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April 11, 2022

Jennifer Nelson, Executive Director
Captiva Erosion Prevention District
11513 Andy Rosse Lane, Unit 4
Captiva, FL 33924

Re: Proposal for Resiliency, Adaptation and Recovery Strategy & Implementation

Dear Jennifer:

This letter is in response to your request for a proposal for Aptim Coastal Planning & Engineering, LLC (APTIM) to assist the Captiva Erosion Prevention District (CEPD) with the evaluation of sea level rise adaptation strategies, formation of an implementation plan and development of documentation to support funding requests, permitting and implementation of a priority adaptation project.

Background

Initiating adaptation projects is becoming increasingly pertinent as sea level rise accelerates. The anticipated rise in mean sea level from 2020 to 2070 is approximately 2.7 feet, based on the Intermediate High Scenario provided by the National Oceanic and Atmospheric Administration. This is the scenario that is aligned with recent observed sea level data over the past 10 years. One of the early consequences of sea level rise is tidal flooding. During the fall season, high tides rise to levels more than one foot higher than the rest of the year, resulting in flow of saltwater over banks and seawalls into neighborhoods and across roads and drainage systems. Since 1993, tidal flooding has been observed one to ten days annually. As sea level rises, the number of days when saltwater will cause flooding will increase to over 226 days by year 2060 if no barriers or adaptation projects are constructed (NOAA, 2018). Additionally, storm surge elevations will increase, potentially impacting areas further inland. Expected annual losses on Captiva Island are estimated at \$483,000 primarily due to flooding and based on building values according to the National Risk Index provided by Federal Emergency Management Association.

The 2020 Captiva Island Resiliency Assessment identified roads, stormwater infrastructure, recreational facilities, and structures potentially at risk to tidal flooding or inundation. Comparing the amount of infrastructure at risk with 2 feet of change in mean higher high water versus 4 feet of change indicates there is a significant tipping point between these two scenarios and under planning or investing could lead to avoidable loss. To optimize the return of investment of capital projects implemented as sea level rises, an adaptation strategy consisting of alternative pathways or sequences of progressive actions triggered by changing conditions is proposed.

How to Address Sea Level Rise and Mitigate Risk through Adaptation

Building coastal resilience requires a combination of future conditions policy development, master planning and asset management, and design and implementation of shoreline and flood protection projects and energy reliability and resilience projects. Future conditions policy and plans should address resilience standards, operational changes and elevation requirements for tidal flood barriers, drainage systems and structures based on increased rainfall, sea level rise and saltwater intrusion. Shoreline protection including beach renourishment, seawalls and bulkheads and nature-based solutions is



necessary to reduce sheet flow of flood waters into neighborhoods. Enhanced stormwater and pumping systems are necessary to address seepage, increased rainfall flooding and address water quality concerns. Saltwater intrusion of septic or contaminated areas poses new risks and challenges for remediation. The severity of sea level rise impacts is dependent upon the emissions mitigation and prompts the need for investment by coastal communities in clean energy and electrification.

APTIM will apply its institutional knowledge of best practices in resilience planning and direct experience in engineering design, construction, and capital project management to develop a comprehensive resilience strategy to mitigate risk in phases based on funding availability, priority needs and return on investment. The resilience strategy will include adaptation measures for changing environmental conditions including flooding, winter storms, heat, and hurricanes, for socioeconomic risks including property value reductions, tax base loss, disruptions to sales, jobs, supplies and businesses and for aging infrastructure supporting water resource management, transportation, and utilities. Based on Captiva Island's resilience goals and strategy, a resilience program will be implemented to coordinate regional support for mitigation projects across jurisdictions, track overall improvement in the community's resilience over time, and incorporate feedback as the program evolves.

Strategic elements of adaptation include

1. Establishing thresholds for when regional solutions may be necessary to address inadequacies in individual/ property-scale adaptation efforts.
2. Developing and vetting a prioritized list of adaptation strategies that combine engineering protection measures, policy initiatives, and land use management strategies. Different solutions may suit different property types and a menu of strategies may be necessary to allow some flexibility in implementation.
3. A return on investment analysis will be based on estimated project costs and the averted damage and maintenance costs associated with the assessed sea level rise impacts. This effort simplifies and justifies decision making for passive or active investment.
4. Planning and bundling capital projects to provide site-specific or full protection and organizing shovel ready projects that address urgent problems, existing priorities, compliance requirements and are sequenced based on anticipated funding sources and investments made by regional stakeholders and owners.
5. Planning funding strategies and managing capital and grant programs.

The Benefits of Proactive Investment

Planning now for future water levels benefits local governments and property owners in multiple ways. First, it is prudent to budget for the necessary adaptation before impacts to property values or infrastructure occur. Also, coastal flood protection measures that do not consider sea-level rise will likely require premature reinvestment to replace failed infrastructure at a significant expense to the property owner and the community at large. Property owners who ensure their coastal flood protection project is designed to meet the resiliency standard will be better positioned to protect their property and investment and limit exposure to increasing flood insurance premiums.

Timely adaptation may also reduce the level of required investment in surface water management infrastructure (pumps) for areas that will be below sea level in the future. Proactive investments and strategic efforts are likely to improve eligibility for federal and state funding and support maintenance of bond ratings.



Scope of Work

APTIM proposes the following scope of work for the evaluation of adaptation strategies which includes the following components:

2a. Evaluation of Alternatives: A range of adaptation strategies will be evaluated based on previous analyses, existing data and coordination with the CEPD. Adaptation strategies will address tidal flooding and high frequency surge events, potential overwash along the low-lying Gulf of Mexico and bayfront shorelines, sea level rise inundation and future drainage restrictions associated with sea level rise and future environmental conditions. If feasible, adaptation strategies will be developed to derive co-benefits for community resilience including water quality improvements. Adaptation action areas will be identified for planning purposes and for inclusion in county and municipal policy and land use plan elements. Adaptation strategies to be evaluated will include projects with benefits to areas under CEPD jurisdiction and private property to build holistic resilience and program sustainability. It is acknowledged CEPD's role in implementation may vary depending on property ownership; however, it is assumed CEPD will continue to serve as a steward of the island and advocate for various coordinated resilience projects. This evaluation of alternatives will provide reference and justification for CEPD's decision-making process.

Available and collected data, cost estimates and a return-on-investment analysis will support the comprehensive evaluation of adaptation strategies as described below.

2a.1. Costs of various adaptation strategies will be estimated based on libraries developed as part of the U.S. Army Corps of Engineers South Atlantic Coastal Study or recent project costs.

2a.2. A return-on-investment analysis will be based on estimated project costs and the averted damage and maintenance costs associated with the assessed sea level rise impacts. This information will be developed in a manner that will support the benefit cost analysis sections of (future) federal mitigation funding and resiliency grant applications (by others). Return on investment analyses will focus on gross costs and benefits necessary to support planning efforts.

2b. Strategy Development: APTIM will develop a draft prioritized list of adaptation strategies that combine engineering protection measures, policy initiatives, and land use management strategies. These strategies will be presented to the CEPD and public in one workshop. Direction and feedback will be incorporated into the strategies to ensure fit with the goals of the jurisdictional authorities and stakeholder community. Through discussion, water level elevation thresholds will be established for when regional solutions may be necessary to address inadequacies in individual/ property-scale adaptation efforts.

APTIM will refine the draft strategies based on input above into final strategies. APTIM will prepare a presentation and attend one workshop to transfer the final adaptation strategies to the public and the CEPD.

Short- and medium-term resilient capital improvement plans will be developed based on conceptual design of recommended adaptation strategies, the optimized sequencing of measures and anticipated funding sources. For example, adaptation strategies for areas at risk of inundation under 2-year extreme water levels would be integrated into a 5-year capital improvement plan. Similarly, strategies for adaptation to flooding that could occur under 5-year extreme water levels would be integrated into a 10-year capital improvement plan.



The Resiliency, Adaptation and Recovery Strategy & Implementation Plan will be developed. The plan will serve to address vulnerabilities assessed in the CEPD's jurisdictional area, support the advancement of resilience policy and standards by the regional and local jurisdictional partners and provide a clear implementation plan for phased adaptation or post-disaster recovery projects. The implementation plan will outline a process for the CEPD to move their plan into action. The plan will identify costs and preliminary design features of the preferred adaptation strategies. The plan will determine sequencing and funding of short- and long-term measures. Visuals will be developed illustrating adaptation action areas and their sequence of adaptation and the decrease in risk after adaptation. Additional public engagement and CEPD support will be provided to educate them on strategy and implementation and to garner support for resilience initiatives and adoption of the plan. Up to two virtual public meetings will be organized and hosted. An additional in person presentation to the CEPD will be provided.

During this phase, APTIM will also coordinate with County, State, and Federal resource protection agencies to schedule a meeting to overview work to date. The purpose of this meeting will be to describe design decisions that the CEPD reached in formulating the proposed project. Goals of this meeting are to obtain agency input on the proposed designs and identify any potential data needs or concerns.

2c. Project Performance Modeling: APTIM will perform hydrodynamic modeling using DELFT3D+SWAN to evaluate the performance of five (5) select adaptation project alternatives and their benefits and impacts on adjacent upland, shorelines and wetlands. APTIM will utilize its previous calibrated model as a framework for the study. Model results will assist in the refinement of strategy, provide additional detail related to the risks of future high frequency flooding, provide justification for funding applications and partnerships and support the permitting process for initial adaptation projects. Simulations will include future flood scenarios based on water levels representing annual tidal flooding event and a 10 year storm surge scenario in the future under the NOAA Intermediate High scenario (or alternative scenario). A report documenting the model setup, scenario development and results will be delivered.

2d. Adaptation Project Permitting: APTIM will submit a request for permit to the FDEP and USACE for the priority adaptation strategy or up to three (3) individual projects. The request will utilize information delivered from the modeling task to support the proposed design. APTIM will prepare a design summary that will supplement previously developed reports. The design methodology for the selected alternatives will also be documented in the engineering summary for use in permitting. Along with the engineering summary, APTIM will prepare a project and construction description, project schedule, impact analysis, and other required engineering documents and drawings for the permit application. Biologists will review and compile environmental data that may be requested by the FDEP and USACE. No new field work is proposed under this task. Environmental sections of the permit applications, including threatened and protected species present, existing natural communities, wildlife within the area, and biological resources, etc., will be prepared by a qualified biologist. Additionally, existing geology information and cultural resources will be assembled and provided in support of permitting. APTIM will assemble the request, permit sketches, supporting documentation from related reports, and provide it to the agencies. APTIM will respond to one request for additional information from the agencies. A benefit cost assessment will be prepared per FEMA guidelines for the selected project.

Assumptions

Adaptation strategies to be evaluated will include projects with benefits to areas under CEPD jurisdiction and private property to build holistic resilience and program sustainability.

Existing and publicly available information plus deliverables from this scope will be sufficient for permitting requirements.



No new survey, geotechnical, or environmental field work is proposed herein. If additional field work is required, it will be proposed under a separate scope of work.

Fee Proposal

The proposed work will be performed by APTIM as a Task Order under the terms and conditions of our Master Services Agreement dated October 17, 2012, (the "Agreement") (Exhibit A). The work proposed herein will be performed on a lump sum basis as detailed in Exhibit B for a not-to-exceed (NTE) cost of \$XXX,xxx. Although this proposal is detailed by separable items and estimated by specific staff and categories, staff of APTIM will be used as needed to support the CEPD up to the NTE amount.

If you have any questions, please feel free to call or email. Thank you for the opportunity to serve the CEPD.

Sincerely,

Nicole S. Sharp, P.E.
Coastal Restoration & Modeling Program Manager
Aptim Coastal Planning & Engineering, LLC

CLIENT: Captiva Erosion Prevention District
Acknowledgement and Acceptance

cc: Samantha Danchuk, PhD, PE, APTIM

Authorized Representative Signature

Printed Name

Title

Date

DRAFT