: 83001474)
SR: 10/3/1980
(#107 - Thematic Nomination of Early Stone Houses of Bergen County)

Church of the Holy Communion (ID#592)

Summit Avenue
NR: 6/23/1988 (NR Reference #: 88000928)
SR: 5/1/1988

Ferdon House (ID#593)

366 Fourteenth Street
NR: 1/10/1983 (NR Reference #: 83001505)
SR: 10/3/1980
(#109 - Thematic Nomination of Early Stone Houses of Bergen County)

Haring-Vervalen House (ID#594)

200 Tappan Road
NR: 1/10/1983 (NR Reference #: 83001517)
SR: 10/3/1980
(#108 - Thematic Nomination of Early Stone Houses of Bergen County, demolished between 2012-2015.)

Presbyterian Church of Norwood (ID#4266)

701 Broadway
NR: 2/1/2006 (NR Reference #: 05001567)
SR: 12/7/2005
COE: 4/20/2004

Oakland Borough

Bogert-Wilkens Factories Sites (ID#595)

SHPO Opinion: 12/26/1990

Caille Lake Dam Site (ID#596)

SHPO Opinion: 6/25/1980

Abraham Demarest House (ID#597)

213 Ramapo Valley Road
NR: 1/10/1983 (NR Reference #: 83001491)
SR: 10/3/1980
(#113 - Thematic Nomination of Early Stone Houses of Bergen County)

Jacobus Demarest House (ID#599)

3 Dogwood Drive
NR: 1/10/1983 (NR Reference #: 83001493)
SR: 10/3/1980
(#112 - Thematic Nomination of Early Stone Houses of Bergen County)

Demarest-Hopper House (ID#598)

21 Breakneck Road
NR: 1/10/1983 (NR Reference #: 83001490)
SR: 10/3/1980
(#114 - Thematic Nomination of Early Stone Houses of Bergen County)

Doty Road Bridge (SI&A #020042A) (ID#600)

Doty Road over Ramapo River
SHPO Opinion: 2/16/1990
(Demolished; new bridge to east.)

Mill Dam Remains (ID#601)

SHPO Opinion: 6/25/1980

Salwen Prehistoric Site (28-Be-180) (ID#602)

SHPO Opinion: 12/26/1990

Sandy Beach Recreation Facility (ID#603)

SHPO Opinion: 12/26/1990

Van Allen House (ID#604)

Northeast corner of US Route 202 and Franklin Avenue
NR: 7/24/1973 (NR Reference #: 73001080)
SR: 6/13/1973
(a.k.a Hendrick Van Aulen House #110 - Thematic Nomination of Early Stone Houses of Bergen County)

Van Winkle-Fox House (ID#605)

669 Ramapo Valley Road
NR: 1/10/1983 (NR Reference #: 83001578)
SR: 10/3/1980
(#111 - Thematic Nomination of Early Stone Houses of Bergen County)

Vygeberg Farm Office Building (ID#4261)

3 Franklin Avenue
COE: 9/18/2001
(Older COE Chrono #G1997-036 clarified that this was also individually eligible and therefore a contributing feature of the Van Allen House)

Appendix B

1. Water Allocation Minor Modification Application



BOSWELL ENGINEERING

ENGINEERS - SURVEYORS - PLANNERS - SCIENTISTS
330 PHILLIPS AVENUE, SOUTH HACKENSACK, N.J. 07606
TEL: (201) 641-0770 • FAX: (201) 641-1831



M² Associates Inc

Providers of Geologic, Environmental, & Groundwater Consulting Services

May 19, 2020

Terry Pilawski
Bureau Chief
Bureau of Water Allocation and Well Permitting
New Jersey Department of Environmental Protection
Mail Code 401-04Q
PO Box 420
Trenton, New Jersey 08625

Re: Oakland Water Department, Oakland Borough, Bergen County, New Jersey.
Application for Minor Modification to Water Allocation Permit 5199.

Dear Ms. Pilawski:

Enclosed please find the application for a minor modification to Water Allocation Permit 5199 for Oakland Water Department, Oakland Borough, Bergen County, New Jersey. This application is submitted as per discussions between the Borough and New Jersey Department of Environmental Protection (NJDEP) regarding the decommissioning of three small wastewater treatment plants and the extension of sewer service from the Borough to the Northwest Bergen County Utilities Authority (NBCUA) wastewater treatment plant in Waldwick, New Jersey. Transmitting wastewater from the Borough to the NBCUA facility would result in an inter-basin transfer of water from the Pompton, Pequannock, Wanaque, Ramapo basin to the Lower Passaic and Saddle River basin.

The three small wastewater treatment plants were constructed as part of residential developments. Given the age and construction; these plants are not operating at design capacities. In addition, many of the homes and businesses within the Borough utilize septic systems for the disposal of wastewater. It is a public benefit to replace these community wastewater treatment facilities and any failing septic systems with the NBCUA facility.

NBCUA has the capacity to treat the 1.8 million gallons per day (mgd) that the Borough would like to stop discharging to the community plants and septic systems. However, the Borough recognizes that the transfer of 1.8 mgd from the Ramapo basin could affect downstream conditions. At this time, the Borough will transfer 0.065 mgd (65,000 gallons per day) to address the most significant concerns with community systems.

Oakland Borough derives its water from seven wells completed in stratified drift deposits near the Ramapo River. The Water Department was granted Water Allocation Permit 5199, which allows the diversion of 124 million gallons per month (mgm) and 759 million gallons per year (mgy) of groundwater from these wells. To compensate for the transfer of wastewater to NBCUA, the Borough is proposing to reduce its diversions by an equal volume of 0.065 mgd. This is equivalent to a monthly maximum decrease of 2.015 mgm and an annual decrease in permitted allocation of 23.725 mgy.

Water diversions as reported to NJDEP-Bureau of Water Allocation & Well Permitting for the period January 1, 2005 to December 31, 2019 were evaluated to assess maximum monthly and annual withdrawals, and the average and median diversions for the Borough. The compilation of these data are summarized as follows:

| | January | February | March | April | May | June | July | August | September | October | November | December | Annual |
|----------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|--------|
| Maximum: | 49.99 | 48.71 | 52.59 | 50.41 | 59.26 | 67.72 | 73.19 | 75.87 | 75.25 | 45.94 | 49.91 | 50.28 | 608.78 |
| Average: | 35.57 | 33.09 | 36.85 | 37.87 | 46.25 | 51.66 | 61.33 | 59.23 | 53.91 | 40.16 | 34.54 | 34.98 | 525.44 |
| Median: | 35.52 | 31.04 | 34.97 | 37.05 | 44.75 | 51.90 | 63.12 | 59.66 | 50.50 | 39.57 | 34.66 | 34.20 | 528.88 |

The maximum monthly diversion for this 15-year period was 75.87 mgm in August of 2005. A slightly lower maximum monthly diversion was recorded in September 2015 at 75.25 mgm. If the Borough's permitted maximum monthly allocations is reduced from 124 to 121.985 mgm to compensate for the transfer of 0.065 mgd, the Borough remains unlikely to exceed its allowable monthly allocation.

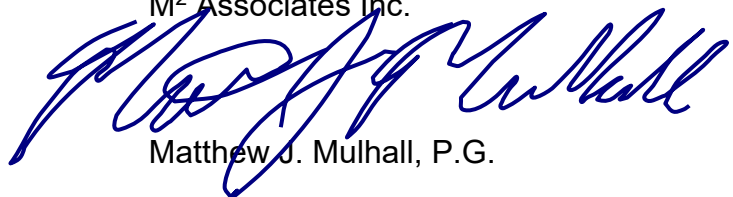
The maximum annual water use was 608.782 mgy in 2015. In 2014, 590.253 mgy were withdrawn from the wells. The average and median annual water use is much lower. If the annual allocation were reduced from 759 to 735.275 mgy to off-set the 0.065 mgd transfer, the Borough is unlikely to exceed their new annual allocation limit.

Based on the 15-years of water use data, the Water Department has sufficient capacity and allocations to continue to meet its water-supply demands. Reducing the permitted monthly and annual diversions to compensate for the transfer of 0.065 mgd will not result in the Water Department exceeding its new permitted allocations to meet Borough water demands.

Respectfully, we request NJDEP-Bureau of Water Allocation & Well Permitting accept the requested minor modification to Water Allocation Permit 5199 to reduce the Oakland Water Department's monthly and annual allocation limits to 121.985 mgm and 735.275 mgy to compensate for the transfer of 0.065 mgd from the Ramapo River basin to the Saddle River basin and the NBCUA facility. We also request that the new limits not be imposed until the day when discharges to NBCUA are initiated.

We look forward to working with you on this application, if you have any technical questions; please call Matt Mulhall at (908) 238-0827. For engineering questions, please contact Kevin Boswell at (201) 641-0770. For all other questions, please contact Richard Kunze, Borough Administrator at (201) 337-8111 ext. 2004.

Respectfully submitted,
M² Associates Inc.



Matthew J. Mulhall, P.G.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
MAIL CODE 401-04Q
DIVISION OF WATER SUPPLY & GEOSCIENCE
BUREAU OF WATER ALLOCATION & WELL PERMITTING
P.O. Box 420
TRENTON, NEW JERSEY 08625-0420
(609) 984-6831



WATER ALLOCATION PERMIT APPLICATION
MINOR MODIFICATION

PLEASE READ THE INSTRUCTIONS BEFORE COMPLETING THIS APPLICATION FORM.
Provide all requested information, as applicable.

A. LOCATION AND PROPERTY INFORMATION

The Department maintains a single database of regulated sites. The following information will prevent unnecessary duplication of data.

1. ACTUAL DIVERSION LOCATION

Name of Facility Application is for (For facilities pending or under construction, please use the proposed facility name)
Oakland Water Department

Street Address/Location (or nearest cross streets if no address is available; P.O. Boxes are not acceptable)

63 Oak Street

City or Town Oakland State NJ Zip Code 07436 +

Municipality Oakland Borough Does the Facility span multiple municipalities? Yes ☐ No ☒

County Bergen Does the Facility span multiple counties? Yes ☐ No ☒

2. PROPERTY/LAND OWNERS(S) INFORMATION

Name Oakland Borough Telephone (201) 337-8104

Mailing Address 1 Municipal Plaza

City or Town Oakland State NJ Zip Code 07436 +

Organization Type: ☐ Authority/District/Commission ☒ Municipal ☐ County ☐ State
(Check one) ☐ Commercial/Industry ☐ Individually Owned ☒ Utility ☐ Corporation
☐ Investor (Non-BPU) ☐ Investor (BPU) ☐ Other

3. APPLICANT/OPERATING ENTITY(IES)

Name Oakland Borough Water Department Telephone (201) 337-8104

Mailing Address 63 Oak Street

City or Town Oakland State NJ Zip Code 07436 +

Fax (201) 405-7723 E-Mail address dpw@oakland-nj.org

CONTACT INFORMATION

Application Contact (contact at the above address for all application matters):

If an agent has been authorized under the certification section of the application to act as the agent/representative in all matters pertaining to the application, please check here: ☐

If an agent has not been authorized, provide an Application Contact:

Name Matthew J. Mulhall Telephone (908) 238-0827

Reporting Form Recipient/Permit Contact (contact at the above address for permit information and monitoring reports):

Name Anthony Marcucilli Telephone (201) 337-8103

Title Superintendent Department Water

4. RESPONSIBLE ENTITY/ORGANIZATION

If the responsible organization is the Applicant located in No. 3 above, check here: ☒

If the responsible organization is different from the Applicant in No. 3 above, complete the following:

Organization Name _____ Telephone () _____

Mailing Address _____

City or Town _____ State _____ Zip Code _____ + _____

Fax () _____ E-Mail _____

Organization Type: ☐ Authority/District/Commission ☐ Municipal ☐ County ☐ State
(Check one) ☐ Commercial/Industry ☐ Individually Owned ☐ Utility ☐ Corporation
☐ Investor (Non-BPU) ☐ Investor (BPU) ☐ Other _____

5. BILLING CONTACT

Billing should go to mailing address of:

☐ Responsible Entity/Organization address in No. 4 ☒ Applicant/Operating Entities address in No. 3

Name Anthony Marcucilli Telephone (201) 337-8103

6. OTHER PERMITS/AGENCIES

Provide the following for any other state, local or federal permit that has been applied for/obtained in relation to this project.

| Permit Type | Application No./ Permit No./Relevant DEP No. | Application Date | Application Status |
|---|--|------------------|--------------------|
| ● Water Quality Management Plan Amendment | | | |
| ● Safe Drinking Water System/Potable Water Supply Well or Intake | PWSID0242001 | | Approved |
| ● Hazardous Waste Management Program | | | |
| ● Land Use Permits (Freshwater Wetlands, etc.) | | | |
| ● Relevant Environmental Permits – Including Federal, State, & Local Approvals – Specify: | | | |
| | | | |
| | | | |
| | | | |

Is the project located within the New Jersey Pinelands Area? ___ Yes ☒ No

If this application includes a new source of supply, which is located in the New Jersey Pinelands Area, or is for an increase in allocation, then a Certificate of Filing or Public Development Approval (whichever is appropriate) from the

New Jersey Pinelands Commission must be submitted with the application. The Pinelands Commission can be contacted at (609) 894-7300.

Is the project located in the Delaware River Basin? ☐ Yes ☒ No

If Yes, has a docket been issued for this project by the Delaware River Basin Commission?

☐ Yes Docket No. _____

☐ No Docket applied for on _____ (Date)

The Delaware River Basin Commission can be contacted at (609) 883-9500.

B. CERTIFICATIONS

In cases where the official required to sign Certification 1 below is the same person as the official required to sign the Certification 2 below, only Certification 1 need be signed. In all other cases, both certifications shall be completed.

1. HIGHEST RANKING INDIVIDUAL OF FACILITY

This certification is to be signed by the highest-ranking individual at the facility with overall responsibility for that facility.

I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate or incomplete information, including fines and/or imprisonment.

Date



Signature

Anthony Marcucilli

Name (please print)

Superintendent

Title

2. HIGHEST RANKING INDIVIDUAL

This certification shall be signed as follows:

- (a) For a corporation, by a principal executive officer of at least the level of vice president; or
- (b) For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
- (c) For a municipality, State, Federal or other public agency, by either the principal executive officer ranking elected official.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information. I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate or incomplete information, including the possibility of fines and/or imprisonment.

Date



Signature

Linda Schwager

Name (please print)

Mayor

Title

3. APPLICANT'S AGENT (IF APPLICABLE)

I, the Applicant/Owner _____ or Applicant/Operator (when the owner of the facility and the operator of the facility are distinct parties) _____ or Co-permittee (if applicable) _____ authorize to act as my agent/representative in all matters pertaining to my application the following person:

Name _____ Phone _____

Company/Employer _____

Address _____ County _____

City or Town _____ State _____ Zip Code _____

Occupation/Profession _____

E-Mail address _____

(Signature of Applicant/Owner)

(Signature of Applicant/Owner)

(Signature of Co-permittee)

AGENT'S CERTIFICATION

Sworn before me

this _____ day of
_____ 20 _____

Notary Public

I agree to serve as agent for the above mentioned applicant

(Signature of Agent)

4. STATEMENT OF PREPARER OF PLANS, SPECIFICATIONS, SURVEYORS OR TECHNICAL REPORT (IF APPLICABLE)

I hereby certify that the engineering plans, specifications and engineer's report applicable to this project comply with the current rules and regulations of the State Department of Environmental Protection with the exceptions as noted.

(Signature of Engineer)

Type: Name and Date

Position, Name of Firm

PROFESSIONAL ENGINEER'S
EMBOSSSED SEAL

C. REASON FOR MINOR MODIFICATION

Check the appropriate reason for minor modification request:

| | | |
|-------------------------------------|----|--|
| <input type="checkbox"/> | 1. | A Replacement Diversion source within 100 feet of the original diversion source |
| <input type="checkbox"/> | 2. | The Addition of a Backup Diversion source within 100 feet of the original diversion source |
| <input type="checkbox"/> | 3. | Groundwater Remediation activities such as: -relocation or replacement of diversion source -increase of pump capacity -addition of diversion source |
| <input type="checkbox"/> | 4. | The Addition of an Off-stream, bermed, lined pond |
| <input type="checkbox"/> | 5. | Sale of Property: _____ |
| <input checked="" type="checkbox"/> | 6. | Other: <u>Reduction in allocation as part of interbasin transfer.</u> |

D. REQUIRED SUBMITTALS/ APPLICATION ATTACHMENTS

Check to ensure the following are included with the application:

| Included | | |
|--------------------------|----|---|
| <input type="checkbox"/> | 1. | Map showing location(s) of any proposed/new source(s) in relation to existing source(s) |
| <input type="checkbox"/> | 2. | Well Record any proposed/new source(s) |
| <input type="checkbox"/> | 3. | Decommissioning Records for any wells being replaced |

E. DIVERSION REQUEST AND DIVERSION SOURCE INFORMATION

This application is for a Minor Modification of:

☒ Existing Permit No. 5199 Activity No. (if known) WAP120001

1. Present Allocation:

a. Groundwater: 124 million gallons of water per month at a maximum rate of 4200 gallons per minute.

Please note the present Aquifer Specific Allocation:

| Aquifer/Formation Name | Present Allocation (million gallons) | |
|------------------------|---|----------------|
| | Per Month (mgm) | Per Year (mgy) |
| | | |
| | | |
| | | |

b. Surface water: 0 million gallons of water per month at a maximum rate of 0 gallons per minute.

c. All sources: 124 million gallons of water per month at a maximum rate of 4200 gallons per minute.

d. All sources: 759 million gallons of water per year.

Note: Monthly allocations are established based upon the maximum withdrawal expected during any one month (31 days) of the calendar year.

2. Diversion to be used for public community supply.

3. Complete the following for each diversion source:

a. Groundwater (wells)

| State Well Permit No. (mandatory) | Well Local Name | Location Description | Existing (E) Proposed (P) | Proposed Maximum Withdrawal Rate (million gallons) | |
|--------------------------------------|-----------------|----------------------|------------------------------|--|----------|
| | | | | Per Month | Per Year |
| 2300000994 | 5 | 81 Oak Street | E | 30.2 | 363 |
| 2300001929 | 6 | 13 Valley Forge Rd. | E | 8.6 | 104 |
| P201006035 | 7 | 13 Valley Forge Rd. | E | 17.3 | 207 |
| 2300002507 | 8 | 13 Valley Forge Rd. | E | 56.2 | 674 |
| 2300005006 | 9 | 25 Raritan Dr. | E | 15.1 | 181 |
| 2300005007 | 10 | 58 Spruce St. | E | 45.4 | 544 |
| P201117614 | 8A (Backup) | 13 Valley Forge Rd. | E | 49.7 | 596 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

4. Complete Addendum A and B for each diversion source.

ADDENDUM A **SOURCE DATA FOR GROUNDWATER (WELLS)**

Complete Well information for all existing and proposed sources. This information is mandatory. Refer to instructions for acceptable values. Please reference the same State Well Permit Numbers and Well Names as referenced in Section D of the application. Attach additional copies of addendum as needed.

| | | | |
|--|------------------------------|--|------------------------------|
| State Well Permit No. | 2300000994 | State Well Permit No. | 2300001929 |
| Well Local Name | 5 | Well Local Name | 6 |
| Date Drilled | 2/23/1954 | Date Drilled | 4/14/1956 |
| Total Finished Depth (feet) (include tailpiece if any) | 130 | Total Finished Depth (feet) (include tailpiece if any) | 96 |
| Depth to Top of Open Hole Interval or Screen (feet) | 108 | Depth to Top of Open Hole Interval or Screen (feet) | 83 |
| Depth to Bottom of Open Hole Interval or Screen (feet) | 128 | Depth to Bottom of Open Hole Interval or Screen (feet) | 86 |
| Rated Pump Capacity (gpm) | 700 | Rated Pump Capacity (gpm) | 200 |
| Yield (gpm) | 700 | Yield (gpm) | 200 |
| Aquifer/Geological Formation | Stratified Drift | Aquifer/Geological Formation | Stratified Drift |
| Elevation Information: | | Elevation Information: | |
| Site Elevation | 220 | Site Elevation | 237.34 |
| Elevation System Description | ft amsl | Elevation System Description | ft amsl |
| Elevation Method Description | DEP Program Database | Elevation Method Description | DEP Program Database |
| Absolute Elevation Accuracy | 10 | Absolute Elevation Accuracy | 0.1 |
| Absolute Elevation Accuracy Units (feet or meters) | feet | Absolute Elevation Accuracy Units (feet or meters) | feet |
| Locational Information: | | Locational Information: | |
| X coordinate (e.g. Longitude) of well center | 741348.835 | X coordinate (e.g. Longitude) of well center | 741509.595 |
| Y coordinate (e.g. Latitude) of well center | 410133.836 | Y coordinate (e.g. Latitude) of well center | 410126.927 |
| Coordinate System Code and Description | 20 Lat/Long (NAD83) - DMS | Coordinate System Code and Description | 20 Lat/Long (NAD83) - DMS |
| Coordinate Method Description | DEP Program Database | Coordinate Method Description | DEP Program Database |
| Absolute Location Accuracy | 10 | Absolute Location Accuracy | 10 |
| Accuracy Units (feet or meters) | feet | Accuracy Units (feet or meters) | feet |

ADDENDUM A **SOURCE DATA FOR GROUNDWATER (WELLS)**

Complete Well information for all existing and proposed sources. This information is mandatory. Refer to instructions for acceptable values. Please reference the same State Well Permit Numbers and Well Names as referenced in Section D of the application. Attach additional copies of addendum as needed.

| | | | |
|--|------------------------------|--|------------------------------|
| State Well Permit No. | P201006035 | State Well Permit No. | 2300002507 |
| Well Local Name | 7 | Well Local Name | 8 |
| Date Drilled | 8/6/1957 | Date Drilled | 4/11/1959 |
| Total Finished Depth (feet) (include tailpiece if any) | 100 | Total Finished Depth (feet) (include tailpiece if any) | 112 |
| Depth to Top of Open Hole Interval or Screen (feet) | 63 | Depth to Top of Open Hole Interval or Screen (feet) | 87 |
| Depth to Bottom of Open Hole Interval or Screen (feet) | 83 | Depth to Bottom of Open Hole Interval or Screen (feet) | 112 |
| Rated Pump Capacity (gpm) | 400 | Rated Pump Capacity (gpm) | 1300 |
| Yield (gpm) | 300 | Yield (gpm) | 1300 |
| Aquifer/Geological Formation | Stratified Drift | Aquifer/Geological Formation | Stratified Drift |
| Elevation Information: | | Elevation Information: | |
| Site Elevation | 250 | Site Elevation | 240 |
| Elevation System Description | ft amsl | Elevation System Description | ft amsl |
| Elevation Method Description | DEP Program Database | Elevation Method Description | DEP Program Database |
| Absolute Elevation Accuracy | 10 | Absolute Elevation Accuracy | 10 |
| Absolute Elevation Accuracy Units (feet or meters) | feet | Absolute Elevation Accuracy Units (feet or meters) | feet |
| Locational Information: | | Locational Information: | |
| X coordinate (e.g. Longitude) of well center | 741508.308 | X coordinate (e.g. Longitude) of well center | 741331.62 |
| Y coordinate (e.g. Latitude) of well center | 410125.019 | Y coordinate (e.g. Latitude) of well center | 410301.41 |
| Coordinate System Code and Description | 20 Lat/Long (NAD83) - DMS | Coordinate System Code and Description | 20 Lat/Long (NAD83) - DMS |
| Coordinate Method Description | DEP Program Database | Coordinate Method Description | DEP Program Database |
| Absolute Location Accuracy | 10 | Absolute Location Accuracy | 10 |
| Accuracy Units (feet or meters) | feet | Accuracy Units (feet or meters) | feet |

ADDENDUM A

SOURCE DATA FOR GROUNDWATER (WELLS)

Complete Well information for all existing and proposed sources. This information is mandatory. Refer to instructions for acceptable values. Please reference the same State Well Permit Numbers and Well Names as referenced in Section D of the application. Attach additional copies of addendum as needed.

| | | | |
|--|------------------------------|--|------------------------------|
| State Well Permit No. | 2300005006 | State Well Permit No. | 2300005007 |
| Well Local Name | 9 | Well Local Name | 10 |
| Date Drilled | 8/1/1967 | Date Drilled | 8/22/1967 |
| Total Finished Depth (feet) (include tailpiece if any) | 155 | Total Finished Depth (feet) (include tailpiece if any) | 100 |
| Depth to Top of Open Hole Interval or Screen (feet) | 85 | Depth to Top of Open Hole Interval or Screen (feet) | 65 |
| Depth to Bottom of Open Hole Interval or Screen (feet) | 95 | Depth to Bottom of Open Hole Interval or Screen (feet) | 91 |
| Rated Pump Capacity (gpm) | 350 | Rated Pump Capacity (gpm) | 1050 |
| Yield (gpm) | 350 | Yield (gpm) | 1050 |
| Aquifer/Geological Formation | Stratified Drift | Aquifer/Geological Formation | Stratified Drift |
| Elevation Information: | | Elevation Information: | |
| Site Elevation | 298.7 | Site Elevation | 212.9 |
| Elevation System Description | ft amsl | Elevation System Description | ft amsl |
| Elevation Method Description | DEP Program Database | Elevation Method Description | DEP Program Database |
| Absolute Elevation Accuracy | 10 | Absolute Elevation Accuracy | 10 |
| Absolute Elevation Accuracy Units (feet or meters) | feet | Absolute Elevation Accuracy Units (feet or meters) | feet |
| Locational Information: | | Locational Information: | |
| X coordinate (e.g. Longitude) of well center | 741328.77 | X coordinate (e.g. Longitude) of well center | 741521.17 |
| Y coordinate (e.g. Latitude) of well center | 410259.84 | Y coordinate (e.g. Latitude) of well center | 410109.02 |
| Coordinate System Code and Description | 20 Lat/Long (NAD83) - DMS | Coordinate System Code and Description | 20 Lat/Long (NAD83) - DMS |
| Coordinate Method Description | DEP Program Database | Coordinate Method Description | DEP Program Database |
| Absolute Location Accuracy | 10 | Absolute Location Accuracy | 10 |
| Accuracy Units (feet or meters) | feet | Accuracy Units (feet or meters) | feet |

ADDENDUM A

SOURCE DATA FOR GROUNDWATER (WELLS)

Complete Well information for all existing and proposed sources. This information is mandatory. Refer to instructions for acceptable values. Please reference the same State Well Permit Numbers and Well Names as referenced in Section D of the application. Attach additional copies of addendum as needed.

| | | | |
|--|------------------------------|--|--|
| State Well Permit No. | P201117614 | State Well Permit No. | |
| Well Local Name | 8A (Backup) | Well Local Name | |
| Date Drilled | 11/16/2012 | Date Drilled | |
| Total Finished Depth (feet) (include tailpiece if any) | 115 | Total Finished Depth (feet) (include tailpiece if any) | |
| Depth to Top of Open Hole Interval or Screen (feet) | 89 | Depth to Top of Open Hole Interval or Screen (feet) | |
| Depth to Bottom of Open Hole Interval or Screen (feet) | 115 | Depth to Bottom of Open Hole Interval or Screen (feet) | |
| Rated Pump Capacity (gpm) | 1150 | Rated Pump Capacity (gpm) | |
| Yield (gpm) | 1380 | Yield (gpm) | |
| Aquifer/Geological Formation | Stratified Drift | Aquifer/Geological Formation | |
| Elevation Information: | | Elevation Information: | |
| Site Elevation | 230 | Site Elevation | |
| Elevation System Description | ft amsl | Elevation System Description | |
| Elevation Method Description | DEP Program Database | Elevation Method Description | |
| Absolute Elevation Accuracy | 10 | Absolute Elevation Accuracy | |
| Absolute Elevation Accuracy Units (feet or meters) | feet | Absolute Elevation Accuracy Units (feet or meters) | |
| Locational Information: | | Locational Information: | |
| X coordinate (e.g. Longitude) of well center | 741333.05 | X coordinate (e.g. Longitude) of well center | |
| Y coordinate (e.g. Latitude) of well center | 410302.28 | Y coordinate (e.g. Latitude) of well center | |
| Coordinate System Code and Description | 20 Lat/Long (NAD83) - DMS | Coordinate System Code and Description | |
| Coordinate Method Description | DEP Program Database | Coordinate Method Description | |
| Absolute Location Accuracy | 10 | Absolute Location Accuracy | |
| Accuracy Units (feet or meters) | feet | Accuracy Units (feet or meters) | |