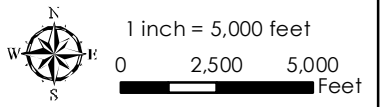




LOCATION MAP



pH PRINCETON HYDRO, LLC.
1108 OLD YORK ROAD
P.O. BOX 720
RINGOES, NJ 08551
*with offices in NJ, PA and CT



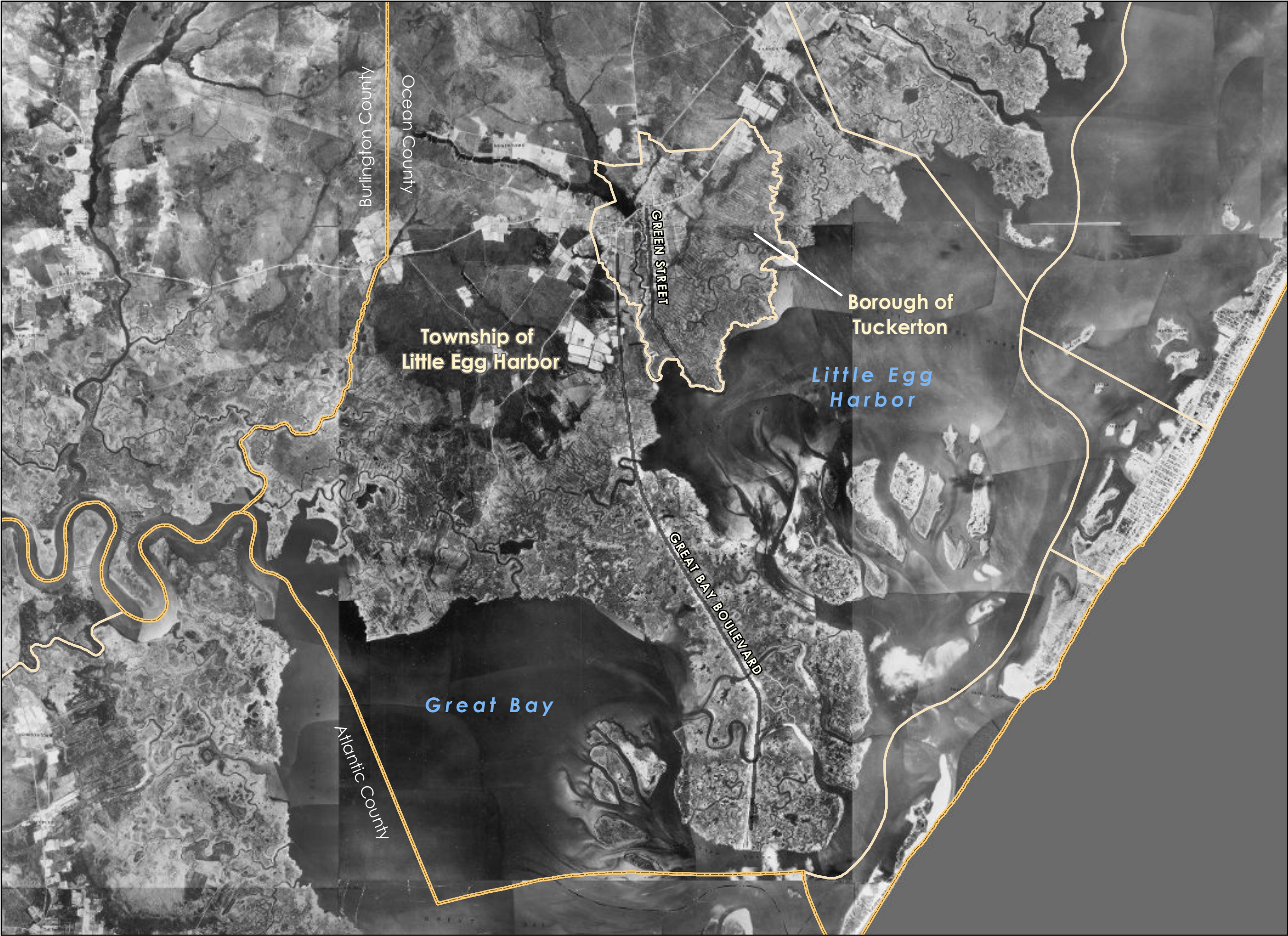
NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
2. County and municipal boundaries obtained from New Jersey Geographic Information Network (NJGIN).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-1
STUDY AREA**

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

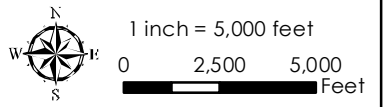
- Legend**
- Study Area
 - County Boundary
 - Municipal Boundary



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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P.O. BOX 720
RINGOES, NJ 08551
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NOTES:
1. 1930's aerial imagery obtained from NJ Office of Information Technology (NJGIT), Office of Geographic Information Systems (OGIS).
2. County and municipal boundaries obtained from New Jersey Geographic Information Network (NJGIN).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-2
1930'S AERIAL IMAGERY

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

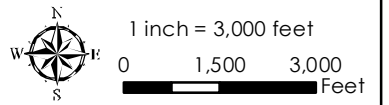
- Legend**
- 2016 County Boundary
 - 2016 Municipal Boundary



LOCATION MAP



pH PRINCETON HYDRO, LLC.
1108 OLD YORK ROAD
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RINGOES, NJ 08551
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
2. County and municipal boundaries obtained from New Jersey Geographic Information Network (NJGIN).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-3
LAGOON COMMUNITIES

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

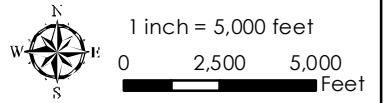
Legend
 County Boundary
 Municipal Boundary



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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P.O. BOX 720
RINGOES, NJ 08551
*with offices in NJ, PA and CT



- NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
 2. 1930s, 1970, and 2012 shorelines delineated using imagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
 3. 1956 shoreline delineated using imagery obtained from Nationwide Environmental Title Research, LLC (NETR).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-4
SHORELINE CHANGE

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

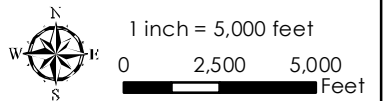
- Legend**
- 2012 Shoreline
 - 1970 Shoreline
 - 1956 Shoreline
 - 1930 Shoreline



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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P.O. BOX 720
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
2. 1930s and 2012 shorelines delineated using imagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
3. Net Shoreline Migration calculated using the United States Geological Survey's (USGS) Digital Shoreline Analysis System (DSAS).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-5
NET SHORELINE MIGRATION
1930 TO 2012

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

Legend

Net Shoreline Migration (Meters)

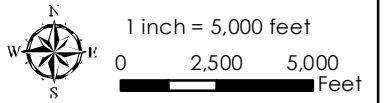
< -200	0 - 100
-200 - -100	100 - 200
-100 - -50	200 - 300
-49 - 0	> 300



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ/OIT), Office of Geographic Information Systems (OGIS).
2. Shoreline typology based off Environmental Sensitivity Index (ESI) Maps obtained from the National Oceanic and Atmospheric Administration (NOAA) and refined to a finer scale using 2015 orthoimagery.

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-6
SHORLINE TYPOLOGY

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

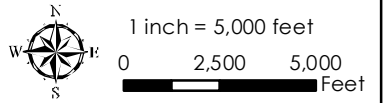
- Legend**
- Beach
 - Boat Ramp
 - Bulkhead
 - Disturbed/Roadside Vegetation
 - Emergent Wetlands; Ditch Influenced
 - Emergent Wetlands; Not Ditch Influenced
 - Rip-Rap; Exposed
 - Rip-Rap; Sheltered
 - Scrub/Shrub Upland
 - Unarmored Lawn



LOCATION MAP



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- NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJGIT), Office of Geographic Information Systems (OGIS).
 2. County and municipal boundaries obtained from New Jersey Geographic Information Network (NJGIN).
 3. 1930s wetlands delineated using 1930s aerial imagery obtained from NJ Office of Information Technology (NJGIT), Office of Geographic Information Systems (OGIS) and compared to wetlands (2012 Land Use/Land Cover) obtained from NJDEP GIS website: www.state.nj.us/dep/gis/

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-7
WETLAND CHANGE**

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

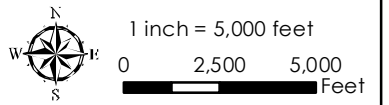
- Legend**
- County Boundary
 - Municipal Boundary
 - Additional Wetlands Since 1930
 - Loss of Wetlands Since 1930



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.2.0 coastal vulnerability model. Model inputs include:
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI)
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-8
RELATIVE
WAVE EXPOSURE

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

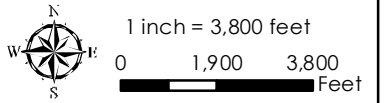
- Legend**
- Relative Wave**
- 0 - 20 Percentile
 - 21 - 40 Percentile
 - 41 - 60 Percentile
 - 61 - 80 Percentile
 - 81 - 100 Percentile



LOCATION MAP



pH PRINCETON HYDRO, LLC.
1108 OLD YORK ROAD
P.O. BOX 720
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ/OIT), Office of Geographic Information Systems (OGIS).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-9
FIELD SURVEY
SITE LOCATIONS

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

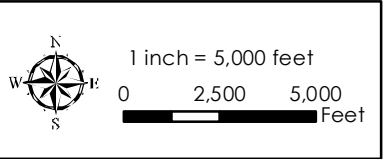
Legend
 Site Location



LOCATION MAP



pH PRINCETON HYDRO, LLC.
1108 OLD YORK ROAD
P.O. BOX 720
RINGOES, NJ 08551
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NOTES:
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a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI)
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-10
GEOMORPHOLOGY**

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

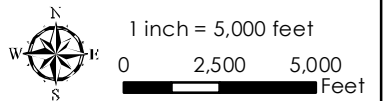
- Legend**
- Geomorphology**
- Low Vulnerability
 - Moderate Vulnerability
 - High Vulnerability
 - Very High Vulnerability



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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RINGOES, NJ 08551
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NOTES:
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a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI)
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-11
RELATIVE
SURGE POTENTIAL**

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

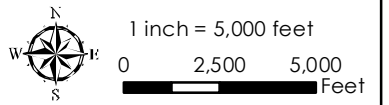
- Legend**
- Relative Surge**
- 0 - 20 Percentile
 - 21 - 40 Percentile
 - 41 - 60 Percentile
 - 61 - 80 Percentile
 - 81 - 100 Percentile



LOCATION MAP



pH PRINCETON HYDRO, LLC.
1108 OLD YORK ROAD
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RINGOES, NJ 08551
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
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b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI)
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-12
RELATIVE
WIND EXPOSURE**

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

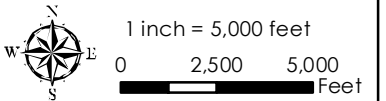
- Legend**
- Relative Wind**
- 0 - 20 Percentile
 - 21 - 40 Percentile
 - 41 - 60 Percentile
 - 61 - 80 Percentile
 - 81 - 100 Percentile



LOCATION MAP



pH PRINCETON HYDRO, LLC.
1108 OLD YORK ROAD
P.O. BOX 720
RINGOES, NJ 08551
*with offices in NJ, PA and CT



NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJGIT), Office of Geographic Information Systems (OGIS).
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a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI)
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-13
RELATIVE ERODIBILITY

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

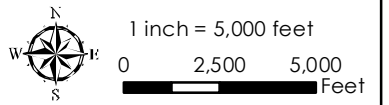
- Legend**
- Relative Erodibility**
- Very Low Relative Erodibility
 - Low Relative Erodibility
 - Moderate Relative Erodibility
 - High Relative Erodibility
 - Very High Relative Erodibility



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
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b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-14
RELATIVE RELIEF

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

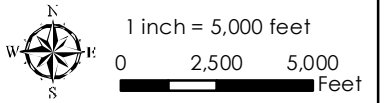
- Legend**
- Relative**
- 0 - 20 Percentile
 - 21 - 40 Percentile
 - 41 - 60 Percentile
 - 61 - 80 Percentile
 - 81 - 100 Percentile



LOCATION MAP



pH PRINCETON HYDRO, LLC.
1108 OLD YORK ROAD
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RINGOES, NJ 08551
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.2.0 coastal vulnerability model. Model inputs include:
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI)
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-15
NATURAL HABITATS**

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

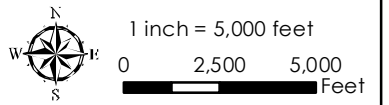
- Legend**
- Natural Habitats**
- Very Low Vulnerability
 - Low Vulnerability
 - Moderate Vulnerability
 - High Vulnerability
 - Very High Vulnerability



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI)
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-16
RELATIVE
COASTAL EXPOSURE**

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

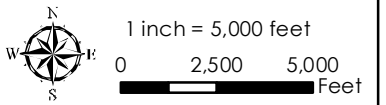
- Legend**
- Relative Coastal Exposure**
- Low Relative Exposure
 - Moderate Relative Exposure
 - High Relative Exposure
 - Very High Relative Exposure



LOCATION MAP



pH PRINCETON HYDRO, LLC.
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RINGOES, NJ 08551
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NOTES:
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJ OIT), Office of Geographic Information Systems (OGIS).
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.2.0 coastal vulnerability model. Model inputs include:
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: www.state.nj.us/dep/gis/
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI)
d. Climatic data obtained NOAA WAVEWATCH III wave model.
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-17
RELATIVE COASTAL EXPOSURE
NO HABITATS**

SHORELINE STRATEGIC PLAN
TOWNSHIP OF LITTLE EGG HARBOR
& BOROUGH OF TUCKERON
OCEAN COUNTY, NEW JERSEY

- Legend**
- Relative Coastal Exposure;
No Habitats**
- Low Relative Exposure
 - Moderate Relative Exposure
 - High Relative Exposure
 - Very High Relative Exposure