EARTHEN BERM

KEY MAP

Tottenville, Staten Island

WHERE ARE WE NOW?

30% Schematic Design

FRAME CLEAR AND COMPREHENSIVE DESIGN INTENT

FOCUS ON PROJECT AS A WHOLE

WE ARE HERE

60% Schematic Design

ADVANCE PROPOSED SCHEME & FURTHER DEVELOP FINAL DESIGN

FOCUS ON ALIGNMENT AND DETAILS OF THE DESIGN ELEMENTS:

- REDESIGN BERM ALIGNMENT CROSSING EXISTING PATHWAY
- DETAILED PLANTING DESIGN FOR EARTHEN BERM
- BIOLOGICAL BENCHMARKING OF NEARBY WETLANDS
- WETLAND RESTORATION DESIGN
- ECO-REVETMENT DESIGN: ALIGNMENT & MATERIALS
- STUDY & FINALIZE PATHWAY ALIGNMENT & MATERIALS
- STUDY & FINALIZE REMOVAL OF TEMPORARY DUNE

100% Final Design

DESIGN IS SET

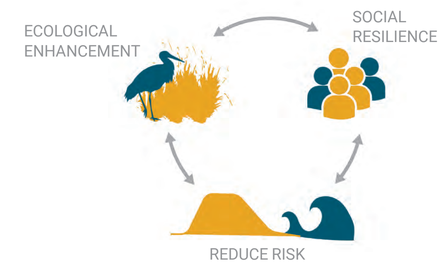
REFINE DETAILS, ALLOWING THE PROJECT TO BE PRECISELY BID

FOCUS ON PROVIDING A CLEAR, CONCISE AND COMPLETE DESCRIPTION OF THE PROJECT

EXISTING CONDITIONS

PROPOSED DESIGN

PROJECT GOALS



Risk Reduction

REDUCE EVENT-BASED COASTAL EROSION

ENHANCE NATURAL BUFFER THROUGH HABITAT RESTORATION AND BERM DESIGN

DESIGN FOR 30 INCHES OF SEA LEVEL RISE

ADDRESS THE IMPACTS OF COASTAL FLOODING

DESIGN TO LAST WITH MINIMAL MAINTENANCE FOR A MINIMUM OF 50 YEARS AND WITHSTAND A 100-YEAR STORM EVENT

Ecological Enhancement

WETLAND RESTORATION

HABITAT ENHANCEMENT

MARITIME FOREST PRESERVATION AND ENHANCEMENT

NATIVE SHORELINE PLANTING

MANAGE STORMWATER DRAINAGE ONSITE

Social Resiliency

INCREASE ACCESS TO AND ALONG THE WATER'S EDGE

ENHANCE COMMUNITY STEWARDSHIP OF ONSHORE & IN-WATER ECOSYSTEMS

INCREASE ACCESS TO RECREATIONAL OPPORTUNITIES

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

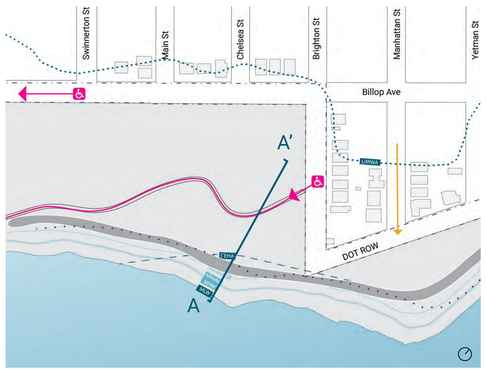
STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

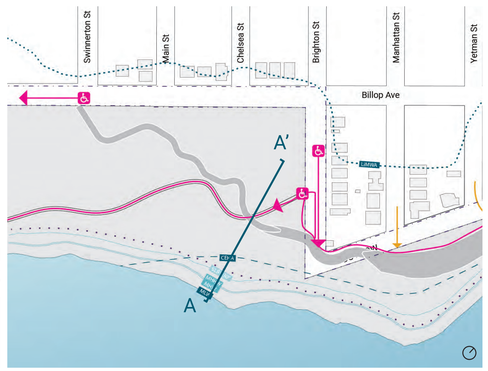
WHAT COULD IT LOOK LIKE?

CIRCULATION DIAGRAMS

Existing Circulation



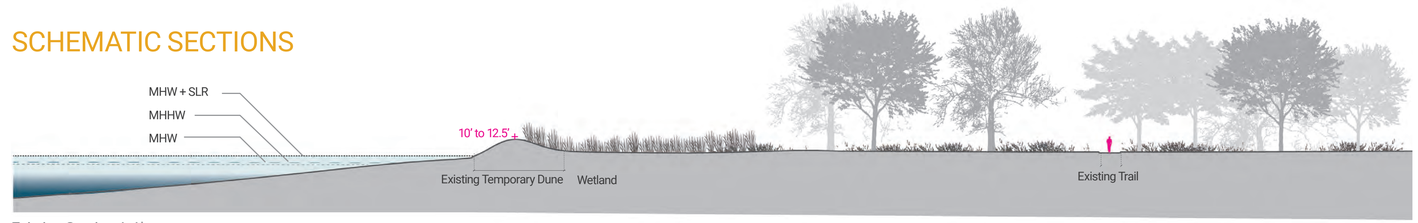
Proposed Circulation



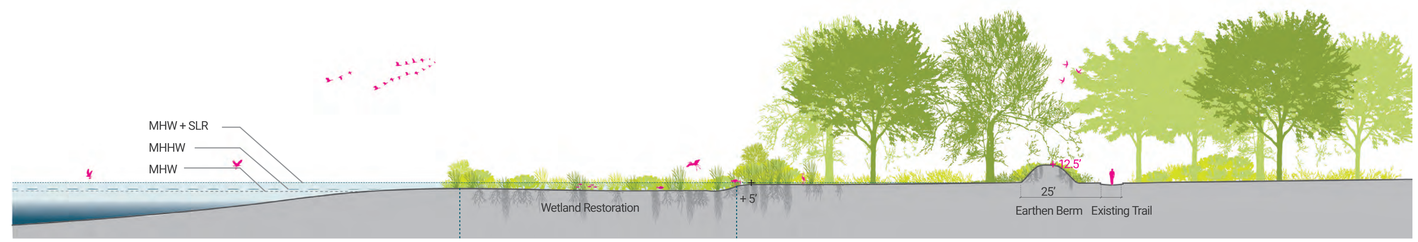
Key

- DOT Right of Way
- Limit of Moderate Wave Action
- CEHA
- Mean High High Water
- Mean High Water
- Mean Low Water
- Linear Access Point
- Access
- Private Road
- Coastal Structures
- ADA Access

SCHEMATIC SECTIONS



Existing Section A-A'



Proposed Section A-A'

BEACH TIDAL WETLAND MARITIME FOREST

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

HYBRID-DUNE REVETMENT

KEY MAP

Tottenville, Staten Island

WHERE ARE WE NOW?

30% Schematic Design

FRAME CLEAR AND COMPREHENSIVE DESIGN INTENT

FOCUS ON PROJECT AS A WHOLE

WE ARE HERE

60% Schematic Design

ADVANCE PROPOSED SCHEME & FURTHER DEVELOP FINAL DESIGN

FOCUS ON ALIGNMENT AND DETAILS OF THE DESIGN ELEMENTS:

- STUDY AND FINALIZE HYBRID-DUNE ALIGNMENT
- STRUCTURAL DESIGN OF STONE CORE & SAND BASED ON MODELING RESULTS
- STUDY & FINALIZE PATHWAY ALIGNMENT & MATERIALS
- DETAILED PLANTING DESIGN

100% Final Design

DESIGN IS SET

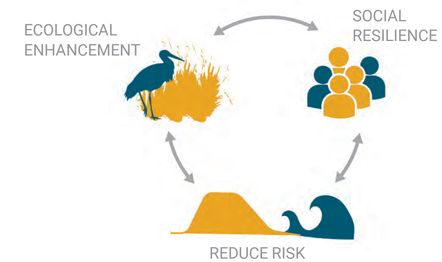
REFINE DETAILS, ALLOWING THE PROJECT TO BE PRECISELY BID

FOCUS ON PROVIDING A CLEAR, CONCISE AND COMPLETE DESCRIPTION OF THE PROJECT

EXISTING CONDITIONS

PROPOSED DESIGN

PROJECT GOALS



Risk Reduction

ATTENUATE WAVE ENERGY DURING COASTAL STORM EVENTS (25 YEAR STORM)

DESIGN FOR 30 INCHES OF SEA LEVEL RISE

REDUCE EVENT-BASED COASTAL EROSION

ADDRESS THE IMPACTS OF COASTAL FLOODING

DESIGN TO LAST WITH MINIMAL MAINTENANCE FOR A MINIMUM OF 50 YEARS AND WITHSTAND A 100-YEAR STORM EVENT

Ecological Enhancement

HABITAT ENHANCEMENT

NATIVE SHORELINE PLANTING

MANAGE STORMWATER DRAINAGE ON SITE

Social Resiliency

INCREASE ACCESS TO AND ALONG THE WATER'S EDGE

ENHANCE COMMUNITY STEWARDSHIP OF ONSHORE & IN-WATER ECOSYSTEMS

INCREASE ACCESS TO RECREATIONAL OPPORTUNITIES

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

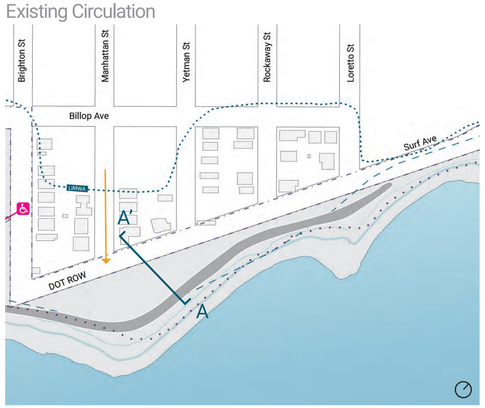
STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

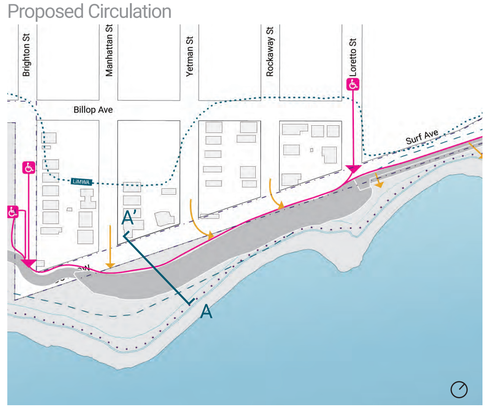
WHAT COULD IT LOOK LIKE?

CIRCULATION DIAGRAMS

Existing Circulation



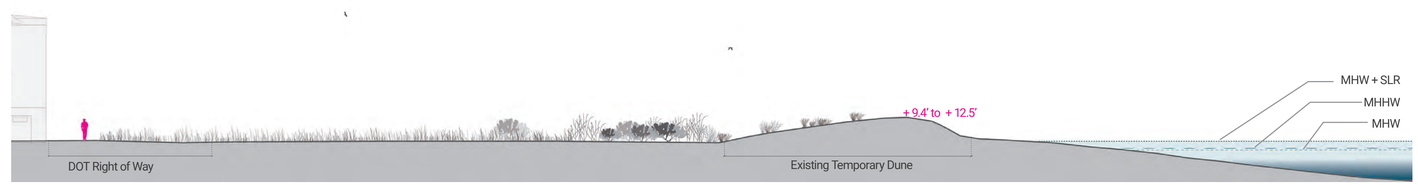
Proposed Circulation



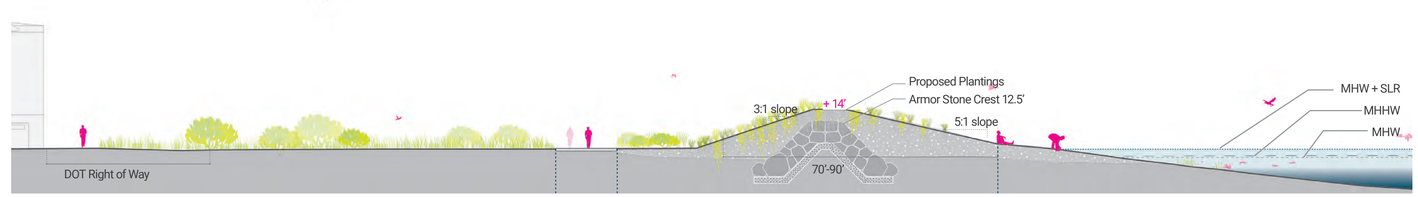
Key

- DOT Right of Way
- Limit of Moderate Wave Action
- CEHA
- Mean High High Water
- Mean High Water
- Mean Low Water
- Linear Access Point
- Access
- Private Road
- Coastal Structures
- ADA Access

SCHEMATIC SECTIONS

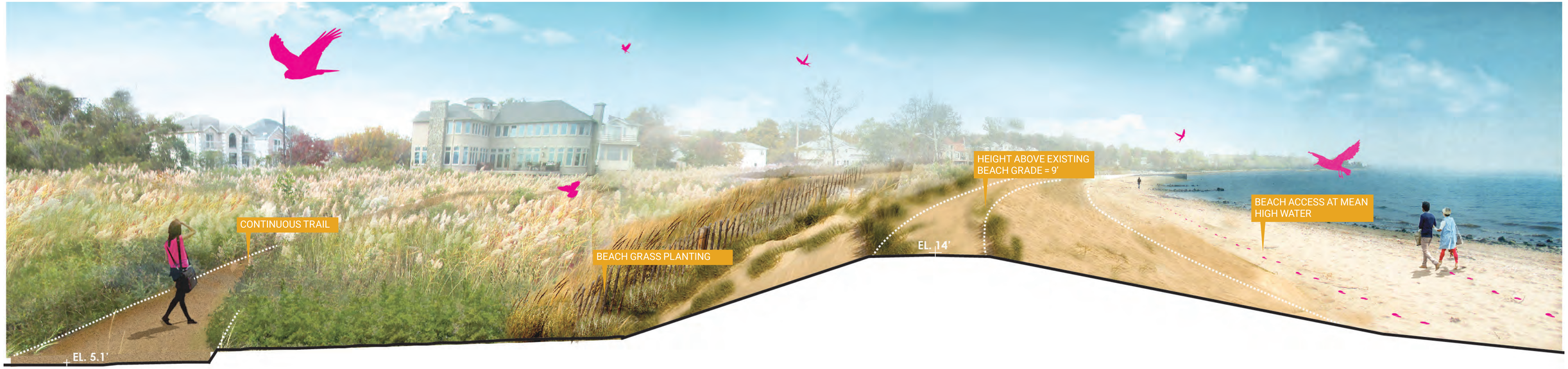


Existing Section A-A'



Proposed Section A-A'

UPLAND PLANTINGS | ADA TRAIL | HYBRID DUNE REVETMENT | BEACH



TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

ECO-REVETMENT

KEY MAP

Tottenville, Staten Island

WHERE ARE WE NOW?

30% Schematic Design

FRAME CLEAR AND COMPREHENSIVE DESIGN INTENT

FOCUS ON PROJECT AS A WHOLE

WE ARE HERE

60% Schematic Design

ADVANCE PROPOSED SCHEME & FURTHER DEVELOP FINAL DESIGN

FOCUS ON DETAILS OF THE DESIGN ELEMENTS:

- STRUCTURAL DESIGN OF REVETMENT STONES BASED ON MODELING
- STUDY GRADING & DRAINAGE IN DETAIL TO ADDRESS STORMWATER ONSITE
- STUDY & DESIGN COMMUNITY ACCESS: TRANSITION NODES, NEW SIDEWALK, STAIRS TO BEACH
- STUDY AND FINALIZE PATHWAY MATERIALS
- DETAILED PLANTING DESIGN

100% Final Design

DESIGN IS SET

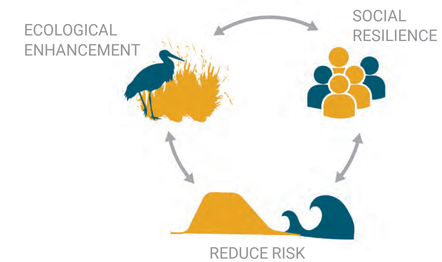
REFINE DETAILS, ALLOWING THE PROJECT TO BE PRECISELY BID

FOCUS ON PROVIDING A CLEAR, CONCISE AND COMPLETE DESCRIPTION OF THE PROJECT

EXISTING CONDITIONS

PROPOSED DESIGN

PROJECT GOALS



Risk Reduction

ATTENUATE WAVE ENERGY DURING COASTAL STORM EVENTS (25 YEAR STORM)

REDUCE EVENT-BASED COASTAL EROSION

DESIGN FOR 30 INCHES OF SEA LEVEL RISE

ADDRESS THE IMPACTS OF COASTAL FLOODING

DESIGN TO LAST WITH MINIMAL MAINTENANCE FOR A MINIMUM OF 50 YEARS AND WITHSTAND A 100-YEAR STORM EVENT

Ecological Enhancement

HABITAT ENHANCEMENT

NATIVE SHORELINE PLANTING

MANAGING STORMWATER DRAINAGE ONSITE

Social Resiliency

INCREASE ACCESS TO AND ALONG THE WATER'S EDGE

ENHANCE COMMUNITY STEWARDSHIP OF ONSHORE & IN-WATER ECOSYSTEMS

INCREASE ACCESS TO RECREATIONAL OPPORTUNITIES

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

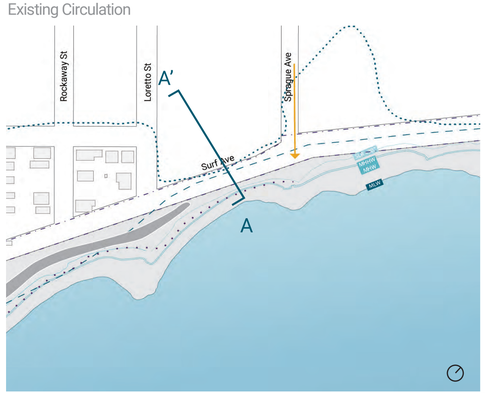
STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

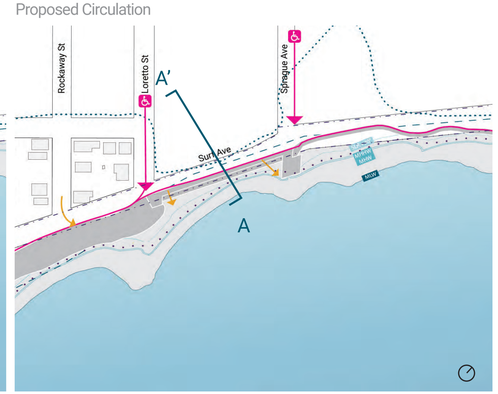
WHAT COULD IT LOOK LIKE?

CIRCULATION DIAGRAMS

Existing Circulation



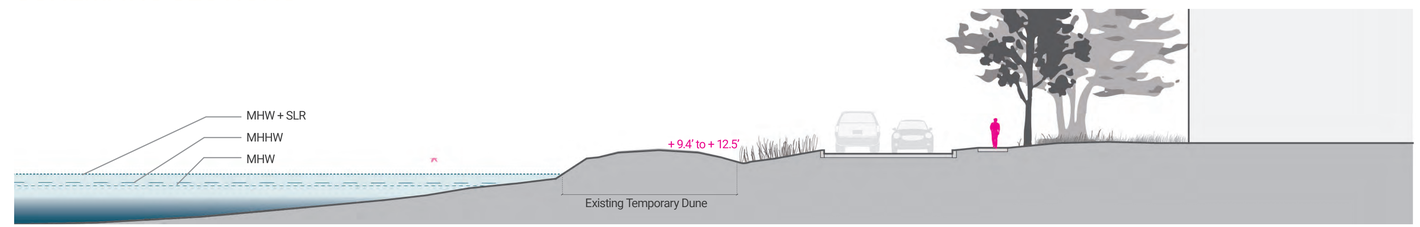
Proposed Circulation



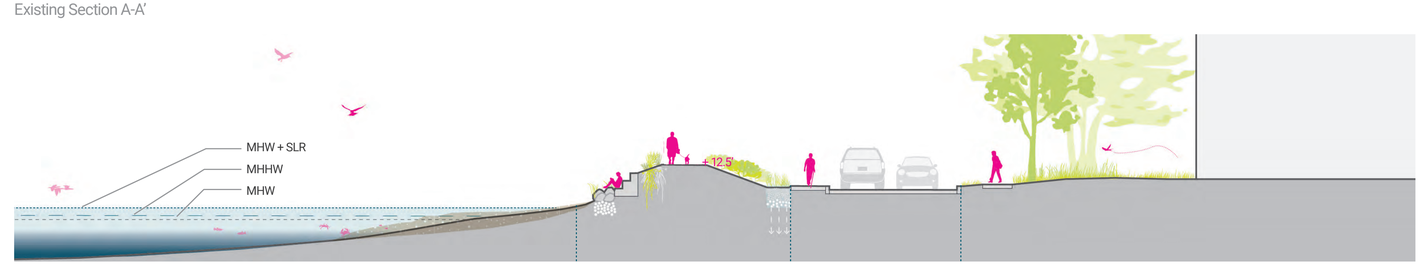
Key

- DOT Right of Way
- Limit of Moderate Wave Action
- CEHA
- Mean High High Water
- Mean High Water
- Mean Low Water
- Linear Access Point
- Access
- Private Road
- ADA Access
- Coastal Structures

SCHEMATIC SECTIONS



Existing Section A-A'



Proposed Section A-A'

BEACH ECO-REVETMENT SURF AVE

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

RAISED EDGE

KEY MAP

Tottenville, Staten Island

WHERE ARE WE NOW?

30% Schematic Design

FRAME CLEAR AND COMPREHENSIVE DESIGN INTENT

FOCUS ON PROJECT AS A WHOLE

WE ARE HERE

60% Schematic Design

ADVANCE PROPOSED SCHEME & FURTHER DEVELOP FINAL DESIGN

FOCUS ON ALIGNMENT AND DETAILS OF THE DESIGN ELEMENTS:

- STUDY AND FINALIZE RAISED EDGE ALIGNMENT
- STRUCTURAL DESIGN OF REVETMENT STONES BASED ON MODELING
- STUDY GRADING & DRAINAGE IN DETAIL TO ADDRESS STORMWATER ONSITE
- STUDY AND FINALIZE PATHWAY ALIGNMENT & MATERIALS
- DETAILED PLANTING DESIGN

100% Final Design

DESIGN IS SET

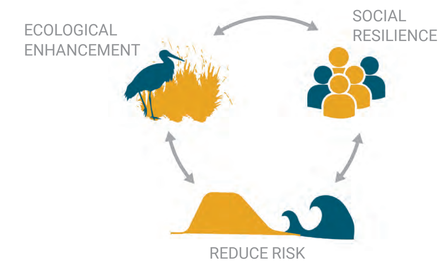
REFINE DETAILS, ALLOWING THE PROJECT TO BE PRECISELY BID

FOCUS ON PROVIDING A CLEAR, CONCISE AND COMPLETE DESCRIPTION OF THE PROJECT

EXISTING CONDITIONS

PROPOSED DESIGN

PROJECT GOALS



Risk Reduction

REDUCE EVENT BASED COASTAL EROSION

RAISE SHORELINE TO ACCOMODATE 30 OF SEA LEVEL RISE WHERE LIMWA IS CLOSE TO THE SHORE

ACCOMODATE 30 INCHES OF SEA LEVEL RISE WHERE LIMWA IS CLOSE TO THE SHORE

DESIGN TO LAST WITH MINIMAL MAINTENANCE FOR A MINIMUM OF 50 YEARS AND WITHSTAND A 100-YEAR STORM EVENT

Ecological Enhancement

HABITAT ENHANCEMENT

NATIVE SHORELINE PLANTING

MANAGE STORMWATER DRAINAGE ONSITE

Social Resiliency

INCREASE ACCESS TO AND ALONG THE WATER'S EDGE

ENHANCE COMMUNITY STEWARDSHIP OF ONSHORE & INWATER ECOSYSTEMS

INCREASE ACCESS TO RECREATIONAL OPPORTUNITIES

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

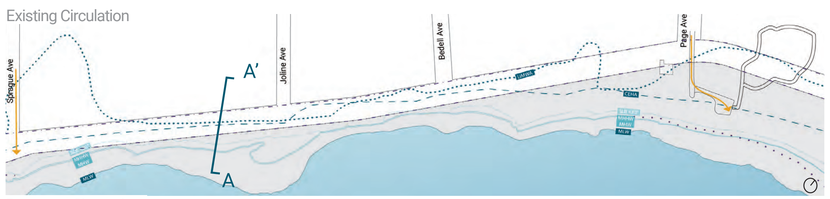
STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

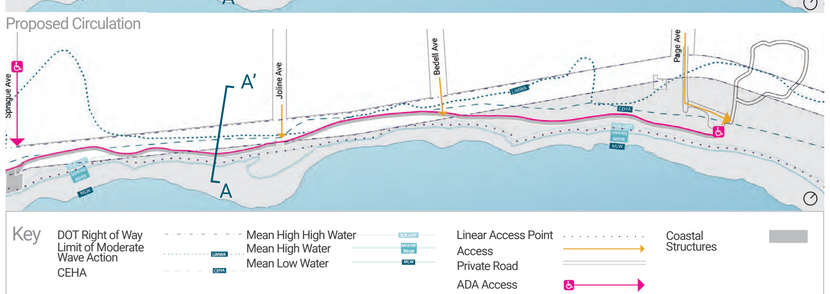
WHAT COULD IT LOOK LIKE?

CIRCULATION DIAGRAMS

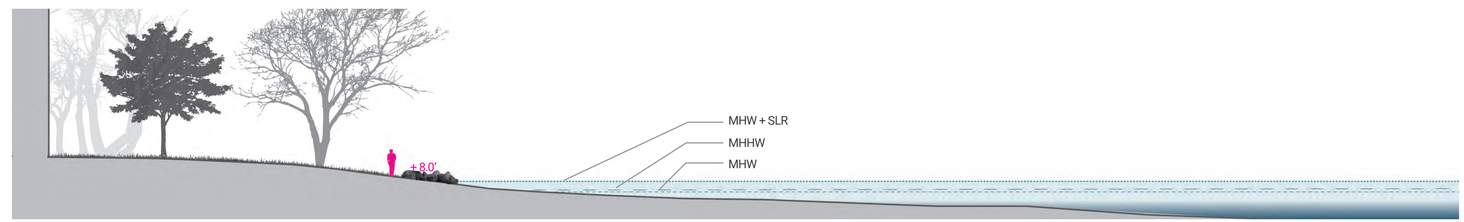
Existing Circulation



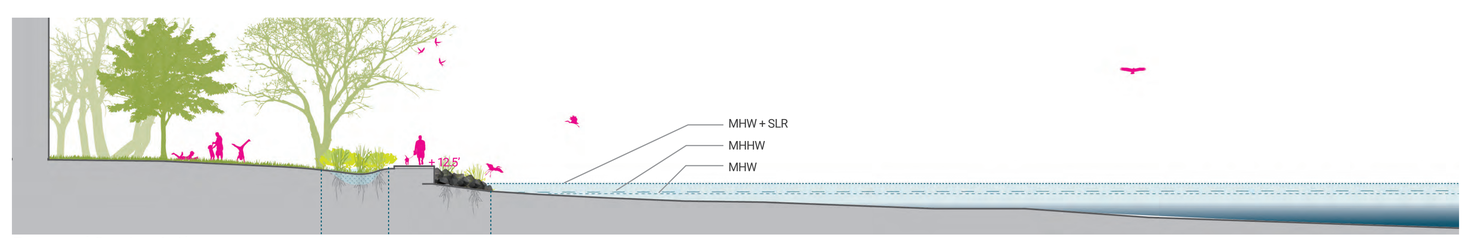
Proposed Circulation



SCHEMATIC SECTIONS



Existing Section A-A'



Proposed Section A-A'

BIOSWALE RAISED EDGE BEACH

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

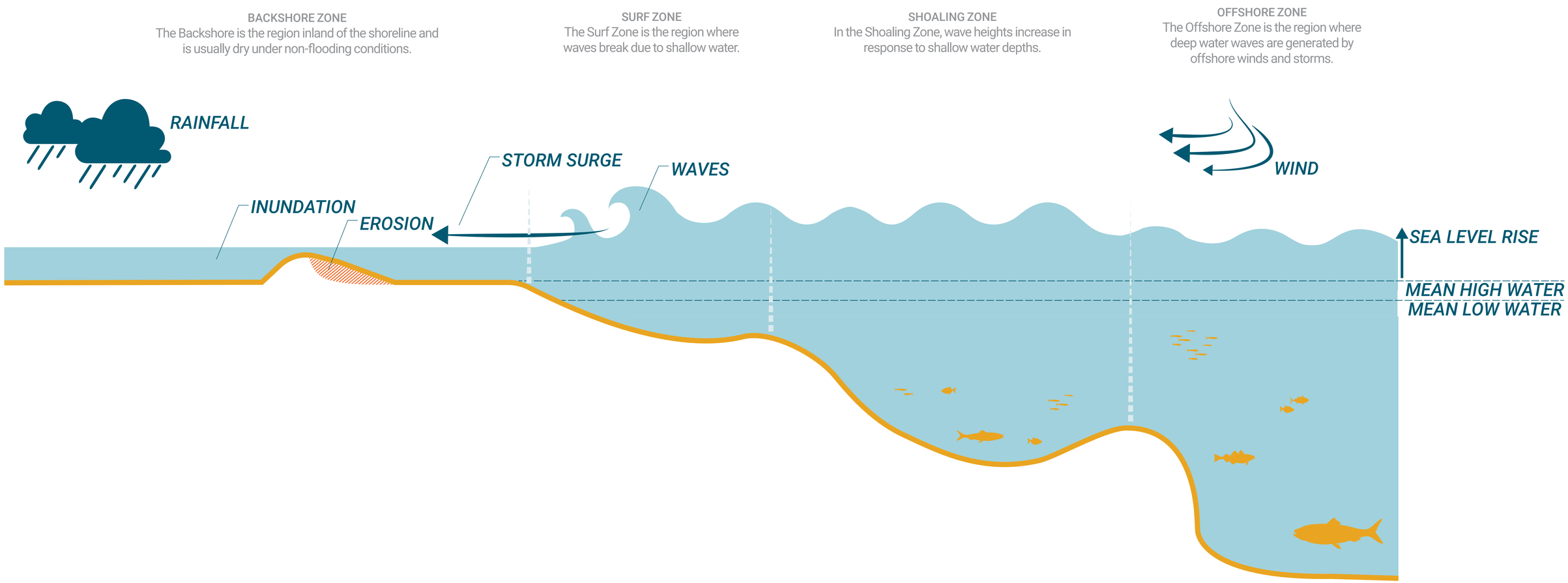
COASTAL RISKS

THE TOTTENVILLE SHORELINE PROTECTION PROJECT AIMS TO:

-REDUCE ***WAVE ACTION***

-REDUCE ***EVENT-BASED EROSION***

-ADDRESS ***COASTAL FLOODING***



TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

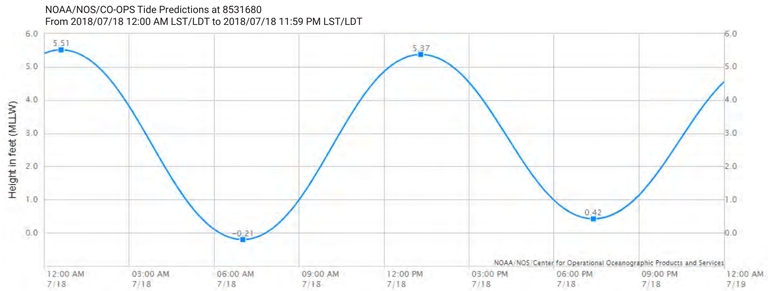
STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

COASTAL PROCESSES AND HAZARDS

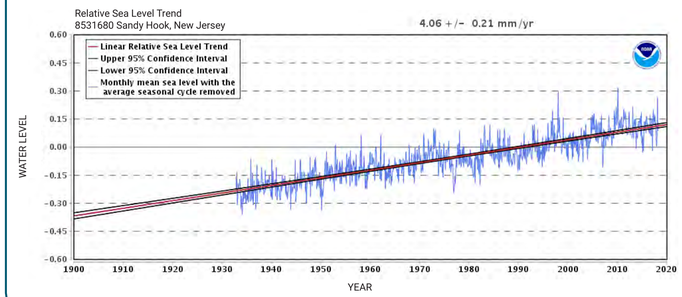
TIDES

The daily (diurnal) or twice daily (semidiurnal) alternate rising and falling of sea levels due to the gravitational forces of the moon and sun.



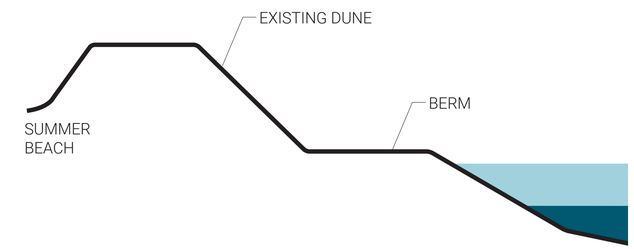
SEA LEVEL RISE

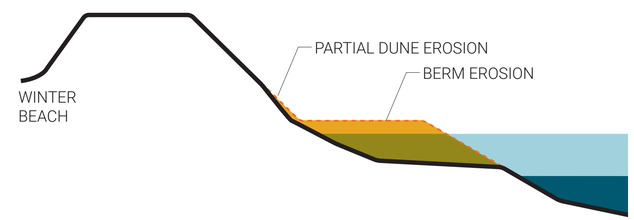
The long-term increase in oceanic water levels.



EROSION

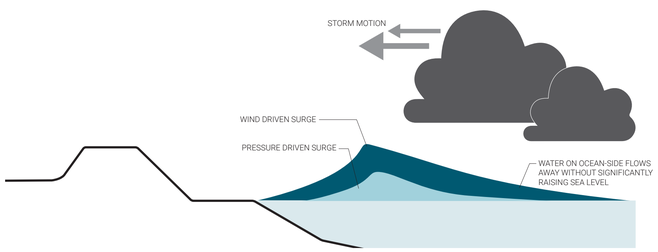
The removal of sediments caused by wave breaking and nearshore currents. Typically, notable erosion occurs during the winter.





STORM SURGE

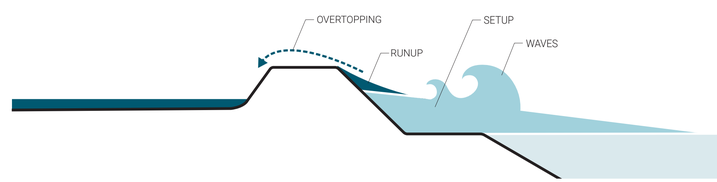
A rise in water levels above the astronomical tide generated by wind speeds and pressure gradients from a storm.



WAVE RUNUP & OVERTOPPING

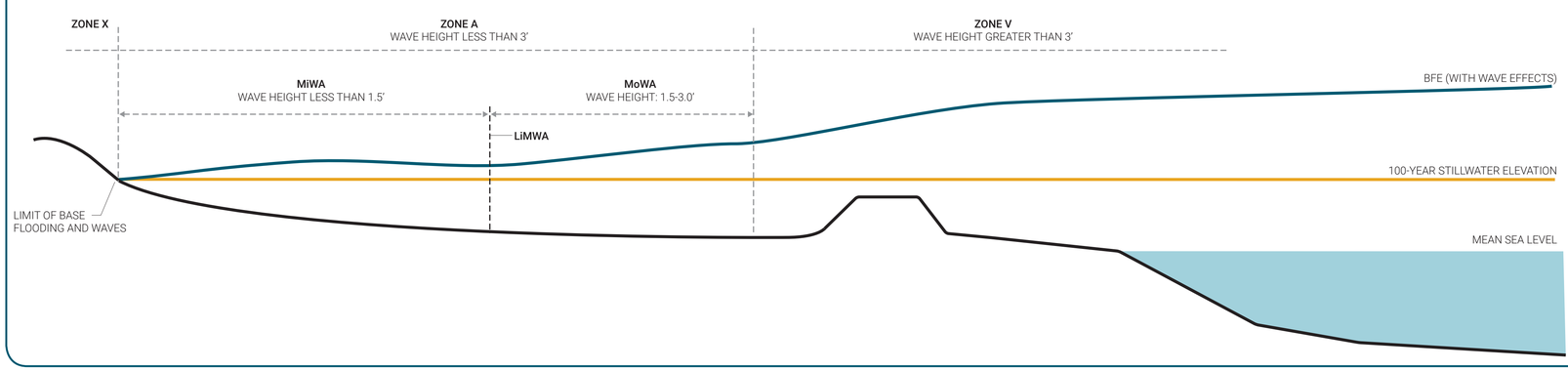
WAVE RUNUP: The uprush of water along a beach or steep coastal feature such as a dune, bluff, or coastal structure.

WAVE OVERTOPPING: The overflow of water inland of a shoreline barrier that occurs when the runup elevation exceeds the barrier crest's elevation.



OVERLAND WAVE PROPOGATION

The change in wave heights over low-lying inundated floodplains.



COASTAL PROCESSES GUIDE DESIGN

The coast is a dynamic environment that responds to coastal processes and hazards from the everyday to the major event. To address the TSPP project goals, each of the coastal processes and hazards illustrated and described in this board are taken into account through the modeling and design process. Some processes like sea level rise and storm surge act on scales greater than our control, but our understanding of these processes have improved and we can better prepare for them. Other processes such as waves and erosion can be addressed with design and construction of countermeasures that mitigate or reduce or slow down their impacts.

To understand, assess, and reduce the risk of waves and erosion at the Tottenville Shoreline Protection Project, the latest advances in coastal science and computational models are being applied.

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

PROJECT DRAINAGE AREAS

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

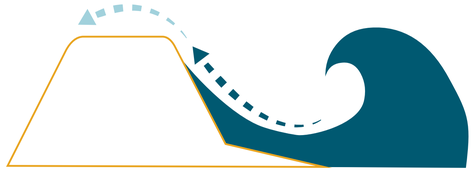
RISK MODELING PROCESSES

REGIONAL MODELING

-Storm surge water levels
-Offshore waves

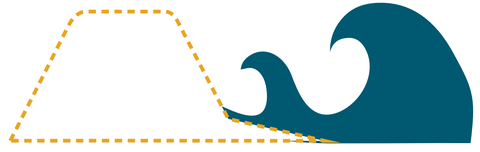
LOCAL COASTAL MODELING

-Local wave dynamics
-Assess impact of Living Breakwaters on TSPP project area



NEARSHORE WAVE ANALYSIS

-Runup & Overtopping
-Erosion



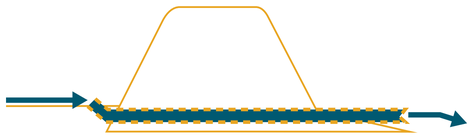
GEOMETRIC DESIGN

-Attenuate wave energy for 25-year storm
-Alignment and sections studied and developed

REVISE

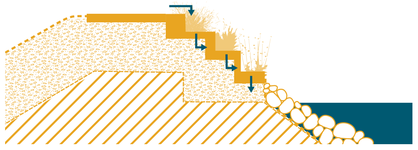
SEEPAGE ANALYSIS

-Water level recession
-Flow through ground and structures analyzed



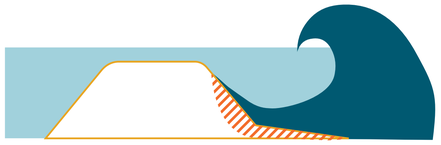
STORM SEWER ANALYSIS

-Rainfall runoff
-System capacity
-Coastal intrusion
-Resiliency of sewer system



DETAILED DESIGN

-Material design
-Structural design
-Habitat design
-Drainage studies



COASTAL RISK ASSESSMENTS

-Flood risk
-Coastal erosion

REVISE

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

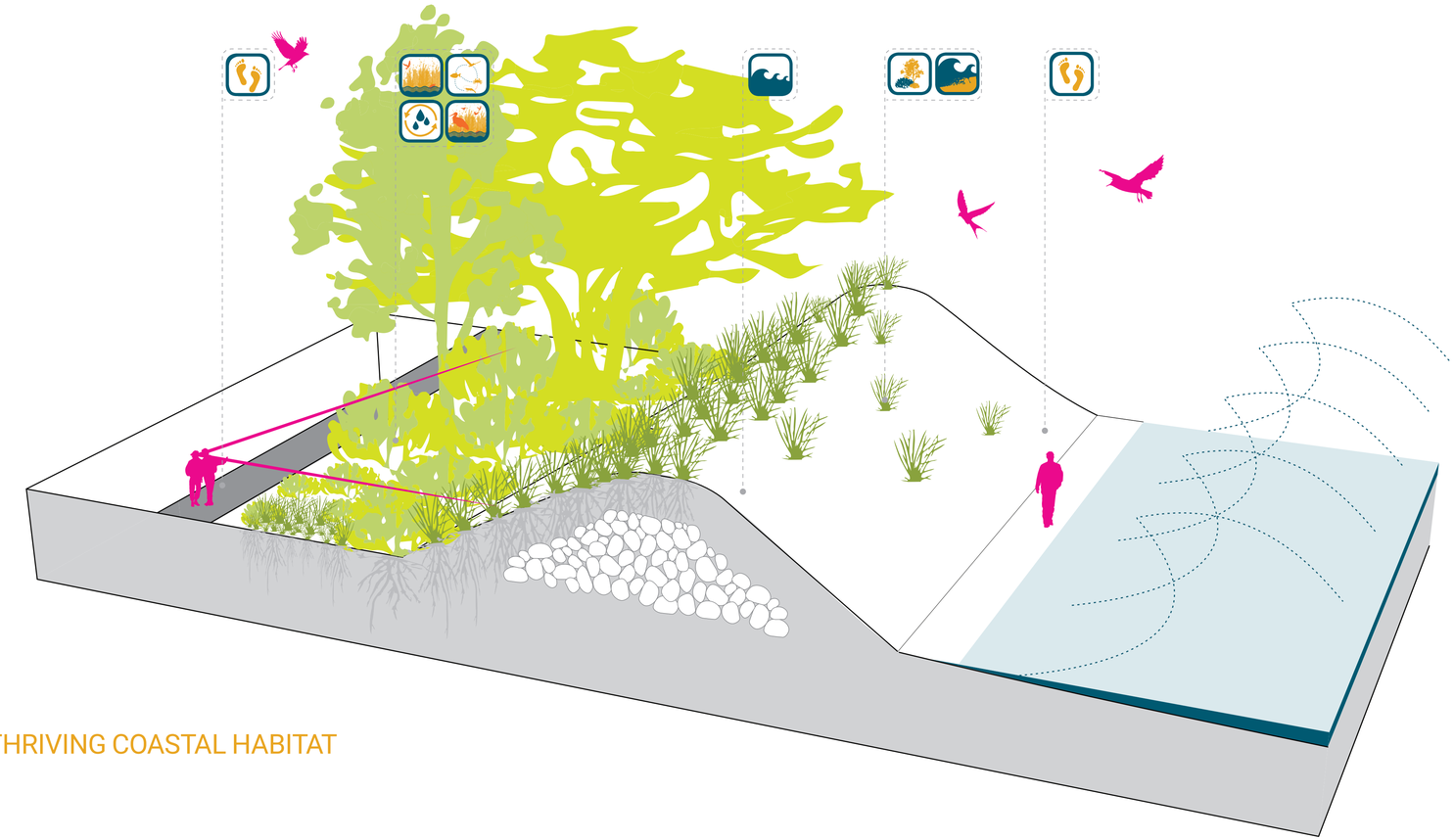
NYC Parks

STANTEC TEAM
STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES

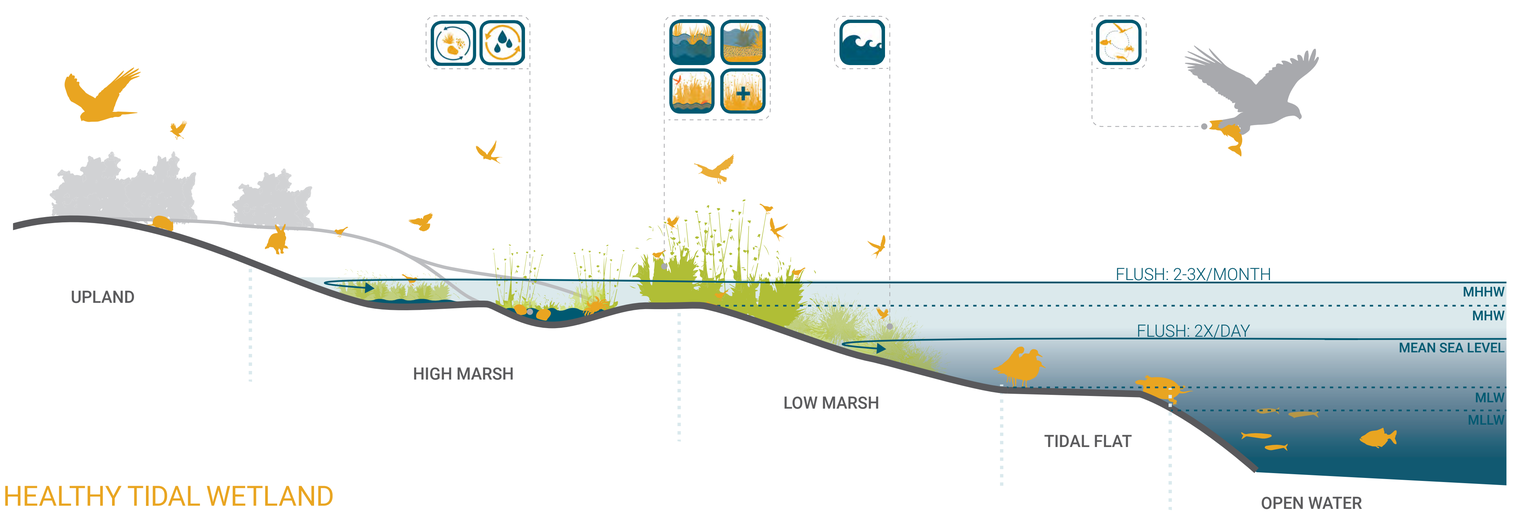
INTEGRATED COASTAL DESIGN

DESIGN TOOLBOX

- ACCESS
- PROVISION OF HABITAT
- HABITAT ENHANCEMENT
- BIOMASS PRODUCTION
- EROSION REDUCTION
- SUPPORT OF FOOD WEB DYNAMICS
- GREEN INFRASTRUCTURE
- CYCLING OF NUTRIENTS
- WETLAND RESTORATION
- REMOVAL OF CONTAMINENTS
- COMMUNITY STEWARDSHIP
- ATTENUATION OF WAVE ENERGY
- NATIVE PLANTING
- STORAGE OF FLOOD WATER
- ADA ACCESSIBILITY
- SEDIMENTATION & ACCRETION



THRIVING COASTAL HABITAT



HEALTHY TIDAL WETLAND

TOTTENVILLE SHORELINE PROTECTION PROJECT

Stantec

NEW YORK STATE OF OPPORTUNITY. DASNY

Governor's Office of Storm Recovery

NYC Parks

STANTEC TEAM

STANTEC CONSULTING SERVICES
RACE COASTAL ENGINEERS
AMY GREENE ENVIRONEMENTAL
SITEWORKS
NAIK GROUP
KC ENGINEERING
VJ ASSOCIATES