TRIDENT
ENVIRONMENTAL
Site Remediation, Land Use & Ecology

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1423.0016
Revised: December 22, 2020
July 1, 2019
August 19, 2018

CAFRA INDIVIDUAL PERMIT COMPLIANCE STATEMENT

2065 HIGHWAY 37
BLOCK 44 * LOT 15.01
MANCHESTER TOWNSHIP
OCEAN COUNTY
NEW JERSEY

PREPARED FOR:

HARVEY KAREN
150 TENNIS COURT
WALL, NJ 07719

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Trident Environmental was retained to assist in preparing a Coastal Area Facility Review Act (CAFRA) Individual Permit. This CAFRA application proposes 210 residential units, an 18,000 SF commercial pad, and 5,525 square-foot convenience markets with gas pumps.

This compliance statement has been prepared per the requirements set forth at N.J.A.C. 7:7, Coastal Zone Management Rules.

II. EXISTING CONDITIONS

Site Location:

The property is located along Highway Route 37. It can be found on the Keswick Grove USGS Quadrangles with N.A.D. 1983 state plane coordinates of E (x) 553,283 N (y) 422,935 at the site's approximate center. The site is located within a Coastal Suburban sewer and non-sewer service Planning Area.

Property:

The site contains 45.43 acres consisting of two abandoned commercial structures, vacant cleared land, and undeveloped woodlands.

Current Uses of Adjoining Properties:

North: Highway Route 37 and Commercial Development
West: Undeveloped Woodlands
East: Residential Development
South: Utility Right of Way and Undeveloped Woodlands

III. PROPOSED DEVELOPMENT

The project proposes to build a mixed-use development consisting of 210 residential units, a 5,525 square-foot convenience market with gas pumps, and 18,000 square feet of commercial space. Access to the development is proposed via two (2) driveways along Route 37. Interior roadways and a stormwater management basin will also be constructed as part of the project. Please refer to the Site Development Plan prepared by FWH Associates, P.A., for further detail.

IV. COMPLIANCE WITH CAFRA POLICIES

In accordance with the provisions of CAFRA, Rules on Coastal Zone Management (NJAC 7:7 et. seq.); Trident Environmental identified the following policies to be addressed as listed below:

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SUBCHAPTER 9 - SPECIAL AREAS

7:7-9.25 Flood Hazards Areas

Flood hazard areas include those areas mapped by the Department, areas defined or delineated as an A or a V zone by FEMA, and any unmapped areas subject to flooding by the flood hazard area design flood. Flood hazard areas are subject to either tidal or fluvial flooding, and the extent of flood hazard areas shall be determined or calculated in accordance with the procedures at N.J.A.C. 7:13-3.

This entire site is located within an X Zone, which is not a flood hazard area.

7:7-9.26 Riparian Zones

A riparian zone exists along every regulated water, except there is no riparian zone along the Atlantic Ocean or any human-made lagoon, stormwater management basin, oceanfront barrier island, spit, or peninsula.

There are no Riparian Zones located on the site. The closest mapped waterway is located more than 300-ft from the property.

7:7-9.27/ 7:7-9.28 Wetlands /Wetland Buffers

Wetlands are an area that is inundated or saturated by surface water or groundwater at a frequency or duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

The property does contain wetlands. A Letter of Interpretation Line Verification (File No. 1518-07-0003.1) dated 11/19/07 had been previously issued for the site. The project proposes to fill the wetlands onsite utilizing a Freshwater Wetland General Permit No. 6 & 7. An application to fill the wetlands has been submitted along with this application.

7:7-9.32 Steep Slopes

Steep slopes are land areas with slopes greater than 15 percent, not adjacent to the shoreline, therefore not coastal bluffs. Steep slopes include natural swales and ravines and human-made areas, such as those created by mining for sand, gravel, or fill, or road grading. Slopes of less than 15 percent are not considered to be steep slopes.

The property does contain areas of steep slopes. No development is proposed on the steep slopes located onsite.

7:7-9.36 Endangered & Threatened Species Potential

Trident Environmental Reviewed Landscape Project Version 3.3 data for threatened/endangered wildlife species potential. The NJDEP developed the Landscape Project, Division of Fish and Wildlife, Endangered and Non-Game Species Program (ENSP) as a wildlife habitat mapping program to identify and map critical habitats for endangered, threatened, and special-concern wildlife.

The site lies within the Pinelands Coastal Region of the Landscape Project Version 3.3. A Rank 3, Northern Pine Snake occupied habitat is mapped throughout the site. Habitat for Northern Pine Snake has been identified in the rear of the property along the western property boundary. The remaining areas of the site are not characterized as critical habitat due to the presence of wetlands that are typically avoided by the pine snake, disturbed areas of the site resulting from prior asphalt plant operations that resulted in an area of contamination, gravel and stone areas throughout the central portion of the site, and asphalt and buildings in the north adjacent to Route 37.

The Natural Heritage Database also listed habitat near the site for Corn Snake, Barred Owl, Pine Barrens Treefrog, and Least Tern. A review of the property determined no critical habitat for Barred Owl, Pine Barren Treefrog, or Least Tern is located on the site. The site does contain suitable habitat for Corn Snake since it typically occupies similar habitats as the Northern Pine Snake, which has been documented and identified onsite.

A 300-foot conservation easement is proposed from the southern property boundary where no development of structures, roadway, parking areas, or impervious coverage would be allowed. The 300-foot buffer will deed restrict 9.68 acres to be protected from any further development or disturbance. The development will also construct a shallow recharge basin located adjacent to the conservation easement, adding an additional 150 feet of buffer for the existing critical habitat.

A Habitat Evaluation Model ("HEM") model was prepared after field investigations to quantify the quality of the existing northern pine and corn snake habitat located on the site, as well as to determine the value of the habitat that would be disturbed by the proposed development. In doing so, the Applicant and the Department can then determine the appropriate amount of mitigation that would be required to offset any disturbance to existing northern pine and corn snake habitat. The HEM model calculated a total score of 24.50 units, that would be disturbed and therefore must be accounted for by way of mitigation. It should be noted that the HEM model that was completed took into account not only the habitat impacts from the proposed development detailed above but possible future impacts to the habitat that will be impacted by the possible future expansion of the WQMP which the Applicant will be seeking. The applicant proposes to purchase mitigation credits from the existing bank owned by (put in their full name here ("Magnolia") to satisfy any proposed impacts to the northern pine snake and corn snake habitats.

7:7-9.37 Critical Wildlife Habitat

The site was reviewed for critical wildlife habitat as described in N.J.A.C. 7:7-9.37. Critical wildlife habitat is specifically known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating.

The site contains an existing forested area of 23.77 acres. An area of 14.53 acres of tree preservation is proposed as identified on the Overall Site Plan (Sheet 4). Therefore the project will impact 9.24 acres of habitat. The applicant proposes to mitigate for this loss of habitat with the credits acquired from Magnolia for the required Northern Pine Snake and Corn Snake mitigation.

7:7-9.39 Special Hazard Areas

The property contains a groundwater CEA NJDEP Case No. 98-06-11-1151-20, Program Interest No. 016764. The CEA is estimated at 340 feet in length with a width of 130 feet and is located in the southwestern portion of the site near the western property boundary. The site also mapped within a TCE CKE (PI No. G000009218). The location of the TCE Plume has been delineated on the site and is estimated to be about 500 feet in length by about 280 feet in width located near the jughandle on State Highway 37 in the northeast portion of the Site.

The project proposed to construct four (4) recharge stormwater basins as part of the project. The project has been designed to ensure the recharging of stormwater will not adversely affect the groundwater contamination on the site. The proposed locations for the Infiltration Basins surround the CEA Boundary and the TCE Plume Area at distances of between 50 feet to 750 feet away and are located hydraulically downgradient of the Groundwater CEA Boundary and TCE Plume Area. Therefore, their impact on the groundwater flow direction and movement of the CEA Boundary and TCE Plume Areas is negligible.

The Groundwater CEA Area is underlain by the Cohansey Formation, which is fine to medium to coarse-grained sand facies, and Fill which is reworked native and Cohansey sand. The soil hydraulic conductivity (K) is 44 ft./day, the hydraulic gradient (i) is 0.019 ft./ft., and the effective porosity is 0.25. The soil test pits conducted on the site encountered groundwater between 3.6 and 13.6 feet. The measured permeability rate ranged from <0.2 in./hr. (0.4 ft./day) in SP-B, F, G, and I to 31.24 in./hr. (62 ft./day) in SP-E. Soil test borings SP-1 through SP-9, which are between 7 and 15 feet deep encountered yellow, brownish sand with 5% to 15% gravel and encountered groundwater between 6 and 15 feet. The measured permeability rate ranged from 16.86 in./hr. (33 ft./day) in soil test boring SP-9 to 71.13 in./hr. (142 ft./day) in SP-1.

The hydrogeologic properties and soil test borings information detailed above would also indicate that the proposed shallow Infiltration Basins would drain quickly and not adversely impact the groundwater flow direction and movement of the CEA Boundary and TCE Plume Areas, which are surrounded by the proposed Infiltration Basins.

The proposed residential and commercial developments will be constructed with a vapor barrier in accordance with the required regulations outlined in N.J.A.C. 7:26E.

7:7-9.42 Pinelands National Reserve and Pinelands Protection Area

The Pinelands National Reserve includes those lands and water areas defined in the National Parks and Recreation Act of 1978, Section 502 (P.L. 95-625), an approximately 1,000,000 acre area ranging from Monmouth County in the north, south to Cape May County and from Gloucester and Camden County on the west to the barrier islands of Island Beach State Park and Brigantine Island along the Atlantic Ocean on the east (see Appendix, Figure 10, incorporated herein by reference). The "Pinelands Area" is a slightly smaller area within the Pinelands National Reserve. It was designated for State regulation by the Pinelands Protection Act of 1979 (N.J.S.A. 13:18-1 et seq.). The Pinelands Commission adopted a Comprehensive Management Plan in November 1980. Within the Pinelands Area, the law delineates a Preservation Area, where the plan shall "preserve an extensive and contiguous area of land in its natural state, thereby ensuring the continuation of a Pinelands environment...." (Section 8c).

The property is located with Regional Growth Area within the Pinelands National Reserve; it is not within the Pinelands Area. The project has been designed to be consistent with the intent, policies, and objectives of the Pinelands National Reserve.

SUBCHAPTER 13 - REQUIREMENTS FOR IMPERVIOUS COVER AND VEGETATIVE COVER FOR GENERAL LAND AREAS AND CERTAIN SPECIAL AREAS.

7:7 - 13.15 Coastal Planning Areas in the CAFRA Area

The site is situated within a Coastal Suburban Planning Area in both the sewer and non-sewer service area.

7:7 - 13.17 Impervious Cover Limits for a Site in the CAFRA Area

The site is within a Coastal Suburban Planning Area sewer service and non-sewer service area. The impervious coverage limits for the two planning areas are determined under 7:7-13.17, Table H. The net land area is 45.43 acres; the corresponding impervious cover percentage of a Coastal Suburban Planning Area within a sewer service area is 30%. The corresponding impervious cover for the Suburban non-sewer service area is 5%. For impervious limits and the proposed impervious, please refer to the table below.

PROPOSED IMPERVIOUS SURFACE ON-SITE

Planning Area	Net Land Area	Allowable Impervious	Proposed Impervious
Suburban (SSA)	39.0 Ac	11.7 Ac (30%)	11.06 Ac (29.8%)
Suburban (NSA)	6.43 Ac	0.32 Ac (5%)	0.0 Ac (0%)

7:7 - 13.18 Vegetative Cover Percentages for a Site in the CAFRA Area

The acreage in which trees and herbaceous/shrub vegetation shall be planted or preserved is calculated by first identifying forested and unforested portions of the site, as determined under N.J.A.C. 7:7-13.5.

Forested portions of a site within a Coastal Suburban Planning Area within a sewer service area require 35 percent of the site's forested part to be preserved. The unforested portions of a site within a Coastal Suburban Planning Area (sewer service) require 5% preservation and planting. The Suburban Planning Area (non-sewer service) requires 70% tree preservation for forested areas of the site and 5% for the site's non-forested area.

PROPOSED TREE PRESERVATION ON-SITE

Planning Area	Net Land Area	Existing Net Forested Area	Required Tree Preservation (Forested)	Existing Net Unforested Area	Required Tree Preservation (Unforested)	Total Required Tree Preservation	Total Proposed Tree Preservation
Suburban (SSA)	39.0 Ac	17.34 Ac	6.07 (35%)	21.66 Ac	1.08 Ac (5%)	7.15 Ac	10.80 Ac
Suburban (NSA)	6.43 Ac	6.43 Ac	4.50 (70%)	0.0 Ac	0 Ac	4.50 Ac	4.66 Ac

PROPOSED HERBACEOUS & SHRUB PLANTING ON-SITE

Planning Area	Net Land Area	Allowable Impervious	Required Tree Preservation	Allowable Herb / Shrub	Proposed Herb / Shrub
Suburban (SSA)	39.0 Ac	11.70 Ac	7.15 Ac	20.15 Ac	17.14Ac
Suburban (NSA)	6.43 Ac	0.32 Ac	4.50 Ac	1.61 Ac	1.77 Ac

SUBCHAPTER 14 - GENERAL LOCATION RULES

7:7-14.2 Basic Location Rule

The proposed development is not anticipated to impact public health, safety, welfare, or the natural environment.

7:7-14.3 Secondary Impacts

No secondary impacts of the proposed development are anticipated regarding traffic or wastewater treatment systems. Regarding the potential effects of the slight increases in traffic and sanitary sewer flows from the project, these increases are negligible. They can be accommodated through improvements to the existing roadway and utility infrastructure in the development area. Upon completing the project, the traffic will operate at a level of C or better for this area of Route 37.

SUBCHAPTER 15. USE RULES

7:7-15.2 Housing

The development is located adjacent to an existing Ocean Ride bus stop is located along Highway Route 37 and Commonwealth Boulevard. The development will provide lighted sidewalks with shade trees throughout the development and along Highway Route 37.

7:7-15.10 Commercial Facility

The proposed commercial development will comply with all applicable location and resource rules. The commercial building is located in a Highway Development Zone and will be compatible with scale and design with surrounding commercial development.

SUBCHAPTER 16 - RESOURCE RULES

7:7-16.3/16.6 Water Quality and Stormwater Management

The proposed project meets the definition of "major development" and will comply with the Stormwater Management rules at N.J.A.C. 7:8. For detailed information regarding stormwater, please refer to the Stormwater Management Plan prepared by FWH Associates, P.A.

7:7-16.7 Vegetation

The site contains native vegetation that will be disturbed as part of the project. Upon completion of the project, the site will be landscaped with native vegetation to the maximum extent practical. A Landscape Plan has been provided within the Site Development plans prepared by FWH Associates, P.A.

7:7-16.8 Air Quality

The proposed development will conform to all applicable State and Federal regulations, standards, and guidelines for ozone, particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, lead, and visibility.

The proposed development will be located along Highway Route 37. The development will utilize the Ocean Ride bus stop already situated on Highway Route 37 and Commonwealth Boulevard.

7:7-16.10 Scenic Resources and Design

The proposed development will blend in with the surrounding landscape and neighboring developments. Development surrounding the property includes residential development, commercial development, roadways, and undeveloped wooded areas. The proposed development will benefit the surrounding area.

7:7-16.11 Buffers and Compatibility of Uses

Buffers are natural or human-made areas, structures, or objects that separate distinct uses or areas. The compatibility of uses is the ability for users to existing together without aesthetic or functional conflicts. Adequate buffers will be provided where practical. The project will be compatible with the surrounding area. The Highway Route 37 corridor consists of a mix of residential and commercial developments. The residential portion of the site will be set back from Highway Route 37.

7:7-16.12 Traffic

The proposed project will operate a service Level "D" or better upon completing the roadway improvements along Highway Route 37. Please refer to the traffic report in Appendix C for further detail.

7:7-16.14 Solid and Hazardous Waste

Solid waste means any garbage, refuse, sludge, or other waste material, including solid, liquid, semi-solid, or contained gaseous material. A material is a solid waste if it is "disposed of" by being discharged, deposited, injected, dumped, spilled, leaked or placed into or on any land or water so that such material or any constituent thereof may enter the environment or be emitted into the air or discharged into ground or surface waters. Solid waste becomes a hazardous waste when it exhibits any of the characteristics which are specified in the Federal Regulations on Identification and Listing of Hazardous Waste (40 C.F.R. 261). The general characteristics of hazardous waste

include, but are not limited to, characteristics of ignitability, characteristics of corrosivity, characteristics of reactivity, and characteristics of toxicity.

The property contains a groundwater CEA NJDEP Case No. 98-06-11-1151-20, Program Interest No. 016764. The CEA is estimated at 340 feet in length with a width of 130 feet and is located in the southwestern portion of the site near the western property boundary. The site also mapped within a TCE CKE (PI No. G000009218). The location of the TCE Plume has been delineated on the site and is estimated to be about 500 feet in length by about 280 feet in width located near the jughandle on State Highway 37 in the northeast portion of the site.

The proposed development will conform with all applicable State and Federal regulations, standards and guidelines for the handling and disposal of solid and hazardous wastes, including the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., the Solid Waste Management rules, N.J.A.C. 7:26, the Recycling rules, N.J.A.C. 7:26A, and the Hazardous Waste rules, N.J.A.C. 7:26G.

V. SECTION 10 ANALYSES 13:19-10

The project conforms to all applicable criteria pertaining to N.J.S.A. 13:19-10:

a. The proposed project conforms to all applicable air, water and radiation emissions and effluent standards and all applicable water quality criteria and air quality standards.

   The proposed development, as proposed, will result in the minimal emission of pollutants into the air. No emission of radiation is anticipated. During the construction phase of the project, short-term air quality impacts may occur are related to the production of fugitive dust and the generation of emissions from exhausts of construction vehicles. Mitigation measures, including dust control practices and the use of construction equipment with efficient air pollution control devices, will minimize these adverse effects on local air quality.

   The operation of the project will not result in the violation of any air quality standard. Heating and air conditioning equipment will be energy efficient and comply with applicable emission regulations. The long-term air quality impacts anticipated from the project are related primarily to automobile exhaust emissions, carbon monoxide (CO), hydrocarbons, and nitrogen oxides (NOx). Impact to air quality from automobiles will be minimized since the adjacent roadway will operate at a service Level "D" or better upon completion of the project.

   The site will be serviced by municipal sewer. This off-site treatment of wastewater by a regional municipal facility will ensure compliance with applicable water quality standards.

   The proposed project will not result in the violation of any applicable water quality standard, through strict adherence to the Soil Erosion and Sediment Control Plan approved by the Ocean County Soil Conservation District and through the treatment of stormwater.

b. The proposed project will prevent air emissions and water effluents more than the existing dilution, assimilative, and recovery capacities of the air and water environments at the site and within the surrounding region.

   The impacts will be minimized by mitigating measures, including dust control practices, the use of efficient air pollution control devices, soil erosion, and sediment control measures, and treatment of wastewater.

c. Measures for the collection and disposal of litter, recyclable, and solid waste will be taken care of through a standard public collection. This will minimize adverse environmental effects and the threat to public health, safety, and welfare.

   The commercial and residential components will utilize dumpsters, collected by a private hauler, and transported to an approved landfill for disposal. Manchester Township requires the recycling of glass, aluminum, metal cans, plastic, magazines, and newspaper.

d. Upon completion of the proposed project, there will be no impairments to the regenerative capacity of water aquifers or other ground or surface water supplies.

   The stormwater management system has been designed to collect runoff and ensure water quality. These stormwater design will ensure that there are minimal feasible impairment of the regenerative capacity if water aquifers or other ground or surface water supplies. For specific details, refer to the Stormwater Management Report prepared for the project by FWH Associates, P.A.

e. The proposed project will cause minimal interference with the natural functioning of the plant, animal, fish, and human life processes at the site and within the surrounding region.

   The proposed project has been designed to cause minimal feasible interference with the natural functioning of the plant, animal, fish, and human life processes at the site and in the surrounding region by complying with applicable municipal and State land use regulations. The project will preserve 14.53 acres of forested area onsite along with planting natural vegetation throughout the development.

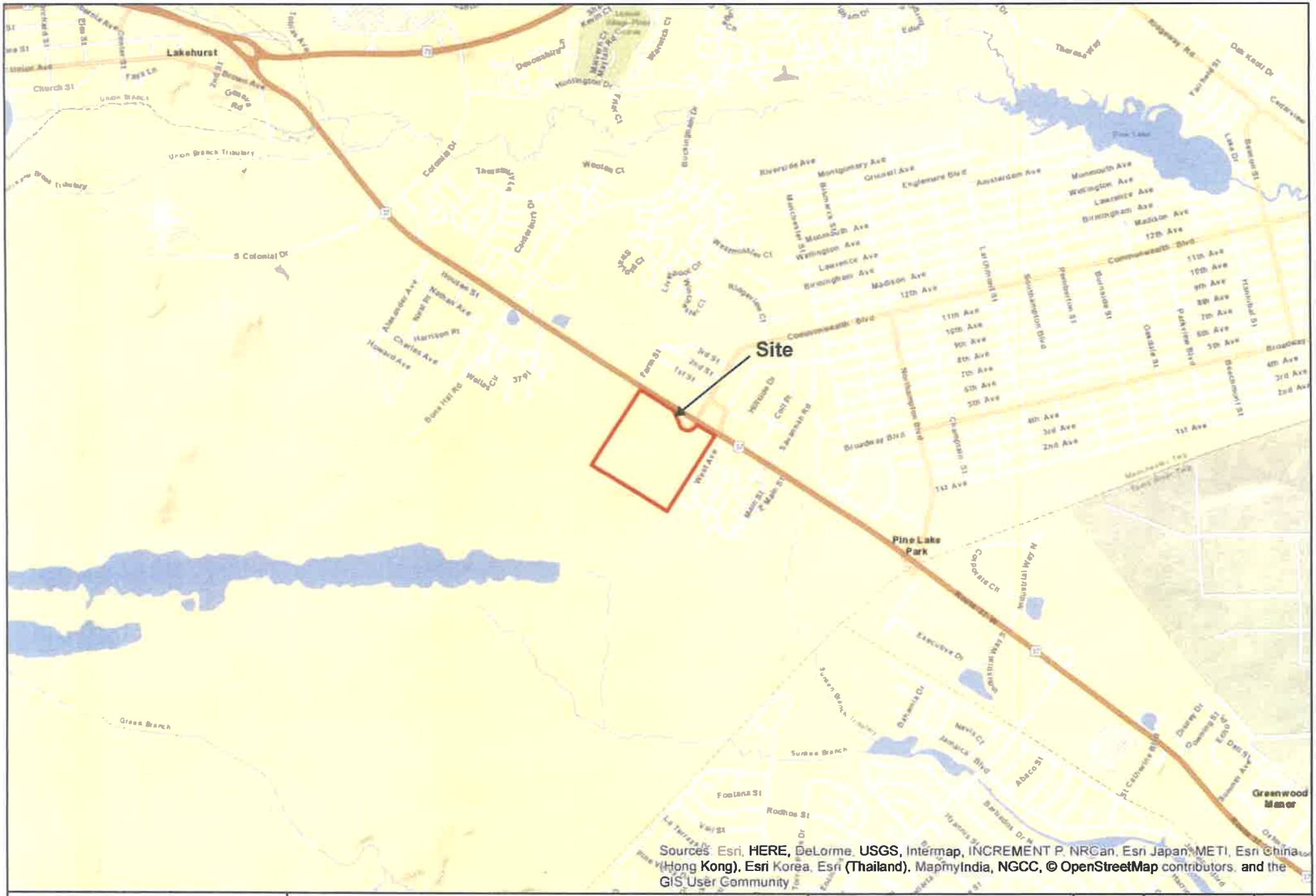
f. The proposed project will be constructed to neither endanger human life or property nor otherwise impair the public health, safety, and welfare.

   The proposed project will not endanger human life or property nor otherwise impair the public health, safety, and welfare. The public welfare and safety will be protected through compliance with the state and local permits and ordinances and the implementation of the best management practices during construction activities, as described above.

g. No areas of historic or archeological land will be disturbed as part of this project.

   The project is surrounded by residential and commercial development and will not result in the degradation of unique or irreplaceable land types, historical or archaeological areas, or existing public scenic attributes at the site or within the surrounding region.

FIGURES



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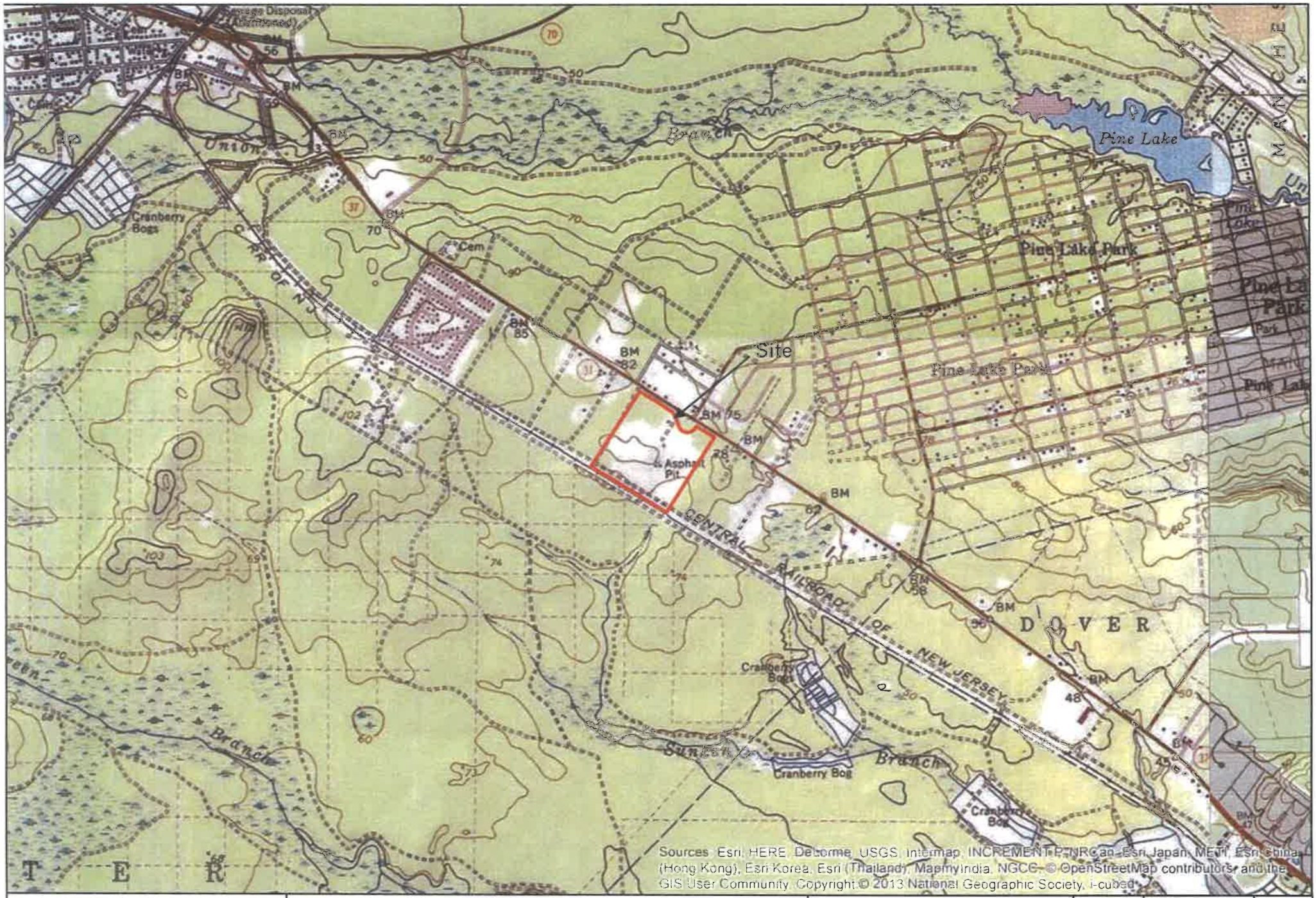
New Jersey Roads Map

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 1	JOB NO.: 1423.0016

SCALE: 1 inch = 2,000 feet
3,978,960
Feet



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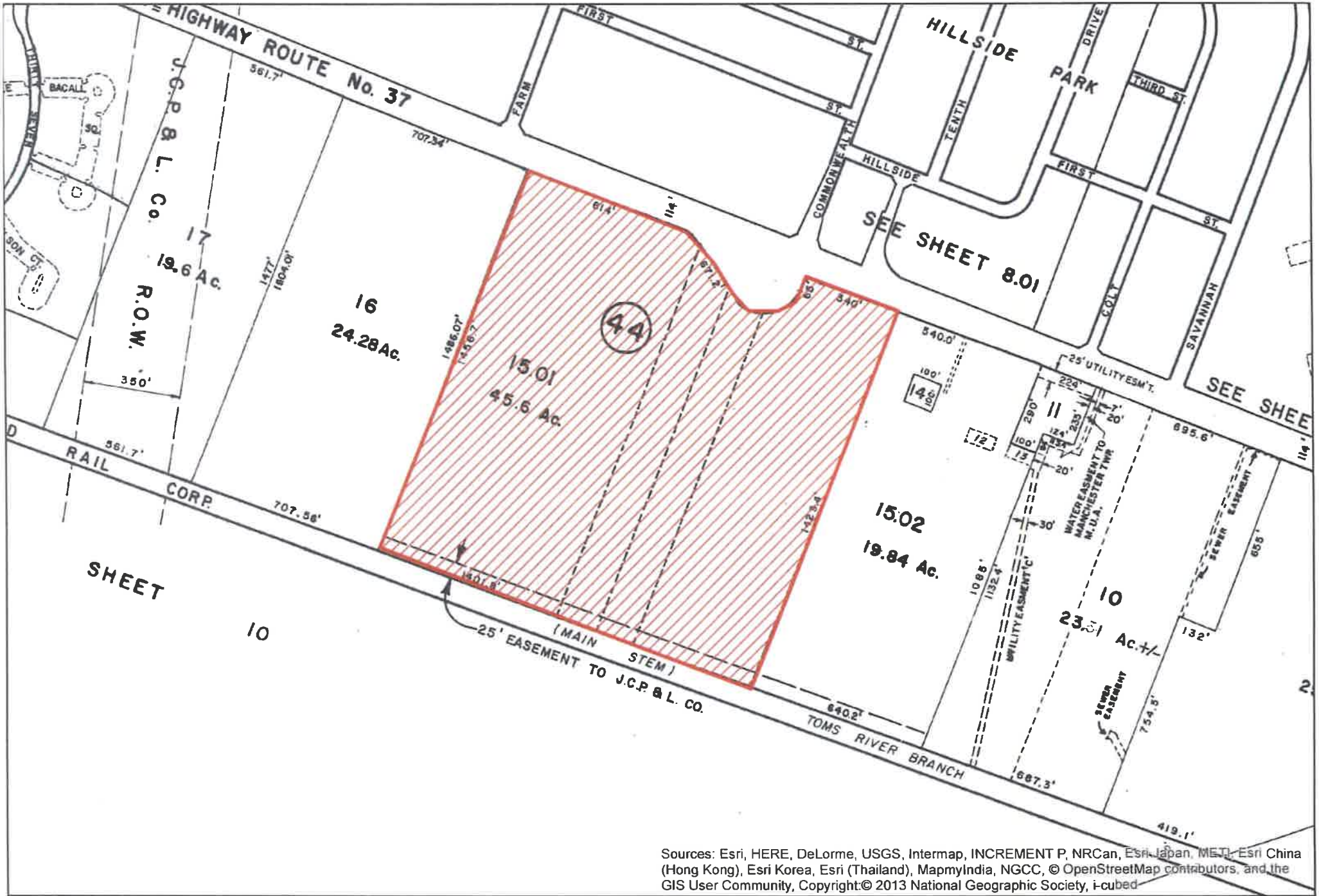
Keswick Grove
USGS Quadrangle

2065 Highway 37
Block 44 – Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE:	JOB NO.:
2	1423.0016

SCALE: 1 inch = 2,000 feet
0 1,000 2,000
Feet



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Manchester Township Tax Map

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 3	JOB NO.: 1423.0016
SCALE: 1 inch = 1 feet	
NTS	

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Ocean County Soils Map

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 4	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300 Feet

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NJDEP Mapped Freshwater Wetlands

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE:	JOB NO.:
5	1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300
Feet

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Aerial- 2015

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 6	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300 Feet

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Landscape Project
Version 3.3

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 7	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37 5 75 150 225 300 Feet

APPENDIX A

Site Photographs

2063 Highway 37 Site Photographs
Block 44 * Lot 15.01
Manchester Township, Ocean Co., NJ

TRIDENT ENVIRONMENTAL
Site Remediation, Land Use & Ecology

Photograph 1: View along Highway 37 with the site to the left

Photograph 2: View along Highway 37 with the site to the right

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Photograph 3: View of the central portion of the site

Photograph 4: View of the central portion of the site

Photograph 5: View of the abandoned commercial structures within the southern portion of the site

APPENDIX B

NHP Request

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Acting Commissioner

August 6, 2018

Nicole Budzek
Trident Environmental Consultants, Inc.
1856 Route 9
Toms River, NJ 08755

Re: 2065 Highway 37
Block(s) - 44, Lot(s) - 15.01
Manchester Township, Ocean County

Dear Ms. Budzek:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by

the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 18-3907483-14636

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Reptilia								
	Northern Pine Snake	Pituophis melanoleucus melanoleucus	Occupied Habitat	3	NA	State Threatened	G4T4	S2

Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Amphibia								
	Pine Barrens Treefrog	Hyla andersonii	Breeding Sighting	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Occupied Habitat	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Vernal Pool Breeding	3	NA	State Threatened	G4	S2
Aves								
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Least Tern	Sternula antillarum	Foraging	4	NA	State Endangered	G4	S1B,S1N
Reptilia								
	Corn Snake	Pantherophis guttatus	Occupied Habitat	4	NA	State Endangered	G5	S1
	Northern Pine Snake	Pituophis melanoleucus melanoleucus	Occupied Habitat	3	NA	State Threatened	G4T4	S2

Other Animal Species
In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Amphibia								
	Pine Barrens Treefrog	Hyla andersonii	Breeding Sighting	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Occupied Habitat	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Vernal Pool Breeding	3	NA	State Threatened	G4	S2
Aves								
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Nesting Colony	2	NA	Special Concern	G5	S3B,S4N
	Least Tern	Sternula antillarum	Foraging	4	NA	State Endangered	G4	S1B,S1N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
Insecta								

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Dotted Skipper	Hesperia attalus slossonae	Casual Flyby	2	NA	Special Concern	G3G4T3	S3
	Two-spotted Skipper	Euphyes bimacula	Casual Flyby	2	NA	Special Concern	G4	S3
Reptilia								
	Corn Snake	Pantherophis guttatus	Occupied Habitat	4	NA	State Endangered	G5	S1
	Northern Pine Snake	Pituophis melanoleucus melanoleucus	Occupied Habitat	3	NA	State Threatened	G4T4	S2

Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Vernal habitat area	2806
Potential vernal habitat area	1250
Potential vernal habitat area	1253
Potential vernal habitat area	1285

Total number of records: 4

Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

APPENDIX C

Traffic Report

TRAFFIC IMPACT STUDY

PROPOSED MIXED-USE DEVELOPMENT

NJSH Route 37
Block 44, Lot 15.01
Manchester Township
Ocean County, New Jersey

Prepared For:
Davies Consultants, Inc.

Date: July 30, 2020
Revised: January 29, 2021
SE&D Job No.: S-17003

John R. Corak, PE
Project Manager
NJ P.E. License #54973

Matthew J. Seckler PE, PP, PTOE
Principal
NJ P.E. License #48731

STONEFIELD
92 Park Avenue, Rutherford, NJ 07070

TECHNICAL APPENDIX

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

Comparative Level of Service (Delay) Table

TURNING MOVEMENT COUNT DATA

Intersection of NJSH Route 37 & Commonwealth Boulevard

Intersection of Commonwealth Boulevard & Hillside Drive

Intersection of 10th Avenue & Hillside Drive

INTERNAL CAPTURE SHEETS

FIGURES

Figure 1 – Site Location Map

Figure 2 – 2018 As-Counted Traffic Volumes

Figure 3 – 2021 Existing Traffic Volumes

Figure 4 – 2024 Base Traffic Volumes

Figure 5 – Other Planned Development Projects Future Traffic Volumes

Figure 6 – 2024 No-Build Traffic Volumes

Figure 7 – "Internally" Site-Generated Traffic Volumes

Figure 8 – "New" Site-Generated Traffic Volumes

Figure 9 – "Pass-By" Site-Generated Traffic Volumes

Figure 10 – 2024 Build Traffic Volumes

EXISTING TRAFFIC SIGNAL TIMINIG DIRECTIVE

Intersection of NJSH Route 37 & Commonwealth Boulevard

HIGHWAY CAPACITY ANALYSIS DETAIL SHEETS

2021 Existing Traffic Conditions

2024 No-Build Traffic Conditions

2024 Build Traffic Conditions

Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on traffic signal plans provided by (New Jersey Department of Transportation) NJDOT and field recordings.

2021 EXISTING CONDITION

2021 EXISTING ROADWAY CONDITIONS

The proposed mixed-use development is located along the eastbound side of NJSH Route 37 directly across from Commonwealth Boulevard in Manchester Township, Ocean County, New Jersey. The subject property is designated as Block 44, Lot 15.01 as depicted on the Manchester Township Tax Map. The site has approximately 1,445 feet of frontage along NJSH Route 37. Land uses in the area are a mix of residential and commercial uses.

NJSH Route 37 is classified as an Urban Principal Arterial roadway with a general east-west orientation and is under the jurisdiction of the NJDOT. Along the site frontage, the roadway provides two (2) lanes of travel in each direction, with jughandles at key intersections to facilitate turning movements. NJSH Route 37 has a posted speed limit of 50 mph. Curb and shoulders are provided along both sides of the roadway, sidewalk is not provided, and on-street parking is not permitted. NJSH Route 37 provides east-west mobility within Ocean County and provides access to NJSH Route 70 to the west and the Garden State Parkway and NJSH Route 35 to the east for predominately commercial uses along its length.

Commonwealth Boulevard (County Route 8) is classified as an Urban Major Collector roadway with a general east-west orientation and is under the jurisdiction of Ocean County. In the immediate site vicinity, the alignment runs in a north-south orientation. In the vicinity of the site, the roadway provides one (1) lane of travel in each direction, with additional lanes provided at key intersections to facilitate turning movements and provide additional capacity. Commonwealth Boulevard has a posted speed limit of 35 mph. Curb, sidewalk, and shoulders are not provided, and on-street parking is not permitted. Commonwealth Boulevard provides access to Route 37 at its westerly terminus and Ridgeway Road (County Route 571) at its easterly terminus for access to predominately residential uses along its length.

Hillside Drive is a local roadway with a general north-south orientation and is under the jurisdiction of Manchester Township. At its intersection with Commonwealth Boulevard, Hillside Drive has an east-west orientation. In the vicinity of the site, the roadway provides one (1) lane of travel in each direction and has a posted speed limit of 25 mph. Curb, sidewalk, and shoulders are not provided, and on-street parking is permitted along both sides of the roadway. Hillside Drive is part of the NJSH Route 37 westbound jughandle near Commonwealth Boulevard and serves predominately residential uses along its length.

- 10th Avenue & Hillside Drive

Specifically, manual turning movement counts were conducted on the following dates and during the following times:

- Wednesday, June 27, 2018, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 7:00 p.m.
- Saturday, June 30, 2018, from 11:00 a.m. to 2:00 p.m.

The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Based on the review of the count data the weekday morning peak hour occurred from 8:00 a.m. to 9:00 a.m.; the weekday evening peak hour occurred from 4:00 p.m. to 5:00 p.m.; and the Saturday midday peak hour occurred from 11:45 a.m. to 12:45 p.m. The Technical Appendix contains a summary of the turning movement count data. The 2018 As-Counted Traffic Volumes are summarized on appended **Figure 2**.

The 2018 traffic volumes were grown to the current year to generate the 2021 Existing Conditions traffic volume data. In accordance with industry guidelines, the 2018 traffic volumes along the study roadways were increased by 1.00% annually for three (3) years. The 1.00% background growth rate was obtained from the NJDOT Annual Background Growth Rate Table. The 2021 Existing weekday morning, weekday evening, and Saturday midday peak-hour volumes are summarized on appended **Figure 3**.

2021 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2021 Existing Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersections.

Under the Existing Condition, the signalized intersection of NJSH Route 37, Commonwealth Boulevard, and the NJSH Route 37 eastbound jughandle is calculated to operate at overall Level of Service B during each of the peak hours studied. Each of the NJSH Route 37 approaches are calculated to operate at Level of Service B and each of the minor approaches are calculated to operate at Level of Service D or better during each of the peak hours studied. The turning movements at the unsignalized intersection of Commonwealth Boulevard and Hillside Drive are calculated to operate at Level of Service B or better during each of the peak hours studied. It is noted the signalized intersection located to the south of Hillside Drive along Commonwealth Boulevard would provide the opportunity for gaps in traffic for vehicles exiting Hillside Drive. The turning movements at the unsignalized intersection of 10th Avenue, Hillside Drive, and the NJSH Route 37 westbound off-ramp are calculated to operate at Level of Service A during each of the peak hours studied.

The signalized intersection of NJSH Route 37, Commonwealth Boulevard, and the NJSH Route 37 eastbound jughandle is calculated to operate generally consistent with the findings of the Existing Condition at Level of Service B during each of the peak hours studied. The turning movements at the unsignalized intersection of Commonwealth Boulevard and Hillside Drive are calculated to operate generally consistent with the findings of the Existing Condition at Level of Service B or better during each of the peak hours studied. The turning movements at the unsignalized intersection of 10th Avenue, Hillside Drive, and the NJSH Route 37 westbound off-ramp are calculated to operate generally consistent with the findings of the Existing Condition at Level of Service A during each of the peak hours studied.

2024 BUILD CONDITION

The site-generated traffic volume of the proposed mixed-use development was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project "build out" is assumed within three (3) years of the preparation of this study.

TRIP GENERATION

Trip generation projections for the proposed mixed-use development were prepared utilizing NJDOT's Highway Access Permit System (HAPS) and ITE's Trip Generation Manual, 10th Edition. It is noted that the HAPS does not contain data for the enter/exit trip distribution for its land uses. Therefore, the enter/exit trip distribution for each land use was obtained from the ITE's Trip Generation Manual, 10th Edition. Trip generation rates associated with Land Use 221 "Multifamily Housing (Mid-Rise)", Land Use 820 "Shopping Center", and Land Use 960 "Super Convenience Market/Gas Station" were cited for the 210 residential dwelling units, 18,000 square feet of commercial space, and 5,563-square-foot Wawa with fuel service, respectively. **Table 1** provides the weekday morning, weekday evening, and Saturday midday peak hour trip generation volumes associated with the proposed development.

TABLE 1 – PROPOSED TRIP GENERATION

	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
Land Use	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**
210 Units Multifamily Housing (Mid-Rise) *ITE Land Use 221*	20	56	76	56	36	92	45	47	92
18,000 SF Shopping Center *ITE Land Use 820*	11	6	17	79	85	164	83	77	160
5,563 SF Super Convenience Market *ITE Land Use 960*	232	231	463	193	192	385	178	177	355
Total	**263**	**293**	**556**	**328**	**313**	**641**	**306**	**301**	**607**

TABLE 2 – PROPOSED TRIP GENERATION – ADJUSTED

Land Use Code	Land Use	Amount	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
221	Multifamily Housing (Mid-Rise)	210 Units	20	56	76	56	36	92	45	47	92
820	Shopping Center	18,000 SF	11	6	17	79	85	164	83	77	160
960	Super Convenience Market/Gas Station	5,563 SF	232	231	463	193	192	385	178	177	355
Trip Generation Total			**263**	**293**	**556**	**328**	**313**	**641**	**306**	**301**	**607**
Internal Capture Trip Reduction			-1	-1	-2	-41	-41	-82	-30	-30	-60
Land Use 820 Pass-By Trip Reduction			--	--	--	-26	-26	-52	-19	-19	-38
Land Use 960 Pass-By Trip Reduction			-176	-176	-352	-132	-132	-264	-83	-83	-166
Total New Vehicular Trips			**86**	**116**	**202**	**129**	**114**	**243**	**174**	**169**	**343**

At the site driveways, the calculated number of pass-by trips is shown as a negative number at the through movement as the vehicles are temporarily diverted from the through travel stream into and out of the site access point.

TRIP ASSIGNMENT/DISTRIBUTION

The "new" trips associated with the retail uses generated by the proposed development were distributed according to a Gravity Model with a three (3)-mile radius prepared for the site. The methodology used in the preparation of the Gravity Model assumes that trip distribution is proportional to population densities and travel distance within a given radius from the site. The municipalities within the market area were divided by census tract, with the population information identified through 2010 Census Data published by the U.S. Census Bureau. Further, the new trips associated with the residential use generated by the proposed development were distributed according to a Journey-To-Work Model with a restriction to the top 25 surrounding municipalities prepared for the site. The methodology used in the preparation of the Journey-To-Work Model utilizes the location of residents' jobs identified through 2010 Census Data published by the US Census Bureau, divided by municipality, in the surrounding area to determine the trip distribution.

Pass-by trips generated by the proposed development were distributed based on existing travel volumes on the adjacent roadway network and the access management plan of the site. The "Internally" Site-Generated Traffic Volumes are illustrated on **Figure 7.** The "New" Site-Generated Traffic Volumes are illustrated on **Figure 8** and the "Pass-By" Site-Generated Traffic Volumes expected to access the site are depicted on **Figure 9**.

of the peak hours studied. The turning movements at the proposed two-way stop-controlled intersection of the access roadway, convenience market driveway, and retail driveway are calculated to operate at acceptable Level of Service A during the weekday morning and at acceptable Level of Service B or better during the weekday evening and Saturday midday peak hours.

The turning movements at the proposed driveway along NJSH Route 37 are calculated to operate at acceptable Level of Service C during each of the peak hours studied. The calculated 95th percentile queue length of approximately two (2) vehicles at the proposed driveway during the critical peak hour can be accommodated on site without blocking internal drive aisles.

SITE CIRCULATION

A review was conducted of the proposed mixed-use development using the Site Plan prepared by FWH Associates. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Access to the site is proposed via a central access roadway connecting to the existing NJSH Route 37 eastbound jughandle and adjacent signalized intersection and one (1) right-in/right-out driveway along NJSH Route 37 located to the east of the signalized intersection. The central access roadway would provide access to each of the proposed uses and the driveway along NJSH Route 37 would provide direct access to the Wawa. The proposed Wawa would be located on the easterly side of the central access roadway and the proposed retail use would be located on the westerly side of the access roadway. In addition to the driveway along NJSH Route 37, direct access to and from the proposed Wawa would be via one (1) full-movement driveway and one (1) egress-only driveway along the access roadway. Direct access to the proposed retail use would be via one (1) full-movement driveway along the access roadway located directly across from the Wawa full-movement driveway. Access to the residential portion of the property would be at the southerly terminus of the access roadway.

The retail use building would be centrally located on its portion of the site with parking areas to the west, north, and south of the building. The Wawa would be centrally located on its portion of the site with parking areas to the east, north, and south of the building with a loading dock along the westerly portion of the building. The fueling service area would be located to the north of the Wawa building with the fuel tank located to the north of the fueling service area. Two-way vehicular circulation throughout the retail and Wawa portions of the site would be facilitated by drive aisles with a minimum width of 25 feet and 30 feet, respectively. The Wawa trash enclosure would be located on the southeasterly portion of its area. Circulation throughout the residential portion of the site would be facilitated by six (6) 24-foot-wide roadways.

the 18,000 square feet of commercial space, and 5,563-square-foot Wawa, this equates to 83 spaces and 46 spaces, respectively. As such, the proposed parking supply of 142 spaces for the retail use and 50 spaces for the Wawa would be sufficient to support the parking demand of the site.

CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed mixed-use development consisting 210 residential dwelling units, 18,000 square feet of commercial space, and 5,563-square-foot Wawa with fuel service. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The mixed-use nature of the site would result in a reduced traffic generation on the adjacent roadway network as compared to a similar suburban development with separate land uses per lot. The proposed intersection improvements would maintain acceptable Levels of Service in the Build Condition without altering the current vehicle progression or offset timings along the corridor. The site driveways and on-site layout have been designed to provide for effective access to and from the subject property and based on the Manchester Township Ordinance and ITE published parking rates the parking supply would be sufficient to support this project.

S:\2017\S-17003 Karen Realty Group Northeast, Inc. (Route 37 & Commonwealth Boulevard, Manchester, NJ)\Reports\2021-01 Local TIS\2021-01 TIS.docx

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

STONEFIELD

Table A1: Comparative Level of Service (Delay) Table

Route 37 Manchester, Ocean County, New Jersey

X (n) = Level of Service (seconds of delay)

Intersection	Lane Group	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
		2021 Existing Condition	2024 No-Build Condition	2024 Build Condition	2021 Existing Condition	2024 No-Build Condition	2024 Build Condition	2021 Existing Condition	2024 No-Build Condition	2024 Build Condition
Route 37 (E/W) & Jughandle/Access Roadway (N)/ Commonwealth Boulevard (S)	EB Through	B (15.7)	B (16.7)	B (12.4)	B (12.0)	B (12.8)	B (18.3)	B (15.3)	B (16.4)	B (16.1)
	WB Through	B (16.2)	B (16.7)	B (12.3)	B (11.7)	B (12.9)	B (18.6)	B (14.7)	B (15.8)	B (15.4)
	NB Left	D (36.7)	D (36.7)	D (36.4)	D (44.4)	D (44.1)	D (35.4)	D (38.0)	D (38.1)	D (35.3)
	NBThrough			D (45.8)			D (51.5)			D (51.5)
	NB Through/Right	D (38.4)	D (38.5)		D (53.3)	D (53.5)		D (41.2)	D (41.4)	
	NB Right			D (40.7)			D (39.8)			D (39.9)
	SB Left	C (25.4)	C (25.5)	C (31.3)	D (47.0)	D (49.6)	C (33.0)	C (30.9)	C (31.0)	C (32.2)
	SB Through			D (35.9)			D (36.0)			D (39.3)
	SB Right	C (23.3)	C (23.6)	D (35.2)	C (35.0)	D (35.4)	C (34.9)	C (29.9)	C (30.5)	D (37.3)
	Overall	**B (18.2)**	**B (18.7)**	**B (18.0)**	**B (18.6)**	**B (19.2)**	**C (23.7)**	**B (18.7)**	**B (19.3)**	**C (22.1)**
Jughandle (E)/Egress Driveway (W) & Access Roadway (N/S)	EB Left			B (10.3)			B (12.5)			B (13.1)
	EB Right			A (8.6)			A (9.0)			A (9.1)
	WB Right			A (8.8)			A (8.9)			A (9.1)
Retail Driveway (E)/Wawa Driveway (W) & Access Roadway (N/S)	EB Left/Through/Right			A (9.8)			B (10.4)			B (11.2)
	WB Left/Through/Right			A (8.6)			A (9.4)			A (9.3)
	NB Left			A (0.0)			A (7.4)			A (7.4)
	SB Left			A (7.4)			A (7.3)			A (7.4)
Route 37 (E) & Driveway (N)	NB Right			C (18.4)			C (22.9)			C (18.3)
Hillside Drive (E/W) & Route 37 westbound off-ramp (N)/10th Avenue (S)	EB Left/Through	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)
	NB Left/Through	A (9.0)	A (9.0)	A (9.3)	A (9.5)	A (9.5)	B (10.0)	A (9.1)	A (9.1)	A (9.5)
	NB Right	A (8.3)	A (8.3)	A (8.3)	A (8.4)	A (8.4)	A (8.4)	A (0.0)	A (0.0)	A (0.0)
	SB Left/Right	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)
Hillside Drive (W) & Commonwealth Boulevard (N/S)	WB Left/Right	B (10.8)	B (10.9)	B (12.0)	B (12.6)	B (12.8)	C (16.0)	B (11.2)	B (11.4)	B (14.5)
	SB Left/Through	A (7.4)	A (7.4)	A (7.4)	A (7.6)	A (7.6)	A (7.7)	A (7.5)	A (7.5)	A (7.7)

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Route 37 (E/W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.01
Site Code : 00017003
Start Date : 6/27/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Route 37 Eastbound					Route 37 Westbound					Jug Handle Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
07:00 AM	0	122	0	0	122	0	226	1	0	227	0	8	0	0	8	23	0	7	11	41	398
07:15 AM	0	119	0	0	119	0	244	0	0	244	3	13	0	0	16	23	0	7	21	51	430
07:30 AM	0	148	0	0	148	0	237	0	0	237	2	15	0	0	17	31	0	6	17	54	456
07:45 AM	0	163	0	0	163	0	196	0	0	196	3	8	0	1	12	33	0	9	29	71	442
Total	0	552	0	0	552	0	903	1	0	904	8	44	0	1	53	110	0	29	78	217	1726
08:00 AM	0	178	0	0	178	0	208	0	0	208	3	16	0	0	19	43	0	9	23	75	480
08:15 AM	1	174	0	0	175	0	206	0	0	206	4	6	1	0	11	31	0	7	27	65	457
08:30 AM	0	190	0	0	190	0	240	0	0	240	0	13	0	0	13	34	0	7	16	57	500
08:45 AM	0	192	0	0	192	0	181	0	0	181	6	15	0	0	21	41	0	6	13	60	454
Total	1	734	0	0	735	0	835	0	0	835	13	50	1	0	64	149	0	29	79	257	1891
*** BREAK ***																					
04:00 PM	0	289	1	0	290	0	273	1	0	274	10	42	0	0	52	54	0	16	24	94	710
04:15 PM	0	245	0	0	245	0	257	2	0	259	11	34	0	0	45	51	0	18	25	94	643
04:30 PM	0	281	0	0	281	0	246	1	0	247	10	38	0	0	48	37	0	11	31	79	655
04:45 PM	0	256	0	0	256	0	257	0	0	257	11	35	0	0	46	42	0	5	21	68	627
Total	0	1071	1	0	1072	0	1033	4	0	1037	42	149	0	0	191	184	0	50	101	335	2635
05:00 PM	0	263	0	0	263	0	249	0	0	249	6	42	0	0	48	31	1	12	23	67	627
05:15 PM	0	258	0	0	258	0	265	0	0	265	6	43	0	0	49	70	0	13	19	102	674
05:30 PM	0	224	0	0	224	0	254	0	0	254	10	34	1	0	45	39	0	10	23	72	595
05:45 PM	0	213	0	0	213	0	202	0	0	202	12	45	0	0	57	46	0	21	19	86	558
Total	0	958	0	0	958	0	970	0	0	970	34	164	1	0	199	186	1	56	84	327	2454
06:00 PM	0	210	0	0	210	0	216	0	0	216	7	34	1	0	42	39	0	14	12	65	533
06:15 PM	0	210	0	0	210	0	198	2	0	200	7	34	0	0	41	37	0	7	23	67	518
06:30 PM	0	182	0	0	182	0	174	1	0	175	7	47	0	0	54	29	0	8	24	61	472
06:45 PM	0	136	0	0	136	0	149	0	1	150	11	28	0	0	39	31	0	10	15	56	381
Total	0	738	0	0	738	0	737	3	1	741	32	143	1	0	176	136	0	39	74	249	1904
Grand Total	1	4053	1	0	4055	0	4478	8	1	4487	129	550	3	1	683	765	1	203	416	1385	10610
Apprch %	0	100	0	0		0	99.8	0.2	0		18.9	80.5	0.4	0.1		55.2	0.1	14.7	30		
Total %	0	38.2	0	0	38.2	0	42.2	0.1	0	42.3	1.2	5.2	0	0	6.4	7.2	0	1.9	3.9	13.1	
Auto	1	3987	1	0	3989	0	4410	8	1	4419	128	547	3	1	679	760	1	203	411	1375	10462
% Auto	100	98.4	100	0	98.4	0	98.5	100	100	98.5	99.2	99.5	100	100	99.4	99.3	100	100	98.8	99.3	98.6
HV	0	62	0	0	62	0	65	0	0	65	1	0	0	0	1	5	0	0	1	6	134
% HV	0	1.5	0	0	1.5	0	1.5	0	0	1.4	0.8	0	0	0	0.1	0.7	0	0	0.2	0.4	1.3
B/SB	0	4	0	0	4	0	3	0	0	3	0	3	0	0	3	0	0	0	4	4	14
% B/SB	0	0.1	0	0	0.1	0	0.1	0	0	0.1	0	0.5	0	0	0.4	0	0	0	1	0.3	0.1

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.02
Site Code : 00017003
Start Date : 6/27/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Eastbound					Hillside Drive Westbound					Commonwealth Boulevard Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
08:00 AM	0	0	0	0	0	12	0	2	0	14	0	18	1	0	19	1	64	0	0	65	98
08:15 AM	0	0	0	0	0	19	0	5	0	24	0	13	0	0	13	0	53	0	0	53	90
08:30 AM	0	0	0	0	0	17	0	2	0	19	0	15	0	0	15	1	50	0	0	51	85
08:45 AM	0	0	0	0	0	19	0	5	0	24	0	23	2	0	25	1	45	0	0	46	95
Total	0	0	0	0	0	67	0	14	0	81	0	69	3	0	72	3	212	0	0	215	368
*** BREAK ***																					
04:00 PM	0	0	0	0	0	21	0	6	0	27	0	44	4	0	48	1	70	0	0	71	146
04:15 PM	0	0	0	0	0	23	0	11	0	34	0	36	7	0	43	0	71	0	0	71	148
04:30 PM	0	0	0	0	0	17	0	5	0	22	0	36	0	0	36	1	59	0	0	60	118
04:45 PM	0	0	0	0	0	20	0	7	0	27	0	34	3	0	37	1	50	0	0	51	115
Total	0	0	0	0	0	81	0	29	0	110	0	150	14	0	164	3	250	0	0	253	527
Grand Total	0	0	0	0	0	148	0	43	0	191	0	219	17	0	236	6	462	0	0	468	895
Apprch %	0	0	0	0		77.5	0	22.5	0		0	92.8	7.2	0		1.3	98.7	0	0		
Total %	0	0	0	0	0	16.5	0	4.8	0	21.3	0	24.5	1.9	0	26.4	0.7	51.6	0	0	52.3	
Auto	0	0	0	0	0	146	0	42	0	188	0	217	17	0	234	6	456	0	0	462	884
% Auto	0	0	0	0	0	98.6	0	97.7	0	98.4	0	99.1	100	0	99.2	100	98.7	0	0	98.7	98.8
HV	0	0	0	0	0	2	0	1	0	3	0	0	0	0	0	0	1	0	0	1	4
% HV	0	0	0	0	0	1.4	0	2.3	0	1.6	0	0	0	0	0	0	0.2	0	0	0.2	0.4
B/SB	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	5	0	0	5	7
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0.8	0	1.1	0	0	1.1	0.8

	Eastbound					Hillside Drive Westbound					Commonwealth Boulevard Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	12	0	2	0	14	0	18	1	0	19	1	64	0	0	65	98
08:15 AM	0	0	0	0	0	19	0	5	0	24	0	13	0	0	13	0	53	0	0	53	90
08:30 AM	0	0	0	0	0	17	0	2	0	19	0	15	0	0	15	1	50	0	0	51	85
08:45 AM	0	0	0	0	0	19	0	5	0	24	0	23	2	0	25	1	45	0	0	46	95
Total Volume	0	0	0	0	0	67	0	14	0	81	0	69	3	0	72	3	212	0	0	215	368
% App. Total	0	0	0	0		82.7	0	17.3	0		0	95.8	4.2	0		1.4	98.6	0	0		
PHF	.000	.000	.000	.000	.000	.882	.000	.700	.000	.844	.000	.750	.375	.000	.720	.750	.828	.000	.000	.827	.939
Auto	0	0	0	0	0	66	0	14	0	80	0	67	3	0	70	3	206	0	0	209	359
% Auto	0	0	0	0	0	98.5	0	100	0	98.8	0	97.1	100	0	97.2	100	97.2	0	0	97.2	97.6
HV	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2
% HV	0	0	0	0	0	1.5	0	0	0	1.2	0	0	0	0	0	0	0.5	0	0	0.5	0.5
B/SB	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	5	0	0	5	7
% B/SB	0	0	0	0	0	0	0	0	0	0	0	2.9	0	0	2.8	0	2.4	0	0	2.3	1.9

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (E/W)
and 10th Avenue (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.03
Site Code : 00017003
Start Date : 6/27/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
08:00 AM	1	0	0	0	1	0	1	0	0	1	13	0	1	0	14	0	0	0	0	0	16
08:15 AM	0	0	0	0	0	0	5	0	0	5	19	0	2	0	21	0	0	0	0	0	26
08:30 AM	0	1	0	0	1	0	1	0	0	1	16	0	0	0	16	0	0	2	0	2	20
08:45 AM	0	3	0	0	3	0	6	0	0	6	17	0	0	0	17	0	0	1	0	1	27
Total	1	4	0	0	5	0	13	0	0	13	65	0	3	0	68	0	0	3	0	3	89
*** BREAK ***																					
04:00 PM	0	4	0	0	4	0	0	0	0	0	26	2	0	0	28	0	0	1	0	1	33
04:15 PM	2	5	0	0	7	0	4	0	0	4	27	2	1	0	30	0	0	3	0	3	44
04:30 PM	0	1	0	0	1	0	4	1	0	5	16	1	1	0	18	0	0	2	0	2	26
04:45 PM	0	3	0	0	3	0	1	0	0	1	25	1	0	0	26	0	0	1	0	1	31
Total	2	13	0	0	15	0	9	1	0	10	94	6	2	0	102	0	0	7	0	7	134
Grand Total	3	17	0	0	20	0	22	1	0	23	159	6	5	0	170	0	0	10	0	10	223
Apprch %	15	85	0	0		0	95.7	4.3	0		93.5	3.5	2.9	0		0	0	100	0		
Total %	1.3	7.6	0	0	9	0	9.9	0.4	0	10.3	71.3	2.7	2.2	0	76.2	0	0	4.5	0	4.5	
Auto	3	17	0	0	20	0	22	1	0	23	156	6	5	0	167	0	0	10	0	10	220
% Auto	100	100	0	0	100	0	100	100	0	100	98.1	100	100	0	98.2	0	0	100	0	100	98.7
HV	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	3
% HV	0	0	0	0	0	0	0	0	0	0	1.9	0	0	0	1.8	0	0	0	0	0	1.3
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	1	0	0	0	1	0	1	0	0	1	13	0	1	0	14	0	0	0	0	0	16
08:15 AM	0	0	0	0	0	0	5	0	0	5	19	0	2	0	21	0	0	0	0	0	26
08:30 AM	0	1	0	0	1	0	1	0	0	1	16	0	0	0	16	0	0	2	0	2	20
08:45 AM	0	3	0	0	3	0	6	0	0	6	17	0	0	0	17	0	0	1	0	1	27
Total Volume	1	4	0	0	5	0	13	0	0	13	65	0	3	0	68	0	0	3	0	3	89
% App. Total	20	80	0	0		0	100	0	0		95.6	0	4.4	0		0	0	100	0		
PHF	.250	.333	.000	.000	.417	.000	.542	.000	.000	.542	.855	.000	.375	.000	.810	.000	.000	.375	.000	.375	.824
Auto	1	4	0	0	5	0	13	0	0	13	64	0	3	0	67	0	0	3	0	3	88
% Auto	100	100	0	0	100	0	100	0	0	100	98.5	0	100	0	98.5	0	0	100	0	100	98.9
HV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
% HV	0	0	0	0	0	0	0	0	0	0	1.5	0	0	0	1.5	0	0	0	0	0	1.1
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Route 37 (E/W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Saturday, June 30, 2018

File Name : S-17003.01_sat
Site Code : 00017003
Start Date : 6/30/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Route 37 Eastbound					Route 37 Westbound					Jug Handle Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
11:00 AM	0	218	0	0	218	0	221	0	0	221	7	41	1	0	49	37	0	15	9	61	549
11:15 AM	0	222	1	0	223	0	241	0	0	241	9	30	0	0	39	27	0	19	5	51	554
11:30 AM	1	232	0	0	233	0	223	0	0	223	9	40	0	0	49	33	0	13	19	65	570
11:45 AM	0	269	0	0	269	0	224	0	0	224	9	31	0	0	40	31	0	15	29	75	608
Total	1	941	1	0	943	0	909	0	0	909	34	142	1	0	177	128	0	62	62	252	2281
12:00 PM	0	231	0	0	231	0	247	0	0	247	4	39	0	0	43	32	0	16	25	73	594
12:15 PM	0	254	0	0	254	0	220	0	0	220	9	28	0	0	37	26	0	13	19	58	569
12:30 PM	0	275	0	0	275	0	251	0	0	251	9	29	1	0	39	27	0	19	22	68	633
12:45 PM	0	231	0	0	231	0	202	0	0	202	2	39	0	0	41	36	0	6	15	57	531
Total	0	991	0	0	991	0	920	0	0	920	24	135	1	0	160	121	0	54	81	256	2327
01:00 PM	1	235	0	0	236	0	221	0	0	221	5	32	0	0	37	36	0	5	16	57	551
01:15 PM	0	249	0	0	249	0	228	0	0	228	5	46	0	0	51	27	0	10	12	49	577
01:30 PM	0	256	0	0	256	0	261	0	0	261	13	30	0	0	43	31	0	9	20	60	620
01:45 PM	0	264	0	0	264	0	246	0	0	246	6	37	0	0	43	18	0	14	19	51	604
Total	1	1004	0	0	1005	0	956	0	0	956	29	145	0	0	174	112	0	38	67	217	2352
Grand Total	2	2936	1	0	2939	0	2785	0	0	2785	87	422	2	0	511	361	0	154	210	725	6960
Apprch %	0.1	99.9	0	0		0	100	0	0		17	82.6	0.4	0		49.8	0	21.2	29		
Total %	0	42.2	0	0	42.2	0	40	0	0	40	1.2	6.1	0	0	7.3	5.2	0	2.2	3	10.4	
Auto	2	2927	1	0	2930	0	2778	0	0	2778	86	421	2	0	509	356	0	153	210	719	6936
% Auto	100	99.7	100	0	99.7	0	99.7	0	0	99.7	98.9	99.8	100	0	99.6	98.6	0	99.4	100	99.2	99.7
HV	0	7	0	0	7	0	7	0	0	7	1	1	0	0	2	5	0	1	0	6	22
% HV	0	0.2	0	0	0.2	0	0.3	0	0	0.3	1.1	0.2	0	0	0.4	1.4	0	0.6	0	0.8	0.3
B/SB	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% B/SB	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Route 37 Eastbound					Route 37 Westbound					Jug Handle Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	269	0	0	269	0	224	0	0	224	9	31	0	0	40	31	0	15	29	75	608
12:00 PM	0	231	0	0	231	0	247	0	0	247	4	39	0	0	43	32	0	16	25	73	594
12:15 PM	0	254	0	0	254	0	220	0	0	220	9	28	0	0	37	26	0	13	19	58	569
12:30 PM	0	275	0	0	275	0	251	0	0	251	9	29	1	0	39	27	0	19	22	68	633
Total Volume	0	1029	0	0	1029	0	942	0	0	942	31	127	1	0	159	116	0	63	95	274	2404
% App. Total	0	100	0	0		0	100	0	0		19.5	79.9	0.6	0		42.3	0	23	34.7		
PHF	.000	.935	.000	.000	.935	.000	.938	.000	.000	.938	.861	.814	.250	.000	.924	.906	.000	.829	.819	.913	.949
Auto	0	1023	0	0	1023	0	941	0	0	941	31	127	1	0	159	115	0	63	95	273	2396
% Auto	0	99.4	0	0	99.4	0	99.9	0	0	99.9	100	100	100	0	100	99.1	0	100	100	99.6	99.7
HV	0	5	0	0	5	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	7
% HV	0	0.5	0	0	0.5	0	0.1	0	0	0.1	0	0	0	0	0	0.9	0	0	0	0.4	0.3
B/SB	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% B/SB	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070

201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (E/W)
and 10th Avenue (N/S)
Manchester, Ocean County, New Jersey
Saturday, June 30, 2018

File Name : S-17003.03_sat
Site Code : 00017003
Start Date : 6/30/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
11:45 AM	0	1	0	0	1	0	3	0	0	3	19	0	0	0	19	0	0	2	0	2	25
Total	0	1	0	0	1	0	3	0	0	3	19	0	0	0	19	0	0	2	0	2	25
12:00 PM	1	4	0	0	5	0	5	0	0	5	17	0	0	0	17	0	0	1	0	1	28
12:15 PM	1	2	0	0	3	0	3	0	0	3	14	1	0	0	15	0	0	2	0	2	23
12:30 PM	1	2	0	0	3	0	4	0	0	4	17	0	0	0	17	0	0	2	0	2	26
Grand Total	3	9	0	0	12	0	15	0	0	15	67	1	0	0	68	0	0	7	0	7	102
Apprch %	25	75	0	0		0	100	0	0		98.5	1.5	0	0		0	0	100	0		
Total %	2.9	8.8	0	0	11.8	0	14.7	0	0	14.7	65.7	1	0	0	66.7	0	0	6.9	0	6.9	
Auto	3	9	0	0	12	0	15	0	0	15	67	1	0	0	68	0	0	7	0	7	102
% Auto	100	100	0	0	100	0	100	0	0	100	100	100	0	0	100	0	0	100	0	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	1	0	0	1	0	3	0	0	3	19	0	0	0	19	0	0	2	0	2	25
12:00 PM	1	4	0	0	5	0	5	0	0	5	17	0	0	0	17	0	0	1	0	1	28
12:15 PM	1	2	0	0	3	0	3	0	0	3	14	1	0	0	15	0	0	2	0	2	23
12:30 PM	1	2	0	0	3	0	4	0	0	4	17	0	0	0	17	0	0	2	0	2	26
Total Volume	3	9	0	0	12	0	15	0	0	15	67	1	0	0	68	0	0	7	0	7	102
% App. Total	25	75	0	0		0	100	0	0		98.5	1.5	0	0		0	0	100	0		
PHF	.750	.563	.000	.000	.600	.000	.750	.000	.000	.750	.882	.250	.000	.000	.895	.000	.000	.875	.000	.875	.911
Auto	3	9	0	0	12	0	15	0	0	15	67	1	0	0	68	0	0	7	0	7	102
% Auto	100	100	0	0	100	0	100	0	0	100	100	100	0	0	100	0	0	100	0	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Mixed-Use Development	**Organization:**	SE&D
Project Location:	Manchester, Ocean County, New Jersey	**Performed By:**	NLP
Scenario Description:	S-17003	**Date:**	1/20/2021
Analysis Year:	2024	**Checked By:**	JRC
Analysis Period:	**AM Street Peak Hour**	**Date:**	1/20/2021

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	820 & 960	18,000 & 5,563	SF	480	243	237
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	210	Units	76	20	56
Hotel				0		
All Other Land Uses[2]				0		
				556	263	293

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	556	263	293
Internal Capture Percentage	0%	0%	0%
External Vehicle-Trips[5]	554	262	292
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	0%	0%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	2%
Hotel	N/A	N/A

[1] Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2] Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3] Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4] Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5] Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6] Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Mixed-Use Development	**Organization:**	SE&D
Project Location:	Manchester, Ocean County, New Jersey	**Performed By:**	NLP
Scenario Description:	S-17003	**Date:**	1/20/2021
Analysis Year:	2024	**Checked By:**	JRC
Analysis Period:	**PM Street Peak Hour**	**Date:**	1/20/2021

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	820 & 960	18,000 & 5,563	SF	549	272	277
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	210	Units	92	56	36
Hotel				0		
All Other Land Uses[2]				0		
				641	328	313

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	26	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	15	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	641	328	313
Internal Capture Percentage	13%	13%	13%
External Vehicle-Trips[5]	559	287	272
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	6%	9%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	46%	42%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Mixed-Use Development	**Organization:**	SE&D
Project Location:	Manchester, Ocean County, New Jersey	**Performed By:**	NLP
Scenario Description:	S-17003	**Date:**	1/20/2021
Analysis Year:	2024	**Checked By:**	JRC
Analysis Period:	**Saturday Peak Hour**	**Date:**	1/20/2021

Table 1-S: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	820 & 960	18,000 & 5,563	SF	515	261	254
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	210	Units	92	45	47
Hotel				0		
All Other Land Uses[2]				0		
				607	306	301

Table 2-S: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-S: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-S: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	17	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	13	0	0		0
Hotel	0	0	0	0	0	

Table 5-S: Computations Summary

	Total	Entering	Exiting
All Person-Trips	607	306	301
Internal Capture Percentage	10%	10%	10%
External Vehicle-Trips[5]	547	276	271
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-S: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	5%	7%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	38%	28%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

4Enter vehicle occupancy assumed in Table 1-S vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-S, 9-S (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

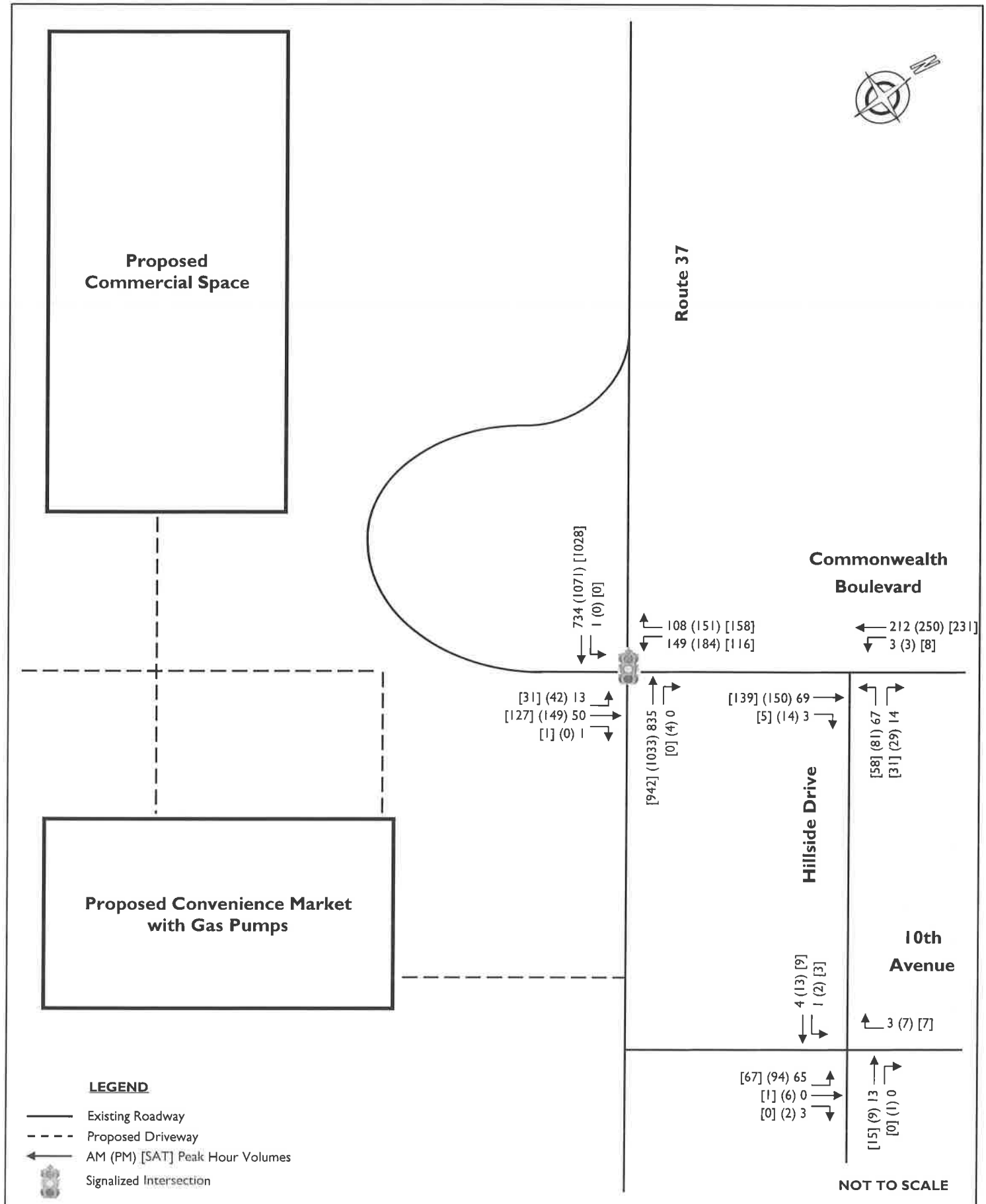
5Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-S.

[6]Person-Trips

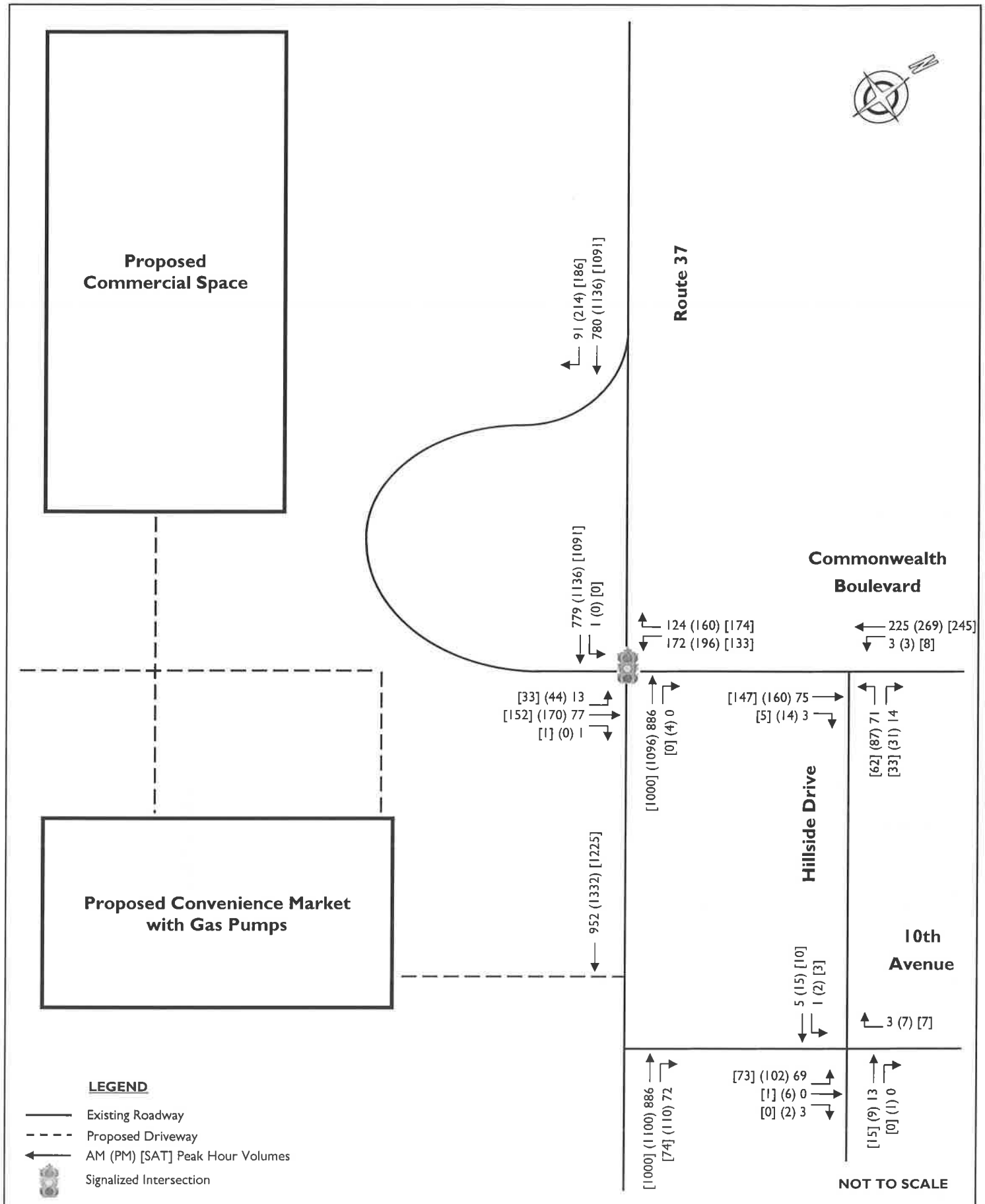
*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

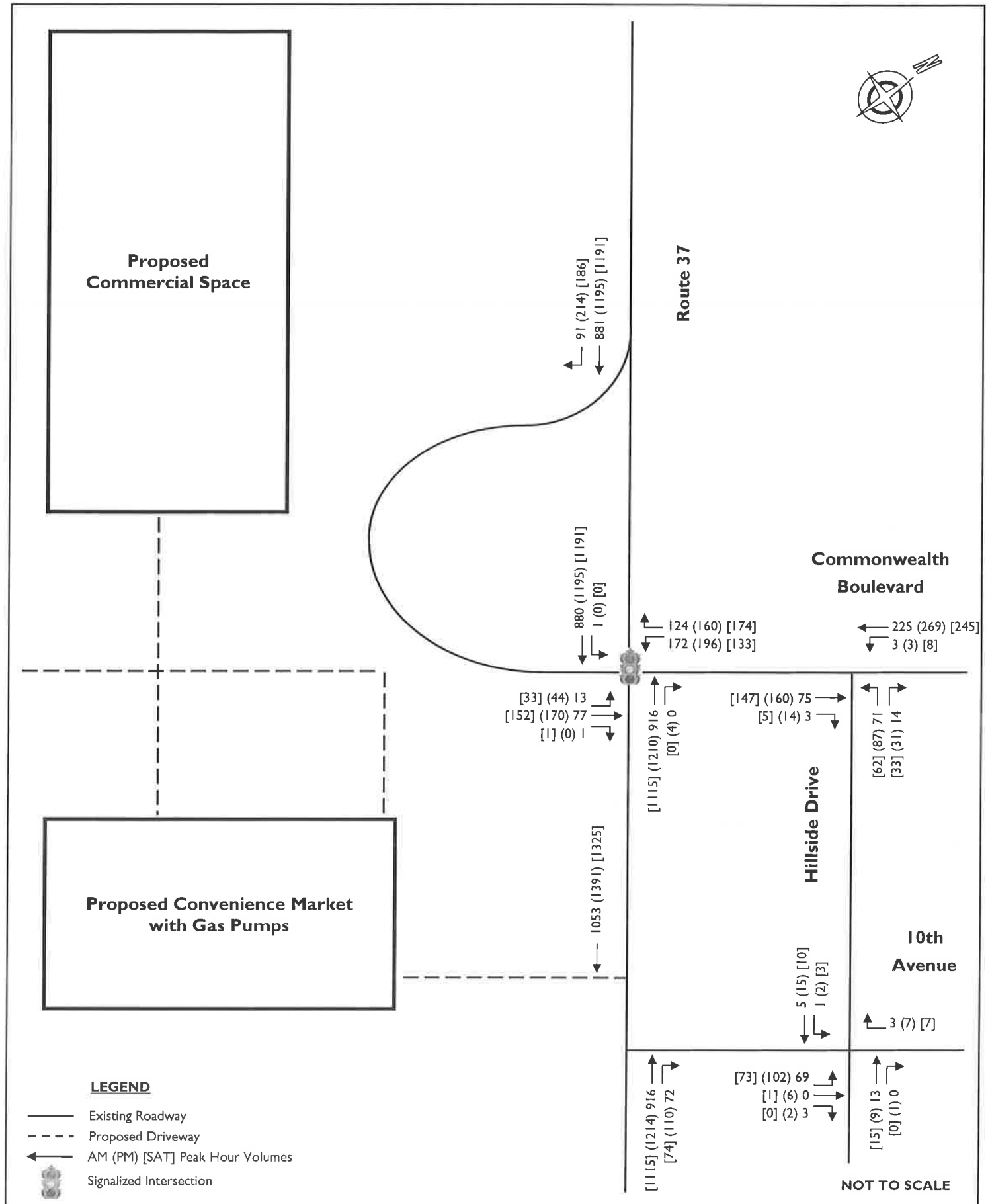
FIGURES



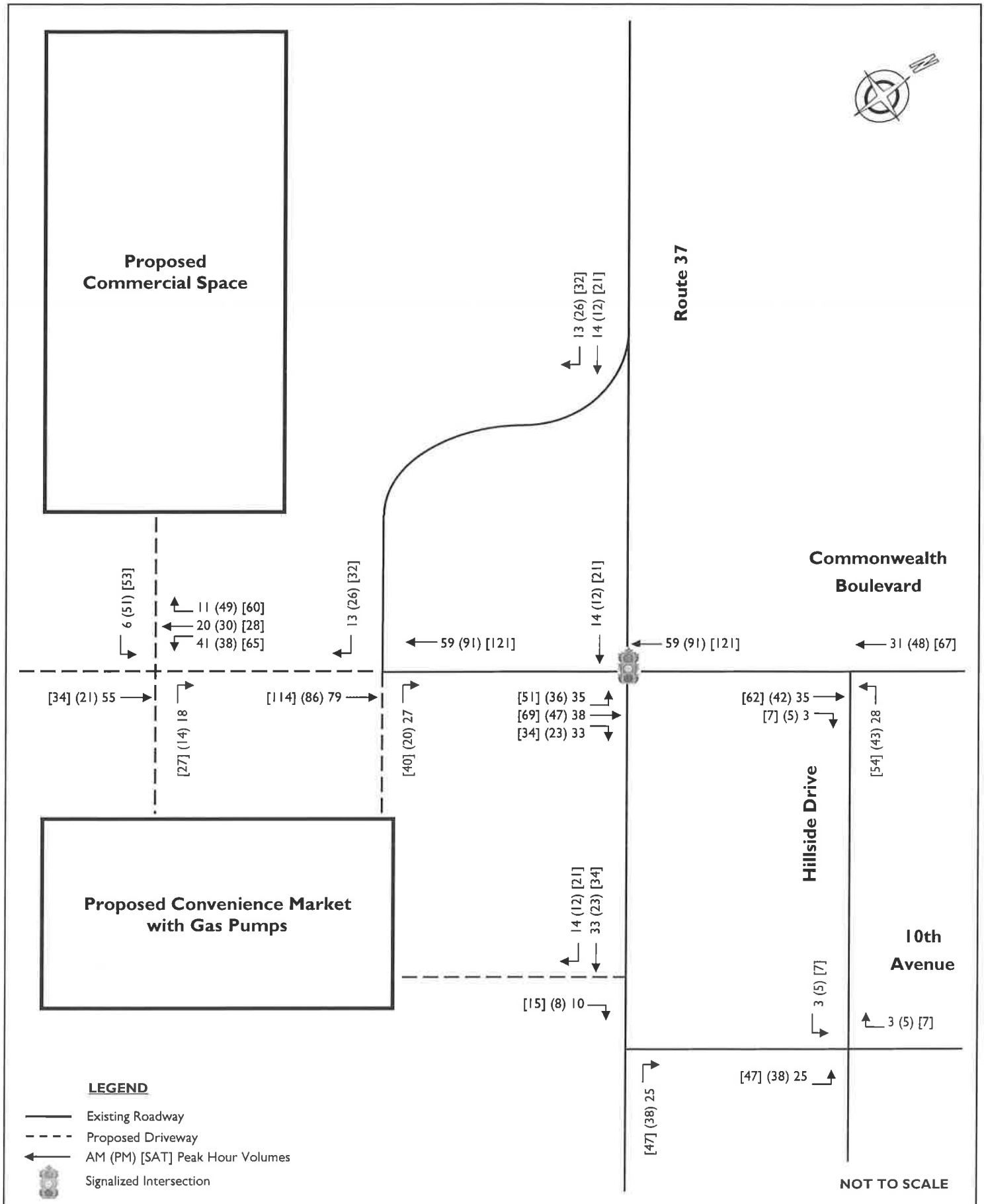
STONEFIELD	Proposed Mixed-Use Development Route 37 & Commonwealth Boulevard Manchester, Ocean County, New Jersey Traffic Impact Study	FIGURE 2 2018 As-Counted Traffic Volumes



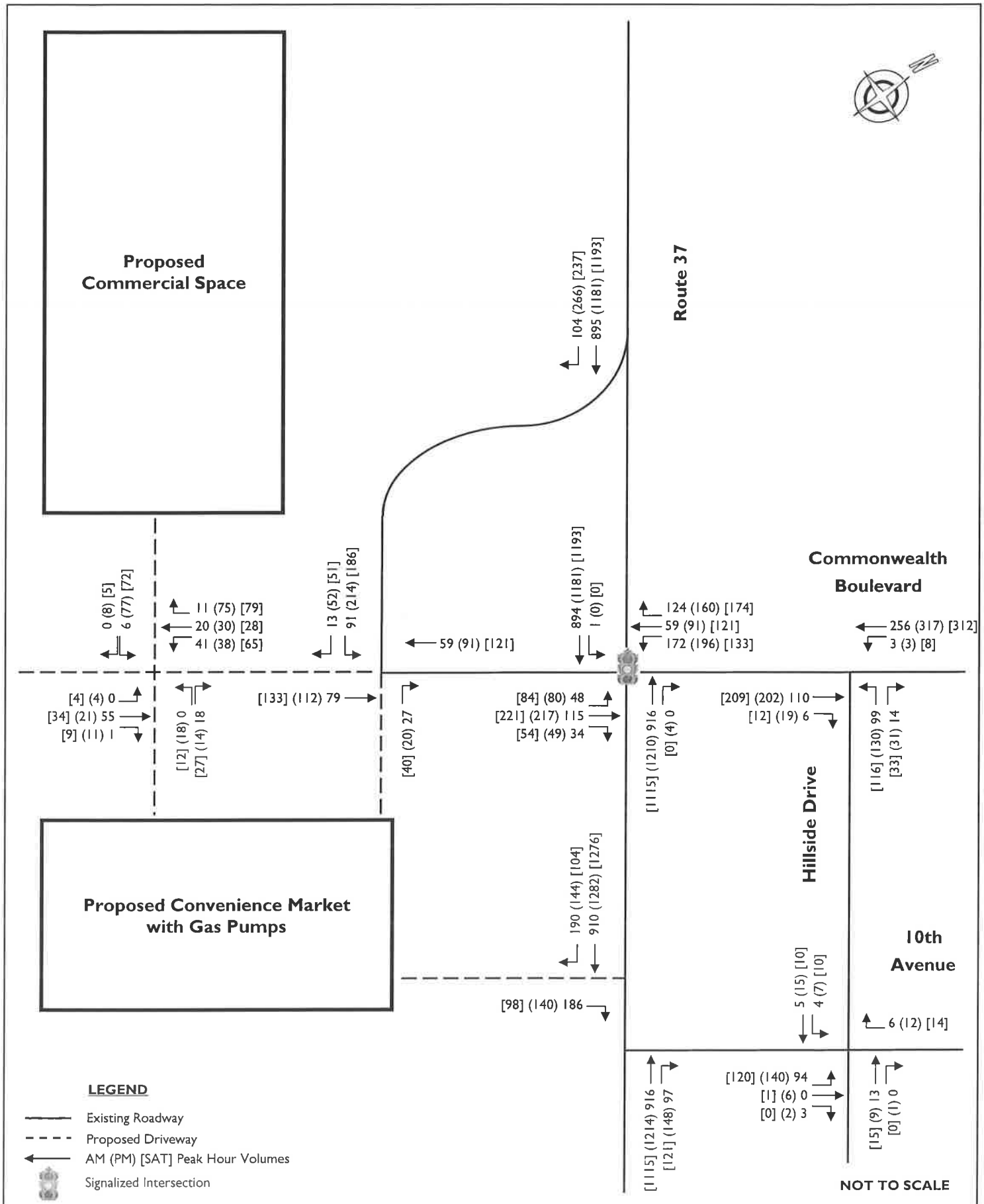
STONEFIELD	Proposed Mixed-Use Development Route 37 & Commonwealth Boulevard Manchester, Ocean County, New Jersey Traffic Impact Study	FIGURE 4 2024 Base Traffic Volumes



STONEFIELD	Proposed Mixed-Use Development Route 37 & Commonwealth Boulevard Manchester, Ocean County, New Jersey Traffic Impact Study	FIGURE 6 2024 No-Build Traffic Volumes



STONEFIELD	Proposed Mixed-Use Development Route 37 & Commonwealth Boulevard Manchester, Ocean County, New Jersey Traffic Impact Study	FIGURE 8 "New" Site-Generated Traffic Volumes



STONEFIELD	Proposed Mixed-Use Development Route 37 & Commonwealth Boulevard Manchester, Ocean County, New Jersey Traffic Impact Study	FIGURE 10 2024 Build Traffic Volumes

Phase	Route and Cross Street	Signal Faces		Cycle 1 / 90-Second Cycle			
		1 – 8	9 – 14	Split 1	Split 2	Split 3	Split 4
		NORMAL OPERATION					
A.	Route 37	G	R	70 – 54	70 – 54	70 – 54	70 – 54
	Change	Y	R	5	5	5	5
	Clearance	R	R	2	2	2	2
B.	Commonwealth Boulevard	R	G	7 – 23	7 – 23	7 – 23	7 – 23
	Change	R	Y	3	3	3	3
	Clearance	R	R	3	3	3	3
	Emergency Flash	Y	R	-	-	-	-

Offsets / Cycle 1:
Offset 1 = 30
Offset 2 = 26
Offset 3 = 26
Offset 4 = 26
Offset 5 = 35

Phase	Route and Cross Street	Signal Faces		Cycle 2 / 105-Second Cycle			
		1 – 8	9 – 14	Split 1	Split 2	Split 3	Split 4
		NORMAL OPERATION					
A.	Route 37	G	R	85 – 58	85 – 58	85 – 58	85 – 58
	Change	Y	R	5	5	5	5
	Clearance	R	R	2	2	2	2
B.	Commonwealth Boulevard	R	G	7 – 34	7 – 34	7 – 34	7 – 34
	Change	R	Y	3	3	3	3
	Clearance	R	R	3	3	3	3
	Emergency Flash	Y	R	-	-	-	-

Offsets / Cycle 2:
Offset 1 = 63
Offset 2 = 12
Offset 3 = 12
Offset 4 = 12
Offset 5 = 86

1. The manual control is to be disconnected.
2. The vehicle interval is to be 2 seconds.
3. The memory circuit for the loop detectors is to be off.
4. Pedestrian actuation is to guarantee a minimum of 23 seconds of green time to Phase B.
5. Offsets (in seconds) are measured from the beginning of yellow to Route 37 at Hospital Drive to the beginning of yellow to Route 37 at this intersection.

Hours of Operation:

Monday thru Friday, 6:00 A.M. – 8:00 A.M. / Cycle 2 (105 Sec.) / Offset 5 / Split 2
Monday thru Friday, 8:00 A.M. – 2:00 P.M. / Cycle 2 (105 Sec.) / Offset 3 / Split 2
Monday thru Friday, 2:00 P.M. – 6:00 P.M. / Cycle 3 (115 Sec.) / Offset 5 / Split 2
Monday thru Friday, 6:00 P.M. – 9:00 P.M. / Cycle 2 (105 Sec.) / Offset 3 / Split 2
Saturday, 7:00 A.M. – 10:00 A.M. / Cycle 2 (105 Sec.) / Offset 3 / Split 2
Saturday, 10:00 A.M. – 3:00 P.M. / Cycle 3 (115 Sec.) / Offset 1 / Split 2
Saturday, 3:00 P.M. – 10:00 P.M. / Cycle 2 (105 Sec.) / Offset 5 / Split 2
Sunday, 7:00 A.M. – 1:00 P.M. / Cycle 2 (105 Sec.) / Offset 3 / Split 2
Sunday, 1:00 P.M. – 9:00 P.M. / Cycle 2 (105 Sec.) / Offset 5 / Split 2
All Other Times / Cycle 1 (90 Sec.) / Offset 3 / Split 1

Memorial Day and Labor Day Observed: Use Sunday Schedule

July 4th Observed: If Wednesday, Thursday, Friday – Use Saturday Schedule
If Monday or Tuesday – Use Sunday Schedule
All other times as detailed under Hours of Operation.

For Traffic Responsive Only: Cycles, splits, offsets in Section 1 as selected by threshold values installed at the Central computer in lieu of time of day, as determined by Traffic Operations Center.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↰	↱		↰		↱
Traffic Volume (vph)	1	756	0	0	860	0	13	74	1	167	0	120
Future Volume (vph)	1	756	0	0	860	0	13	74	1	167	0	120
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3632			3597		1852	1872		1834		1579
Flt Permitted		0.95			1.00		0.95	1.00		0.60		1.00
Satd. Flow (perm)		3467			3597		1852	1872		1164		1579
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	796	0	0	905	0	14	78	1	176	0	126
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	79
Lane Group Flow (vph)	0	797	0	0	905	0	14	78	0	176	0	47
Heavy Vehicles (%)	0%	2%	0%	0%	3%	0%	0%	4%	0%	1%	0%	5%
Turn Type	Perm	NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases	4						2			6		6
Actuated Green, G (s)		55.8			55.8		17.6	17.6		36.2		36.2
Effective Green, g (s)		55.8			55.8		17.6	17.6		36.2		36.2
Actuated g/C Ratio		0.53			0.53		0.17	0.17		0.34		0.34
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		1842			1911		310	313		500		544
v/s Ratio Prot					c0.25			0.04		c0.05		0.01
v/s Ratio Perm		0.23					0.01			c0.07		0.02
v/c Ratio		0.43			0.47		0.05	0.25		0.35		0.09
Uniform Delay, d1		15.0			15.4		36.7	38.0		25.0		23.2
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.7			0.8		0.1	0.4		0.4		0.1
Delay (s)		15.7			16.2		36.7	38.4		25.4		23.3
Level of Service		B			B		D	D		C		C
Approach Delay (s)		15.7			16.2			38.1			24.5	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	69	14	72	3	3	218
Future Vol, veh/h	69	14	72	3	3	218
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	0	3	0	0	3
Mvmt Flow	73	15	77	3	3	232

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	317	79	0	0	80	0
Stage 1	79	-	-	-	-	-
Stage 2	238	-	-	-	-	-
Critical Hdwy	6.42	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	676	987	-	-	1531	-
Stage 1	944	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	675	987	-	-	1531	-
Mov Cap-2 Maneuver	675	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	800	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	713	1531	-
HCM Lane V/C Ratio	-	-	0.124	0.002	-
HCM Control Delay (s)	-	-	10.8	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↱		↔	
Traffic Vol, veh/h	2	15	0	0	9	1	98	6	2	0	0	7
Future Vol, veh/h	2	15	0	0	9	1	98	6	2	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	3	20	0	0	12	1	129	8	3	0	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	13	0	-	-	-	0	43	39	20	45	39	13
Stage 1	-	-	-	-	-	-	26	26	-	13	13	-
Stage 2	-	-	-	-	-	-	17	13	-	32	26	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1619	-	0	0	-	-	960	857	1064	962	857	1073
Stage 1	-	-	0	0	-	-	992	878	-	1013	889	-
Stage 2	-	-	0	0	-	-	1002	889	-	990	878	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1619	-	-	-	-	-	950	855	1064	951	855	1073
Mov Cap-2 Maneuver	-	-	-	-	-	-	950	855	-	951	855	-
Stage 1	-	-	-	-	-	-	990	876	-	1011	889	-
Stage 2	-	-	-	-	-	-	993	889	-	977	876	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0	9.5	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	944	1064	1619	-	-	-	1073
HCM Lane V/C Ratio	0.145	0.002	0.002	-	-	-	0.009
HCM Control Delay (s)	9.5	8.4	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0	0	-	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↰	↱		↰		↱
Traffic Volume (vph)	0	1059	0	0	971	0	32	148	1	129	0	169
Future Volume (vph)	0	1059	0	0	971	0	32	148	1	129	0	169
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3668			3668		1852	1948		1834		1658
Flt Permitted		1.00			1.00		0.95	1.00		0.51		1.00
Satd. Flow (perm)		3668			3668		1852	1948		979		1658
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1115	0	0	1022	0	34	156	1	136	0	178
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	74
Lane Group Flow (vph)	0	1115	0	0	1022	0	34	157	0	136	0	104
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases							2			6		6
Actuated Green, G (s)		67.0			67.0		22.5	22.5		35.0		35.0
Effective Green, g (s)		67.0			67.0		22.5	22.5		35.0		35.0
Actuated g/C Ratio		0.58			0.58		0.20	0.20		0.30		0.30
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		2137			2137		362	381		368		504
v/s Ratio Prot		c0.30			0.28			c0.08		c0.03		0.02
v/s Ratio Perm							0.02			0.08		0.05
v/c Ratio		0.52			0.48		0.09	0.41		0.37		0.21
Uniform Delay, d1		14.4			13.9		37.9	40.5		30.2		29.7
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.9			0.8		0.1	0.7		0.6		0.2
Delay (s)		15.3			14.7		38.0	41.2		30.9		29.9
Level of Service		B			B		D	D		C		C
Approach Delay (s)		15.3			14.7			40.6			30.3	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	32	143	5	8	238
Future Vol, veh/h	60	32	143	5	8	238
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	63	33	149	5	8	248

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	416	152	0	0	154	0
Stage 1	152	-	-	-	-	-
Stage 2	264	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	597	900	-	-	1439	-
Stage 1	881	-	-	-	-	-
Stage 2	785	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	593	900	-	-	1439	-
Mov Cap-2 Maneuver	593	-	-	-	-	-
Stage 1	881	-	-	-	-	-
Stage 2	780	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	673	1439	-
HCM Lane V/C Ratio	-	-	0.142	0.006	-
HCM Control Delay (s)	-	-	11.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0	-

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↑↱			↰↑	↱		↔	
Traffic Vol, veh/h	1	5	0	0	13	0	69	0	3	0	0	3
Future Vol, veh/h	1	5	0	0	13	0	69	0	3	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	1	6	0	0	16	0	84	0	4	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	-	-	-	0	26	24	6	26	24	16
Stage 1	-	-	-	-	-	-	8	8	-	16	16	-
Stage 2	-	-	-	-	-	-	18	16	-	10	8	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	984	873	1083	990	873	1069
Stage 1	-	-	0	0	-	-	1013	893	-	1009	886	-
Stage 2	-	-	0	0	-	-	1001	886	-	1016	893	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1615	-	-	-	-	-	980	872	1083	986	872	1069
Mov Cap-2 Maneuver	-	-	-	-	-	-	980	872	-	986	872	-
Stage 1	-	-	-	-	-	-	1012	892	-	1008	886	-
Stage 2	-	-	-	-	-	-	998	886	-	1012	892	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0	9	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	980	1083	1615	-	-	-	1069
HCM Lane V/C Ratio	0.086	0.003	0.001	-	-	-	0.003
HCM Control Delay (s)	9	8.3	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	0	-	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↰	↱		↰		↱
Traffic Volume (vph)	0	1195	0	0	1210	4	44	170	0	196	0	160
Future Volume (vph)	0	1195	0	0	1210	4	44	170	0	196	0	160
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3668			3667		1816	1950		1834		1641
Flt Permitted		1.00			1.00		0.95	1.00		0.36		1.00
Satd. Flow (perm)		3668			3667		1816	1950		704		1641
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	1285	0	0	1301	4	47	183	0	211	0	172
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	41
Lane Group Flow (vph)	0	1285	0	0	1305	0	47	183	0	211	0	131
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	2%	0%	0%	1%	0%	1%
Turn Type		NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases							2			6		6
Actuated Green, G (s)		73.0			73.0		16.0	16.0		29.0		29.0
Effective Green, g (s)		73.0			73.0		16.0	16.0		29.0		29.0
Actuated g/C Ratio		0.63			0.63		0.14	0.14		0.25		0.25
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		2328			2327		252	271		275		413
v/s Ratio Prot		0.35			c0.36			0.09		c0.07		0.03
v/s Ratio Perm							0.03			c0.13		0.05
v/c Ratio		0.55			0.56		0.19	0.68		0.77		0.32
Uniform Delay, d1		11.8			11.9		43.7	47.0		37.5		34.9
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.9			1.0		0.4	6.5		12.1		0.4
Delay (s)		12.8			12.9		44.1	53.5		49.6		35.4
Level of Service		B			B		D	D		D		D
Approach Delay (s)		12.8			12.9			51.6			43.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	87	31	160	14	3	269
Future Vol, veh/h	87	31	160	14	3	269
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	3	0	0	0	0
Mvmt Flow	98	35	180	16	3	302

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	496	188	0	0	196	0
Stage 1	188	-	-	-	-	-
Stage 2	308	-	-	-	-	-
Critical Hdwy	6.41	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	535	851	-	-	1389	-
Stage 1	846	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	533	851	-	-	1389	-
Mov Cap-2 Maneuver	533	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	746	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	591	1389	-
HCM Lane V/C Ratio	-	-	0.224	0.002	-
HCM Control Delay (s)	-	-	12.8	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0	-

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↱		↔	
Traffic Vol, veh/h	3	10	0	0	15	0	73	1	0	0	0	7
Future Vol, veh/h	3	10	0	0	15	0	73	1	0	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	3	11	0	0	16	0	80	1	0	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	-	-	-	0	37	33	11	34	33	16
Stage 1	-	-	-	-	-	-	17	17	-	16	16	-
Stage 2	-	-	-	-	-	-	20	16	-	18	17	-
Critical Hdwy	4.1	-	-	-	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	973	864	1076	978	864	1069
Stage 1	-	-	0	0	-	-	1008	885	-	1009	886	-
Stage 2	-	-	0	0	-	-	1004	886	-	1006	885	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1615	-	-	-	-	-	964	862	1076	976	862	1069
Mov Cap-2 Maneuver	-	-	-	-	-	-	964	862	-	976	862	-
Stage 1	-	-	-	-	-	-	1006	883	-	1007	886	-
Stage 2	-	-	-	-	-	-	997	886	-	1003	883	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	9.1	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	962	-	1615	-	-	-	1069
HCM Lane V/C Ratio	0.085	-	0.002	-	-	-	0.007
HCM Control Delay (s)	9.1	0	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	-	0	-	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	1	894	0	0	916	0	48	115	34	172	59	124
Future Volume (vph)	1	894	0	0	916	0	48	115	34	172	59	124
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		7.0			7.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor		0.95			0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3632			3597		1852	1875	1658	1834	1950	1579
Flt Permitted		0.95			1.00		0.72	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)		3467			3597		1397	1875	1658	1006	1950	1579
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	941	0	0	964	0	51	121	36	181	62	131
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	32	0	0	106
Lane Group Flow (vph)	0	942	0	0	964	0	51	121	4	181	62	25
Heavy Vehicles (%)	0%	2%	0%	0%	3%	0%	0%	4%	0%	1%	0%	5%
Turn Type	Perm	NA			NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4						2		2	6		6
Actuated Green, G (s)		62.8			62.8		19.1	12.7	12.7	29.2	19.8	19.8
Effective Green, g (s)		62.8			62.8		19.1	12.7	12.7	29.2	19.8	19.8
Actuated g/C Ratio		0.60			0.60		0.18	0.12	0.12	0.28	0.19	0.19
Clearance Time (s)		7.0			7.0		3.0	6.0	6.0	3.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2073			2151		281	226	200	386	367	297
v/s Ratio Prot					0.27		0.01	0.06		c0.06	0.03	
v/s Ratio Perm		c0.27					0.02		0.00	c0.07		0.02
v/c Ratio		0.45			0.45		0.18	0.54	0.02	0.47	0.17	0.08
Uniform Delay, d1		11.6			11.6		36.1	43.4	40.7	30.4	35.7	35.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.7			0.7		0.3	2.4	0.0	0.9	0.2	0.1
Delay (s)		12.4			12.3		36.4	45.8	40.7	31.3	35.9	35.2
Level of Service		B			B		D	D	D	C	D	D
Approach Delay (s)		12.4			12.3			42.6			33.5	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	91	0	13	0	0	27	0	79	0	0	59	0
Future Vol, veh/h	91	0	13	0	0	27	0	79	0	0	59	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	96	0	14	0	0	28	0	83	0	0	62	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	159	-	62	-	-	83	-	0	-	-	-	0
Stage 1	62	-	-	-	-	-	-	-	-	-	-	-
Stage 2	97	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.13	-	6.2	-	-	6.2	-	-	-	-	-	-
Critical Hdwy Stg 1	6.13	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	-	3.3	-	-	3.3	-	-	-	-	-	-
Pot Cap-1 Maneuver	804	0	1009	0	0	982	0	-	0	0	-	0
Stage 1	947	0	-	0	0	-	0	-	0	0	-	0
Stage 2	907	0	-	0	0	-	0	-	0	0	-	0
Platoon blocked, %								-			-	
Mov Cap-1 Maneuver	781	-	1009	-	-	982	-	-	-	-	-	-
Mov Cap-2 Maneuver	781	-	-	-	-	-	-	-	-	-	-	-
Stage 1	947	-	-	-	-	-	-	-	-	-	-	-
Stage 2	881	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	8.8	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	WBLn1	SBT
Capacity (veh/h)	-	781	1009	982	-
HCM Lane V/C Ratio	-	0.123	0.014	0.029	-
HCM Control Delay (s)	-	10.3	8.6	8.8	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0.4	0	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	910	190	0	916	0	186
Future Vol, veh/h	910	190	0	916	0	186
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	0	0	3	0	0
Mvmt Flow	958	200	0	964	0	196

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	579
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	0	463
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	463
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	18.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	463	-	-	-
HCM Lane V/C Ratio	0.423	-	-	-
HCM Control Delay (s)	18.4	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	2.1	-	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	99	14	110	6	3	256
Future Vol, veh/h	99	14	110	6	3	256
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	0	3	0	0	3
Mvmt Flow	105	15	117	6	3	272

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	398	120	0	0	123	0
Stage 1	120	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.42	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	607	937	-	-	1477	-
Stage 1	905	-	-	-	-	-
Stage 2	769	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	606	937	-	-	1477	-
Mov Cap-2 Maneuver	606	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	0.1
HCM LOS	B		

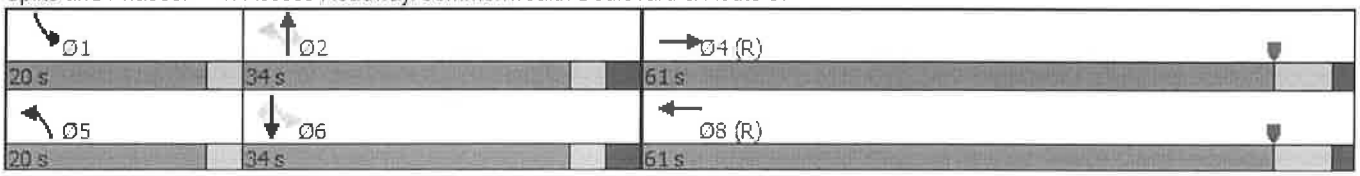
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	634	1477	-
HCM Lane V/C Ratio	-	-	0.19	0.002	-
HCM Control Delay (s)	-	-	12	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0	-

Phase Number	1	2	4	5	6	8
Movement	SBL	NBTL	EBT	NBL	SBTL	WBT
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	None	C-Max	None	None	C-Max
Maximum Split (s)	20	34	61	20	34	61
Maximum Split (%)	17.4%	29.6%	53.0%	17.4%	29.6%	53.0%
Minimum Split (s)	13	13	61	13	13	61
Yellow Time (s)	3	3	5	3	3	5
All-Red Time (s)	0	3	2	0	3	2
Minimum Initial (s)	7	7	54	7	7	54
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	2	2	2	2	2	2
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)						
Flash Dont Walk (s)						
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	79	99	18	79	99	18
End Time (s)	99	18	79	99	18	79
Yield/Force Off (s)	96	12	72	96	12	72
Yield/Force Off 170(s)	96	12	72	96	12	72
Local Start Time (s)	7	27	61	7	27	61
Local Yield (s)	24	55	0	24	55	0
Local Yield 170(s)	24	55	0	24	55	0

Intersection Summary	
Cycle Length	115
Control Type	Actuated-Coordinated
Natural Cycle	90

Offset: 72 (63%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Splits and Phases: 1: Access Roadway/Commonwealth Boulevard & Route 37



Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↱			↱	
Traffic Vol, veh/h	77	0	8	18	0	14	4	21	11	38	30	75
Future Vol, veh/h	77	0	8	18	0	14	4	21	11	38	30	75
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	83	0	9	19	0	15	4	23	12	41	32	81

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	200	198	73	196	232	29	113	0	0	35	0	0
Stage 1	155	155	-	37	37	-	-	-	-	-	-	-
Stage 2	45	43	-	159	195	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	763	701	995	767	672	1052	1489	-	-	1589	-	-
Stage 1	852	773	-	984	868	-	-	-	-	-	-	-
Stage 2	974	863	-	848	743	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	736	681	995	744	653	1052	1489	-	-	1589	-	-
Mov Cap-2 Maneuver	736	681	-	744	653	-	-	-	-	-	-	-
Stage 1	849	753	-	981	865	-	-	-	-	-	-	-
Stage 2	957	860	-	819	724	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	9.4	0.8	1.9
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1489	-	-	754	853	1589	-	-
HCM Lane V/C Ratio	0.003	-	-	0.121	0.04	0.026	-	-
HCM Control Delay (s)	7.4	-	-	10.4	9.4	7.3	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰	↗		↔	
Traffic Vol, veh/h	7	15	0	0	9	1	140	6	2	0	0	12
Future Vol, veh/h	7	15	0	0	9	1	140	6	2	0	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	9	20	0	0	12	1	184	8	3	0	0	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	13	0	-	-	-	0	59	51	20	57	51	13
Stage 1	-	-	-	-	-	-	38	38	-	13	13	-
Stage 2	-	-	-	-	-	-	21	13	-	44	38	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1619	-	0	0	-	-	937	844	1064	945	844	1073
Stage 1	-	-	0	0	-	-	977	867	-	1013	889	-
Stage 2	-	-	0	0	-	-	998	889	-	975	867	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1619	-	-	-	-	-	919	839	1064	932	839	1073
Mov Cap-2 Maneuver	-	-	-	-	-	-	919	839	-	932	839	-
Stage 1	-	-	-	-	-	-	971	862	-	1007	889	-
Stage 2	-	-	-	-	-	-	983	889	-	958	862	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0	10	8.4
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	915	1064	1619	-	-	-	1073
HCM Lane V/C Ratio	0.21	0.002	0.006	-	-	-	0.015
HCM Control Delay (s)	10	8.4	7.2	0	-	-	8.4
HCM Lane LOS	B	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.8	0	0	-	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↖	↑	↗	↖	↑	↗
Traffic Volume (vph)	0	1193	0	0	1115	0	84	221	54	133	121	174
Future Volume (vph)	0	1193	0	0	1115	0	84	221	54	133	121	174
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		7.0			7.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor		0.95			0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3668			3668		1852	1950	1658	1834	1950	1658
Flt Permitted		1.00			1.00		0.68	1.00	1.00	0.31	1.00	1.00
Satd. Flow (perm)		3668			3668		1317	1950	1658	598	1950	1658
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1256	0	0	1174	0	88	233	57	140	127	183
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	47	0	0	145
Lane Group Flow (vph)	0	1256	0	0	1174	0	88	233	10	140	127	38
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	1%	0%	0%
Turn Type		NA			NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)		67.5			67.5		27.5	19.6	19.6	34.5	23.6	23.6
Effective Green, g (s)		67.5			67.5		27.5	19.6	19.6	34.5	23.6	23.6
Actuated g/C Ratio		0.59			0.59		0.24	0.17	0.17	0.30	0.21	0.21
Clearance Time (s)		7.0			7.0		3.0	6.0	6.0	3.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2152			2152		351	332	282	307	400	340
v/s Ratio Prot		c0.34			0.32		0.02	c0.12		c0.05	0.07	
v/s Ratio Perm							0.04		0.01	0.09		0.02
v/c Ratio		0.58			0.55		0.25	0.70	0.03	0.46	0.32	0.11
Uniform Delay, d1		14.9			14.4		34.9	44.9	39.8	31.1	38.9	37.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2			1.0		0.4	6.6	0.1	1.1	0.5	0.1
Delay (s)		16.1			15.4		35.3	51.5	39.9	32.2	39.3	37.3
Level of Service		B			B		D	D	D	C	D	D
Approach Delay (s)		16.1			15.4			46.0			36.3	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	186	0	51	0	0	40	0	133	0	0	121	0
Future Vol, veh/h	186	0	51	0	0	40	0	133	0	0	121	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	196	0	54	0	0	42	0	140	0	0	127	0

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	288	-	127	-	-	140	-	0	-	-	-	0
Stage 1	127	-	-	-	-	-	-	-	-	-	-	-
Stage 2	161	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.1	-	6.2	-	-	6.2	-	-	-	-	-	-
Critical Hdwy Stg 1	6.1	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	-	3.3	-	-	3.3	-	-	-	-	-	-
Pot Cap-1 Maneuver	668	0	929	0	0	913	0	-	0	0	-	0
Stage 1	882	0	-	0	0	-	0	-	0	0	-	0
Stage 2	846	0	-	0	0	-	0	-	0	0	-	0
Platoon blocked, %								-			-	
Mov Cap-1 Maneuver	637	-	929	-	-	913	-	-	-	-	-	-
Mov Cap-2 Maneuver	637	-	-	-	-	-	-	-	-	-	-	-
Stage 1	882	-	-	-	-	-	-	-	-	-	-	-
Stage 2	807	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	9.1	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	WBLn1	SBT
Capacity (veh/h)	-	637	929	913	-
HCM Lane V/C Ratio	-	0.307	0.058	0.046	-
HCM Control Delay (s)	-	13.1	9.1	9.1	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	1.3	0.2	0.1	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	1276	104	0	1115	0	98
Future Vol, veh/h	1276	104	0	1115	0	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	1343	109	0	1174	0	103

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	726
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	0	372
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	372
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	372	-	-	-
HCM Lane V/C Ratio	0.277	-	-	-
HCM Control Delay (s)	18.3	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	116	33	209	12	8	312
Future Vol, veh/h	116	33	209	12	8	312
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	121	34	218	13	8	325

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	566	225	0	0	231	0
Stage 1	225	-	-	-	-	-
Stage 2	341	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	489	819	-	-	1349	-
Stage 1	817	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	486	819	-	-	1349	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	720	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.5	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	534	1349	-
HCM Lane V/C Ratio	-	-	0.291	0.006	-
HCM Control Delay (s)	-	-	14.5	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0	-

APPENDIX D

Water and Sanitary Sewer
Service Determination

REMINGTON & VERNICK ENGINEERS

9 Allen Street
Toms River, NJ 08753
O: (732) 286-9220
F: (732) 505-8416

August 16, 2018

Mr. Harvey Karen
Davies Consultants, LLC.
150 Tennis Court
Wall, New Jersey 07719

Re: Application for Service Determination
Water and Sanitary Sewer
Block 44, Lot 15.01
Our File: 1519-T-006

Dear Mr. Karen:

Our office has received the application for water and sewer service determination and finds the following:

A. General:

The applicant, Davies Consultants, is proposing to construct twenty-seven (27) buildings with 216 2-bedroom townhomes as well as a clubhouse and pool facility. Two (2) commercial pads that are 7,225 SF and 22,605 SF with 16 fueling stations and a 5,525 SF market are also proposed. The applicant is requesting water and sanitary sewer service determination at this time. The applicant's primary mailing address is located at 150 Tennis Court, Wall, New Jersey 07719. The applicants engineer is Jessica L. Staszewski, P.E., of FWH Associates, P.A. The applicant's attorney is not known at this time.

B. Water:

1. The applicant has submitted an Application for Water Service Determination. We have the following comments:
2.
   a. The projected daily water demand for the development is 44,225 GPD or approximately 0.0442 MGD.

   b. The property upon which the site is located, Block 44, Lot 15.01, can be serviced by the existing water main located in Route 37. The applicant shall submit an application for Preliminary Water System Approval and must submit for all subsequent approvals before connecting to the authorities main.

   c. At this time capacity is available to service the project. The Township shall allocate water capacity to the project only for the development of the currently proposed improvements. The Township's commitment of available water capacity occurs only upon the Township issuance of Final Approval for the project.

C. Sewer:

1. The applicant has submitted an Application for Sewer Service Determination. We have the followings comments:

    a. The projected daily sewer flow for the development is 54,141 GPD or approximately 0.0541 MGD.

    b. The property upon which the site is located, Block 44, Lot 15.01, can be serviced by the existing sewer main located in New Jersey Route 37. The applicant shall submit an application for preliminary sewer system approval and must submit for all subsequent approvals before connecting to the Authority's main.

    c. At this time capacity is available to service the project. The Township shall allocate sewer capacity to the project only for the development of the currently proposed improvements. The Township's commitment of available sewer capacity occurs only upon the Township issuance of Final Approval for the project.

Should any questions arise regarding this matter, please do not hesitate to contact our Toms River office.

God Bless America,

REMINGTON & VERNICK ENGINEERS

Alan B. Dittenhofer, P.E., P.P., C.M.E.

TED/ABD:ag

cc: Via E-Mail
Mr. Al Yodakis, PE – Director of Public Works (AYodakis@manchestertwp.com)
Mr. Joseph Veni, PE, Principal Engineer (JVeni@manchestertwp.com)
Mr. Jeff Ruerup, Operations Manager (JRuerup@manchestertwp.com)
Davies Consultants, LLC. (150 Tennis Court, Wall, NJ 07719)
Ms. Jessica L. Staszewski, P.E., P.P., FWH Associates, P.A. (jstaszewski@fwhassociate.com)
Mr. Trace Dittenhofer, E.I.T., RVE (trace.dittenhofer@rve.com)

APPENDIX E
Statement of Qualifications

TRIDENT
ENVIRONMENTAL
Site Remediation, Land Use & Ecology

P/ 732.818.8699 F/ 732.818.3744
E/ info@tridentenviro.com

Kyle Weise - Director of Land Use Services

KWeise@tridentenviro.com
732-818-8698

Experience

Trident Environmental, Toms River, New Jersey, August 2002 - Present

- Environmental Scientist

Brick Township Municipal Authority, Brick, New Jersey, March 2002 – August 2002

- Lab Technician, - Water Treatment Plant Operator

Qualification Highlights

- B.S., Environmental Science, Western New England College, 2002
- NAHB Certified Green Professional-2009
- Expert Witness Testimony

Summary of Qualifications

Mr. Weise is a Sr. Environmental Scientist with the firm of Trident Environmental Consultants and is responsible for the organization and execution of various environmental reports, permitting for a wide range of projects, and conducting environmental site investigations and assessments.

Mr. Weise is well versed in the rules and regulations set forth by the NJDEP in the form of the N.J.A.C. 7:7 – Coastal Program Rules, N.J.A.C. 7:7E- Coastal Zone Management Rules N.J.A.C. 7:7A Freshwater Wetland Protection Act Rules and N.J.A.C. 7:13 Flood Hazard Area Control Act Rules and Pinelands CMP.

In the 16 years Mr. Weise has been with Trident Environmental Consultants, he has prepared or assisted in the preparation of numerous applications for Letters of Interpretation (LOI), Wetland Delineation Reports, Tidelands Conveyances, Waterfront Development Permits, CAFRA Permits, various State General and Individual Wetland Permits for submittal to the New Jersey Department of Environmental Protection (NJDEP), Pinelands Commission and United States Army Corps of Engineers. Mr. Weise also prepares Environmental Impact Statements (E.I.S.) for Township Approval.

Mr. Weise has also conducted threatened/endangered surveys for Bog Turtles, Northern Pine Snakes, Barred Owls and Indiana Bats in New Jersey, New York, Pennsylvania, Delaware, and Maryland. These activities include helping with directed visual surveys, implementation of various trapping methods in a variety of habitats and radio-telemetry projects.

Additionally, Mr. Weise is versed in, geographical information systems (GIS), habitat assessments, wildlife surveys, laboratory testing and analysis, soil sampling and characterization, river/pond and sediment sampling and wetland mitigation. Mr. Weise helped design and received the necessary State approvals for the Nishisakawick Creek and Great Egg Harbor River, Marsh Bog Brook I & II and Barkers Brook Mitigation Banks.

Expert Testimony:

Mr. Weise has provided expert testimony to municipal boards and environmental commissions.

Planning Boards: Upper Freehold Township, Monmouth County, New Jersey
Lakewood Township, Ocean County, New Jersey.

Zoning Boards: Neptune Township, Monmouth County, New Jersey

Environmental Commissions: Howell Township, Monmouth County, New Jersey
Freehold Township, Monmouth County, New Jersey

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Site Remediation, Land Use & Ecology

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E/ info@tridentenviro.com

Nicole Budzek
Environmental Scientist

Education:
B.S. Marine and Environmental Biology and Policy
Monmouth University-2015

Professional Experience:

Ms. Nicole Budzek is an Environmental Scientist with the firm of Trident Environmental.

Ms. Budzek has completed the wetlands delineation certificate series with Rutgers University. She has conducted wetland delineations. She has prepared and assisted in the preparation of numerous applications for Letters of Interpretation (LOI), Wetland Delineation Reports, CAFRA General and Individual Permits and Waterfront Development Permits, various State General and Individual Wetland Permits for submittal to the New Jersey Department of Environmental Protection (NJDEP) and Pinelands Commission. Ms. Budzek has also prepared Environmental Impact Statements (EIS) for Township Approval.

Furthermore, Ms. Budzek has performed Phase I and Phase II investigations to support due diligence requirements for property transactions. She has also conducted soil and groundwater sampling, tank sweep investigations, soil sampling and characterization, soil permeability testing, and tree surveys.

Additionally, Ms. Budzek is well versed in ESRI Arc Map Geographic Information Systems (GIS) software and Global Positioning Systems (GPS). She has created various maps to depict visual representations for clients.

Related Certifications & Experience:

OSHA 40-hour Health and Safety (29 CFR 1910.120) plus all annual 8 hour refreshers.

Rutgers University Wetland Delineation Certificate

Rutgers University Soils and Site Evaluation for Septic Disposal Systems and Stormwater BMP's

New Jersey Conservation Foundation Advanced Pineland Plant Course

Attended the New Jersey Ecological Evaluation Practitioners Forum

Attended the LSRP Continuing Education Course: Due Diligence in New Jersey

Career Positions:

2015 – Present, Trident Environmental, Toms River, New Jersey – Environmental Scientist

2015, National Oceanic and Atmospheric Administration, Highlands, New Jersey- Research Associate/Lab Technician