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This proposal includes information that shall not be disclosed outside of Cape May County and shall not be duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of, or in connection with, the submission of this information, Cape May County shall have the right to duplicate, use, or disclose the information to the extent provided in the resulting contract. This restriction does not limit Cape May County's right to use information contained in this proposal if it is obtained from another source without restriction. The information subject to this restriction is contained on all pages that follow.

PROJECT OVERVIEW

Introduction

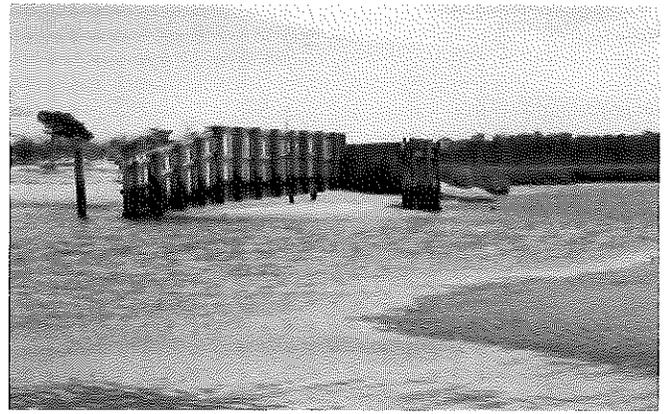
The Louis Berger Group Inc. (Louis Berger) has been engaged in tidal and coastal restoration projects in the region for decades, supporting such clients as National Oceanic and Atmospheric Administration (NOAA), US Army Corps of Engineers (USACE) (New York, Philadelphia and Baltimore Districts), The New Jersey Department of Environmental Protection (NJDEP), the Delaware Department of Transportation (DelDOT), the New Jersey Department of Transportation (NJDOT), the New Jersey Transit Authority (NJTA), NJ Meadowlands Commission, NYC Economic Development Commission, and many other state and local agencies. Throughout the years, Louis Berger has collaborated on numerous important and challenging restoration projects with our clients, including the Higbee Beach restoration project with NJDEP in Cape May, the first tidal wetland mitigation bank in New York City, and Round Hill Tidal Marsh restoration project for the Massachusetts Division of Ecological Restoration which involves detailed tidal hydrology modeling and extensive local community coordination. The same team members that have successfully completed these assignments are proposed to serve this project and have available capacity to meet the schedule needs of the project.

Louis Berger is one of the nation's leading firms in the ecological restoration field, and is well qualified to provide technical assistance to Cape May County to successfully support the baseline and feasibility studies leading to concept design and permitting of this project. Louis Berger is a broad-based environmental and engineering firm that offers professional services in the fields of environmental sciences, civil and environmental engineering, cultural resources, and planning. Louis Berger handles most of these assignments in-house, including technical assessments required to assess project feasibility; civil and structural design; securing regulatory approval of the design; construction monitoring and maintenance of the project; and development and presentation of material to the public and stakeholders.

Louis Berger will conduct the work from our Morristown, New Jersey office. Team member, Gibson Associates, PA, has been selected to provide New Jersey licensed survey services. Louis Berger has worked directly with Gibson Associates over the past three years on the NJTA Garden State Parkway Interchange 9, 10, 11 Improvement Project and propose to continue that successful relationship on this project. Gibson specializes in land surveying, road and bridge design, environmental permitting, structural integrity bridge inspection (NBIS program), site planning and land use engineering and construction engineering services. Gibson also offers the benefits of local knowledge and close proximity to the site (6 miles).

Technical Understanding

Cape May County is proposing to undertake the Green Creek Bay and Tidal Estuary Sustainability Project along the Delaware Bay Shore between Norbury's Landing to Pierces Point. The purpose of the project is to examine alternative methods to restore the bay shore and tidal wetlands damaged by Hurricane Sandy, address potential hydrologic impacts to community infrastructure and sensitive ecological areas, and advance the design and permitting of a preferred alternative. The project will be led by the Cape May County Team (Planning Department, Engineering Department, Public Works, Mosquito Control Department, and the County Counsel) and be supported by its Partners (NJDEP, Middle Township government, Rutgers Haskin Shellfish Laboratory, the Cape May Oyster Cooperative, United



Norburys Landing/Schellingings Creek outlet to Delaware Bay. Source: Chris Sanfino, 2011.

States Fish and Wildlife Service (USFWS) and others), stakeholders and the selected consultant team. Collectively, the Louis Berger Team brings the County all of the elements needed for a successful project: a project management team skilled in managing successful restoration projects; technical experts passionate about their work; team players that engage with clients and stakeholders; and a familiarity with the design and regulatory issues derived from extensive experience and local knowledge.

Louis Berger understands that working cooperatively with Cape May County, is essential to the development of relevant and feasible alternatives that meet the project objectives, and ultimately to the selection, design, and permitting of the preferred approach. Louis Berger also understands the importance of open dialogue with stakeholders to build trust and support within the local community and with the regulatory agencies.

The project objectives include developing a

comprehensive strategy that:

- Protects community infrastructure, access roadways, and residences / seasonal home sites serviced by septic systems;
- Reestablishes a healthy and sustainable bay dune environment;
- Reestablishes a manageable inlet system;
- Controls elevation of daily/seasonal tidal inundation;
- Increases the height of the tidal marsh, where appropriate;
- Protects maritime forest and freshwater wetlands;
- Establishes an ecological uplift of the wetland systems.



Forest conversion to marsh at Rt. 47. Source: Google, 2015.

As a Team oriented consultant, Louis Berger recognizes client and stakeholder input as vital to the effective completion of the project. Louis Berger has prepared a project approach that will generate required baseline data to build the conceptual design and permit applications. Prior to initiating work, Louis Berger proposes to meet with the Cape May Team to review and refine the proposed work plan to ensure it addresses the engineering and environmental data needs required to address project objectives and stakeholder concerns, and to identify supplemental support work, if any, that could be accomplished by the County.

The results of the baseline inform the Team and partners of existing conditions and help characterize observed issues, which will be integrated into the development of project alternatives for public and stakeholder review and comment. Louis Berger understands that alternatives need to address project objectives and be feasible, permittable and constructable. Louis Berger has completed these types of evaluations on numerous wetland restoration projects and can well advise the

Cape May Team and partners through this process. Following public and stakeholder input, additional analysis and selection of an initially preferred Alternative will be completed and advanced for design and permitting.

Each alternative will include the restoration of the protective dune along the Delaware Bay as an essential feature for protecting the shoreline and interior tidal marsh and to meet project objectives.

Additional alternative elements may include:

- Installation of in-channel structures to attenuate tidal energy, reduce erosion, and regulate tidal flow and inundation;
- Reconstruction of more natural tidal channel geometry;
- Improvement of resiliency of tidal and freshwater marshes through thin layer placement to raise marsh plain elevation;
- Review and incorporation of sustainable shoreline protection measures such as living shorelines and geotubes;
- Incorporation of features to protect sensitive areas;
- Invasive plant treatment and replanting of forest zones with native species;
- Cooperative multiparty agreements to define the jurisdictional responsibilities for the management of the area.

Louis Berger understands that the alternatives analysis needs to be sufficient enough to serve the needs of the permit application and demonstrate to regulatory agencies that the project will alleviate safety issues, protect human infrastructure and sensitive bay dunes, tidal marsh and freshwater wetland systems.

ASSIGNED PERSONNEL

Introduction

The Louis Berger Team possesses the necessary ability and depth of experience to undertake this multidiscipline assignment, and commits key personnel from recent and relevant restoration projects to this project. The organization chart illustrates how Louis Berger intends to organize the management of the project team; key technical personnel were selected based on both their technical expertise and experience in the successful completion of similar assignments.

These personnel bring a both depth of knowledge of the issues faced by the Green Creek wetland restoration project and an understanding of how federal and state environmental regulations apply to restoration projects in New Jersey. This experience is also reflected in our project approach.

The experts are supported by a full staff of junior-level scientists, engineers, and other technical assistants to allow for the cost-competitive execution of each task.

Project success relies largely upon successful project management. There are many requirements and objectives to accomplish, to achieve a "smooth running" project. These include:

- A proactive project manager with a focus on addressing the needs of the client and project
- Strong organizational skills and responsiveness
- A positive approach to challenges based on a commitment to cooperation
- Creating and maintaining a team environment with the design team and the client and consensus building
- Excellent written, verbal and visual communication
- Close coordination and scrutiny of the project schedule, budget, quality and progress reporting
- Building relationships with stakeholders founded on integrity

QA/QC Manager

Peg McBrien, PE, PWS, will serve as the QA/QC manager. She has successfully provided quality assurance and control on a variety of wetland restoration sites in the Mid-Atlantic region.

Ms. McBrien has managed ecological studies for the restoration of aquatic ecosystems for more than 40 projects throughout the country. Ms. McBrien will serve as the QA/QC reviewer of all deliverables and design development.

Project Manager

Jennifer Brunton, PE, will serve as project manager, has successfully led similar teams to evaluate and establish a variety of wetland restoration sites in the Mid-Atlantic region.

Ms. Brunton is an environmental engineer with 17 years of experience in environmental consulting, with an emphasis on ecological engineering and water resources engineering. Her area of expertise includes tidal and fluvial stream restoration design by applying the principals of natural stream channel design, fluvial geomorphology, hydrology, and hydraulics to stabilize identified causes of degradation from a landscape perspective. She is competent in managing, developing, and implementing feasibility studies for restoration projects; leading field crews during intensive field efforts to support technical studies; managing and performing technical analyses to support ecological restoration and water resource engineering projects, including sediment; developing engineering plans and cost estimates; writing specifications; conducting post-construction monitoring for restoration projects; and developing and implementing adaptive management actions.

Task Managers

Abdulai Fofanah, PE, D. WRE, CFM will serve as the task manager for the hydrology study. Mr. Fofanah is a Professional Engineer with more than 15 years of water resources engineering experience. Mr. Fofanah's primary areas of expertise are in the field

of coastal inlet wetland modeling, stream restoration design; water budget modeling; highway culvert and drainage system design; water supply and sewer system design; pipe network analysis; water quality modeling; detention/retention basin design; watershed modeling; hydrologic and hydraulic modeling; freshwater and tidal wetland design; numerical/analytical and wave/coastal processes modeling; hydropower headwater benefit analysis; sediment transport modeling; and environmental impact assessment.

Bethany Bearmore, PE will manage the team of hydraulic, geotechnical, and environmental engineers to develop the preliminary structural and wetland restoration design alternatives. Ms.

Bearmore has worked on wetland creation projects, comprising more than 500 acres, with a majority in the New York, New Jersey area. Her work has consisted of technical analysis and design of wetlands, including surface modeling, groundwater modeling, geotechnical considerations, survey coordination, and the general oversight of construction for several mitigation projects. Ms. Bearmore's comprehensive technical skills include plan development using MicroStation and AutoCAD software, surface modeling, site design, earthwork modeling and grading, surface water and groundwater modeling, geomorphology, geotechnical analysis, and survey coordination.

Sachin Apte, PE will manage the survey task and the work effort and survey products of our Team member, Gibson Associates. Mr. Apte has extensive

experience in planning, design, survey, construction and task management of major civil and environmental engineering projects. Mr. Apte has been a task manager/senior engineer working on project subcontractor management, planning, design and plan production, quantity estimation, permitting and construction oversight management of wetland mitigation and ecological restoration projects, infrastructure construction, transmission line projects, airports, and building and sport facilities.

Edward Samanns, PWS, CE will serve as the project and coastal ecologist and will manage the ecological assessment, ecological design and permitting tasks. Mr. Samanns, a professional wetland scientist and certified ecologist, will oversee the field investigations for biological data collection to support the development of alternatives; develop the planting plans; details and specifications for dune; tidal marsh; and freshwater wetland restoration for the project; and manage the regulatory permit process. Mr. Samanns has more than 25 years of experience conducting terrestrial, wetland and threatened and endangered species studies, functional assessments, restoration designs, and environmental permitting throughout New Jersey and the mid-Atlantic region, including recent work for NJTA for the Interchange 9, 10 and 11 interchange improvements and the NJDEP along Higbee Beach/Pond Creek in Cape May County.

ORGANIZATIONAL CHART



CAPE MAY COUNTY

PRINCIPAL

- Gul Khan, PE

QA/QC

- Margaret (Peg) McBrien, PE, PWS

PROJECT MANAGER

- Jennifer Brunton, PE, CFM

- KEY**
- Louis Berger
 - Gibson
 - * Task Lead

KEY PERSONNEL

TASK 1 - FIELD SURVEY REPORT	TASK 2 - HYDROLOGY INVESTIGATION AND REPORTS	TASK 3 - ENGINEERING DESIGN AND ALTERNATIVES	TASK 4 - COASTAL ECOLOGY ECOLOGICAL ASSESSMENTS & PERMITS
<ul style="list-style-type: none"> Sachin Apte, PE* Mark Gibson, PLS Walter Surran Jr., PE 	<ul style="list-style-type: none"> Abdulai Fofanah, PE, D. WRE, CFM, * Jeffery Tabar, PE Mike Dunn, PE Amber Ingg 	<ul style="list-style-type: none"> Bethany Bearmore, PE* Sachin Apte, PE Matthew Holthaus, EIT, CFM Dincer Egin, PhD, PE, PG Justin Baker 	<ul style="list-style-type: none"> Edward Samanns, PWS, CE* <i>Ecological Assessments/Permitting</i> Ann Folli, PWS Dana Flynn, CWB Tom Shinsky Tara Stewart <i>GIS</i> Heather Shaw <i>Site Assessment</i> Tom Waldron, PG, LSRP <i>Cultural Resources</i> Lena Hayden, RPA

RESUMES

JENNIFER BRUNTON PE, CFM

Ms. Brunton is an environmental engineer with more than 17 years of experience in environmental consulting. Her expertise includes managing, developing, and implementing technical studies for ecosystem restoration projects; developing engineering plans and cost estimates; writing specifications; providing construction supervision; conducting post-construction monitoring of restoration projects; and developing and implementing adaptive management actions. Ms. Brunton is also experienced in developing state and federal permits applicable to water resource engineering projects and working with stakeholders and watershed associations during project development.

Firm Louis Berger

Education

- MS, Civil and Environmental Engineering
- BS, Public Environmental Affairs Registrations / certifications
- Licensed Professional Engineer
- Certified Floodplain Manager

Years of Experience 17
Years with firm 10

Relevant Project / Work Experience

Higbee Beach Marsh Restoration Project for New Jersey Department of Environmental Protection Cape May, New Jersey. Project manager overseeing the engineering design of several hundred acres of tidal marsh restoration and more than 30 acres of coastal dune forest restoration in Cape May County, New Jersey. The principal project goal is to reestablish tidal inundation to a large portion of Pond Creek marsh without increasing the flood risk to the upper watershed or inundating the eastern marsh area, and allowing for habitat management of the northern marsh area. Directed the execution of the following baseline studies to support the conceptual design development. Through an iterative process of defining, modeling, and refining the inlet channel, determined the optimal design. Currently developing an approach to permit application development and final design, which will include full design of the marsh restoration, berms, and associated water control structures; design of over 30 acres of maritime forest restoration, bridge design to provide access over the restored inlet channel, the design of nature trails, interpretive signage and other recreational features, and preliminary site design of a proposed educational facility or interpretive center within a former manufacturing plant on site.

NJDEP, Mad Horse Creek Wetlands Restoration Project, Salem County, New Jersey. Project manager overseeing the engineering design of more than 230 acres of tidal marsh, forest, grassland, emergent freshwater marsh in Salem County, NJ. The site is being restored as partial compensation for the 250,000 gallon oil spill caused by the grounding of the merchant marine oil tanker Presidente Rivera in the Delaware River in 1989. Impacts caused by the spill included park and fishery closures, and oil deposits along the coastal wetlands and shoreline impacts through 30 miles of river. On-going project tasks include performing an intensive cultural resource survey of the project site. Subsequent project tasks include overseeing the development of engineering plans, specifications, and an engineer's cost estimate. Project components will also include construction oversight and post-construction monitoring.

NJTA, Garden State Parkway Garden State Parkway Interchange 9, 10,11 Improvements Project, Township of Middle, Cape May County, New Jersey. Lead engineer responsible for designing mitigation to satisfy permit requirements associated with the Garden State Parkway Interchange 9, 10, 11 Improvements Project. The project involved nearly 5 acres of permanent impacts to tidal and freshwater wetlands and open waters. Mitigation to offset these impacts consisted of purchasing credits from a mitigation bank and developing mitigation on off-site parcels. Performed baseline studies to support permitting and mitigation design development. Developed plans, specifications, and engineers estimate for an off-site tidal wetland mitigation component of the project. Coordinated with regulatory agencies to ensure project satisfied permit requirements. Project elements will include construction oversight (schedule for spring 2016) and post-construction monitoring.

NJDEP, Lincoln Park Wetland Restoration, Hudson County, New Jersey. Supported the engineering tasks associated with the redevelopment of a landfill for tidal marsh restoration. As part of this \$7 million project, responsibilities included development of contract documents that describe the excavation of landfill debris from within the historical wetland area to re-establish tidal channels and salt marsh. Project components included draft and final design plans and specifications, as well as cost estimates and quantities, and bid packages. The project restored 42 acres of wetlands, streams, salt marsh habitat, and added additional anadromous fish spawning habitat to the Hackensack River. Project required dredging 245,000 cy of material, including 2-feet of over-excavation followed by the import and placement of processed dredged material (PDM) to achieve final proposed grades.

MARGARET (PEG) MCBRIEN PE, PWS

Ms. McBrien has 28 years of managing and/or providing QA/QC of 2,000 acres of ecological restoration projects including managing multi-disciplinary staff and contractors to complete topographic/bathymetric surveying; soil borings and geotechnical studies; sediment and water contamination investigations; habitat surveys; vegetation mapping; cultural resource assessments; environmental permit applications; hydraulic and hydrodynamic modeling; civil design plans and specifications; construction cost estimates; technical reports; and construction oversight. Ms. McBrien is thoroughly familiar with environmental regulations and has extensive experience delineating wetland boundaries, assessing wetland functions, restoring/creating streams and wetlands, and obtaining state and federal permits.

<p>Firm Louis Berger</p> <p>Education</p> <ul style="list-style-type: none"> • ME, Environmental Engineering • BA, Geology <p>Registrations / certifications</p> <ul style="list-style-type: none"> • Professional Engineer (NJ, MA) • Professional Wetlands Scientist <p>Years of Experience 25 Years with firm 13</p>

Relevant Project / Work Experience

NOAA Damage Assessment Remediation and Restoration Program (DARRP) Indefinite Delivery Indefinite Quantity (IDIQ), Environmental Restoration Projects and Related Work. Program manager for the NOAA Ecosystem Restoration IDIQ contract, which focuses on DARRP-funded projects, emergency response, restoration design, and National Environmental Policy Act (NEPA) for various NOAA actions/facilities. Recent projects include the Saugatucket River Fish Ladder Design and Construction Assistance in Rhode Island, Seagrass Restoration Services along the Northern Coast of the Gulf of Mexico in Florida, and Alaska/Arctic Oil Spill Risk Analysis.

Mad Horse Wetland Restoration, Salem County, New Jersey. Task manager for Freshwater and Tidal Wetland Restoration Design Studies, Construction Plans and Specifications for the Mad Horse Creek Wetland and Coastal Grassland adjacent to the Delaware Bay. Managed the characterization of the existing ecological, hydrological and geotechnical conditions, and completion of design plans and specifications. The site is being restored as partial compensation for the 250,000 gallon oil spill caused by the grounding of the merchant marine oil tanker Presidente Rivera in the Delaware River in 1989. Impacts caused by the spill included park and fishery closures, and oil deposits along the coastal wetlands and shoreline impacts through 30 miles of river.

Massachusetts Division of Fish and Game – Division of Ecological Restoration (DER) Round Hill Tidal Marsh. Quality Control manager for modelling, design and permitting of the Round Hill Salt Marsh Restoration Project located in Dartmouth, Massachusetts. In coordination with DER and the National Oceanic and Atmospheric Administration (NOAA), on behalf of the New Bedford Harbor Trustee Council (NBHTC); The Town of Dartmouth, and the U.S. Fish and Wildlife Service, overseeing supplemental assessment, preparation of engineering design plans and regulatory application materials, and construction bid documents for implementing the Round Hill Salt Marsh Restoration Project on Town-owned property bordering the Round Hill Town beach. Design will excavate fill material and reconnect the site to the existing Meadow Shores marsh via a culvert replacement under Ray Peck Drive.

NJDEP, Higbee Beach Wetland Restoration Project, Cape May County, New Jersey. Quality Control manager for the engineering design of over several hundred acres of tidal marsh restoration in Cape May County, NJ on Delaware Bay. The project included developing and implementing baseline studies, including bathymetric and topographic surveys, habitat mapping and wetland delineations, and hydrodynamic, hydrologic, and hydraulic modeling. This effort will support the multi-phased restoration and redevelopment of the full project site, which consists of the following three phases: Phase 1: Restore estuarine intertidal emergent wetland habitat within the Pond Creek Salt Marsh; Phase 2: Establish native upland habitat within the majority of the former Harbison Walker magnesite plant site; and Phase 3 : Create interpretive and education opportunities, including the design and construction of an interpretive center and trail system, within the former Harbison Walker magnesite plant site

ABDULAI FOFANAH PE, D. WRE, CFM

Mr. Fofanah is a water resources engineer with 16 years of experience in tidal and freshwater marsh restoration, stream restoration, hydrodynamic modeling, sediment transport and nearshore coastal processes. Mr. Fofanah has worked with public and private clients including the USACE New York and Kansas District, the National Resources Conservation Service (NRCS), United State Fish and Wildlife Service (USFWS) and local and state agencies across the United States. Mr. Fofanah's technical/modeling experience include HEC-RAS/GeoRAS, HEC-HMS/GeoHMS, RiverCAD, CHANLPRO, SMS, RMA2, CMS-Flow, CMS-Wave, GMS/MODFLOW, MIKE SWMM, BASINS 4, WinTR-55, HYDRAFLOW Hydrographs, AutoCAD Civil 3D, ArcGIS, PKFQWin, HydroCAD, ArcSWAT Model, and CulvertMaster

<p>Firm Louis Berger</p> <p>Education</p> <ul style="list-style-type: none"> • MS, Water Resources Engineering • Civil Engineering <p>Registrations / certifications</p> <ul style="list-style-type: none"> • Professional Engineer • D.WRE • CFM <p>Years of Experience 16 Years with firm 14</p>
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Relevant Project / Work Experience

Round Hill Tidal Marsh Restoration, Dartmouth, Massachusetts. Technical lead responsible for the hydrodynamic, sediment transport, inlet channel morphology change and flood impact modeling of the Round Hill tidal marsh restoration. The restoration site is directly connected to a beach in Buzzard's Bay, MA and there are concerns among some property owners in the vicinity of the inlet channel that increasing wetland tidal prism through restoration of the Round Hill tidal marsh will adversely impact their properties through flooding and erosion. Modeling was performed using the US Army Corps of Engineers (USACE) two-dimensional, depth integrated finite element model, RMA-2, with a Surface Modeling System (SMS) user interface for the marsh restoration modeling; and the morphology change, sediment transport and flooding impacts were analyzed using the physically based CMS-Flow and CMS-Wave models. The CMS-Flow model is a product of the Coastal Inlets Research Program (CIRP) at the USACE Research and Development Center. CMS-Flow is a finite-volume, depth-averaged model that calculates water surface elevation, flow velocity, sediment transport and geomorphic change at tidal inlet channels.

Higbee Beach Wildlife Management Area Restoration Project, Cape May, New Jersey. Technical lead responsible for the hydrodynamic and flood impact modeling of the of Higbee Beach Wildlife Management Area Restoration Project. The modeling efforts the multi-phased restoration and redevelopment of the full project site, which consists of the former Harbison Walker magnesite plant, Daveys Lake, and unnamed lakes northeast of Daveys Lake, as well the majority of the Pond Creek marsh. Modeling was performed using the USACE two-dimensional, physically based CMS-Flow and CMS-Wave models, with a Surface Modeling System (SMS) user interface for the marsh restoration modeling.

Richard P. Kane Natural Area Wetland Mitigation Bank, Carlstadt and South Hackensack, New Jersey. Hydrology and hydraulics Project Engineer for the wetland mitigation design of the Richard P. Kane Natural Area Wetland Mitigation Bank in Carlstadt and South Hackensack, New Jersey. The project objective is to provide, through wetland banking, economically efficient and flexible off-site compensatory mitigation opportunities for New Jersey transportation agencies seeking to develop within and in accordance with all relevant Federal, State and local regulations and guidance. For the proposed tidal marsh component, work involved the use of the USACE two-dimensional RMA-2 computer model to simulate tidal circulation through three proposed inlet channels to the 240 acres parcel. The RMA2 model was also used to design the inlet and on-site channel layout and configuration to reintroduce the required tidal flows to the site and to restore the proper hydroperiod and promote the establishment of desirable salt marsh vegetation species. Also analyzed the stability of the designed channels. Since the project involves the construction of a perimeter berm on a floodplain to confine the daily tidal flows within the proposed tidal wetland mitigation bank site, extensive hydrologic flood routing was conducted to determine the impact of the perimeter berm on flooding impacts. Work also involved the preparation of several regulatory permit applications. Also developed an excel spreadsheet water budget model for the freshwater parcel of the site to determine the required hydroperiod of the proposed freshwater forested wetland. Project responsibilities also included coordination with the US Army Corps of Engineers regarding associated projects which affected the modeling boundary conditions and design constraints. Prepared NJDEP, USACE, Bergen Soil Conservation District, and permit applications.

BETHANY BEARMORE PE

Ms. Bearmore is registered professional engineer focusing on coastal resiliency and restoration with more than 18 years of experience in environmental consulting and government work. Her expertise includes coastal resiliency planning; managing, developing, and implementing feasibility studies for tidal and non-tidal wetland restoration projects; beneficial use of dredged material; living shoreline design; submerged aquatic vegetation projects; shellfish re-establishment and dam removal projects; Damage Assessment and Restoration Planning lead Trustee representative with NOAA for NRDA cases; leading field crews during intensive field efforts to support technical studies; managing and performing technical analyses to support ecological restoration, developing engineering plans and cost estimates; writing specifications; field surveying, providing construction supervision; conducting post-construction monitoring for restoration projects; and developing and implementing adaptive management actions.

Firm Louis Berger

Education

- ME, Ocean Engineering
- BS, Bioresource Engineering
- BS, Environmental Science

Registrations / certifications

- Professional Engineer (NY)
- 40-Hour HAZWOPER (Current)
- PADI Open Water Dive Certificate #0109344226

Years of Experience 18
Years with firm 3

Relevant Project / Work Experience

National Park Service, Fort Tilden, New York. Ms. Bearmore is the coastal engineer helping develop four feasible alternatives for the management of the Atlantic coastal area of Fort Tilden, conducting a value analysis with draft and final reports, preparing a draft Environmental Assessment (EA) for three NPS reviews, participation in public meetings, making appropriate revisions to the EA in response to NPS review comments, preparing a revised EA for public review, and preparing the appropriate decision document (i.e., either a Finding of No Significant Impact or Notice of Intent). Specific duties included reviewing and commenting the coastal management area alternatives, development of conceptual plans and costs, and NEPA analysis

New York City Department of Environmental Protection (NYCDEP), Dutch Kills Wetland Demonstration Project, Queens, New York. Ms. Bearmore acting as the project manager and lead restoration engineering designer for the demonstration project that includes restoration of a salt marsh within the Dutch Kills, a tributary of Newtown Creek. The project encompassed placing fill and restoring a 500 square foot area back into a tidal salt marsh. The demonstration project is the initial effort within the Newtown Creek system to restore what was once a tidal marsh and improve the water quality within the system. Ms. Bearmore was able to work with a team of engineers, biologists, state, local and other Government officials and construction crews to design and implement this project.

Philadelphia Regional Port Authority, Jack's Marina wetland Mitigation Project, Bucks County, Pennsylvania. Ms. Bearmore was the lead restoration engineering designer for the restoration of a tidally influenced freshwater marsh at Jacks Marina. The project encompassed removing fill and restoring a 13-acre area back into a freshwater tidal marsh. The restoration included reviewing and finalizing the conceptual design provided by another consultant and reviewing the specifications. Project review details included tidal analysis, topographic and bathymetric surveys, bio-benchmarks for plant survival, development of 100% plans and specifications and the overall logistics of removing fill, grading to the right elevations and planting. Ms. Bearmore was able to work with a team of engineers, biologists, state, local and other Government officials and construction crews to design and implement this project.

SACHIN APTE PE

Mr. Sachin Apte has extensive experience in planning, design, survey, construction and task management of major civil and environmental engineering projects. Mr. Apte has been a senior engineer working on project proposals, planning, design and plan production, quantity estimation, permitting and construction oversight management of transmission line projects, airports, building and sport facilities, wetland mitigation and ecological restoration projects. Mr. Apte's previous experience also encompasses design/build construction, project management and construction inspection of highways, bridges, waterfront facilities, and buildings, parks for federal state and local governmental agencies, private clients and construction firms.

Firm Louis Berger

Education

- MS, Civil Engineering
- BS, Civil Engineering

Registrations / certifications

- Professional Engineer (NH, NJ)
- 40-Hour OSHA Health & Safety Training for Hazardous Waste Operations,

Years of Experience 14
Years with firm 10

Relevant Project / Work Experience

Higbee Beach Marsh Restoration Project for New Jersey Department of Environmental Protection Cape May, New Jersey. Project Leader assisting the manager to oversee the engineering design of over several hundred acres of tidal marsh restoration in Cape May County, New Jersey. Developed and implemented baseline studies, including bathymetric and topographic surveys, habitat mapping and wetland delineations, and hydrodynamic, hydrologic, and hydraulic modeling. The phased effort is to support the multi-phased restoration and redevelopment of the full project site, which consists of restoring estuarine intertidal emergent wetland habitat within the Pond Creek Salt Marsh, establishing native upland habitat within the majority of the former Harbison Walker magnesite plant site and creating interpretive and education opportunities, including the design and construction of an interpretive center and trail system, within the former Harbison Walker magnesite plant site.

Goshen Wetland Mitigation for Orange County Airport Runway 3-21 RSA Improvement Project, Orange County Montgomery, New York. Project manager for Wetland Mitigation part of overall project providing Engineering consultant services to Orange County Airport. As the Airport's consultant, project task manager providing design services and construction management service to engineering task orders developed in the contract for wetland mitigation site reconnaissance, permitting, preliminary and final design, project plans, specifications and cost estimate for the project. Work involves routine coordination with project stakeholders, managing deadlines, schedules and deliverables and project close out.

Phase II Apron Expansion Project between Taxiways M & J, Jet Aviation at Teterboro Airport, Teterboro, New Jersey. Project involved the design of an expansion of the existing apron facility (area of 1.65 acres) at Teterboro Airport including geotechnical analysis & pavement design, adjustments to the existing drainage structures, design of new drainage/stormwater management/water quality facilities, review of previous wetland delineations, and new Freshwater Wetland design, Flood Hazard Areas, Stormwater Management, Water Quality and Soil Erosion and Sediment Control Permits, certifications and approval. Performed review of submittals to comply with standards and specifications provided by the Port Authority of New York and New Jersey (PAN&YNJ), prepared submittals logs, RFI logs, invoices, cost estimates, quantity take-offs, daily inspection reports for each site visit and close out documentation and attended site meetings. Reviewed shop drawings and rebar drawings including civil & structural drawings. Performed project inspections with client, contractor and PANY&NJ's representatives.

Environmental Mitigation at Jacks Marina for Philadelphia Regional Port Authority. Croyden Pennsylvania. Project involved project leader responsible for design of freshwater tidal wetland mitigation at Jack's Marina site in Croydon, Pennsylvania as required in the USACE and PADEP permits. In coordination with AP Construction, assisted in project initiation, project planning, design/build phase of project along with construction project monitoring and construction phase close out of the project with various permit requirements and permit compliance. Responsibilities also included carrying out the design plans, specifications and cost estimates needed for project along with project monitoring and cost control during design/build phases of project.

EDWARD SAMANNS PWS, CE

Mr. Samanns is the senior program manager of environmental sciences at Louis Berger with more than 27 years of experience managing environmental investigations, studies and permitting efforts for a variety of projects and clients. Mr. Samanns specializes in ecological restoration/mitigation and related topics including stream and wetland ecology, permitting, threatened and endangered species studies, invasive species management, natural resource management and NEPA and permit compliance. Mr. Samanns is a key member of Louis Berger's Ecosystem Restoration practice, a unique assemblage of key scientists and engineers that conduct tidal and freshwater restoration projects including wetland and stream mitigation banks, endangered species habitat enhancement, freshwater and coastal wetland mitigation and restoration, and "Living Shorelines"

Firm Louis Berger

Education

- MS, Geography
- BS, Biology

Registrations / certifications

- Professional Wetland Scientist
- Certified Ecologist, Ecological Society of America

Years of Experience 28
Years with firm 26

Relevant Project / Work Experience

New Jersey Department of Environmental Protection, Higbee Beach Wetland Restoration Project, Cape May County, New Jersey. Lead ecologist supporting the scoping and completion baseline studies for an alternative analysis and conceptual design for the rehabilitation of a tidally restricted 300-acre common reed dominated marsh system. Baseline studies included bathymetric and topographic surveys, habitat mapping and wetland delineations, and hydrodynamic, hydrologic, and hydraulic modeling, T&E species screening and permit requirement evaluations. The completed work support the multi-phased restoration and redevelopment of the project site under three phases including the restoration of estuarine intertidal emergent wetland habitat within the Pond Creek Salt Marsh, the establishment of native upland habitat within the majority of the former Harbison Walker magnesite plant site, and the development of interpretive and education opportunities.

New Jersey Turnpike Authority, Garden State Parkway Interchange 9, 10 and 11 Improvements Feasibility Assessment, Preliminary and Final Design, and Environmental Assessment and Permitting, Atlantic/Cape May County, New Jersey. Task supervisor responsible for overseeing the collection of baseline data and the analysis of impacts to natural resources for a Feasibility Assessment Report and a NEPA Environmental Assessment for three intersection improvements along a 6-mile corridor. Also managed the development of NJDEP Freshwater Wetlands and Coastal Wetlands permit (CAFRA/Waterfront Development/Tidal Wetlands) and USACE Individual permit applications. Also coordinated development of Mitigation Plans for Wetlands, Critical Habitat, No-Net-Loss Reforestation, and Riparian Zones to maximize mitigation credit and reduce overall mitigation costs. In addition to freshwater and tidal wetland mitigation site selection, and design, provided construction support for the project.

New Jersey Department of Environmental Protection (in coordination with the National Oceanic and Atmospheric Administration), Lincoln Park Wetland Restoration Project, Jersey City, New Jersey. Task supervisor, responsible for overseeing and providing technical input on the design, permitting and construction of a 42-acre tidal marsh restoration site located in an Essex County park. Permits acquired for the project include USACE Section 404 Nationwide Permit No. 27 and NJDEP Waterfront Development Permit - In-Water/Upland, Freshwater Wetland General Permit No. 16, and Water Quality Certificate. Provided technical review of design including planting plans, details and specifications.

USACE, Baltimore District, Preparation and Production of the Updated Version of the 1981 USACE Technical Guide on Shore Protection, Maryland. Task manager/lead scientist. Provided planning and engineering support services to the Baltimore District with the preparation and production of an updated version of the 1981 USACE technical guide titled "Low Cost Shore Protection...a Guide for Engineers and Contractors." The updated document focused on appropriate measures for protecting the shorelines of the Chesapeake Bay emphasizing the "Living Shorelines" concept, promoting best management practices, the latest engineering technologies, and State-of-the-art technologies that provide stability and improve coastal habitat, including dunes, coastal marshes, and shorelines. Promoted practices include those that also provide some treatment of land-generated stormwater runoff. Obsolete practices, especially those with unacceptable environmental impacts, were deleted from the technical guide. The technical manual is written for use by county planners, contractors, engineers and other professionals.

DETAILED PROJECT TASK

The following section outlines Louis Berger's proposed approach to complete the the requested tasks. As noted previously, Louis Berger staff would propose to meet with the Cape May Team to go through and modify the approach to best meet the needs of Cape May and the project prior to initiation of the work.

Task 1. Surveying

Louis Berger will provide topographic survey as per the technical requirements to provide sufficient data to develop the preferred preliminary design for the permit application. It is assumed that the County of Cape May will provide Louis Berger with any maps or pertinent information in its possession that may assist in acquiring all relevant information for this task. The survey area consists of approximately two miles of shoreline and adjacent wetlands, extending from just south of Haskin Shellfish research laboratory to Norbury's Landing road (County Road 642). All of the survey plan sheets will be signed and sealed by a New Jersey-licensed land surveyor. Survey work will be performed in US Survey Feet, and the mapping will be tied to New Jersey State Plane Coordinate System North American Datum of 1983 (NAD83) for Horizontal Control and North American Vertical Datum of 1988 (NAVD88) for vertical control. The vertical accuracy of 0.6 ft. will be obtained for the survey area along the shore line, tidal channels, and immediately adjacent tidal marsh. Attention to detail will be paid for the survey area along the perimeter of the adjacent wetlands.

The task will include a field review and ground truthing of the existing survey to verify the elevations shown on the existing survey are accurate as per the required accuracy. This existing survey is assumed to be available from the county (DEM and LIDAR). Louis Berger will also review the topographic data from the available survey and supplement the 2008 LIDAR data, elevations, post -Superstorm Sandy and Hurricane Irene, to identify how the project area have affected elevation changes. Additional site features shall be surveyed to provide an accurate map of the project site and the adjacent wetlands. Critical elevations points shall be surveyed including but not limited to existing dune structures, breaches and hydraulically significant features such as culverts, channel cross-sections and water level (with the time the survey data was collected noted). Information for manmade structures will also be collected that includes inlet and outlet invert elevations, type of material (e.g. concrete, iron pipe, etc.), size, length, width, opening shape and configuration (e.g. wing wall or no wing wall and type of wing wall). Monitoring gages will be installed and surveyed to collect information on water level fluctuation for hydrographic and hydrologic analysis, cross sections data along Green Creek, Schellingers Creek and one additional tributary channel to analyze the existing tidal conditions in the adjacent wetlands. Up to 30 bio-benchmarks will be collected to establish a range of key elevations at which native

freshwater and tidal vegetative species are thriving so as to incorporate critical elevation data into the preferred alternative design. Installation of semi-permanent monuments will be completed to assist in establishing horizontal and vertical ground control for site that will be used during construction phase of the project.

DELIVERABLE

A survey report will be prepared to provide Cape May County with 24" x 36" sheets at an appropriate scale for the entire project area, and the electronic files in compatible format

Task 2. Hydrology Study

Louis Berger shall conduct hydrodynamic modeling to assess tidal hydrology through the system and will analyze the complex relationship between tidal flow and scouring in the system and will recommend a design that will minimize or prevent system scouring. The methods, analysis, findings and recommendations will be incorporated into a report deliverable. Even though not specifically stated in the RFP, based on Louis Berger experience in modeling similar systems in Cape May, inlets in this area have the potential to be filled with beach sediment cutting off inland marsh areas from tidal circulation. If inlet mouth infilling is not analyzed, any restored marsh will have the potential to be cut off from the ocean tide leading to marsh impairment.

Because the inlet channel to the site is directly exposed to a coastal beach, inlet shoaling may occur. Coastal beach settings specifically pose various challenges as inlets tend to shoal due to the dynamic nature of shorelines. Interaction from the inner bays, estuaries, or wetlands through these inlets adds to the complex hydrodynamics of the system. Therefore, this task needs to coordinate and complement the hydrodynamics of the wetland system and any solution/ analysis thereof. Inlet stabilization is a relatively complex problem that requires detailed analysis of waves, coastal circulation, sediment transport and morphological changes.

Louis Berger hydrodynamic modeling will include inlet stability analysis, inlet channel mouth migration, and impacts that will result with the preferred alternative. All models shall be properly calibrated and validated using measured published tidal and sediment data. Prior to initiating modeling, Louis Berger shall confirm the modeling approach by providing a rationale for the proposed models, citing assumptions, strengths, and weakness of the approach for the Project Team's approval.

In modeling the tidal circulation and sizing the tidal inlets, berms, weirs or other hydraulic structures to predict the potential hydroperiod and maximum water level of three feet NAVD 88 within the restored marsh, Louis Berger recommends employing a two-dimensional hydrodynamic modeling the approach to the design.

The CMS-Flow model is a robust physics-based model of flow, sediment transport, and geomorphic change. CMS-Flow is a product of the Coastal Inlets Research Program (CIRP) at the U.S. Army Corps of Engineers Research and Development Center (ERDC). The proposed modeling shall be an iterative number of model runs by varying proposed marsh surface elevations and refining inlet tidal channel sizes and other structures to predict appropriate marsh wetting and water surface elevation, and the potential effect of drying that a maximum water elevation of three feet NAVD88. The analyses will help to determine the number, location, and dimensions of proposed restored tidal creek channels and other marsh surface features by using channel cross section survey and tide monitoring information gathered from nearby reference marshes. The modeling approach will not specifically address the likely relative SLR impact on the existing marsh since this is not the dominant concern of the project. Should this issue be identified as a more prominent issue by regulatory agencies or the project team, the proposed model could be used to compare the existing marsh conditions and predict normal, annual astronomical, and storm tide events, as well as tide range with predicted SLR, applying the current USACE SLR model projections. The results of the SLR tidal modeling could also be used to predict changes in the existing inlet opening location, dimensions, and stability, including an assessment of whether the increased tidal prism resulting from the project may increase the risk of damage to adjacent properties. The SLR analysis would be considered additional work outside of the proposed scope.

Since dune breaching is a function of tide wind and wave action, Louis Berger will couple the CMS-Flow model with a wave model to analyze dune breaching and inlet channel infilling. One such model is CMS-Wave. CMS-Wave is a spectral wave transformation numerical model that can be incorporated into the CMS-Flow model to provide accurate and reliable representation of wave processes affecting coastal sand dunes and other coastal structures. Like CMS-Flow, CMS-Wave is a product of the Coastal Inlets Research Program (CIRP) at the ERDC. The effect of locally-generated wind can also be significant during wave propagation at inlets.

Louis Berger shall also collect the additional data needed to run CMS-Flow. The additional data includes offshore bathymetry, shoreline sediment classification, wind and wave data. Since one of the objectives of the project is the design of a suitable bay dune, an approximately 1-mile (seaward from vegetated fringe) wide by 3-mile long (along the shoreline) bathymetric survey of the shoreline in the vicinity of the inlet channel shall be developed from available sources and the data included in the hydrodynamic model. Shoreline bathymetry data may include bathymetric data from the NOAA's Coastal Relief Model website. Wind and wave data shall be obtained from the nearest National Oceanic NOAA National Buoy Center (NDBC) or Wave Information Study (WIS) stations, which have historic record of wind and wave data needed

to run the CMS-Wave module. Sediment data shall be obtained from previous investigations by USACE and others.

As discussed above, Louis Berger could incorporate relative sea level rise (SLR) into the modeling and calculate the low, medium, and high rates of relative SLR at the site at five-year intervals up to a period of 50 years from an assumed project start date if the Project Team determined this was a critical issue for the project location. This would be completed as an additional task under a modification to task budget. The team has recently completed this analysis for a similar tidal restoration project in Massachusetts. Louis Berger would use the most recent version of the sea level change projection methodology summarized in USACE Engineer Regulation (ER) 1100-2-8162 (USACE, 2013). Predictions would be incorporated into project plans produced in the subsequent design tasks. Louis Berger would calculate levels for mean low water (MLW), mean high water (MHW), mean high water spring (MHWS), and identified coastal storm events (10-year, 50-year, 100-year) with the sea level rates incorporated to provide the data for a subsequent impact analysis. Louis Berger would also identify design or operations and maintenance measures that could be implemented to minimize adverse consequences of SLR while maximizing ecological beneficial effects. To accompany this task, Louis Berger would prepare a technical memorandum explaining the rationale for this specific model selection, the assumptions, strengths and weaknesses included in this modeling approach, the model inputs, calibration, output runs, and verification including graphics depicting tidal elevations with normal, annual astronomical, tidal flood/surge events, and effects of projected SLR.

DELIVERABLE

The project task deliverable includes a technical report explaining the rationale for model selection, the assumptions included in this modeling approach, the model inputs, calibration, output runs, and verification including graphics depicting tidal elevations with normal, annual astronomical, and tidal flood/surge events. The report will also present the methods, findings, drawings (in NAD83 and NAVD88) and backup material used to evaluate up to three design alternatives, including structural measures (designed under Task 3).

Task 3. Engineering Design of Selected Alternatives

Working with Middle Township, Cape May County, the Cape May County Mosquito Department, NJDEP Coastal Engineering, U.S. Fish and Wildlife Service, Rutgers University, local residents, businesses, commercial/recreational fishing interests, and other various stakeholders, Louis Berger will develop three conceptual alternatives with rough quantities and costs based on data collected in Task 1 and 2. The project scope will be to develop a plan to protect and enhance the tidal estuary portion of the Green Creek Watershed, where

the watershed meets the Delaware Bay. The initiative will plan and design a sturdy sustainable bay dune. The use of non-structural vegetative management and enhancement will be emphasized, but an alternative to the restoration plan could include augmentation by filling or structural means where necessary for the reestablishment of a healthy natural system. Tidal control structures will also be looked at and designed conceptually to maintain the tidal marsh hydrology and prevent flooding from extreme high tide events. The plan and design will result in enhanced estuarine habitat, water quality, storm damage protection and coastal resiliency. Louis Berger will seek to maintain that budget within schematic design and identify items that potentially fall outside that budget during the design process. It is understood that during this phase Louis Berger will study various alternatives, coordinate with stakeholders and gain approval for an initially preferred alternative.

Three conceptual alternatives will be developed with enough information to protect and enhance the tidal estuary portion of the Green Creek Watershed, where the watershed meets the Delaware Bay. The alternatives will aim to demonstrate a natural shoreline stabilization technique that can also increase the wetland system without jeopardizing nearby residents and freshwater habitat. Structural alternatives will also be evaluated when necessary. The project can become a catalyst for engaging stakeholders on identifying and implementing natural shoreline protection measures that take the dynamic nature of our coasts, and the future impacts of sea level rise into account. These designs should depict alternative living shoreline options from which the Project Team and stakeholders will select a final design.

DELIVERABLES

Attendance at a one day charrette and three public meetings; three draft conceptual-level design plan sheets, quantities and cost estimates in excel format. Louis Berger will respond to review comments on the conceptual alternatives and further develop the preferred alternative to reflect input obtained. A permit plan set will also be prepared to support permit applications.

Task 4. Costal Ecology

Proposed activities will require authorizations from several regulatory agencies prior to implementation of onsite activities. The anticipated regulatory approvals and associated regulations that will likely be applicable to implementation of this project are summarized below.

Environmental Assessment

Louis Berger coastal and wetland ecologists, marine biologists, and threatened and endangered species specialists will conduct field studies and agency correspondence (USWS, NMFS, NJDEP Natural Heritage Program) to document potential and known occurrences of federal and state listed special status species within the project area. The field work will include mapping of habitat types, a wetland delineation along potential work areas along the dune and channel areas, an

inventory of flora and fauna, and identification of special and sensitive areas. In addition, our Team will conduct a Phase 1A cultural resource investigation of the project area (which will be required to cover the areas potentially affected by hydrologic changes). Louis Berger staff recently completed a similar study for a tidal marsh restoration project in Cape May and will utilize this data to support this investigation. Louis Berger also assumes a Phase I site contamination screening is not necessary for this project, and that access to property will be coordinated by the county.



Aerial view of proposed project area limit for environmental assessment.

The environmental assessment will derive information that will be essential in the development and evaluation of project alternatives, and in the selection process of a preferred design to advance through permitting. The collected information will be brought into GIS to prepare project mapping that can support discussions with the Cape May County Team, stakeholders and public.

The project ecologist will also use this information to support project design, including developing the species type, quantity and cost for reestablishing the flora on the dune and in the marsh and forest habitats, and setting appropriate timing restrictions to avoid conflicts migratory bird species and breeding birds, and in particular with the horseshoe crabs and shorebird feeding, including the federally listed rufa red knot (*Calidris canutus rufa*).

Permitting

Agency Consultation

Agency consultation with the USACE Philadelphia District, NJDEP Division of Land Use Regulation (DLUR), USFWS, NOAA NMFS, NJDEP DFW, NJDEP HPO, and NJDEP Office of Dredging and Sediment Technology, among others is anticipated. It is anticipated that agency consultation will be conducted throughout the project development and implementation and throughout the regulatory approval process.

Pre-application Meetings

Early in the permitting process, Louis Berger will coordinate with the County and regulatory agencies, including scheduling a pre-application meeting. At the pre-application meeting, designs will be presented and regulatory input solicited with the goal of obtaining preliminary project concurrence. One pre-application meeting is assumed (i.e., a Joint Permit Program meeting); either at NJDEP in Trenton, New Jersey or at the County offices.

The pre-application process will identify specific program policies and the extent of any special studies and/or required application materials that may be required. Regular communication with NJDEP and USACE will occur in an effort to assure that permit application packages are being prepared in accordance with NJDEP and USACE standards, and that the project receives coordinated and timely reviews from regulatory entities.

The pre-application meetings will be conducted prior to development of the permit application documents. A pre-application meeting request package will be prepared and submitted to the agencies prior to the meetings. Following each meeting, a meeting summary report or minutes of the meeting will be prepared and distributed to those in attendance for input and comment. One round of revisions to the meeting minutes is anticipated.

NJDEP Permits

It is anticipated that multiple NJDEP Permits and approvals will be required for the proposed project as described below:

Waterfront Development/CAFRA/Freshwater Wetland GP/Tidal Wetlands 1970/Water Quality Certificate Application

One joint NJDEP coastal permit application document addressing Waterfront Development(WFD)/CAFRA/ Freshwater Wetlands General Permit/Tidal Wetlands 1970/and Water Quality Application will be prepared in accordance with the permit application checklists. Each regulation and its anticipated applicability to this project is presented below. The application will include the DLUR Form, Project Description, Public Notifications, Threatened and Endangered Species information, supporting plans, mapping, analyses and photographs. Louis Berger assumes the County will cover the application fee for this project.

Upon submission of the application, Louis Berger will routinely follow up with the application reviewers to address comments that may arise, in an effort to ensure timely approvals

- Waterfront Development Permit – A NJDEP WFD Permit pursuant to N.J.A.C. 7:7-2.3, is required for all development that occurs in a tidal waterway up to and including the mean high water

line. For development within the CAFRA area (which includes this project), NJDEP must review construction, reconstruction, alteration, expansion or enlargement of structures, excavation, and filling. A WFD Permit application for the proposed project will show compliance with various coastal zone management policies defined in the Rules on Coastal Zone Management, N.J.A.C. 7:7E and information required by the WFD permit application checklist. Pursuant to N.J.A.C. 7:7-4.2, Application Contents, of the Coastal Permit Program Rules, 10 copies of the WFD Permit application and 15 copies of the development plans will be prepared for submittal to the NJDEP unless otherwise agreed to by the NJDEP.

- Coastal Area Facilities Review Act (CAFRA) – The project is located within the CAFRA zone. The CAFRA law regulates development activities, including construction, relocation, and enlargement of buildings and/or structures and all related work, such as excavation, grading, shore protection structures, and site preparation.
- A Freshwater Wetlands Permit, pursuant to N.J.A.C. 7:7A, is required for all development that occurs in freshwater wetlands, which are those areas that occur landward of the upper wetland boundary, and associated transition areas under the regulatory jurisdiction of the NJDEP. Pursuant to 7:7A-5.16, the project is not anticipated to require a freshwater wetlands permit; however, if a project component triggers the need for a freshwater wetlands permit, Louis Berger anticipates that the project will qualify for a General Permit No. 16 for Habitat Creation and Enhancement Activities. The General Permit No. 16 application will be structured to include all items indicated on the Application Checklist and will be incorporated into the WFD Permit application.
- Tidal Wetlands Permit - The Wetlands Act of 1970 requires the NJDEP to regulate development in coastal wetlands. Regulated coastal wetlands are those depicted on tidal wetland mapping prepared by the NJDEP. Coastal wetland maps are used to determine jurisdiction or as in this case, they are depicted as the upper wetland limit boundary using NJDEP GIS data. A coastal wetlands permit is required to excavate, dredge, fill or place a structure on any coastal wetland shown on these maps/GIS mapping.
- Water Quality Certification (WQC) - Section 401 of the CWA requires state issuance (NJDEP) of a WQC for development when such development might have a negative impact on water quality. It also requires certification that the permitted project complies with the state water quality standards for actions within waters of the state. Under Section 401, states must establish Water Quality Standards for all state waters, including the territorial sea. To receive state WQC, a permit applicant must demonstrate that these standards will not be contravened. CWA provisions to which Section 401 WQC applies include Section 404 permits from USACE. Approval of a WQC is a prerequisite of issuance of a USACE permit under

Section 404 of the CWA. Typically, a WQC is issued simultaneously with the wetland permit and ensures that surface and groundwater resources are being protected during construction and operation of the proposed project.

Tidelands

A Tidelands grant, lease, or license is required for areas currently or formerly flowed by the tide. These areas will include tidal streams that presently, or formerly, crossed the subject properties. The streams may still exist or may have previously been filled in. These unclaimed areas are presently delineated and owned by the State of New Jersey (unless previously conveyed to other entities), and must either be purchased or a license to use the properties must be obtained from the State. It is anticipated that a Riparian Grant will not be required since most of the land is under Federal or State ownership.

A request will be made to the NJDEP Bureau of Floodplain Management for copies of the NJDEP Tidelands mapping for the Project Site, as well as mapping that indicates those Tidelands properties that have been previously granted or leased. This information will be shared with the Team upon receipt from NJDEP.

USACE Permits

Tidal wetlands and wetlands contiguous to tidally flowed waterways within the Project Site are regulated by USACE under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899. Specifically, Section 404 (33 CFR Part 323) states that the discharge of dredge material into waters of the U.S. (including wetlands) requires a permit from USACE. For the purpose of this project, discharge would include anything placed below the mean high water line and any impact to existing tidal wetlands and open waters under the regulatory jurisdiction of USACE. Coordination with USACE Philadelphia District will be necessary to determine if a separate Jurisdictional Determination from USACE will be required prior to initiating permitting activities. Past experience indicates that this step is not necessary for projects with low potential impacts. This issue will be addressed at the pre-application meeting with USACE. as part of this task. . A site inspection with USACE personnel is included in this task; however, preparation of a formal jurisdictional determination request is not included.

Louis Berger's approach is to get the proposed project authorized under a USACE Nationwide Permit No. 27 for Wetland and Riparian Restoration and Creation Activities, (also Aquatic Habitat Restoration, Establishment, and Enhancement Activities). An application for USACE Nationwide Permit 27 and a Section 10 permit will be prepared and include a completed Application For Department of the Army Form, description of the project location, site history, and schedule, purpose and need statement, alternatives analysis, summary of existing conditions (geomorphology,

soils, hydrology, uplands, wetlands and open water areas, threatened and endangered species, cultural resources, and hazardous waste screening), summary of proposed impacts; and list of required federal, state, and local permits and approvals, and the permit plans (8.5"x11" and full size).

However, should an individual permit be required for the proposed activities, Louis Berger staff will be prepared to develop and obtain that permit as well under a modified cost

Task 5. Public Meetings

The outreach process culminates in a rollout of the alternatives to the general public. In this stage, Cape May County and the Mosquito Control Department involvement is paramount as the completion of the alternatives represents "ownership" of the selected final plan. Louis Berger will attend three public meetings to present the alternatives and receive feedback, present revised alternatives based on public input and present the final selected alternative for the project area. Louis Berger will provide the project manager, engineer and biologist at all three meetings to answer any questions the public or stakeholders may have.

DELIVERABLES

Attendance at three public meetings; meeting minutes in memorandum format.

PAST SUCCESS

Louis Berger has selected just a few of the many projects for which we have successfully performed wetland restoration design, modeling, public outreach, and permitting. Louis Berger's past success is demonstrated in each project and the staff that has accomplished these challenging projects will be same individuals that would support Cape May County on this project. The Green Creek Tidal Estuary Sustainability project is itself a complex and sensitive project and the project examples here demonstrate that Louis Berger has the staff with the experience required to make this project another success for Cape May County residents and State and Federal partners.

Higbee Beach Wetland Restoration Project, Cape May County, New Jersey

Higbee Beach Wetlands Restoration Project Highlights

- Demonstrates local experience and local knowledge addressing similar technical issues
- Recent, successful baseline studies and concept development
- Established successful working relationship with NJDEP and stakeholders

Louis Berger was contracted by New Jersey Department of Environmental Protection (NJDEP) to implement this multi-phased tidal marsh restoration

and redevelopment project along the Delaware Bay in Cape May County, NJ. The project is implemented through the Office of Natural Resource Restoration (ONRR), which coordinates restoration activities to offset natural resource damage claims and restoration settlements within the state of New Jersey. The project will result in the restoration of several hundred acres of salt marshes within the Pond Creek Salt Marsh, the restoration of approximately 35 acres of maritime forest, and the redevelopment of the former Harbison Walker magnesite plant site. Recreational and educational opportunities will be incorporated into the design.

The principal project goal is to reestablish tidal inundation to a large portion of Pond Creek marsh without increasing the flood risk to the upper watershed or inundating the eastern marsh area, and allowing for habitat management of the northern marsh area. Louis Berger executed the following baseline studies to support the conceptual design development: habitat mapping, wetland delineations, biological benchmark (bio-benchmark) assessment, salinity screenings, reference marsh assessment, fishery resources identification, topographic and bathymetric surveys, and hydrologic, hydraulic, and hydrodynamic modeling. Through an iterative process of defining, modeling, and refining the design through stakeholder input, Louis Berger developed a conceptual plan that includes marsh restoration through inlet modification with a berm to maintain flood protection to the upper watershed and to allow habitat management of the northern marsh area. Louis Berger is currently developing an approach to permit application development and final design, which will include full design of the marsh restoration, berms, and associated water control structures; design of over 35 acres of maritime forest restoration, bridge design to provide access over the restored inlet channel, the design of nature trails, interpretive signage and other recreational features, and preliminary site design of a proposed educational facility or interpretive center within a former manufacturing plant. Additional baseline studies will include: sediment characterization, geotechnical

investigations, cultural resource surveys, habitat evaluations to quantify ecological uplift, ecological risk assessments, and development of a dredging and dewatering program.

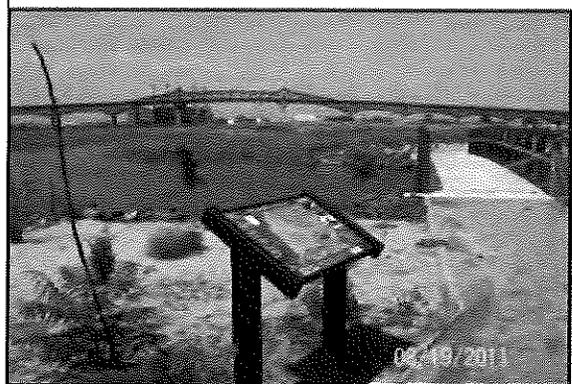
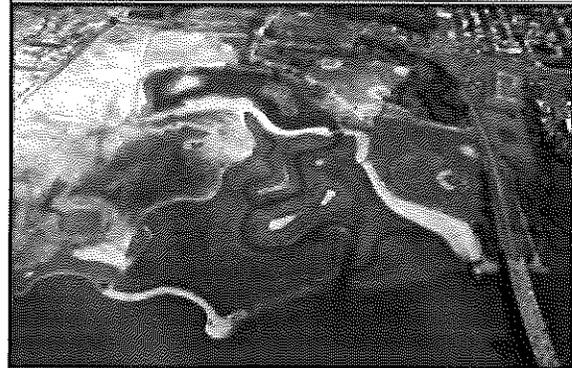
Lincoln Park Wetland Restoration, Jersey City, New Jersey

Lincoln Park Wetland Restoration Project Highlights

- Award Winning and Successful Tidal Marsh Design & Construction project
- Demonstrates experience with tidal system modelling, including design in in-channel control structure
- Close collaboration with NJDEP, NOAA and Essex County

Louis Berger was selected by an Association of NJDEP and NOAA to form part of an innovative program to restore wetlands and redevelop a landfill for active recreational use. This project

restored more than 40 acres of wetlands, tidal streams, salt marsh habitat, and anadromous fish spawning habitat to the Hackensack River. In addition to improving the environment, these efforts will restore fisheries and support more resilient coasts in the face of climate change. Louis Berger conducted environmental sampling and geotechnical investigations in preparation for the conceptual design. Louis Berger then prepared the permit application package that was submitted to obtain regulatory approvals and permits for the project. Louis Berger also developed draft and final design plans and specifications, as well as cost estimates and quantities,



bid packages, and a site specific health and safety plan for the restorative construction of the site.

In February 2009, NOAA received \$167M from the American Recovery and Reinvestment Act (ARRA) of 2009 to restore coastal habitat. With assistance from Louis Berger, NJDEP submitted an application to NOAA requesting funds from ARRA to construct the project. Lincoln Park was one of only 50 projects selected by NOAA to be funded with ARRA funds, receiving the single largest allocation of all the 50 projects: \$10.6M. Since construction start in March 2010, until the completion of all construction activities in September of 2012, Louis Berger provided full-time construction management and oversight and performed post construction monitoring as well as adaptive management for the project until August of 2013. The project received Coastal America's prestigious Coastal Partnership Award for 2011.

Living Shorelines Guidebook for Chesapeake Bay

Living Shorelines Guidebook Project Highlights

- Design manual, including dunes, tidal marsh, and Living Shorelines
- Addresses design, cost and construction process
- Up-to-date design practices

Louis Berger was tasked to provide planning and engineering support services to assist the USACE Baltimore District with the preparation and production of

an updated version of the 1981 USACE technical guide titled "Low Cost Shore Protection...a Guide for Engineers and Contractors."

Since the original version of this document was written, the understanding and implementation of shoreline protection projects has evolved. This was supplemented by the Chesapeake Bay Critical Area Protection Act of 1984 and the enactment of the Living Shoreline Protection Act of 2008. As such, regulatory agencies have rejected some practices that were previously considered acceptable. Developments in the coastal engineering practice enhanced our knowledge and modeling capability, such as major advances in breakwater design, complementing the need to apply practices that are acceptable. The updated document focused on appropriate measures for protecting the shorelines of the Chesapeake Bay, promoting best management practices and the latest engineering technologies. State-of-the-art technologies included those that not only provide stability but also improve coastal habitat, such as living shorelines. Promoted practices also included those that in addition to protecting shorelines also provide some treatment of land-generated stormwater runoff.

Greenbury Point Shoreline Stability Project, Annapolis, Maryland

Greenbury Point Shoreline Stability Project Highlights

- Demonstrate experience assessing multiple shoreline stabilization approaches
- Performed Wave and Shoreline Stability Modelling
- Performed Agency Coordination and Permitting

Louis Berger was contracted by the Naval Facilities Engineering Command (NAVFAC) Washington, Public Works Department Annapolis to develop

design alternatives to stabilize a constructed earthen retaining berm at Greenbury Point, Naval Support Activity Annapolis, Annapolis, Maryland. The project site is located on the west side of Greenbury Point peninsula, near Carr Creek and the mouth of the Severn River in Annapolis, Maryland. An earthen berm lines the western limits of the site. The berm is constructed of soil and fortified with large concrete debris and other disposed of material. Vegetation covers most of the berm where soils are exposed and rubble is not present. The interior of the



project site is largely shallow open water with wetland vegetation located along the perimeter and upland vegetation flanking the outer ring of the area.

The overall objective of the project is to protect the Severn River system from possible contamination. To support the design and permitting of emergency stabilization measures and long-term design solutions, Louis Berger performed the following surveys:

- Sediment Characterization;
- Wave Energy Assessment / Tide Characterization / hydrologic and hydraulic studies;
- Geotechnical / Structural Analysis;
- Bathometric and Planimetric / Topographic Survey;
- Biobenchmark Study;
- Wetland Delineation; and
- Essential Fish Habitat

Historic maps suggest that the project site is a former tidal lagoon. In the 1940's, a berm was constructed and

the site was used as a primary soil repository for dredged materials. Since its original construction, the berm has been reinforced by the placement of large construction debris. Historically, small areas of the berm have failed. Louis Berger has developed two berm rehabilitation alternatives that would achieve NAVFAC's goal of protecting the Severn River system from fill material within the lagoon. The two identified alternatives are as follows.

- Alternative 1: Berm reconstruction with breakwater installation and inter-tidal marsh planting
- Alternative 2: Berm reconstruction with rock-fortified toe of slope

NAVFAC selected alternative 2 to proceed into design. Louis Berger is currently designing alternative 2 using sheet pile as the core of the berm to minimize the freshwater wetland impacts of the constructed berm. The toe of slope along the entire 900-foot length of the berm would require hard armoring in the form of riprap to protect the berm from erosion from wave action. The armoring would consist of rock placed at the toe of slope no greater than 2:1. It is assumed the height of the armoring would not exceed 3 feet.

New Jersey Turnpike Authority Garden State Parkway Interchanges 9, 10, and 11 Improvements Project

NJTA Garden State Parkway Interchange Project Highlights

- Demonstrates experience in complex Joint USACE/NJDEP Coastal Permitting
- Experience Working in Cape May tidal environment
- Experience working with USACE/NJDEP on tidal mitigation

Louis Berger was selected by the New Jersey Turnpike Authority (Authority) to provide engineering and environmental services for the Garden State Parkway (GSP) Interchanges 9,

10 & 11 Improvements Project in the Township of Middle, Cape May County, New Jersey.

The improvements include grade separating the GSP and the local east-west cross streets including on and off-ramps to provide access to the GSP only at certain locations. The overall purpose of the proposed project is to improve safety and to eliminate traffic congestion at the three interchanges through the removal of the existing at-grade signalized intersections and the introduction of grade separation. The three intersections are the only remaining at-grade signalized intersections along the entire length of the GSP.

Louis Berger was retained by the Authority to prepare the Feasibility Assessment, National Environmental Policy Act Environmental Assessment, preliminary design, traffic studies, final design, and federal and state permit applications, including wetland and critical wildlife habitat mitigation. LBG was responsible for obtaining the

following federal permits and approvals for the project: U.S. Army Corps of Engineers (USACE) Jurisdictional Determination and Section 404 of the Clean Water Act/ Section 10 of the Rivers and Harbors Act Individual Permit. Louis Berger was also responsible for obtaining the following permits from the NJ Department of Environmental Protection (NJDEP): Letter of Interpretation – Line verification, Coastal Area Facilities Review Act, Freshwater Wetlands Individual Permit/ Transition Area Waiver, Tidal Wetlands of 1970 Permit, Water Quality Certificate, Flood Hazard Area Control Act Permit, NJ Reforestation Act Compliance, and Tidelands Conveyance. Louis Berger was also responsible for the preparation and approval of an Essential Fish Habitat Assessment by National Marine Fisheries Service.

As part of the permitting effort, Louis Berger developed a Mitigation Plan that provides compensatory mitigation for freshwater and tidal wetland impacts, as well as critical wildlife habitat. The Mitigation Plan includes the purchase of credits from an approved wetland mitigation bank and two additional mitigation sites.

Louis Berger conducted a wetland mitigation site selection study to locate suitable wetland mitigation sites along the project corridor and prepared conceptual wetland mitigation designs for two sites. Baseline studies were conducted at both sites including initial field reconnaissance, hazardous materials screening, cultural resources screening, investigation of existing hydrology, wetland delineations, bio-benchmark surveys, vegetation assessment, among others. Site visits with the regulatory agencies were also conducted. Louis Berger's responsibilities also included: overseeing subcontractors performing topographic and boundary surveys of each site; managing overall project schedule, scope and budget; and designing wetland mitigation site. Assessments.



Round Hill Salt Marsh Restoration Project, Dartmouth, Massachusetts

Round Hill Salt Marsh Restoration Project Highlights

- Demonstrates experience conducting detailed tidal hydrology modelling
- Project issues mirror those of Green Creek system
- Demonstrates success working with multiple stakeholders

On behalf of the National Atmospheric and Oceanic Administration (NOAA) in partnership with the Massachusetts Division of Fish and Game – Division of Ecological

Restoration (DER), the New Bedford Harbor Trustee Council (NBHTC) – which includes NOAA, the U.S. Fish and Wildlife Service (USFWS), and the Massachusetts Executive Office of Energy and Environmental Affairs (EEA), the Massachusetts Department of Environmental Protection (MA DEP), the Town of Dartmouth, and other stakeholders, the Louis Berger Group, Inc. (Louis Berger) developed the Feasibility Study for salt marsh restoration at the Round Hill Tidal Marsh site. The site is situated within a larger Town-owned beach and park property largely comprising historically filled salt marsh. Research to date indicates that this entire wetland area was filled during the early 1900s (pre-1922) to create a private airport and runway system with associated buildings and infrastructure. The Restoration Site appears to have formerly been tidally connected with the Meadows Shore Marsh (to the west) via a main channel that now terminates at an old wooden culvert beneath Ray Peck Drive. Historic map information indicates this tidal wetland was affected by a crossing prior to the mid 1800s. Conceptual restoration design alternatives address various approaches to remove filled wetlands (up to 8 feet of fill) and ensure adequate hydrology within the restoration site. Final design and permitting will take place once an alternative is selected.

Under a separate contract with MA DER, Louis Berger is currently conducting supplemental assessments, preparing engineering design plans and regulatory application materials, and construction bid documents for implementing the Round Hill Tidal Marsh Restoration. Louis Berger used the conceptual full-build design in the feasibility study and in-depth knowledge of the site, to advance the modeling and engineering design of the restoration site and to support the necessary permit applications. Louis Berger integrated pertinent information into the design of a cost-effective and constructable salt marsh restoration project.

Louis Berger applied the CMS-Flow hydrodynamic computer model to simulate the tidal ebbing and flowing at the proposed site. The CMS-Flow model is a physics-based model of flow, sediment transport, and geomorphic change. CMS-Flow is a product of the Coastal Inlets Research Program (CIRP) at the U.S. Army Corps of Engineers Research and Development Center

(ERDC). The CMS model was applied to assess the tidal hydrology of the existing Meadow Shores, the stability of the tidal inlet under both existing and proposed conditions, storm tide flooding and groundwater impacts to the neighboring Round Hill Community properties and freshwater wetland adjacent to the site. As part of this design phase, Louis Berger prepared a Basis for Design report that incorporates results of the modeling and geotechnical tasks, and explains the rationale behind the major project components, including proposed marsh elevations, size, and dimensions of the proposed structure, tidal channels, berms, etc.

The modeling approach also addressed the relative SLR impact on the existing marsh and adjacent properties and freshwater wetlands. The model compared existing marsh conditions and predicted normal, annual astronomical, and storm tide events, as well as tide range with predicted SLR, applying the current USACE SLR model projections. The results of the SLR tidal modeling were used to predict changes in the existing inlet opening location, dimensions, and stability, including an assessment of whether the increased tidal prism resulting from the project may increase the risk of damage to adjacent properties.

PROJECT MANAGEMENT AND SCHEDULING

Project Management Approach and QA/QC Plan

Close adherence and review of project controls is important to achieve the financial and institutional goals of the project. The trio of project schedule, budget, and progress reporting are the primary tools for monitoring the financial status and progress of a project. Louis Berger produces weekly status reports that include metrics on labor, expenses, subcontractor costs that track the current status of a budget on a task by task basis. These reports allow the team to track the progress of a project proactively and adjust levels of staffing, subcontractor involvement or effort as needed. Also, the monthly invoices track and compare the man-hours and cost expended versus the "percent complete" per task. Subconsultants are also required to provide similar information to demonstrate their progress versus their expenditures for every invoice period. Narrative descriptions of all tasks completed are also provided to justify the reported activity for each task. These reports are normally prepared for our clients and will be provided to allow for continuous tracking of this project.

Louis Berger also utilizes SharePoint as a secure place to store, organize, share, and access project information with project teams, which includes clients, so that current project information is readily available to the Team.

Quality assurance (QA) is defined as the overall system of activities for assuring the quality of data produced.

Quality control (QC) is the on-going program to ensure performance to pre-determined specifications. QA goals will be achieved through proper planning, organization, technical and administrative reviews, communication of objectives, auditing, reporting, and corrective action. Peg McBrien, PE, PWS will be accountable to ensure that QA/QC is adequately incorporated in to the project and that CFE is getting exceptional quality client service. Ms. McBrien will work with Jen Brunton, PE, proposed project manager, and will assign the appropriate technical advisors/experts to fulfill the requirements of Louis Berger's QA/QC Process.

As the project manager, Ms. Brunton will serve as the focal point for all technical, administrative, and contractual management aspects of the project. She will be the primary liaison with Cape May County on all matters pertaining to the progress and performance of work and will have full management authority over all personnel assigned to the Louis Berger Team. Her previous history in delivering successful restoration projects provides the County with a knowledgeable and well-rounded Project Manager supported by additional multidisciplinary experts.

SCHEDULE

A proposed project schedule depicting the expected start and completion of tasks is provided below. The Louis Berger Team will work with Cape May County to optimize the schedule and work to complete each task efficiently and ahead of schedule.

TASKS	2015		2016				2017
	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Anticipated Notice to Proceed - September 1, 2015							
Task 1- Surveying Deliverables: Survey							
Task A – Collect Existing Information from client	■						
Task B– Initiate Survey Task for Project	■	■					
Task C - Collect survey Information and develop survey plans & Report			■				
Task 2. Hydrology: Deliverable: Hydrology Report							
Task A – Collect H&H Requirements for project	■	■					
Task B – Perform H & H Modeling for the task			■	■			
Task C – Develop H&H report for conceptual designs					■		
Task 3. Engineering: Deliverables: Engineering Design of Selected Alternatives							
Task A – Initiate Design for project				■			
Task B– Develop three conceptual design alternatives				■	■		
Task C– Narrow down to preferred alternative					■		
Task D– Develop plans & cost estimate for preferred alternative						■	
Task E– Initiate permit plan development							■
Task 4. Coastal Ecologist: Deliverables: Permits							
Task A - Complete Environmental Assessment		■	■	■			
Task B – Initiate permit discussions with regulatory agencies					■		
Task C–Develop draft permit documents & Planting plans, quantities, and cost estimates.				■	■	■	
Task D – Finalize permits applications and processing of permit applications						■	
Task E – Coordination with agencies on permits, seasonal restrictions, etc.							■
Task 5. Public Meetings: Deliverable: Meeting minutes							
Task A – Attend Three Public Meetings					■	■	■

NOTES: Q1: January-March ; Q2: April -June; Q3: July-September; Q4: October-December of Calendar year