ENVIRONMENTAL IMPACT STATEMENT
FOR
BLOCK 47, LOTS 2, 3, 4, 5, AND 6
TOWNSHIP OF WEST WINDSOR
MERCER COUNTY, NEW JERSEY

Prepared for:

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I. EXECUTIVE SUMMARY

East Ridge Development, LLC of Southlake, Texas, proposes a QuickChek food store with fuel sales and a restaurant within a 3.90± acre site known as Block 47, Lots 2, 3, 4, 5, and 6 in the Township of West Windsor, Mercer County, New Jersey. The site is occupied by the remains of residential, office, and agricultural buildings and is characterized by lawn/landscaped areas and upland woodlands. The site is bordered to the north by Princeton-Hightstown Road, to the south by McGetrick Lane, to the west by office development, and to the east by Southfield Road.

The site is proposed to be subdivided into proposed Lots 1 and 2. A 5,866 square feet (SF) QuickChek with fuel sales is proposed on proposed Lot 1. A 4,541 SF restaurant and drive-thru is proposed on proposed Lot 2. Forty-nine parking spaces are proposed for the QuickChek and 43 parking spaces are proposed for the restaurant. Two driveways are proposed with Princeton-Hightstown Road, with right-turn only exits. Two full access driveways are proposed with McGetrick Lane. A right-turn entrance and exit driveway is proposed with Southfield Road. McGetrick Lane is proposed to be realigned. A left-turn lane is proposed on Princeton-Hightstown Road for access into the proposed western driveway.

Stormwater from the developed portions of the site will be collected by a proposed stormwater management system. Porous pavement is proposed for the patio and parking spaces for the proposed restaurant as well as a portion of the parking spaces for the proposed QuickChek. This system will consist of a series of catch basins and inlets and subsurface piping that will convey stormwater to two bioretention basins to be located in the central and southern portions of the site and porous pavement areas located throughout the site. The stormwater management system has been designed to be in compliance with the requirements of the NJDEP's Stormwater Management Rules (N.J.A.C. 7:8) for runoff volume, water quality, ground water recharge, soil erosion and sediment control, and low impact development. For specific details regarding the proposed stormwater management system, refer to the Stormwater Management Report prepared for the project by Bohler dated November 2021.

The principal impacts of the proposed plan are those associated with a change in land use from residential, office, and agricultural development to business/services development. Long-term impacts to the site include an increase in impervious surfaces and the loss of disturbed habitats. Temporary impacts will occur during the construction phase of the project and include soil loss, and increased noise and dust levels. All impacts will be minimized through appropriate mitigation procedures and best management practices.

This Environmental Impact Statement (EIS) has been prepared by EcolSciences, Inc. of Rockaway, New Jersey in support of West Windsor Township's Land Use Ordinance §200-23 and is intended to support plans prepared by Bohler of Warren, New Jersey. The following chapters provide a project description, an inventory of existing environmental conditions in and around the site, a listing of required permits and approvals, an assessment of potential impacts associated with the proposed development plan, and a description of performance controls designed to mitigate adverse impacts.

II. DESCRIPTION OF THE DEVELOPMENT PLAN

A. General Description

East Ridge Development, LLC of Southlake, Texas, proposes a QuickChek food store with fuel sales and a restaurant within a 3.90± acre site known as Block 47, Lots 2, 3, 4, 5, and 6 in the Township of West Windsor, Mercer County, New Jersey (Figures 1 and 2). The site is occupied by the remains of residential, office, and agricultural buildings and is characterized by lawn/landscaped areas and upland woodlands. The site is bordered to the north by Princeton-Hightstown Road, to the south by McGetrick Lane, to the west by office development, and to the east by Southfield Road.

The site is proposed to be subdivided into proposed Lots 1 and 2. A 5,866 square feet (SF) QuickChek with fuel sales is proposed on proposed Lot 1. A 4,541 SF restaurant and drive-thru is proposed on proposed Lot 2. Forty-nine parking spaces are proposed for the QuickChek and 43 parking spaces are proposed for the restaurant. Two driveways are proposed with Princeton-Hightstown Road, with right-turn only exits. Two full access driveways are proposed with McGetrick Lane. A right-turn entrance and exit driveway is proposed with Southfield Road. McGetrick Lane is proposed to be realigned. A left-turn lane is proposed on Princeton-Hightstown Road for access into the proposed western driveway.

B. Master Planning and Zoning

The site is within the Business District (B-2A) Zone of the Township of West Windsor. Restaurants and gas service stations are both permitted uses within the B-2A Zone. The proposed project meets the requirements of the B-2A Zone with exception of some signage requirements. Variances are requested for some signage requirements. For details, please refer to the site plans prepared by Bohler (2021).

According to the New Jersey State Plan, the site is within the Suburban Planning Area (PA2). The Suburban Planning Area, having utility infrastructure, is expected to accommodate much of the market demand for future growth and new development in the state (New Jersey State Planning Commission, 1997). The state plan encourages centers as the focus for development; however, any development in the environs (areas outside centers) should be planned and located to maintain the existing character of the environs.

C. Sanitary Sewage

Sanitary sewage service for the proposed development will be provided through connections to existing facilities located along McGetrick Lane. Wastewater for the project will be conveyed to the Stony Brook Regional Sewerage Authority's sewage treatment plant for treatment. It is estimated

that the proposed development will generate 5,897 gallons per day (gpd) of wastewater (Bohler, 2021).

D. Potable Water Supply

Potable water for the proposed development will be obtained from the New Jersey American Water by a proposed 6-inch potable water line within McGetrick Lane, which will connect to the existing water line within Southfield Road. The estimated demand for potable water for the proposed development is 7,533 gpd (Bohler, 2021).

E. Stormwater Management Facilities

Stormwater from the developed portions of the site will be collected by a proposed stormwater management system. Porous pavement is proposed for the patio and parking spaces for the proposed restaurant as well as a portion of the parking spaces for the proposed QuickChek. This system will consist of a series of catch basins and inlets and subsurface piping that will convey stormwater to two bioretention basins to be located in the central and southern portions of the site and porous pavement areas located throughout the site. The stormwater management system has been designed to be in compliance with the requirements of the NJDEP's Stormwater Management Rules (N.J.A.C. 7:8) for runoff volume, water quality, ground water recharge, soil erosion and sediment control, and low impact development. For specific details regarding the proposed stormwater management system, refer to the Stormwater Management Report prepared for the project by Bohler dated November 2021.

Several "E" inlets are proposed along McGetrick Lane. A 300 linear foot 15-inch reinforced concrete stormwater pipe is proposed within McGetrick Lane, which will connect to existing stormwater manhole #100. A 282 linear foot 15-inch reinforce concrete stormwater pipe is proposed within McGetrick Lane, which will connect to existing stormwater manhole #200.

F. Utilities Plan

All other utilities (electricity, gas, cable television, telephone, etc.) will be provided through connections to the existing lines located along Princeton-Hightstown Road or Southfield Road.

G. Solid Waste Plan

Solid waste generated by the proposed development will be collected and transported to an approved landfill for disposal. The Township of West Windsor, in conjunction with Mercer County, has developed a recycling program that requires the recycling of glass, aluminum, metal cans, plastic bottles, corrugated cardboard, magazines, and newspaper.

III. INVENTORY OF EXISTING NATURAL RESOURCES

A thorough inventory of environmental conditions is a fundamental prerequisite to an understanding of a land tract's ecological and cultural history, current condition, and suitability for alternative future uses. The inventory of existing environmental conditions in this chapter is divided into systematic and logical subsections that treat each aspect of the site and vicinity in detail, and collectively define the constraints to future land use.

A. Geology

The portions of New Jersey that have similar sequences of rock types, geological structures, and geological history have been characterized as Physiographic Provinces - major areas of the state that have experienced specific geological histories and that have similar characteristics at present. From northwest to southeast across the State, the major physiographic provinces are: Appalachian Ridge and Valley, Highlands, Piedmont, and Coastal Plain. Each of these physiographic provinces has regional subdivisions, and each is also a continuation of larger regions in the northeastern United States (Widmer, 1964; Robichaud and Buell, 1973).

The Township of West Windsor is situated within the Inner Coastal Plain Physiographic Province. The Inner Coastal Plain has its origins in coastal, brackish, and marine depositions of clays, silts, sands, and gravels, which were laid down in the Cretaceous period. They were covered to some extent with later deposits made in interglacial Pleistocene time (80,000 –20,000 years ago) as a result of meltwaters from glaciers.

The surficial geology of the site consists of the Pensauken Formation, which consist of yellow, reddish yellow, or white sand, clayey sand, pebble gravel, minor silt, clay, and cobble gravel (NJDEP, August 4, 2021). The sand typically includes weathered feldspar and is locally iron-cemented. The Pensauken Formation may be as much as 140 feet thick (NJDEP, August 4, 2021). Below the surficial deposits, the is mapped as Magothy Formation, which consists of quartz sand, fine- to coarse-grained, interbedded with thin-bedded clay or clay-silt (NJDEP, August 4, 2021).

B. Topography

The topography of a site or area is a description of the variation in elevation of the land surface with horizontal distance; topography is generally described by contour maps where points of equal elevation are connected by smooth contours. The surficial topography of a site or area reflects the underlying geology as altered by geomorphological processes; the surficial topography, in turn, directly influences the drainage patterns, watercourses, soils, and biological communities evolving on the particular site.

The site is characterized by nearly level to gently sloping topography. The elevations on the site range from 91 feet in the southwestern corner of the site to 96 feet in the northeastern portion of the site.

C. Soils

Soils are formed through the interaction of a variety of physical, chemical, and biological factors that include climate, parent material, topography, biological activities, and time. The degree to which any or all of these factors affect the local soil characteristics is quite variable, generally leading to the formation of a mosaic of soil types in any particular locality. The United States Department of Agriculture (USDA) has, through the Natural Resources Conservation Service (NRCS), mapped soils in detail; for New Jersey, the results of these soil surveys are issued for each county.

According to USDA NRCS web soil survey (last modified July 31, 2019), one soil map unit is mapped on the property: Sassafras sandy loam, 5 to 10 percent slopes, Northern Coastal Plain (SacC). A detailed soils map and description of the soil unit is provided within the Custom Soil Resource Report provided in Attachment D. Table 1 lists the soil characteristics, limitations and suitabilities. A brief description of each soil per the SCS is provided as follows:

> Sassafras Series (SacC) - This soil series consists of deep, well drained soils on uplands. These soils were formed in deeply weathered, non-glauconitic, quartzose, medium textured and moderately fine textured materials that are underlain by sand and gravel. They are mostly gently sloping or sloping. Permeability is moderate to moderately rapid. Available water capacity is moderate. The depth to a seasonal high water table is greater than 6 feet.

Melick-Tully & Associates (August 30, 2021) excavated 28 test pits and advanced two soil borings within the project site. The test pits were completed to depths between 12 and 13 feet and the borings were advanced to 10 feet (Melick-Tully & Associates, August 30, 2021). Groundwater seepage was observed in 17 of the test pits at depths of approximately 9.5 to 13 feet below grade (Melick-Tully & Associates, August 30, 2021). Mottling, which is indicative of seasonally saturated conditions, was observed in the test pits at depths ranging from 7 to 108 inches below grade (Melick-Tully & Associates, August 30, 2021).

D. Ground Water Quantity and Quality

Ground water is all water within the soil and subsurface strata that is not at the surface of the land. It includes water that is within the earth that supplies wells and springs. Ground water resources are often functionally linked to overlying land areas and surface water bodies; ground water is often

Table 1:

Soil Characteristics, Limitations, and Suitabilities

Parameter	Sassafras (SacC)
Texture	Sandy loam
Slope (%)	5 - 10
Depth to Bedrock (ft.)	>6.67
Depth to Seasonal High Water Table (ft.)	>6.67
Saturated Hydraulic Conductivity (Ksat) (micrometers/second)	56.71
Available Water Capacity (in./in. soil)	0.11
pH	5.4
Erosion Hazard (Factor K)	0.24
Limitations for Small Commercial Buildings	Somewhat limited (slopes)
Limitations for Local Roads and Streets	Somewhat limited (frost action)

Source: USDA, NRCS, 2019

recharged through "outcrop" areas at the land surface and ground water discharges ("seeps") may contribute to base flows of streams and rivers.

The ground water yields of any particular geological formation are a function of the porosity and permeability of the material comprising the formation (consolidated rock or unconsolidated deposits). Porosity describes the water-containing spaces between individual mineral grains, while permeability is the ease or difficulty with which water is transmitted through interconnecting spaces in the formation. Formations lacking open spaces between the mineral grains have both low porosity and low permeability. Weathering and cracking of the parent bedrock can induce secondary porosity in the formation; water can accumulate and move through these fractures in the primary rock formation.

In the Inner and Outer Coastal Plain Physiographic Provinces, there are five principal ground water aquifers: the Kirkwood-Cohansey aquifer system, the Atlantic City 800-foot sand, the Wenonah-Mount Laurel aquifer, the Englishtown aquifer, and the Raritan-Magothy aquifer system. All but the Kirkwood-Cohansey are confined, except where each aquifer crops out or is overlain by permeable surficial deposits. The aquifers are recharged directly by precipitation in outcrop areas, by vertical leakage through confining beds, and by seepage from surface water bodies. More than 75 percent of the freshwater supply in the Coastal Plain is from ground water aquifers (USGS, 2000).

The site is underlain by the Potomac-Raritan-Magothy bedrock aquifer (NJDEP, August 4, 2021). The Potomac-Raritan-Magothy bedrock aquifer consists of interbedded sand, gravel, silt and clay separated into lower, middle, and upper aquifers. Water is fresh, moderately hard with a near neutral pH.

The NJDEP, NJGS, Bureau of Water Resources (BWR) in conjunction with Mark A. French prepared a GIS layer of "Aquifer Recharge Potential." The aquifer recharge potential was not calculated in areas of wetlands and open waters (NJDEP, NJGS, BWR, Mark French, 2005). The site is mapped as Rank B Ground Water Recharge Rank (12 to 14 inches per year) and Rank B Water-Table Aquifer Rank (250 to 500 gallons per minute) (NJDEP, NJGS, BWR, Mark French, 2005). Rank A is the highest rank and Rank E is the lowest rank (NJDEP, NJGS, BWR, Mark French, 2005).

E. Surface Water Quantity and Quality

Surface waters include lakes, rivers, ponds, and streams - water bodies at the surface of the land. These waters serve as valuable habitats for aquatic organisms; collect, store and distribute water from rainfall; and serve as important aesthetic and recreational features.

There are no streams on or in the vicinity of the site. Overland runoff generally eventually drains to an off-site unnamed tributary of Bear Brook. The NJDEP has classified Bear Brook and its unnamed tributaries FW2-NT (Non-Trout) surface waters (NJDEP, October 17, 2016).

The NJDEP (June 24, 2021) published a "DRAFT 2018/2020 New Jersey Integrated Water Quality Assessment Report (Integrated Report)", which is intended to provide an effective tool for maintaining high quality waters and improving the quality of waters that do not attain their designated uses. The Integrated Report describes attainment of the designated uses specified in New Jersey's Surface Water Quality Standards (N.J.A.C. 7:9B), which include: aquatic life (general), aquatic life (trout), recreation, public water supply, fish consumption, and shellfish consumption (NJDEP, June 24, 2021). The Integrated Report includes management strategies, including Total Maximum Daily Loads (TMDLs), under development to achieve surface water quality standards and attain the designated uses of the waters (NJDEP, June 24, 2021). TMDLs represent the assimilative or carrying capacity of the receiving water taking into consideration point and nonpoint sources of pollution, natural background, and surface water withdrawals (NJDEP, June 24, 2021).

The NJDEP assesses each applicable designated use for all of the State's 293 subwatersheds (assessment units), to determine whether each subwatershed is "fully supporting" the use, "not supporting" the use, or if insufficient information is available to assess the use. A subwatershed is "fully supporting" a designated use only if data for the minimum suite of parameters are available and there are no exceedances of the applicable criteria for each parameter in the suite. If data are available for only some of the minimum suite of parameters, the use is not assessed due to insufficient information. If any one parameter associated with a designated use exceeds the applicable criteria, then the subwatershed is "not supporting" for the designated use.

The site is located within the Bear Brook (below Trenton Road) assessment unit (NJDEP, June 24, 2021). This assessment unit had "insufficient information" for Fish Consumption (NJDEP, June 24, 2021). This assessment unit was "not supporting" for Aquatic Life-General, Water Supply and Primary Recreation for non-attainment of biological parameters, total phosphorus, dissolved oxygen, arsenic, and *Escherichia coli* (NJDEP, June 24, 2021).

By definition, FW-2 waters are suitable for public potable water supply after required treatment. This classification requires that waters be acceptable for primary contact recreation, industrial and agricultural use, and maintenance and migration of the established biota. The Non-Trout (NT) suffix indicates that the waters do not possess the properties suitable for the maintenance of trout species, i.e., high dissolved oxygen levels, relatively low summer temperatures, and low

pollutant loadings. However, more tolerant fish species, particularly warm-water species, may flourish in such waters.

F. Vegetation

Vegetation is the plant life or the total plant cover that is found in a specific area, whether indigenous or introduced by humans. The Coastal Plain Physiographic Province of New Jersey is characterized by broad areas of relatively uniform elevation, with only occasional topographic relief (Robichaud and Buell, 1973). This low degree of habitat diversity results in broad distributions of a limited number of major vegetative communities, rather unlike the fine-scale heterogeneity found in the more topographically diverse physiographic provinces in northern New Jersey. The general types of terrestrial plant habitats described by Robichaud and Buell for the Coastal Plain include excessively drained upland flats, upland flats, freshwater marshes, swamps and floodplains and bogs.

Based upon species composition, soils, and apparent hydrology noted during the field investigation, two vegetative communities were identified within the site: lawn/landscaped areas and upland woodlands.

Upland Woodlands – This fragmented and successional community is found in small areas within the property. Canopy vegetation includes sweet cherry, northern red oak, Norway maple, eastern white pine, and pin oak. The woody understory includes flowering dogwood, sweet cherry, Norway maple, white ash, multiflora rose, boxelder, and sweetgum. Ground cover includes Japanese honeysuckle, periwinkle, field garlic, and garlic mustard.

Lawn/Landscaped Areas - This community is found throughout the property. Scattered trees include eastern white pine, butternut, Norway maple, silver maple, mulberry, sweet cherry, black cherry, callery pear and ornamental trees. Woody shrubs and vines include English ivy, forsythia, yew, bush honeysuckle, and ornamental shrubs. Ground cover is dominated by turf grasses with weedy species such as common dandelion, English plantain, and ground ivy.

G. Wildlife

The utility of an area as wildlife habitat depends on many factors. All wildlife species require food, water, cover, and space. The relative abundance or lack of these resources in relation to each species' particular requirements will, in part, determine the species composition and distribution of a particular area. In addition, the types of vegetative communities present, the size, shape, and complexity of the habitat(s), and the surrounding land uses will further interact to determine the success of various wildlife species at the location being considered. Some wildlife species have

demonstrated great adaptability and tolerance to the human presence; others are less able to tolerate such activities and are displaced to more suitable habitats, if such are available and accessible.

Starting in July 2002, the Natural Heritage Program (NHP) of the NJDEP Office of Natural Lands Management adopted use of the Landscape Project to supplement threatened and endangered species data requests. The Landscape Project was developed by the NJDEP, Division of Fish & Wildlife, Endangered & Nongame Species Program (ENSP). It is a wildlife habitat-mapping program that is used to identify and map critical habitats for endangered, threatened, and special concern species. This approach takes documented records of threatened and endangered wildlife and, based on a species-specific model or "occurrence area", maps areas of suitable habitat contiguous to the record as critical wildlife habitat. Each critical habitat patch appears as a shaded color from light to dark (5 Ranks) indicating its relative priority ranking. Rank 1 is the lowest priority ranking, while Rank 5 is the highest priority ranking. Rank 1 meets the minimum area requirement, but no data exists for the presence of priority species (New Jersey Division of Fish and Wildlife, 2017). This is the NJDEP's lowest priority ranking and is defined as areas meeting the minimum size requirements but with no documented sightings of threatened or endangered species. Rank 2 contains records for priority species, which are species of special concern. Ranks 3, 4, and 5 indicate that the identified land cover type has been identified as providing habitat for State threatened (Rank 3), State endangered (Rank 4), or Federally threatened or endangered (Rank 5) species. According to the NJDEP's Landscape Project (Version 3.3), the site is not mapped within any habitats (Figure 3).

During EcolSciences' 2021 field investigation of the site, the following species were observed by sight, call, tracks, or other signs: eastern chipmunk, gray squirrel, northern spring peeper, turkey vulture, mourning dove, red-bellied woodpecker, blue jay, American crow, Carolina wren, gray catbird, northern mockingbird, European starling, white-throated sparrow, northern cardinal, house finch, and house sparrow. During EcolSciences 2021 field investigation of the site, no sightings of threatened or endangered species were made.

H. Wetlands

Wetlands are lands where water saturation is the dominant factor determining the nature of soil development and the types of plants and animal communities living in the soil and on its surface. Wetlands are transitional areas between terrestrial and aquatic systems, and are unique biological habitats of socioeconomic value. Wetlands moderate extremes in water flow, aid in the natural purification of water, and may be areas of groundwater recharge. According to regulations promulgated by the United States Army Corps of Engineers (COE) and the Environmental Protection Agency (EPA) (33 CFR Section 323.2 and 40 CFR Section 230.2, respectively) and pursuant to the

New Jersey Freshwater Wetlands Protection Act (Effective August 5, 2015), wetlands are those areas that are inundated or saturated with surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The property received a Letter of Interpretation-Presence/Absence Determination (LOI) on January 19, 2005 (File No. 1113-04-00101.). The LOI has since expired. Based upon EcolSciences' site inspection, no wetlands were observed on or adjacent to the property.

I. Floodways and Floodplains

The area inundated by the floodwaters of a river or stream is termed the floodplain. Within the floodplain can be found several subdivisions: the channel, where normal, non-floodplain flow is confined; the floodway, or terrestrial areas on the margins of the channel that show permanent terracing effects of repeated flooding; and the flood fringe, or areas landward of the floodway that may be inundated during more severe (and less frequent) storms. Taken together, these areas constitute the flood hazard area around a river or stream.

According to FEMA mapping (Community Panel No. 34021C0162F), the site is located outside of any Special Flood Hazard Areas.

As part of NJDEP Flood Hazard Area Control Act Rules (N.J.A.C. 7:13 et seq), a riparian zone adjacent to all regulated waters is required and protected. These regulations implement riparian zones that are 50, 150 or 300 feet in width along each side of surface waters throughout the State. The riparian zone width depends on the environmental resources being protected, with the most protective 300-ft riparian zone applicable to waters designated as C1 and certain upstream tributaries. Certain waters supporting trout, or habitats of threatened or endangered species critically dependent on the watercourse to survive receive a 150-ft riparian zone. Regulated waters not identified above would have a 50-foot riparian zone.

As discussed above, the site does not drain to Category One, Trout-Production, or Trout-Maintenance waters. As discussed above, the Landscape Project (Version 3.3) habitat mapping and Natural Heritage Database do not have occurrences of any threatened or endangered wildlife or plant species that are critically dependent on the water for their survival on or within 1 linear mile downstream of the site. Based upon this information, it is expected that off-site unnamed tributary of Bear Brook would have a 50-foot riparian zone. The closest unnamed tributary of Bear Brook is

located approximately 274 feet to the southeast of the site. Therefore, the site does not appear to be constrained by floodways, floodplains, or riparian zones.

J. Air Quality

The Federal and State environmental regulatory agencies have established permissible concentrations, termed the National Ambient Air Quality Standards (NAAQS), for six principal pollutants including carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide. These standards have been shown to reduce to an acceptable level the risk of health effects to vulnerable human populations, primarily the young, the elderly, and those with respiratory ailments. Primary standards define air quality levels intended to protect the public health including "sensitive" populations such as asthmatics, children, and the elderly. The secondary standards define levels of air quality intended to protect the public welfare including protection against decreased visibility and damage to animals, crops, vegetation, and buildings (EPA, 2021).

The NJDEP annual air quality reports summarize the air quality monitoring data for that particular year in New Jersey. The State of New Jersey has been monitoring air quality since 1965. The most recent NJDEP Air Quality Summary Report available is for the year 2019. Based on the 2019 annual air quality report, the entire state of New Jersey is in non-attainment for the ozone NAAQS, and northern New Jersey is classified as being "moderate". A "moderate" area has an ozone range from 0.081 to 0.093 parts per million (ppm) (EPA, 2018). New Jersey was in attainment in 2019 for the remaining five principal pollutants including PM, nitrogen dioxide, sulfur dioxide, carbon monoxide, and lead (NJDEP, November 23, 2020).

The NJDEP annual air quality reports also provide information on longer-term trends in the state, providing summary data for all monitoring locations from 1965 to the latest year reported. Examination of those data indicates that New Jersey has shown a somewhat erratic downward trend in the ozone standard and is getting close to meeting the ozone NAAQS. There has been a steady decline in overall particulate matter $(PM)_{2.5}$, which is now in compliance with the NAAQS. A sharp increase and subsequent decrease in sulfur dioxide concentrations in New Jersey occurred in 2013 as a result of a coal-burning facility across the Delaware River in Pennsylvania. The facility has since ceased operations under a court agreement, and sulfur dioxide levels in New Jersey have returned to meeting the NAAQS for sulfur dioxide. The State of New Jersey has long been in compliance with the NAAQS for the remaining three principal pollutants including nitrogen dioxide, carbon monoxide, and lead (NJDEP, November 23, 2020).

The Rider University and Trenton air quality monitoring stations are located in the general vicinity of the site. The Rider University station monitors ozone, real-time particulates, and meteorological data and the Trenton station monitors only monitors particulates. The summary data included in the 2019 report indicates no contravention of standards for nitrogen dioxide, sulfur dioxide, and carbon monoxide (NJDEP, November 23, 2020).

The Air Quality Index (AQI) is a national air quality rating system based on the NAAQS. An index value of 100 is equal to the primary, or health-based, NAAQS for each pollutant. This allows for a comparison of each of the pollutants used in the AQI. These pollutants are ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. The Riders University station did not have any days in 2019 where the AQI reached the "Unhealthy for Sensitive Groups" ("USG") or "Unhealthy" (UG) thresholds (NJDEP, November 23, 2020). The USG threshold means that members of sensitive groups may experience health effects and that the general public is not likely to be affected. The UG threshold means that everyone may begin to experience health effects and that members of sensitive groups may experience more serious health effects.

These positive trends in air quality have been occurring despite significant population increases in the central and southern regions of the state, and the concomitant increase in vehicular traffic associated with population growth. These countervailing trends appear to be the result of more effective emissions controls on vehicle exhausts and on industrial emissions, the net result of which is a decline in overall air loadings since air monitoring began in 1965 as summarized in the NJDEP report for 2019.

K. Sound Characteristics and Levels

Sound is conducted through air as a series of pressure waves having kinetic energy. The kinetic energy of these sound waves can be quantified in decibels - scalar units that are geometrically related to the energy of the sound at the receptor. A doubling in the sound energy will yield an increase of 6 dB. The decibel (dBA) scale ranges from 0 for the threshold of perception of sound to approximately 130 dBA for the threshold of pain at the ear; a quiet residential street may have noises in the 55 to 60 dBA range, while heavy street traffic generates noises in the 85 to 95 dBA range (EPA, 1976). The "A" suffix means that the sound energy characteristics have been weighted to emphasize the upper audible frequency ranges (A-weighting).

The site is located in a suburban area surrounded by commercial, agricultural, and office uses. Princeton-Hightstown Road, which is a major thoroughfare that experiences large traffic volumes, is located along the site's northern boundary. Southfield Road and McGetrick Lane also border the site.

Sounds generated by traffic passing the site on this road as the other local roads dominate the range of perceived sounds on the site. During peak hours, traffic along these roads could generate sound levels of 75 to 8 dBA at points approximately 25 feet from the roadway. Sound levels would be lower (i.e., 55-70 dBA) during less dense traffic and at points further away from the roadway. At points in the interior of the site, well away from busy roads, sound levels are likely to be typical of a normal suburban residential area, in the range of 53-57 dBA (EPA, 1976).

L. Land Use

The development of a site is in many cases a major alteration of the features of a property. The extent to which such change in land use is significant depends in part on the existing land use(s) on the site and in surrounding areas, and on the zoning constraints selected for the land by the governing municipality.

The site is occupied by the remains of residential, office, and agricultural buildings and is characterized by lawn/landscaped areas and upland woodlands. The site is bordered to the north by Princeton-Hightstown Road, to the south by McGetrick Lane, to the west by office development, and to the east by Southfield Road. The site is located in a suburban area surrounded by commercial, agricultural, and office uses.

M. Historic and Cultural Resources

Historic and cultural resources are man-made or man-modified features of the environment, including objects, structures, site and districts deemed to be of cultural significance. Such resources may be pre-historic or historic in age, and are often worthy of preservation to provide present and future generations with a sense of the peoples who once lived and worked in a particular locality.

The site is occupied by the remains of residential, office, and agricultural buildings. The New Jersey & National Registers of Historic Places (NJDEP, 1995, last updated September 28, 2021) does not list any registered historic or eligible for listing resources on or immediately adjacent to the site. Based on a review of the GIS layers "NJDEP Historic Districts, Property Features, Properties, and Site Grid Map of New Jersey" (NJDEP, NHR, HPO, 2021), no historic resources are mapped on or immediately adjacent to the site. The West Windsor Master Plan (Updated and revised as of February 12, 2020) lists an on-site historical or archaeological site at 21 McGetrick or 125 Southfield Road (Item No. 212). However, the West Windsor Master Plan states that this was demolished.

IV. ASSESSMENT OF ENVIRONMENTAL IMPACT

This chapter addresses the potential impacts to the environmental resources of the site and surrounding areas that could result from the proposed development. Potential impacts are first discussed generally, then according to the specific topics set forth in the preceding chapter that inventoried environmental characteristics of the site. The incorporation of mitigation measures during construction and operational phases of the proposed project are cited here in the context of the potential impacts; reference is made again to these mitigating measures in the following chapter.

In general, the principal environmental impacts associated with the construction phase of such a project result from disturbances to soils and vegetation. In the absence of appropriate control measures, clearing of vegetated tracts of land for construction and access to construction sites could reduce the productivity of the soil and create unsightly conditions and fugitive dust. Precipitation falling on disturbed areas could tend to erode fine soil particles and, in the absence of appropriate controls, increase loadings to areas receiving stormwater runoff. As will be detailed below, these potential adverse effects will be minimized by adherence to the Soil Erosion and Sediment Control Plan, as approved by the Mercer County District of the Soil Conservation Service.

The principal environmental impact associated with the proposed project would be the change in land use and the direct and indirect influences on the surrounding natural communities associated with the reuse of the site as a business/services development.

Potential impacts on specific natural or human resources are discussed in the following sections.

A. Geology

Potential impacts to the project site's geological integrity are typically related to the location and extent of bedrock disturbance resulting from the construction phase. The construction of the project will occur in unconsolidated sandy sediments, which are hundreds of feet thick. Thus, no significant impacts to the project area's geological integrity are anticipated from the construction of the proposed development.

B. Topography

Potential impacts to the topography of the site are related to the extent of excavation and/or filling required to achieve the desired topography for construction of the business/services and development. The topography within the area of proposed development is of nearly level to gentle relief. As indicated on the grading plan, some modifications to the existing topography are proposed.

Cutting and grading will be required at the proposed access driveways, buildings, parking areas, and stormwater management system. A retaining wall is proposed around one of the bioretention basins. Throughout the site, soil erosion and sediment control measures will minimize soil loss and erosion wherever grading is proposed. Where changes to existing topography are planned, the proposed contours will be graded to meet the existing contours. Overall, the grading plan calls for no significant change to the existing site conditions; the general topographic and drainage characteristics of the site will be retained.

C. Soils

In the absence of appropriate control measures, construction activities may result in both short-term and long-term impacts related to soil loss. Removal of topsoil and organic layers could reduce the productivity of the soils, remove ground cover vegetation, and create unsightly conditions. During construction, the potential for soil disturbance will be limited to the area surrounding the proposed buildings, parking areas, stormwater management system, and along the proposed access driveways. During the entire construction period, soil loss and associated adverse impacts will be minimized by strict adherence to the measures specified in the Soil Erosion and Sediment Control Plan, as approved by the Mercer County Soil Conservation District.

These soil erosion measures include the use of crushed stone cleaning blankets at construction driveway intersections with Princeton-Hightstown Road and Southfield Road, installation of inlet protection for all catch basins, and installation of silt fences along the limits of disturbance. Immediately following rough grading, all disturbed soils will be protected from erosion and soil loss by temporary seeding and mulching. Permanent vegetation will be established as soon as possible after final grading, as specified in the site plans. In areas where grading is necessary, rapid stabilization of all disturbed soil areas will minimize adverse effects related to soil loss or erosion. For a complete description of the soil erosion and sediment control measures, please refer to the plans prepared by Bohler (2021).

D. Ground Water Quantity and Quality

Construction of the proposed development is not expected to have an adverse impact on the ground water resources of the project area. No ground water withdrawal or wastewater disposal is proposed within the site, and no private wells will be used to supply potable water for the project. Potable water for the proposed development will be provided by New Jersey American Water. The estimated demand for potable water for the proposed development is 7,533 gpd (Bohler, 2021).

It is estimated that the proposed development will generate 5,897 gpd of wastewater (Bohler, 2021). Wastewater will be conveyed to the Stony Brook Regional Sewerage Authority for treatment (Bohler, 2021). This off-site treatment of wastewater by a regional municipal facility will eliminate the potential for contamination of ground water by wastewater effluent.

There will be an increase in impervious surfaces as a result of the proposed development; therefore, the potential recharge to ground water reserves will be decreased within the site. However, as required by NJDEP's Stormwater Management Rules, ground water recharge will be provided. For specific details, refer to the Stormwater Management Report prepared for the project by Bohler dated November 2021.

E. Surface Water Quantity and Quality

The construction of the proposed development is expected to have a minimal impact to the distant surface water resources. Potential short-term impacts to surface water quality are generally associated with soil loss, erosion, and sedimentation during construction activities. As previously described in Section C (Soils) of this chapter, soil disturbance will be largely confined to areas surrounding the buildings, parking areas, stormwater management system, and access driveways. Any adverse impacts will be minimized by the installation and maintenance of proven soil erosion and sediment control measures presented in the plans. These measures will retain disturbed soil sediment within the areas of construction and will mitigate the potential for sediment being transported off-site.

Stormwater from the developed portions of the site will be collected by a proposed stormwater management system. Porous pavement is proposed for the patio and parking spaces for the proposed restaurant as well as a portion of the parking spaces for the proposed QuickChek. This system will consist of a series of catch basins and inlets and subsurface piping that will convey stormwater to two bioretention basins to be located in the central and southern portions of the site and porous pavement areas located throughout the site. The stormwater management system has been designed to be in compliance with the requirements of the NJDEP's Stormwater Management Rules (N.J.A.C. 7:8) for runoff volume, water quality, ground water recharge, soil erosion and sediment control, and low impact development. For specific details regarding the proposed stormwater management system, refer to the Stormwater Management Report prepared for the project by Bohler dated November 2021.

F. Vegetation

Construction will require removal of existing vegetation from the entire property. These areas are characterized by lawn/landscaped areas and upland woodlands. A landscaping plan will be

implemented to enhance the aesthetic features of the development. The landscaping plan includes shade trees, ornamental trees, evergreen trees, deciduous shrubs, evergreen shrubs, ground cover, and ornamental grasses. In addition, the proposed bioretention basins will be planted with deciduous shrubs, evergreen shrubs, and ornamental grasses.

G. Wildlife

Wildlife habitat at the site is minimal and consists of species largely tolerant of human disturbance and fragmented landscapes. The project will disturb the entire property, which will be redeveloped with a business/services development. A landscaping plan will be implemented to maintain aesthetics and provide soil stabilization throughout the site. The landscaping plan includes shade trees, ornamental trees, evergreen trees, deciduous shrubs, evergreen shrubs, ground cover, and ornamental grasses. In addition, the proposed bioretention basins will be planted with deciduous shrubs, evergreen shrubs, and ornamental grasses. These landscaped areas will offer habitat to species tolerant of human disturbance. No impacts to threatened and endangered species are anticipated.

H. Wetlands

No disturbances are proposed to wetlands.

I. Floodways and Floodplains

No disturbances are proposed to floodways, floodplains, or riparian zones.

J. Air Quality

Short-term air quality impacts during construction are related to production of fugitive dust and generation of emissions from exhausts of construction vehicles. Mitigating measures, including dust control practices and the use on construction equipment of efficient air pollution control devices meeting applicable State/Federal specifications, will minimize adverse effects on local air quality.

Long-term air quality impacts will be related primarily to truck exhaust emissions, primarily carbon monoxide (CO), hydrocarbons, and nitrogen oxides (NO_x). However, the magnitude of the environmental effects attributable to the vehicle traffic associated with the proposed project should not affect regional air quality.

K. Sound Characteristics and Levels

Short-term generation of noise levels elevated over existing ambient levels will be generated during the construction of the proposed development. Sound levels generated during the construction phase can be expected in the range of 66 to 78 dBA at a distance of 50 feet from construction

equipment, based upon the use of best available technology for noise reduction (EPA, 1976). The construction equipment included in this range consists of backhoes, concrete mixers, bulldozers, pavers, and trucks. To minimize adverse impacts to ambient noise levels during the construction period, construction equipment will only be operated during construction periods permitted by local law.

During the operational phase of the project, the principal sources of sound will be vehicular traffic. It is expected that the principal sources of noise in the area will continue to be traffic along Princeton-Hightstown Road and other local roads. The project will comply with the Township's requirements related to noise.

L. Land Use

The proposed development will result in the redevelopment of a former office, residential, and agricultural site into a business/services development.

M. Historic and Cultural Resources

The proposed project is not expected to adversely impact any known cultural or historical resources. There does not appear to be any historical or cultural resources located on the site.

V. UNAVOIDABLE IMPACTS

The applicant and its engineers have proposed and planned a project that conforms with the land use requirements of West Windsor Township. No project can be built and operated without generating some degree of adverse impact on some aspect of the natural or man-made environment. As discussed in the preceding chapter, impacts have been minimized to the extent possible by sound design decisions in the planning stages of the project. Moreover, compliance with State permit and Township ordinance conditions for regulated activities will protect the overall natural resources in the project vicinity. This chapter identifies the probable adverse environmental impacts of the proposed project. The unavoidable environmental impacts resulting from construction and operation of the proposed project are anticipated to be:

- Development of the site characterized as lawn/landscaped areas and upland woodlands and the associated loss of limited wildlife habitat.
- Increases in impervious surfaces.
- Increases in loadings of common constituents in stormwater runoff.

In general, the principal short-term environmental impacts associated with the construction phase of such a project result from temporary disturbances to soils and from the clearing of vegetation. In the absence of appropriate control measures, clearing of vegetated tracts of land for construction and access to construction sites could reduce the productivity of the soil and create unsightly conditions and fugitive dust. Precipitation falling on disturbed areas could tend to erode fine soil particles and, in the absence of appropriate controls, increase loadings to areas receiving stormwater runoff. These potential adverse effects will be managed by adherence to the Soil Erosion and Sediment Control Plan, as approved by the Mercer County Soil Conservation District.

The principal long-term impact associated with the project is the commitment of natural resources resulting from the change in land use. The construction of the project will redevelop an office, residential, and agricultural site to business/services development. The mitigating measures described in the preceding chapters will serve to minimize the potential impacts to natural resources in the project area.

VI. STEPS TO MINIMIZE ENVIRONMENTAL IMPACTS

A number of potential impacts associated with construction and operation of the proposed project were identified in Chapter IV. Environmental protective measures that can minimize or eliminate environmental impacts are summarized below. Some have already been included in the project plans; others will be implemented during the construction phases. Many of the measures identified below have already been discussed in the preceding chapter, in the context of the particular environmental features in which they are identified.

A. Soils and Surface Water Resources

- Existing topography will be maintained to the greatest extent possible in the site planning to minimize the amount of grading required.
- Crushed stone-tracking pads will be installed at the site exit with Princeton-Hightstown Road and Southfield Road to reduce tracking of sediment onto adjacent roadways during construction activities.
- Sediment filter fences will be erected around and/or down slope of disturbed areas to prevent sediment from being transported off-site.
- Upon completion of final grading, all disturbed areas will receive a final seeding and mulching in accordance with the Soil Erosion and Sediment Control Plan.
- All side slopes shall be protected from erosion by top soiling, seeding, and mulching as soon as possible after final grading.
- All soil erosion and sediment control measures shall be kept in place until construction is complete and/or the disturbed area is stabilized.
- All work will be done in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey.
- The stormwater management basin will be maintained free of debris and sediment that would interfere with the effective operation of these facilities.

B. Air Quality

- Construction vehicles that are to operate upon the public highways of the State of New Jersey will comply with the regulations as required by N.J.A.C. 7:27-14 and 15.
- Disposal of incinerable wastes by open burning will not be permitted.
- Exhaust systems and emission control devices on all construction machinery will be maintained in good operating condition.
- Vehicles transporting fill, dirt, or other materials will be covered with canvas or similar material.

C. Sound levels

- To minimize noise generated by construction equipment, mufflers or similar noise abatement devices will be in good operating condition on all construction machinery.
- Silencers, shields, or enclosures will be used around all stationary noise-generating equipment.
- Operation of machinery will be limited to work periods permitted by local law.

VII. LIST OF LICENSES, PERMITS AND OTHER APPROVALS

The following constitutes a list of licenses, permits and approvals required for the proposed project:

Table 2:

List of Licenses, Permits, or Other Approvals Needed

Granting Authority	License, Permit, or Approval	Status
West Windsor Township Planning Board	Preliminary and Final Site Plan Application Preliminary and Final Subdivision	Subject of this application Subject of this application
Mercer County Planning Board	Preliminary and Final Site Plan Application Preliminary and Final Subdivision	To be submitted To be submitted
Mercer County Soil Conservation District	Soil Erosion and Sediment Control Plan Certification	To be submitted
Delaware and Raritan Canal Commission	Certificate of Approvals	To be submitted

VIII. REFERENCES

Bohler, November 4, 2021. Preliminary and Final Major Site Plans & Preliminary & Final Subdivision Plans for East Ridge Development, LLC. Proposed QuickChek Food Store with Fuel Sales and Restaurant with Drive-Thru. Map 23.03, Block 47, Lots 2-6, 332 Hightstown Road and 125 Southfield Road. Township of West Windsor, Mercer County, New Jersey.

Bohler, 2021. Personal Communication

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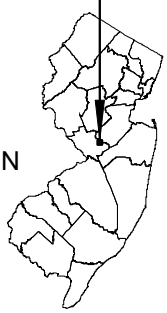
ATTACHMENT A

Figures

Figure 1: USGS Site Location
Figure 2: 2020 Aerial Imagery
Figure 3: Landscape Project

EcolSciences, Inc.
Environmental Management & Regulatory Compliance



State Plane Coordinates (New Jersey NAD 83)
468,820' E; 530,641' N

FIGURE 1: USGS SITE LOCATION

Block 47, Lots 2, 3, 4, 5, and 6
Township of West Windsor
Mercer County, New Jersey

USGS The National Map. 2020 (Hightstown NJ Quadrangle)

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Date: 10/20/21

Scale 1:24,000

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0 200 400
Feet

Legend

Approximate Site Boundary

Streams

FIGURE 2: 2020 AERIAL IMAGERY

Block 47, Lots 2, 3, 4, 5, and 6
Township of West Windsor
Mercer County, New Jersey

Source: NJOIT, OGIS. 2021. NJ 2020 High Resolution Orthophotography.

EcolSciences, Inc.
Environmental Management & Regulatory Compliance

Date: 10/20/21

Scale 1:3,000

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Approximate site boundary

0 300 600 Feet

Species-Based Habitat

RANK

- Rank 1 - Habitat specific requirements
- Rank 2 - Special Concern
- Rank 3 - State Threatened
- Rank 4 - State Endangered
- Rank 5 - Federal Listed

FIGURE 3: LANDSCAPE PROJECT

Block 47, Lots 2, 3, 4, 5, and 6
Township of West Windsor
Mercer County, New Jersey

Sources:
NJDEP, DFW, ENSP. 2017. New Jersey's Landscape Project (Version 3.3).
NJOIT, OGIS. 2021. NJ 2020 High Resolution Orthophotography.

EcolSciences, Inc.
Environmental Management & Regulatory Compliance

Date: 10/20/21

Scale 1:3,000

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ATTACHMENT B

Custom Soil Report

EcolSciences, Inc.

Environmental Management & Regulatory Compliance

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Mercer County, New Jersey

Block 47, Lots 2-6 - Township of West Windsor

October 20, 2021

Preface

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

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

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

Soil Map

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

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,200 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 17, Aug 31, 2021

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

Date(s) aerial images were photographed: May 13, 2020—Jun 24, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SacC	Sassafras sandy loam, 5 to 10 percent slopes, Northern Coastal Plain	3.9	100.0%
Totals for Area of Interest		**3.9**	**100.0%**

Map Unit Descriptions

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

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

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

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

onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Mercer County, New Jersey

SacC—Sassafras sandy loam, 5 to 10 percent slopes, Northern Coastal Plain

Map Unit Setting

National map unit symbol: 2thxs
Elevation: 0 to 470 feet
Mean annual precipitation: 41 to 49 inches
Mean annual air temperature: 53 to 58 degrees F
Frost-free period: 190 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sassafras and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sassafras

Setting

Landform: Flats, fluviomarine terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits

Typical profile

Ap - 0 to 9 inches: sandy loam
Bt1 - 9 to 18 inches: sandy loam
Bt2 - 18 to 28 inches: sandy clay loam
BC - 28 to 40 inches: loamy sand
C1 - 40 to 58 inches: sand
C2 - 58 to 80 inches: sand

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Downer

Percent of map unit: 4 percent

Landform: Flats, knolls, fluviomarine terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, riser, rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Hydric soil rating: No

Woodstown

Percent of map unit: 4 percent
Landform: Depressions, flats, fluviomarine terraces, broad interstream divides
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Ingleside

Percent of map unit: 4 percent
Landform: Flats
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Aura

Percent of map unit: 4 percent
Landform: Low hills, fluviomarine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Fallsington, drained

Percent of map unit: 4 percent
Landform: Flats, depressions, swales
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

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ATTACHMENT C

Qualifications of Preparers

EcolSciences, Inc.

Environmental Management & Regulatory Compliance

ECOLSCIENCES, INC.
CORPORATE HISTORY

EcolSciences, Inc., was founded in 1973 in response to the growing need for responsible environmental planning, as mandated by NEPA, The National Environmental Policy Act. EcolSciences specializes in performing environmental investigations relating to permit acquisition and regulatory compliance, demonstration of "due diligence", waste management, impact analysis, mitigation, and remediation. EcolSciences' strength is a proficiency in current environmental and waste management laws, regulations, and policies, coupled with a practical problem-solving approach to analyzing the environmental consequences of projects.

During its forty-seven years under the same management, EcolSciences has successfully completed more than 10,000 studies for private, quasi-public and public clients. Over the years EcolSciences was awarded a number of “Mission Contracts” working as USEPA’s surrogate in preparing EPA Environmental Impact Statements in Region II, Region II and Region V. In addition, EcolSciences was contracted to provide training on the regulatory process associated with NEPA to USEPA employees and State Environmental Agency employees in all ten USEPA regions. Personnel involved in that work remain part of EcolSciences’ team. EcolSciences has represented many of the country's leading industries, corporations, developers, and financial institutions including AT&T, American Cyanamid Company, Lucent Technologies, Merck, Johnson & Johnson, Hartz Mountain Industries, Exxon, K. Hovnanian Companies, Roseland Property Company, Trammell Crow Company, Principal Real Estate Investors, PNC Bank, The Bank of New York and JP Morgan Chase. Among the many utilities that EcolSciences has served are PSE&G, Jersey Central Power & Light, New Jersey Natural Gas Company, Verizon Wireless, Sprint, Elizabethtown Gas Company, Essex and Hudson County Improvement Authorities, Ocean County Utilities Authority, and numerous municipal utilities authorities. Representative government agency clients, in addition to the U.S. Environmental Protection Agency, include New York City Economic Development Corporation, New York City Department of Design and Construction, and New York City Department of Sanitation.

EcolSciences' interdisciplinary staff of environmental engineers, geologists, biologists and scientists has extensive experience in a diversity of studies related to biological assessment and toxic and hazardous materials management. EcolSciences has performed environmental assessments and has acquired appropriate permits and approvals under a wide variety of federal, state, regional, and local jurisdictions. These include, but are not limited to: federal Section 404 and Section 10 authorizations; New York SEQRA and CEQR approvals; New Jersey CAFRA, Waterfront Development, and Freshwater Wetlands Protection Act permits (both general and individual); NJ Pinelands Commission certifications; Hackensack Meadowlands Development Commission (HMDC) approvals; and Delaware & Raritan Canal Commission approvals. EcolSciences' senior staff is experienced in the delivery of expert testimony; senior staff of the firm have testified in public hearings, Administrative Law proceedings, and county, regional and municipal planning boards.

The ecological\biological staff of EcolSciences has conducted over 7,500 wetland delineations and environmental assessments throughout the eastern United States and mostly in the NJ/NY and PA region. Our staff is skilled in all technical aspects of wetland identification and delineation methodologies established by the NJDEP, ACOE, USFWS, EPA and SCS; the assessment of wetland functions and values using techniques such as HEP, WET, and IVA; the assessment of development-related wetland impacts; the acquisition of wetland permits; and the development and implementation of mitigation plans. Nine of our staff are certified as Professional Wetland Scientists and provisionally

certified by the ACOE. Additionally, EcolSciences' biologists routinely perform specialized studies related to federally-and state-listed threatened and endangered plant and animal species, wildlife habitat surveys, and the assessment of development-related impacts. Seven of EcolSciences' biologists are USFWS Qualified bog turtle surveyors, two are NJDEP Qualified Ornithologists, one is a USFWs Qualified Bat surveyor and four are USFWS Qualified Small-Whorled Pogonia and Northeastern Bulrush surveyors.

In addition, EcolSciences prepares Stormwater Pollution Prevention Plans (SWPPP) and is involved in identifying and resolving SWPPP compliance issues. These plans and accompanying documentation are required for most construction projects per section 402 of the Clean Water Act and delegated to the New Jersey Department of Environmental Protection (NJDEP) with EPA oversight. The plans document the best management practices (BMPs) and other techniques to be implemented on a site during construction that will prevent pollutants from entering waterways. We can provide the required minimum weekly compliance inspections and follow-up on repairs, maintenance, etc. of the site BMPs. We have five certified SWPPP Plan Preparers/Site Inspectors and one additional certified SWPPP Site Inspector on staff.

Since the promulgation of the New Jersey Environmental Cleanup Responsibility Act (ECRA) and its successor, the Industrial Site Recovery Act (ISRA), EcolSciences has been involved in the implementation of the entire ECRA/ISRA program for its industrial clients in several hundred cases resulting in No Further Action determinations. Most recently, and in response to the Site Remediation Reform Act (SRRA) in New Jersey, a number of our senior personnel have become Licensed Site Remediation Professionals (LSRPs). As of 2020, eight of our senior staff have obtained their LSRP licenses. We believe that our LSRPs offer our clients the highest level of confidence and comfort that the work conducted by EcolSciences meets the highest professional standards as measured by the NJDEP and the Site Remediation Professional Licensing Board (SRPLB). EcolSciences' LSRPs have been involved in hundreds of cases as LSRPs of record and have issued over fifty Response Action Outcome (RAO) regulatory approvals, the SRRA equivalent of the No Further Action (NFA) determination that was formerly issued by NJDEP. In addition to NJDEP regulations, there is often an overlap USEPA Toxic Substances Control Act (TSCA) Part 761 (polychlorinated biphenyl [PCB]) regulation when investigation sites within New Jersey. EcolSciences staff of professionals is well versed in these regulations and has successfully obtained both self-implementing and risk-based approvals for cleanup of PCB contaminated media from the USEPA. EcolSciences also maintains a professional relationship with a wide network of environmental specialists that address issues such as radiation, asbestos, lead based paint, vapors, and other aspects of site remediation and Brownfield redevelopment.

As the demonstration of "due diligence" has become a lending industry standard, EcolSciences has completed thousands of Phase I environmental audits per ASTM E1527-13 and AAI and follow-up Phase II studies to clarify the level of environmental risk and liability associated with past and current practices at a particular site or facility. These audits typically include such activities as hazardous materials inventories, building and site inspections, subsurface soil investigations, groundwater monitoring, tank testing, asbestos bulk sampling, development of remediation plans and supervision of cleanup activities. All work is conducted under the supervision of a licensed professional engineer.

EcolSciences is a multi-disciplinary firm that has the experience and capabilities to provide a full range of environmental services. Studies are conducted in a manner that emphasizes the balance of environmental, engineering and cost factors. This approach provides the information necessary for sound and practical project decisions.

DAVID P. MOSKOWITZ, Ph.D., PWS

EDUCATION:

Ph.D. 2016 - Entomology
Rutgers University, New Brunswick, N.J.

M.S. 2000 - Environmental Policy Studies
New Jersey Institute of Technology, Newark, N.J.

B.A. 1984 - Environmental Studies
George Washington University, Washington, D.C.

PROFESSIONAL AFFILIATIONS:

Society of Wetland Scientists
Entomological Society of America
American Entomological Society
Lepidopterists' Society

PROFESSIONAL CERTIFICATIONS:

Professional Wetland Scientist - SWS
Certified Wetland Delineator - Corps of Engineers
USEPA Wetland Delineation - WTI
Qualified Ornithologist - NJDEP
Qualified Bog Turtle Surveyor – USFWS (NJ, NY, PA, DE, MD)

EXPERIENCE:

Dr. Moskowitz is a Senior Vice President with EcolSciences, Inc. During the past 34 years, Dr. Moskowitz has conducted more than 7,500 environmental studies for a wide range of clients including government agencies, and the development, legal, engineering and financial professions. These studies have focused on wetland and wildlife issues including delineations, field surveys, mitigation and regulatory compliance as well as Phase I, Phase II and Brownfields Redevelopment. Dr. Moskowitz has also provided expert testimony before numerous municipal boards and the New Jersey Meadowlands Commission and has been qualified as an expert in Superior Court of New Jersey, New Jersey Office of Administrative Law, New Jersey Condemnation Commission, and the Morris County Board of Taxation.

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EDUCATION:

M.S. Hydrologic Sciences, June 2001
University of California, Davis, California

B.S. Environmental Science, May 1997
Rutgers University, New Brunswick, New Jersey

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AREAS OF EXPERTISE:

Environmental Impact Statement
Regulatory Analysis and Compliance
Wetland Delineation and Permitting
Threatened and Endangered Species Surveys
Ecological Field Studies and Habitat Assessment
Geographic Information Systems (GIS)

CERTIFICATIONS:

Professional Wetland Scientist (Society of Wetland Scientists) #1621
Wetland Delineation Certificate – Rutgers University OCPE
NJDEP's Flood Hazard Area Certification Program – Montclair State University
Recognized Qualified Bog Turtle Surveyor in New Jersey (USFWS)
Recognized Qualified Bog Turtle Surveyor in Hudson River/ Housatonic Recovery Unit in New York, Massachusetts, and Connecticut (USFWS)

PROFESSIONAL ASSOCIATIONS:

Member of Society of Wetland Scientists since 2001

EXPERIENCE:

Ms. Tekel is an Assistant Vice President with EcolSciences, Inc. Her responsibilities include: the delineation of wetlands based on the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, the preparation of applications for Letters of Interpretation, Transition Area Waivers, General Permits, and Individual Permits in accordance with the New Jersey Freshwater Wetlands Protection Act, Flood Hazard Area Control Act, Coastal Zone Management Rules, the implementation and documentation of wildlife and botanical habitat assessments and species surveys, and the use of Geographic Information Systems (GIS) in its capacity as an instrument of environmental analysis.

Prior to joining EcolSciences, Inc., Ms. Tekel was employed as a Research Assistant at the Water Resources Center of the University of California in conjunction with obtaining a Master of Science in Hydrologic Sciences. A summary of Ms. Tekel relevant experience includes:

Wetland Delineations

- Conducted wetland delineations using the Federal Manual three-parameter approach using vegetation, soils, and hydrology.

- Assisted in the wetland delineation on a 243-acre property in the Township of Lafayette, New Jersey.

- Led a wetland delineation on a 274-acre property in the Township of Andover, New Jersey.

- Assisted in the wetland delineation for a 1,510±-acre Duke Farms property in New Jersey.

Permitting

- Prepared and obtained New Jersey Department of Environmental Protection (NJDEP) Freshwater Wetlands and Waterfront Development Permits and U.S. Army Corps of Engineers (USACE) Nationwide Permits for the closure of three abandoned landfills and the construction on the landfill cap of over 1,000,000 square feet of state-of-the-art warehousing. The waterfront development permits ultimately authorized filling below mean high water for the landfill closure and the development of the project on the landfill cap.

- Prepared and obtained over 500 applications for Letters of Interpretation, General Permits, Transition Area Waivers, and Individual Permits pursuant to the NJDEP Freshwater Wetlands Protection Act.

- Prepared and obtained NJDEP Freshwater Wetlands and Coastal Area Facility Review Act (CAFRA) Permit for a 10-acre property in the City of Pleasantville, New Jersey. The project involves the construction of multi-family residential units divided on the site of the former Pleasantville High School, which has since been demolished. All of the required permits were obtained for the project.

- Prepared and obtained NJDEP Highlands Preservation Area Resource Area Determinations for two properties in the Township of Roxbury, New Jersey.

- Prepared and obtained Highlands Exemptions for proposed single-family residences in the Highlands Preservation Area.

- Prepared Joint Applications for USACE Section 404 Permit and Pennsylvania Water Obstruction and Encroachment Permit for sites in Pennsylvania.

- Prepared Wetlands Individual Permit application for a major residential development on ±100 acres of a former golf course spanning two towns in Bergen County, New Jersey. The development plan includes the remediation of pesticide contaminated soils through blending. Also prepared Flood Hazard Area Permit supporting documentation, which included information concerning the restoration of a stream corridor, and prepared municipal Environmental Impact Statements for submission to the two towns. The permits were obtained and the project has begun construction.

- Prepared Freshwater Wetlands and CAFRA permit applications, with supporting documentation, for the expansion of several sand mines on ±1,000 acres in Cumberland County, New Jersey. The permits were obtained, and the expansions are ongoing.

- Prepared Waterfront Development and Freshwater Wetlands permit applications, with supporting documentation, for the construction of a hotel on an existing shopping center site in Hudson County, New Jersey. Public access, threatened and endangered species, and stormwater management were of primary concern. The permits were obtained.

- Prepared and obtained Flood Hazard Area Verifications, Individual Permits, and Hardship Exceptions pursuant to the NJDEP Flood Hazard Area Control Act Rules. Evaluated properties for riparian zone widths.

- Evaluated properties for environmental sensitive areas and prepared Habitat Suitability Determinations for possible inclusion in the sewer service areas in New Jersey.

Corridor/Utility Experience

- Prepared necessary permitting for a petroleum product pipeline relocation underneath the Arthur Kill and Newark Bay and adjacent uplands and wetlands. Applications were submitted to the USACE, New York State Department of Environmental Conservation, New York State Department of State, New York State Office of General Services, NJDEP, and New Jersey Bureau of Tidelands. Issues addressed within the application support documents included impacts to essential fish habitat, freshwater and tidal wetlands, and navigation. All of the required permits were obtained for the project and the project was completed.

- Designed, directed, and participated in wetland delineations, ecological studies, regulatory assessment and regulatory compliance for several proposed underground oil pipelines, upgrade/replacement to electric transmission rights of ways (ROW), and sanitary sewer alignments, and their associated access roads throughout New Jersey.

- Managed complex electronic transmission ROW upgrade projects from planning to construction stages. This included the leading of large-scale field efforts including wetland delineations, threatened and endangered wildlife and plant assessments and surveys, vernal habitat assessments and surveys, and pre-construction monitoring. Worked with project teams to minimize disturbances to regulated areas, managed permitting efforts when needed, and negotiated with NJDEP to solve permitting concerns.

- Monitoring of construction and/or maintenance activities within environmentally sensitive areas along various overhead electric transmission and gas pipeline ROWs. Tasks include delineating and monitoring regulated activities within environmentally sensitive areas for the purposes of natural resources protection (wetlands, waters, and threatened and endangered species), soil and sediment erosion control, access road maintenance and repair, and ROW vegetation maintenance, including herbicide application, mowing, hand-cutting, and tree-cutting.

Wetland/Riparian Zone Mitigation

- Assisted in the preparation of a riparian zone and freshwater wetlands mitigation plan for remediation and subsequent redevelopment within regulated areas for a site in the Borough of Upper Saddle River, New Jersey.

- Conducted multi-year monitoring of remediated and restored wetlands and transition areas pursuant to an approved NJDEP Freshwater Wetlands General Permit Number 4 for a site in Hanover Township, New Jersey. The monitoring includes the evaluation of wetlands hydrology and hydric soils.

- Prepared a transition area restoration planting plan pursuant to a NJDEP Special Activity Waiver for a site in Denville Township, New Jersey.

- Conducted multi-year monitoring of wetlands habitat restoration project. This included the establishment and surveys of plant quadrats, supervision of planting of native shrubs and herbaceous species, and supervision of invasive species treatment and removal using herbicide and manual removal.

Municipal Environmental Impacts Statements

- Prepared over 100 Environmental Impact Statements and Assessments for residential, industrial, and commercial projects throughout New Jersey.

- Prepared an Environmental Impact Assessment for Virgin Spa at Natirar on a 90-acre property in the Borough of Peapack and Gladstone, New Jersey.

- Provided expert testimony concerning wetlands and flood hazard area issues at a municipal hearing for a preliminary and final site plan approval application for a site in Wayne Township, New Jersey.

Vernal Habitats

- Led over 200 vernal habitat assessments and surveys in accordance with survey protocols developed by the NJDEP. Pertinent information was gathered on hydrology, vegetation, observed reptile and amphibian species, and weather conditions.

- Assisted in the preparation of two vernal habitat creation plans, which involved the selection of suitable native vegetation and consultation with the project engineer concerning hydrologic budget, lining material, topographic contours, and construction methodology.

Avian Studies

- Led surveys for the State-endangered (breeding) Northern Goshawk (*Accipiter gentilis*), (breeding) Red-Shouldered Hawk (*Buteo lineatus*), State-threatened Barred Owl (*Strix varia*), special concern (breeding) Broad-Winged Hawk (*Buteo platypterus*), (breeding) Cooper's Hawk (*Accipiter cooperii*), and (breeding) Sharp-Shinned Hawk (*Accipiter striatus*) in New Jersey. Surveys included call surveys and nest/tree cavity searches.

- Led surveys for the State-endangered (breeding) Golden-Winged Warbler (*Vermivora chrysoptera*) in accordance with the Cornell Lab of Ornithology's Golden-Winged Warbler Atlas Project (1999-2005). Surveys included call surveys and habitat assessments.

- Led surveys for the State-threatened Red-Headed Woodpecker (*Melanerpes erythrocephalus*) in New Jersey. Surveys included call and cavity nest surveys.

- Assisted in grassland bird surveys for State-threatened Grasshopper Sparrow (*Ammodramus savannarum*), Savannah Sparrow (*Passerculus sandwichensis*), and Bobolink (*Dolichonyx oryzivorus*) in New Jersey.

Snake Studies

- Assisted in diurnal and nocturnal road cruising, grid searches, and drift fence trapping surveys for State-threatened Northern Pine Snake (*Pituophis melanoleucus melanoleucus*) for multiple properties in the Townships of Barnegat, Stafford, and Toms River New Jersey. The surveys were approved by the NJDEP and Pinelands Commission.

- Conducted radio telemetry for Northern Pine Snakes for multiple properties in the Townships of Stafford and Toms River, New Jersey.

- Assisted in grid searches and drift fence trapping for Northern Pine Snake and State-endangered Timber Rattlesnake (*Crotalus horridus*) on multiple properties in the Townships of Manchester and Stafford. The surveys were approved by the NJDEP and Pinelands Commission.

- Assisted in Timber Rattlesnake gestation surveys at two survey locations associated with an overhead electric transmission line in Morris and Sussex Counties, New Jersey.

Salamander Studies

- Conducted field surveys for the State-endangered Blue-Spotted Salamander (*Ambystoma laterale*) and State-Threatened Long-Tailed Salamander (*Eurycea longicauda longicauda*).

- Led Blue-Spotted Salamander surveys on multiple overhead electric transmission lines in Essex and Morris Counties, New Jersey.

Turtle Studies

- Led Phase I and Phase II Surveys for Federally-threatened and State-endangered Bog Turtle (*Glyptemys muhlenbergii*).

- Assisted in Phase III trapping and radio telemetry for Bog Turtle.

- Prepared over 25 Bog Turtle Phase II Survey Reports for many sites in New Jersey and York County, Pennsylvania.

- Prepared Bog Turtle Phase I Survey Reports for Pocono Manor Inn and Resort and Transcontinental Gas Pipeline Corporation ROW in Pennsylvania, and Tennessee Gas Pipeline ROW in New Jersey.

- Led Bog Turtle Phase I and Phase II surveys on multiple overhead electric transmission line upgrade projects or for routine maintenance for multiple sites in New Jersey.

- Conducted surveys for the State-threatened Wood Turtle (*Clemmys insculpta*) for several sites throughout New Jersey.

- Conducted a long-term Wood Turtle survey that involves radio telemetry of adults and hatchlings, hibernacula surveys, nesting surveys, and nest protection.

Rare Plant Studies

- Conducted several surveys for rare plants including the Federally-threatened and State-endangered Small Whorled Pogonia (*Isotria medeoloides*), Swamp Pink (*Helonias bullata*), and Knieskern's Beaked-Rush (*Rhynchospora knieskerni*), State-endangered Willow-Leaf Aster (*Symphyotrichum praealtum* var. *praealtum*), and Pinelands Commission-listed Little Ladies' Tresses (*Spiranthes tuberosa*).

University Research Studies

- Collected field observational data on individual wetland plant species pertaining to nutrient resorption.

- Conducted vegetation surveys for percent cover, biomass estimations, and community composition for inland Californian freshwater marshes.

- Performed streamflow measurements, groundwater, and infiltration analyses.

- Conducted mesocosm experiments to assess the response of selected wetland plant species (native and introduced) to nutrient enrichment and two different water levels.

PUBLICATIONS:

Rejmánková, Eliska and Karin Tekel. Start July 1, 1998. Technical Completion Report. Life History Strategies of California Native Plants: Implications for Wetland Creation and Restoration. University of California, Davis, Center for Water Resources. http://www.waterresources.ucr.edu/wrc/publications/rejmankova_W-907.pdf

Tekel, Karin Jean. 2001. Thesis (M.S.). The relationship between water quality and plant functional groups in freshwater wetlands. University of California, Davis.