TETRA TECH

Proposal for RFQ-065-24-JJ

Floodplain Management Plan Update

City of Hollywood, Florida

Leading with Science®

April 2024

Cover Letter

Alicia Verea-Feria
Floodplain Development Review Administrator
2600 Hollywood Blvd., Room 308
Hollywood, FL 33020

April 10, 2024

SUBJECT: 2025 Floodplain Management Plan Update (RFQ-065-24-JJ)

Dear Ms. Verea-Feria and Members of the Evaluation Committee,

Tetra Tech Inc. appreciates the opportunity to submit this proposal describing our capabilities to support the City of Hollywood's Floodplain Management Plan (FMP) Update. As a leader in developing innovative planning, engineering, and risk modeling, we feel confident that our proposed project approach and methodology will exceed the City's expectations and meet Community Rating System (CRS) credit criteria for the required CRS elements update.

We have demonstrated our effectiveness in working directly with municipalities and the Federal Emergency Management Agency (FEMA) to develop FMPs, RLAAs, and NFPs associated with the National Flood Insurance Program's (NFIP) CRS. This work has included supporting Roseville, CA (CRS Class 1); King County, WA (CRS Class 2), and Pierce County, WA (CRS Class 3). We believe this experience, coupled with our long history with the City makes us uniquely prepared to support the FMP update.

Tetra Tech will implement the recently updated *FEMA Local Mitigation Planning Policy Guide (OMB 1660-0062)* effective April 19, 2023, related to the 6-local planning requirements. CRS credit criteria standards will follow the *National Flood Insurance Program/Community Rating System 2017 Coordinators' Manual (OMB 1660-0022)* and the *National Flood Insurance Program/Community Rating System 2021 Addendum*. Our familiarity with FEMA's standards, in general, has allowed Tetra Tech to create plans that provide multiple tangible benefits for our clients.

Our project management team will manage the necessary resources to meet and exceed the needs encountered throughout this process. It is no exaggeration to say that our experience with the NFIP CRS program within other municipalities, detailed herein, is unrivaled by our peers. This experience provides our Tetra Tech team a unique advantage over our competitors in that we already have key components of this project ready to support the plan update process.

Our approach is detailed in the attached submittal. We feel confident that our proposed project approach and methodology will exceed the City's expectations. Tetra Tech follows a 7-phase process modeled after FEMA's CRS 10-step planning process. Our familiarity with this process and the CRS program, in general, has allowed Tetra Tech to create plans that provide multiple tangible benefits for our clients. We appreciate the opportunity to provide this proposal to you. Please reach out to our Project and Contracts Management Team at EMRR.Contracts@TetraTech.com should you have any questions or need additional information on our submission.

Sincerely,
Tetra Tech, Inc.

Jonathan Burgiel
Business Unit President

A. Table of Contents

B. Executive Summary

Tetra Tech, Inc. (Tetra Tech) is a leading, global provider of consulting and engineering services. Differentiated by Leading with Science®, Tetra Tech provides innovative technical solutions to support projects focused on water, environment, infrastructure, resource management, energy, and international development. With more than 28,000 associates in 550 offices worldwide, Tetra Tech provides clear solutions to complex problems. Our expertise spans the continuum of resiliency – helping communities prepare for, withstand, respond to, and adapt to climate change.

Why Choose Tetra Tech?

Tetra Tech has been serving the City of Hollywood for two decades including work on the City's major water, wastewater, and stormwater infrastructure projects. We have completed projects to provide resiliency for the City's stormwater pump stations and are working with the City on the Stormwater Master Plan. We look forward to expanding our support and bringing our professional team and experience to update the City's Floodplain Management Plan (FMP).

THE TETRA TECH ADVANTAGE

- Florida based project manager Georgia Vince
- Project team includes Lori Lehr, CFM the CRS Committee Chair for the Florida Floodplain Managers Association
- Existing relationships with City stakeholders and continuity in project staff
- Data gathering already underway through Resilient Florida Vulnerability Assessment work
- Developed plans earned an average CRS Activity 510 score of 318 points, compared to the nationwide average of 129 points.

Leveraging Data to Gain Efficiency

Tetra Tech is currently assisting the City with grant identification, applications, and compliance and can seamlessly help to meet the Resilient Florida grant requirements and is currently completing the City's Vulnerability Assessment. With this active work, Tetra Tech is able to leverage existing models, data, and relationships to streamline the FMP update process.

Our partnership with **the City of Hollywood**...

- Comply with CRS Activity 510 requirements
- Increase community resilience to climate change
- Work to improve CRS category to provide savings to property owners
- Prevent future losses

Tetra Tech consistently delivers **customized and approvable FMP**s for its clients and ensures that they comply with current state and federal guidelines, while incorporating industries best practices.

Knowing that CRS is an essential priority for the City, Tetra Tech's planning process incorporates strategies for complying with Activity 510 requirements to get the City CRS points.

...will deliver a **best-in-class** FMP update.

Dedicated Project Team

Our team for this project has been selected due to their comprehensive knowledge of floodplain management, the CRS program, and previous history working with the City. Key staff members include:

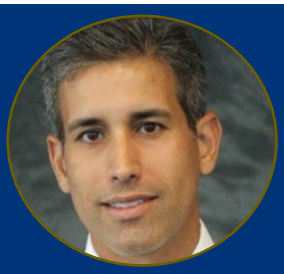
Tony Subbio, MS, CEM, CFM, PMP
Project Principal

Georgia Vince, BS
Project Manager

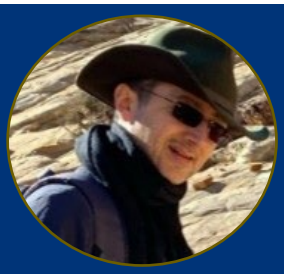
Lori Lehr, CFM
Subject Matter Expert

Melissa Mitchell, CFM
Lead Planner

Emma Kilkelly, MS, AICP
Planner



Ken Caban, MS, PE, LEED® AP
Engineer



Steve Parker, MA
GIS

Proven Success across 300 Plans

The City of Hollywood seeks a trusted partner to support the update of its Floodplain Management Plan to achieve credit under CRS Activity 510. With an average 510 Credit of 226 points across the State of Florida as of April 2024, Tetra Tech's track record of 318 points on average for our applicable plans demonstrates our ability to help the City maximize 510 Credit.

300
Plans Prepared

Tetra Tech has prepared 300 FEMA-compliant local Hazard Mitigation Plans (HMP) and Floodplain Management Plans (FMPs).

Resulting in

318
Points on Average

Our applicable plans earned an average CRS Activity 510 score of 318 points, compared to the **nationwide average of 129 points.**

C. Firm Qualifications and Experience

Response to Minimum Qualifications (4.2 of RFQ)

a) Company Profile

Tetra Tech. is a California-based and nationally recognized engineering and resource management firm of more than 28,000 engineers, scientists, emergency managers, and technical support personnel in over 550 offices in more than 100 countries on 7 continents. **Tetra Tech has the resources of a multi-billion-dollar company and can move at the speed of a 20-person office.**

Tetra Tech is a leading provider of specialized consulting engineering and management services. Our services include complete water resource management; risk and vulnerability assessments; threat and hazards focused planning; regulatory approvals; process, civil, structural, electrical, and mechanical engineering; and environmental services for State and Federal Agencies, municipalities, public and private sector water, wastewater, flood control, and transportation agencies as well as residential, commercial, and industrial developers. **We have been rated 1st in the "Water" category for 20 years in a row as** well as the "Environmental Management" category, and 4th among the "Top 500" design firms nationwide.

Our understanding of the multidisciplinary nature of many projects allows Tetra Tech to develop creative and cost-effective analyses, alternatives, and designs that address the site-specific concerns unique to each project. We apply innovative technology and sound engineering discipline to meet the infrastructure needs essential to our daily life.

Subcontracting Partner – Lori Lehr achieved her certification as a Certified Floodplain Manager (CFM) by the Association of State Floodplain Managers, Inc. in 2000 and has been involved in the floodplain management industry since that time. She started in the City of St. Petersburg serving as the floodplain administrator, building permit construction reviewer, and acting as a liaison between the city and FEMA. She has over 8 years of specific experience as a Community Rating System (CRS) Specialist working with Insurance Services Office (ISO). She is well-versed in all iterations of the CRS Manual and in implementation of the manuals under the most current CRS guidelines. While working with ISO, she submitted over 120 CRS verification files to FEMA, many of which resulted in a CRS class improvement for those communities. She also recertified over 80 communities in the CRS program on an annual basis. She has extensive knowledge and experience with CRS audits and verification processes that can assist communities in reaching their CRS goals.

In 2015, Lori Lehr started Lori Lehr Inc., and as a consultant, she assisted numerous communities in Florida to make applications to the CRS program as well as to achieve CRS class improvements and maintain their CRS programs annually. In addition to having over 20 years of experience in nearly all iterations of the CRS program, she is well-versed in assisting communities to achieve and maintain compliance with the National Flood Insurance Program.

Company Experience

For over thirty years, Tetra Tech has worked with communities to develop plans and strategies for floodplain management, stormwater planning, hazard mitigation, land use, and resilience planning. We regularly support

our clients with not only preparing for the hazards and concerns of today but also looking at how climate changes may impact those hazards in 20, 50 and 70 years. Our goal is to help jurisdictions evolve into vibrant, resilient communities able to address local planning challenges of today and the future.

While Tetra Tech is uniquely experienced and has a highly qualified team to support this work, we are first and foremost committed to listening to the input of stakeholders, bringing forth local knowledge and expertise from within the community, applying what we learn in planning, and providing focused technical support as needed. We have extensive experience bringing together diverse stakeholder groups, and finding ways to present complex concepts in ways that allow elected officials to make policy decisions, while also allowing members of the public to understand their risks and become a part of a more resilient community.

Years of Experience with Governmental Entities in Florida

A registered corporation in Florida, Tetra Tech serves over 50 public entities under continuing services contracts. **Tetra Tech has provided these services to clients in Florida since 1975**. It is our core belief that our professionals serve as an extension of our client's staff. We place a large emphasis on serving the specific project needs and tasks of the City of Hollywood while maintaining and updating an in-depth knowledge of the City's various systems.

The City of Hollywood has been a very important client to Tetra Tech for over a decade. We have completed multiple project phases to the City's satisfaction. We are proud of this relationship, including our most recent work supporting the City's Vulnerability Assessment for Resilient Florida, and look forward to building on that effort to support the FMP Update.

Location of Offices

Tetra Tech has 22 locations within the State of Florida. Our Maitland, FL, office will be the primary office servicing the County for this contract. Our other offices in Florida, including offices in Hialeah and Miami, will be available to provide additional resources and assistance to the City as necessary.

Exhibit 1: Tetra Tech Florida Office Locations

Number of Employees

Tetra Tech employs more than **28,000 associates around the world, including more than 1,000 in the State of Florida.** Serving a diverse base of public and private sector clients, Tetra Tech's company-wide professional staff represents numerous scientific, engineering, surveying, construction management, and professional services disciplines.

b) Years of Experience Providing Services with Other Governmental Entities in Florida

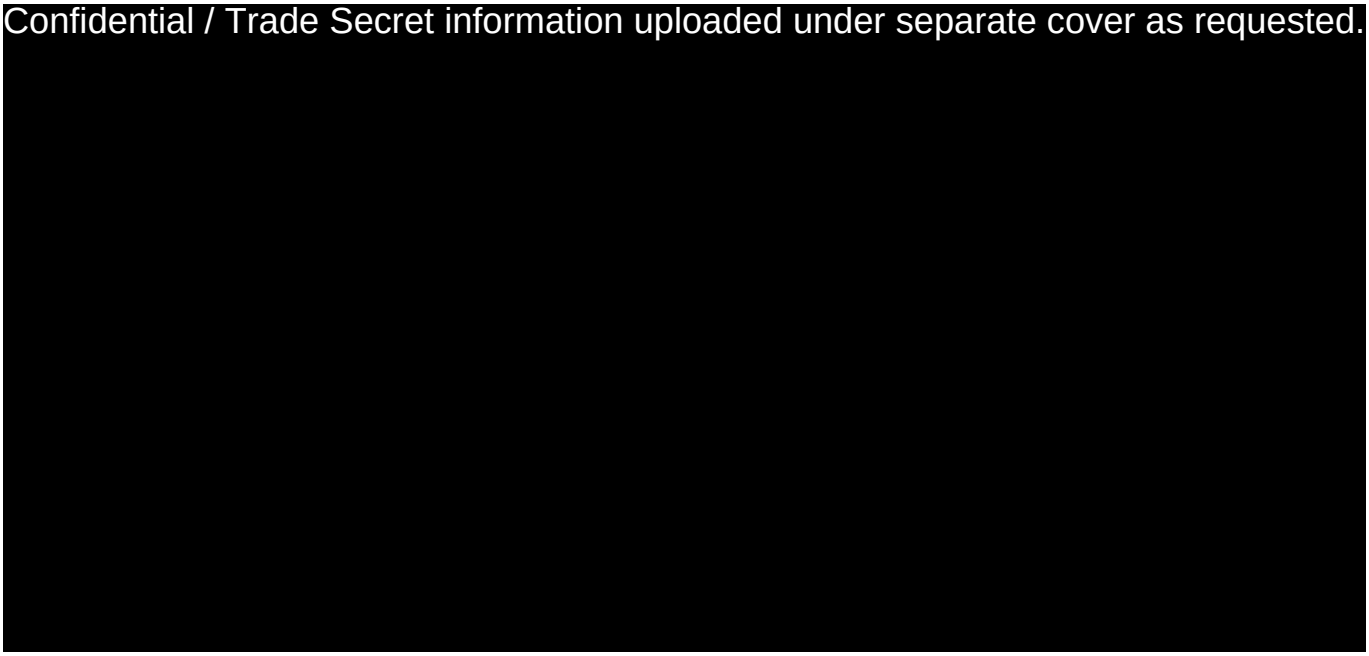
As mentioned above, Tetra Tech has been **working with Florida-based clients since 1975.** This almost 50-year history of working with Florida-based clients provides our teams with a unique understanding of the risks and hazards across the State, but also the progress agencies across the State have made in addressing high-consequence threats including flooding.

c) Recent Florida Clients

Tetra Tech has supported **more than 38,000 projects in Florida throughout the last five years.** The table below provides a list of Tetra Tech's Florida clients for related services within the past five years. Information about our other clients, including disaster response, engineering support, environmental services, and more, is available upon request.

Exhibit 2: Florida-Based Clients 2019 – 2024

Confidential / Trade Secret information uploaded under separate cover as requested.



CONFIDENTIAL / TRADE SECRET
(Section 812.081(f), Florida Statutes)

d) List of Licenses

Tetra Tech is licensed in the City of Hollywood (Account Registration B9068595-2024), the State of Florida (Sunbiz Entity P19034), and holds several active licenses and certifications required for our work in the State, including:

- Architect | AR95915
- Professional Geologist | PG2806
- Continuing Education Provider | 818
- Certified General Contractor | CGC062759
- Engineering Business Registry | 2429

In addition to our corporate licenses, Tetra Tech staff also hold individual licenses and certifications relevant to the scope of work, including Geographic Information Systems Professional (GISP), Professional Engineer (PE), Certified Floodplain Manager (CFM), and more. See page 9 for more information about the proposed team.

e) Summary of Floodplain Management Planning Experience and Projects

Floodplain Management Planning

Tetra Tech is a national leader in providing program management and technical support to communities seeking to maximize their Community Rating System (CRS) potential and consequently reduce their residential and commercial National Flood Insurance Program (NFIP)premium rates. Our team has extensive experience in the field of floodplain management; we helped four of the five highest-rated CRS jurisdictions in the nation to achieve their remarkable status. Tetra Tech has helped over 40 CRS communities enhance their ratings, with notable achievements like Roseville, CA achieving Class 1 and King County, WA as Class 2, and Pierce County, WA as Class 3. We've also prepared 300 FEMA-compliant local HMPs with an average CRS Activity 510 score of 318 points, compared to the nationwide average of 171 points.

Community Rating System Experience

Tetra Tech is a national leader in technical support to help communities join FEMA's CRS program, maintain, and/or increase their ranking to maximize their potential. Tetra Tech's depth of understanding of the Disaster Mitigation Act of 2000, NFIP, CRS program, and local floodplain management allows us to develop and conduct a planning process that supports these programs, promotes participation, and increases the benefits to local program administrators and policyholders. Tetra Tech has worked with counties and communities across the country to help them succeed in the CRS program, including developing local floodplain management plans, hazard mitigation plans, and repetitive loss area analysis that meet CRS credit criteria.

Maximizing the CRS credit potential for those jurisdictions participating or considering participation in the CRS program is an added value of the Tetra Tech technical approach. Our standard approach evolved from the CRS ten-step planning process. Tetra Tech is a national leader in providing technical support to communities wishing to maximize their CRS potential resulting in a reduction, by the maximum percentage possible, in their residential and commercial NFIP flood insurance premium rates. The table below illustrates how plans developed by Tetra Tech have scored under the CRS program.

Tetra Tech an extensive understanding of the CRS credit criteria requirements between CRS Activity 510-Floodplain Management Plan and Repetitive Loss Area Analysis to Category B and Category C CRS Communities.

Exhibit 3: CRS Points Tetra Tech's FMPs and HMPs Earned

Client	Points Earned	Client	Points Earned
Cape May County, New Jersey	295	Town of Shandaken, New York	393*
Contra Costa County, California	256	City of Portland, Oregon	327
City of Los Angeles, California	426*	Harris County, Texas	315
Los Angeles County, California	466*	King County, Washington	289
City of Roseville, California	305	Pierce County, Washington	255
Ada County, Idaho	257	Snoqualmie, Washington	287
Brick Township, New Jersey	320	Thurston County, Washington	307
City of Long Beach, New York	340	Town of Shandaken, New York	393*

** Plan included a Repetitive Loss Area Analysis (RLAA) component that scored extra points.*

+ The 2017 Monroe County HMP earned 236 points for the Town of Greece, Monroe County's only CRS-participating municipality.

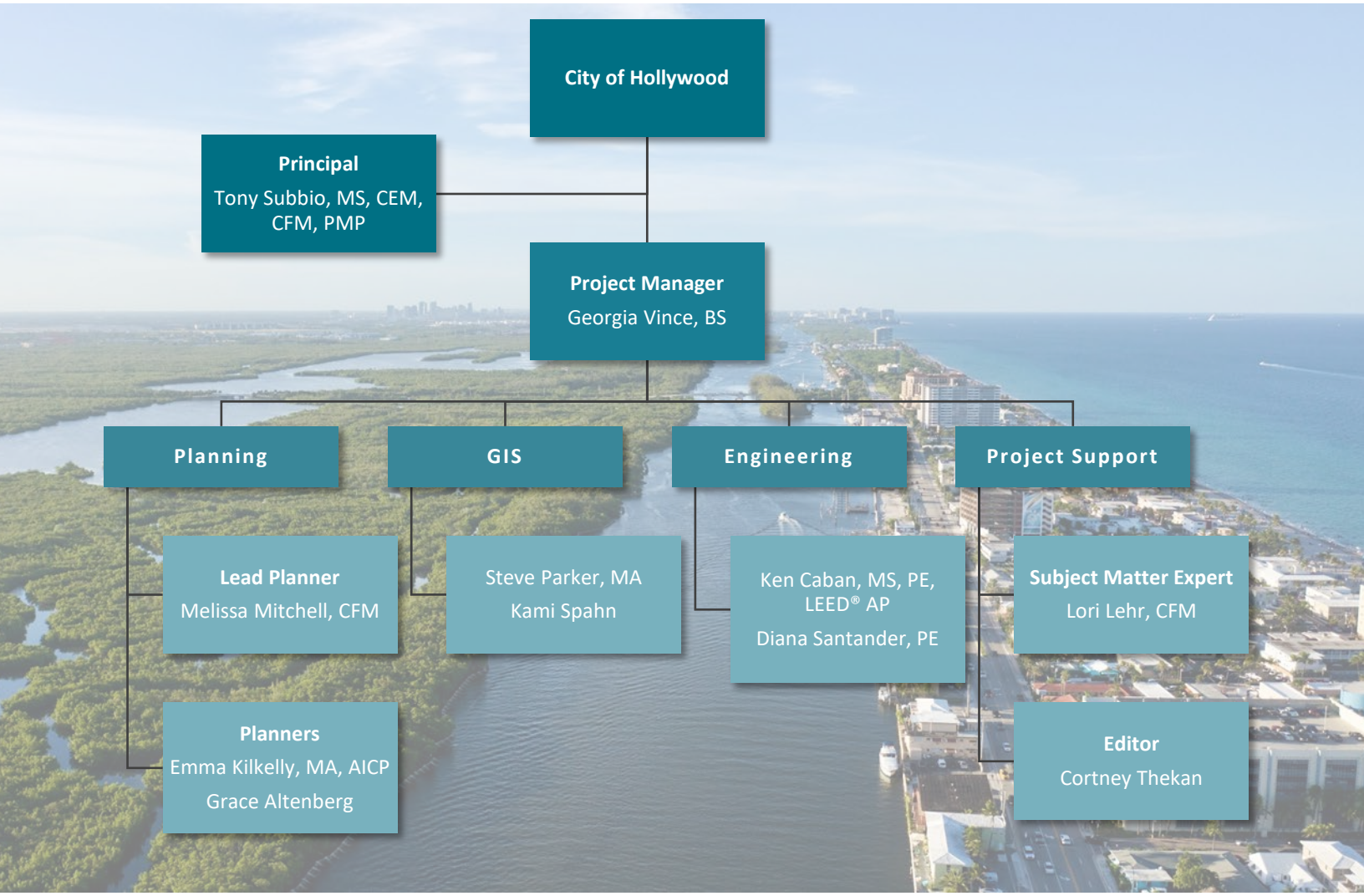
Tetra Tech's commitment to supporting community resilience through the CRS is evident in our portfolio of work. The CRS 10-step planning process is the foundation of our hazard mitigation planning program. The CRS risk awareness parameters are key components of our standard approach to risk assessment and alternative analysis.

f) Proposed Team

Tetra Tech has selected a team of experienced planners and other practitioners to complete this project. Each staff member presented below will be available to support this project as scoped and has experience working on FEMA-approved hazard mitigation plans, CRS activities, and/or other natural hazard-focused plan. Our team has identified the following key staff members for this project. They will be accompanied by a team of experienced flood, mitigation, and resilience planners as shown in the organization chart in Exhibit 4.

- **Proposed Project Principal:** Tony Subbio, CEM, CFM, PMP
- **Proposed Project Manager:** Georgia Vince
- **Proposed Flood Planner:** Melissa Mitchell, CFM

Exhibit 4: Proposed Organization Chart



More information on our project team is provided in Organizational Profile and Project Team Qualifications.

g) References

Tetra Tech has provided completed reference forms within the portal for the following:

Reference #1	Reference #2	Reference #3
St. Lucie County, FL 2022 CRS Verification Oscar Hance, Emergency Management Division Manager 772-462-8219 hanceo@stlucieco.org *On behalf of subcontractor Lori Lehr Inc.*	**City of Snoqualmie, WA** On-call Technical Support Services Emily Arteche, AICP, Community Development Director 425-888-8007 earteche@snoqualmiewa.gov	**City of Hollywood, FL** Vulnerability Assessment Update Luis Lopez, Engineering Support Services Manager 954-921-3410 llopez@hollywoodfl.org

h) Team Experience and Qualification Related to the FMP

For over 30 years, Tetra Tech has worked at the regional, national, municipal, and local levels to develop site-specific analyses and strategic recommendations to improve the resiliency of communities and programs. **This includes over 15 years of direct experience with developing and supporting updates to FMPs and conducting floodplain analyses**. Our team works side-by-side with municipalities, counties, and states across the country to assess natural hazard and climate vulnerability; identify, prioritize, and design mitigation and adaptation measures; develop floodplain management, hazard mitigation, climate adaptation, and resilience plans; and assist with securing funding to implement strategies to adapt to our changing environment.

Data Collection and Hazard Modeling

Watershed Modeling

Tetra Tech has unparalleled qualifications in two- and three-dimensional watershed modeling and we are considered industry experts in multiple aspects of modeling, including flood predictions, water quality, sediment transport, lake and estuarine circulation, reservoir routing, wetland retention, and contaminants. Tetra Tech has one of the largest groups of experienced watershed and water quality modelers among consulting firms; successfully applied models for more than 7,500 waterbodies in over 45 states and for all pollutant, source, and waterbody types; developed numerous watershed and water quality models and project-specific model interfaces; performed numerous projects involving linked watershed, water quality, and/or hydrodynamic models; provided training in modeling in all 10 U.S. Environmental Protection Agency (USEPA) regions and numerous states; developed materials and provided training in water quality modeling principles and application; and developed the Environmental Fluid Dynamics Code (EFDC) model, USEPA's Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) modeling system, and USEPA's Modeling Toolbox.

Our staff have experience with a variety of hydrologic and hydraulic (H&H) models including Hydrologic Engineering Center's River Analysis System (HEC-RAS), PONDS, CHAN, Interconnected Channel and Pond Routing

Model (ICPR), and various Storm Water Management Model (SWMM) programs that could be used to support the City of Hollywood, as needed. The modeling approach for this project will be dictated by the City's goals, available data, existing models and analytical tools, and budget. The Tetra Tech Team brings a wealth of experience in selecting the right analytical tools to provide an actionable plan.

GIS Analysis and Mapping

Our GIS experts keep current with the ever-expanding set of tools available for geospatial data management and visualization, which allow them to develop and customize data products for local needs. Many of these products involve integrating diverse data, developing indicators, and customizing GIS tools for access, analysis, and display of complex information. Along with GIS technical expertise, our team brings a deep understanding of the science behind the data, grounded in years of experience in freshwater, estuarine, and coastal ecology; water quality; and watershed management. Translating technical information to the public or targeted audiences is a particular forte of our communications experts, who work regularly with our scientific and GIS staff to develop products that convey clear, understandable, and effective messages. Our modelers have experience with a variety of coastal dynamics modeling tools including FEMA-HAZUS, ADCIRC, CMS-Flow, CMS-Wave, and STWAVE. We also have experience with sea level rise data and scenarios developed by the U.S. Army Corps of Engineers (USACE) and the National Oceanographic and Atmospheric Administration (NOAA), which are used in the Sea Level Scenario Sketch Planning Tool. Tetra Tech is extremely familiar with the Resilient Florida program requirements, including experience performing the GIS analysis, identifying the critical asset inventory, conducting sensitivity and exposure analysis, and mapping focus areas.

Tetra Tech also can integrate Sea Level Assisted Marsh Model (SLAMM) into the vulnerability assessment. The overall intent of SLAMM is to identify habitat transitions over time, which will help the City identify where they need to develop adaptation strategies for natural resource areas most affected by sea level rise. SLAMM is used by many federal agencies, including USEPA, National Wildlife Refuges, The Nature Conservancy, and the U.S. Geological Survey to help manage sensitive natural areas. The strengths of SLAMM are that the tool is a fairly simple model that contains all major processes pertinent to wetland fate. The model does include a greenhouse gas assessment based on changes in habitats and the associated carbon sequestration and also evaluates changes in salinity and the effects to submerged aquatic vegetation. Tetra Tech has used SLAMM to assist in identifying opportunities for land acquisition and where land management and maintenance practices will require adaptation based on future habitat changes.

Assessing Current and Future Sea Level Conditions

Tetra Tech has been on the cutting edge of climate-focused initiatives for years—investigating climate change effects and responses, conducting vulnerability assessments, and completing adaptation planning for aquatic ecosystems and water resource infrastructure. For nearly three decades, we have worked collaboratively with local and state governments to design resilience programs and develop actionable measures to achieve long-term resilience. Tetra Tech uses a holistic planning approach that considers

In the last two years, Tetra Tech has engaged in six vulnerability assessment projects under the Resilient Florida program:

- St. Lucie County, FL Vulnerability Assessments & Regional Resilience Plan (2023 – Present)
- Palm Beach County, FL Vulnerability Assessment & Resiliency Action Plan (2023 – Present)
- City of Hollywood, FL Vulnerability Assessment Update (2023 – Present)
- City of Key West, FL Comprehensive Adaptation & Resilience Implementation Plan (2023 – Present)
- Volusia County, FL Communitywide Vulnerability Assessment – Community and Stakeholder Engagement Workshops
- St. Lucie County, FL Vulnerability Assessment (2021)

socioeconomic concerns, integrates nature-based solutions, and builds capacity and capability for programmatic success.

We recognize that public engagement increases the visibility of a planning effort and is key to the successful implementation of any plan, and we have successfully implemented workshop-style meetings coupled with tools and technology to gather valuable input and achieve buy-in.

Climate Change Impact Analysis

Tetra Tech is one of the foremost firms in the nation in the fields of natural hazard risk assessment and community climate resilience planning. Our recovery and resiliency services incorporate a combination of advanced scientific modeling, community and economic analysis, feasibility assessments, and robust public outreach strategies to identify the most effective projects that will reduce a community's vulnerability to future disasters. Through in-depth risk analysis, community assessments, hydraulic analysis, and project design, Tetra Tech works to develop practical and cost-conscious strategies that provide a comprehensive roadmap for communities to rebuild in the wake of disasters and better prepare for future hazards by making them more resilient.

We have conducted more than 250 projects (state, county, and local municipality levels) as the premier consultant to support the adaptation planning process regarding addressing climate hazards, including coastal and riparian flooding, sea level rise, drought, wildfire, and water management.

Repetitive Loss Area Analysis (RLAA) & Final Report

Tetra Tech has over 15 years of experience with developing FMPs and floodplain analysis reports. We began with supporting the **City of Roseville, CA** in 2008, and since that time have developed plans for clients across the nation.

In the past nine years our team has developed RLAAs and/or FMPs for the **City of Los Angeles, CA; Los Angeles County, CA; Orange County, CA; Corte Madera, CA; Township of Brick, NJ; Long Beach, NY; and Shandaken, NY; Lewis County, WA/Chehalis Basin; Cowlitz County, WA; Chelan County, WA; King County, WA; Thurston County, WA; Kansas City, KS; Stone Harbor, NJ; Snoqualmie, WA; Pequannock Township, NJ; Key Biscayne, FL; and Upper Township, NJ.** Additionally, our team has done floodplain analysis and planning for the **New Jersey Department of Environmental Protection; Richland County, SC; and Snohomish County, WA**.

Our current CRS RLAA clients include:

- Stone Harbor, New Jersey
- Snoqualmie, Washington
- Pequannock Township, New Jersey

D. Approach to Scope of Work

Organizational Profile and Project Team Qualifications

Tetra Tech's team of planners, community outreach specialists, and GIS analysts have extensive experience not only developing hazard mitigation plans across the nation, but also working with communities in Hawai'i on preparedness, response, recovery, and mitigation projects for over a decade. **Exhibit 5** below provides an overview of our key staff experience relevant to the information in the RFP.

Exhibit 5: Staff Experience

	Florida Based	Experience with Coastal Communities	Repetitive Loss Area Analysis	Floodplain Management Experience	NFIP/CRS Subject Matter Expertise	Modeling Future Conditions	Community Outreach
Tony Subbio, CEM, CFM, PMP* Principal		●	●	●	●		●
Georgia Vince* Project Manager	●	●	●	●			●
Melissa Mitchell, CFM* Lead Planner		●	●	●	●		●
Lori Lehr, CFM* Subject Matter Expert	●	●	●	●	●		●
Emma Kilkelly, AICP* Planner		●	●	●	●		●
Grace Altenberg Planner	●	●		●			●
Ken Caban* Engineering Support	●	●		●		●	
Diana Santander Engineering Support	●	●		●		●	
Steve Parker* GIS/Mapping Technical Reviewer		●	●	●		●	●
Kami Spahn GIS Analyst		●	●	●		●	
Cortney Thekan Editorial Reviewer	●	●	●	●			●

*Denotes Key Staff

Key Staff Biographies

Tetra Tech's proposed key staff are introduced below. Additional information about these team members can be found within their resumes in Appendix A.

Tony Subbio, MS, CEM, CFM, PMP | Principal

Mr. Tony Subbio, CEM, CFM, PMP has over 20 years of professional experience in emergency management and has supported CRS, NFIP, and hazard mitigation planning projects since 2011, including current support of FEMA's HMTAP Program. Mr. Subbio serves as the NFIP lead for a joint venture of two international firms that serves FEMA Regions 5, 6, and 7 as well as FEMA Resilience (formerly FIMA). Mr. Subbio serves as a lead NFIP trainer and floodplain management subject matter expert (SME) for the Commonwealth of Pennsylvania and has served as a project manager supporting the City of Long Beach, NY, and Dauphin County, PA with their CRS application and recertifications.

Georgia Vince, BS | Project Manager

Ms. Georgia Vince has 23 years of experience with environmental programs and 12 years with project management. She is currently serving as the project manager for Tetra Tech's work supporting the City on its Vulnerability Assessment for the Resilient Florida program, and recently was the project manager for the St. Lucie County Vulnerability Assessment completed in 2021 and currently serves as the project manager for the Palm Beach County and Key West Vulnerability Assessment and Resilience Plans. Her background in regulatory and permitting programs for state, federal, and local levels of government has provided her with a detailed understanding of Florida's regulation system. Ms. Vince has extensive experience in public speaking and coordinating with stakeholders on sensitive environmental issues. She is well known for her ability to meet project schedules and stay within budget with a high level of client satisfaction. Before joining Tetra Tech, Ms. Vince worked for the Florida DEP as a Program Administrator and the SFWMD as a Section Leader.

Lori Lehr, CFM | Subject Matter Expert

Ms. Lori Lehr, CFM has over 25 years of experience in floodplain management and helping communities achieve CRS class improvements. Serving as a floodplain administrator, her floodplain management career started in the City of St. Petersburg. Some of her responsibilities included completing permit construction reviews and acting as a liaison between the City and FEMA. Additionally, Lehr offers over eight (8) years of specific experience as a CRS Specialist working with the Insurance Services Office (ISO). Consequently, she is well versed in all iterations of the CRS Manual and the implementation of the Manuals under the most current CRS guidelines. While working with ISO, Lehr submitted over 120 CRS verification files to FEMA, many of which resulted in a CRS class improvement for those communities. As a result of her experience as an ISO/CRS Specialist, Lehr was able to assist communities with the highest dollars of CRS discount in the Nation.

Melissa Mitchell, CFM | Lead Planner

Ms. Melissa Mitchell, CFM is an expert in the Community Rating System (CRS) for Tetra Tech's Emergency Management, Risk, and Resilience Practice. Before joining Tetra Tech, Ms Mitchell was a CRS Specialist for the Insurance Services Office (ISO). Since joining Tetra Tech, she has worked directly with clients to enhance their CRS programs with a focus on obtaining additional program credits. She has supported CRS verification activities and/or floodplain management planning for Orange County, CA; Kansas City, KS; Long Beach, NY; and San Diego County, CA; among others. She is scheduled to lead the CRS verification activities for Mau'i County beginning in late March 2024. In addition to her CRS experience, Ms. Mitchell has served as a subject matter expert for the Federal Insurance and Mitigation Administration (FIMA) where she provided support in the review and assessment of the substantial damage management plan templates to ensure consistency and served as an instructor supporting FEMA's Substantial Damage Estimator course criteria and delivery.

Emma Kilkelly, MA, AICP | Planner

Ms. Emma Kilkelly, AICP is a climate resilience planner specializing in quantitative risk and vulnerability assessments and is currently serving as the lead planner for the Palm Beach County, FL vulnerability assessment. Her extensive background in grant and data management enables her to develop actionable and dynamic assessments that local and state agencies can leverage to guide decision-making and compete for funding. Previously, she has played key roles in developing the Virginia Coastal Resilience Master Plan's comprehensive impact assessment, successful grant applications for large-scale nature-based solutions, and quantitative program evaluation analyses for FEMA's Risk MAP program.

Ken Caban, MS, PE, LEED® AP | Engineering

Mr. Caban has over two and a half decades of experience in the analysis, design, permitting, inspection, construction management, and program and project management of water, reuse, and wastewater conveyance and treatment systems, water, wastewater, and stormwater master planning and design, site development, and capital improvement programs for various water utilities in southeast Florida. He has supported multiple projects for the City including Utilities Continuing Project, Water Main Replacement Program, Stormwater Pump Stations and Control Structures Assessments and Rehabilitation of Pump Station SW-02, and Royal Poinciana Sewer Expansion.

Steve Parker, MA | GIS

Mr. Steve Parker has over 20 years of experience at Tetra Tech in the engineering, mapping, and planning of water resources projects. Mr. Parker has managed multidisciplinary public works projects for municipal agencies. His background is in floodplain mapping and management, hydraulics, and GIS modeling and analysis, performing numerous FEMA map revisions, levee certification modeling and mapping, dam breach analysis, and floodplain inundation mapping. His experience includes management of projects for floodplain management (CRS, LOMR, Levee Certifications), as well as model expertise including the latest versions of HEC-RAS, as well as GeoRAS, FLO-2D, and HEC-HMS and GeoHMS. He also has worked on the City's Los Angeles River Revitalization Master Plan, Corps/City Los Angeles River Ecosystem Restoration Study, the Lower Los Angeles River Revitalization Plan, and the City's 2015 and 2020 Floodplain Management Plans.

Objectives and Tasks (4.3 & 4.1 of RFQ)

The Tetra Tech team understands that, based on the terms and conditions of the state and federal financial assistance grants that will be used, it is imperative that the project stays on schedule to meet all grant deadlines and that each deliverable will need to be tied to a specific funding source. The Tetra Tech team will prepare the final deliverables for each grant milestone to include all results from the data collection, modeling analyses, and public meetings as well as a summary of identified risks and mitigation strategies within the required timeframes identified by each specific grant deliverable. Tetra Tech's project managers are familiar with grant reporting requirements. In Florida, we are currently supporting Community Development Block Grant – Mitigation (CDBG-MIT) grants for Palm Beach County, the City of Key West, and St Lucie County. Monthly reports are developed for each grant and provided to the municipalities ahead of the monthly deadline for review and submittal to the Dept of Commerce.

Tetra Tech's approach to addressing the tasks and objectives outlined in the RFP is provided below.

Objective 1 - Initiate Floodplain Management Plan and Community Engagement/3.1.1 Data Collection and Hazard Modeling

Organize Resources

Tetra Tech will organize the resources that will be utilized to oversee this planning process include a Core Planning Team (CPT) and confirm stakeholder involvement in the Floodplain Management Committee (FMC) (established by City Staff under Task 1) pursuant to the CRS section 511.2.a requirements.

Core Planning Team

The CPT will include designated discipline leads from Tetra Tech and appropriate technical staff from the City (i.e. GIS point of Contact, Public Information Officer, Project Manager). Tetra Tech will hold biweekly and as-needed coordination conference calls with the CPT through the project's completion, with agenda and meeting minutes detailing elements discussed and decided upon between CPT calls and FMC meetings. The CPT will be responsible for identifying planning milestones and project deliverables that will be presented to the FMC discussed below. The CPT will be responsible for the facilitation of all FMC meetings and documenting that process.

Floodplain Management Committee

The FMC will be an advisory body to the City through the planning process. The role of the FMC will be to provide input on key planning milestones and deliverables that will include the public outreach strategy for the planning process, definition of the flood hazard as it relates to the planning area, goals and objectives, plan maintenance strategy, and the comprehensive range of alternatives to be considered by the City. The FMC is expected to meet no fewer

than 6 times (and up to 8 times) at a date and time to be determined, during the plan development process. It is important to note that for full CRS credit, the committee should include a mix of governmental and non-governmental representatives (e.g., citizens, non-governmental organizations, US Army Corps of Engineers [USACE], etc.).

Review of Existing Documentation and Mitigation Strategies

Tetra Tech will conduct a literature review of other studies and programs that could support or impact flood hazard mitigation in effect within the planning area. This will include a comprehensive review of the Broward County Local Mitigation Strategy (LMS), studies, codes and programs, and available floodplain models that may overlap the watershed. Tetra Tech will develop a summary of findings from the review and provide it to the CPT and FMC for review.

Additionally, Tetra Tech will analyze the flood insurance policy coverage within the defined planning area under CRS Activity 370 requirements for the Flood Insurance Coverage Assessment (FIA) element. This will be a spatial analysis utilizing publicly accessible flood insurance policy statistics provided by FEMA and spatial data created under tasks 2A and 2B of this Task. Data analysis will be formatted for inclusion in the plan text to augment the findings of the flood hazard risk assessment. Insurance coverage is received for the entire county, and by city. This analysis will be broken down by all communities within the FMP-covered area.

> CRS Activity 370 - Flood Insurance Assessment, **up to 15 points can be realized** to apply to the City's CRS program.

Deliverables: Summary of findings drafted in memo and provided to the CPT and FMC *(Task 2 Deliverable)*

Public Engagement Strategy

Strategy: Tetra Tech will work with the FHMSC to develop and implement a public involvement strategy that will meet the requirements of the FMP program. The key to this task will be to utilize multiple media within the capabilities of the partnership that will give the public multiple opportunities to provide comment on the subject matter. This strategy will focus on 3 primary objectives:

- Assess the public's perception of risk associated with flood hazards.
- Assess the public's perception of vulnerability to those risks.
- Identify possible mitigation strategies that will be supported by the public.

It should be noted that the level of effort for this Task will be totally at the discretion of the FMC. This strategy will focus on how to best share the information with the public utilizing the capabilities within the planning area and thus allow for the opportunity for public comment. The following tasks are recommended components of a comprehensive public involvement strategy that meet or exceed the requirements of the CRS program.

Survey: Tetra Tech will develop a flood hazard mitigation survey pertinent to issues within the planning area to gauge the public's perception of risk, vulnerability, and willingness to support mitigation initiatives. This survey will be set up in an electronic format that can easily be disseminated and tallied electronically. This task will include tabulation of the survey responses and analysis of the results. Given the large Spanish-speaking community in the City, the FMC may decide to translate the survey into Spanish. The FMC will be asked to review and approve the survey questions to ensure they are tailored to meet the City's needs. Tetra Tech has previous examples from other FMPs if the FMC wants to see what other jurisdictions have utilized.

Public Meetings: Tetra Tech will support City in the facilitation of public meetings during the course of the plan update process. To assure that this planning process will meet the minimum requirements under the CRS program, we propose that a minimum of two (2) public meetings be held during this planning process. One (1) meeting will be held following the conduct of the risk assessment to share findings and to gage the public's perception of risk. This meeting will be held at a location within the floodplain to allow an opportunity for floodplain residents to comment on the risk assessment. Additionally, one (1) public meeting will be held once the draft plan has been assembled to give the public an opportunity to comment on the plan. All public meetings will be advertised via press releases and social media to encourage participation. Tetra Tech will develop agenda, presentations, sign-in sheets and meeting summaries for both meetings.

Website: A key element under this task will be the development and promotion of an FMP website that will be the one-stop shop for all information about this planning process. This website will be hosted and populated by the City, while all prepared materials for the site will be provided by Tetra Tech (media language, meeting minutes, public meeting agendas and materials, draft and final plans, etc.).

Additionally, Tetra Tech will develop an interactive StoryMap as another form of public engagement using the City Esri license. It will summarize the updated planning process and provide an updated overview of the floodplains and flooding hazards and risks in the City, inclusive of interactive maps. The StoryMap will be a link on the website and focus on engaging the public and communicating hazard risk. The StoryMap may remain live after the planning process concludes to continue educating residents on hazard mitigation and serving as a form of outreach for CRS communities.

Media Releases and Social Media Content: Tetra Tech will prepare press release materials via multiple media providing plan update details and announcing the planning process, how the public can get involved in the process, and the public meetings. Additionally, the team will develop content to be posted on City and stakeholders' social media accounts, including Facebook, X (formerly Twitter), and NextDoor.

RLAA Outreach: Section 512. b of the CRS Coordinators Manual requires an outreach effort be made to the properties identified in the repetitive loss areas that advises them of the RLAA process and requests their input on recommended actions. Tetra Tech will prepare an outreach letter and public notice for the City to send to properties identified in the repetitive loss areas.

Deliverables: Public outreach strategy; develop materials (agenda, sign-in-sheet, presentation) and conduct two public meetings, develop meeting summaries with action items *(Task 3 Deliverable)*; copies of public notices to properties in RLAA and distribution list *(Task 4 Deliverable)*, online survey for property owners' input *(Task 4 Deliverable)*

Hazard Modeling Tools

Tetra Tech and the CPT will utilize data identified in the documentation review in conjunction with local knowledge, to identify the best available data to support the development of the flood hazard risk assessment and identify gaps that may limit the options for completing this assessment. The key deliverable for this task will be a detailed inventory of all assets (both the general building stock from the Tax Assessor and critical facilities/infrastructure from local law enforcement, public works, or other applicable source). This information will be used to determine the most appropriate modeling tools for the planning efforts including SLOSH modeling, Hazus, etc. The team will document the hydrogen-database and modeling process used in the FMP.

Site Visits to RLAA Properties

For the RLAA to be creditable, the project team must visually inspect the identified properties within the repetitive loss area(s). The CRS Manual allows for the visits to be in-person or conducted virtually using tools including GIS

mapping, Google Earth, or the appraiser's parcel data if they have current photos. Tetra Tech will utilize the virtual method to assess the RLAA properties and provide a list to the City for inclusion in the plan. The RLAA structure inventory will utilized to complete the mitigation review under Objective 3.

Deliverable: List of properties visited *(Task 6 Deliverable)*

Watershed FPLOS Study and Hazard Models

Working with the CPT and FMC, Tetra Tech will assess and analyze available data for conducting the H&H modeling within the identified watersheds that will be covered in the FMP referencing the guidelines identified within the South Florida Water Management District's FPLOS program. The modeling will consider the system's original design, the current condition of the system, and the range of potential future sea level and rainfall conditions. The modeling will be used to help identify potential land use changes, operational changes, and water use changes that should be addressed in the mitigation strategy included in the FMP. A summary of the models' results by watershed will be developed and included in the final plan.

Deliverables: Summary of hazard model results in a report for each watershed assessed *(Task 7 Deliverable)*

RLAA Modeling and Mapping

Using the RLAA information from the site assessments, and information gathered from FEMA, the FPLOS study, and modeling, Tetra Tech will map the RLAA repetitive loss areas by Section 503.b of the CRS Manual. The maps will be supported by Hazus, SLOSH, and applicable H&H modeling to determine current and future risks and delineate the RLAAs in the included watersheds. Draft and final exhibits will be developed and provided to the CPT and FMC for review.

Deliverable: Draft and Final Exhibit of Revised Delineation of RLAA *(Task 8 Deliverable),* Draft and Final Exhibit of RLA *(Task 9 Deliverable)*

Objective 2 – Assessment of Current and Future Sea Level Conditions/3.1.2 Access Current and Future Sea Level Conditions

Risk Assessment: Tetra Tech will assist the City in assessing the characteristics and potential consequences of the flood hazards that impact the planning area described in this scope of work introduction from existing best available data. This data includes typically includes existing FIRM mapped data and available hydraulic models used for mapping that communities or other regulatory agencies might possess. A thorough assessment of the flood hazard as well as the vulnerability of the planning area will be accomplished using the Hazards U.S. Multi- Hazard v.6.0 (Hazus) risk assessment tool, benefit-cost analysis tools, and historical/local knowledge of past occurrences. These are standard outputs from the Hazus and

benefit/cost analysis tools produced by FEMA. As a starting point, the team will use any existing pertinent studies or plans identified in the Documentation Review as the best available data to create the following elements:

- Define a planning area.
- A description of the type, location (map), and extent of the flood hazard, as defined for the plan, that can impact the planning area.
- Flood hazard area depth grid production
- A description of the planning area's vulnerability to the flood hazard that includes an overall summary of the hazard and its impact on the planning area.
- The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the flood hazard areas and the potential impacts to these facilities.
- An estimate of the potential dollar losses to vulnerable structures in the studied areas.
- A general description of current land uses and development trends within the planning area.
- A review of all identified National Flood Insurance Program (NFIP) repetitive loss properties. This review will meet the Section 503 requirements for repetitive loss communities under the CRS program.
- For the flood hazard, a review of all properties within the defined planning area that have received flood insurance claims (in addition to those identified repetitive loss properties).

Mapping: Tetra Tech and the CPT will utilize data mined under Objective 1 to prepare maps that show the flood risk and vulnerability of the City's assets to the scenarios confirmed by the FMC, by producing maps that illustrate the extent and location of the flood hazards of concern addressed by this plan (Riverine, Coastal, Sea Level Rise, Dams, Tsunami). These maps will be produced and formatted for inclusion in the final plan.

Hazus: Tetra Tech will perform the Hazus (version 5.0 or newer) analysis for the flood hazard specific to the planning area. This will be a level 2, user-defined analysis that includes a general building stock update within the FMP covered area utilizing the City's Assessor's data and available LiDAR data. The team will provide the results of this analysis in a user-friendly format to the FHMSC for their review and approval. Outputs from this task will include:

- Review of past occurrences of assessed flood events.
- Flood Hazard depth grids for the 10, 50, 100, and 500-year flood events in areas where detailed flood studies are available.
- The types and numbers of existing and future buildings, infrastructure, and critical facilities exposed to the identified flood hazard areas for each scenario event.
- Demographic analysis that looks at the social vulnerability of the population exposed to the flood hazards assessed by the plan
- Loss estimates for each scenario event for all residential, commercial, and industrial buildings and identified critical facilities within each hazard area.
- An analysis of identified vulnerable critical facilities and infrastructure (community lifelines) for each scenario event.
- An analysis of the estimated debris generated from each scenario event.
- An estimate of the number of displaced households and short-term shelter needs.
- A land use analysis for each scenario event that includes a look at land with potential for future development (i.e., buildable lands analysis)

The modeling will also include an assessment of a future condition look at the City's coastal floodplains projected to be impacted by sea level rise and tsunami risk, as well as impacts from dam failures in and around Broward County. The best available data (whether from FEMA or other sources) will be used for this task, and outside studies that provide complementary data will be incorporated to maximize CRS credit. This task has a companion Hazard Profile and Results in Objective 4.

This analysis includes the following elements:

- Map the maximum extent and location of areas inundated by the tsunami
- Map the extent and location of the areas projected to be inundated by sea-level rise
- Create depth grids of the maximum extent of tsunami areas based on the best available data
- Create depth grids for the selected projection of the areas to be inundated by sea-level rise.
- Flood Hazard depth grids for dam failures in the county where detailed flood studies are available.
- Hazus-MH analysis for both general building stock and critical facilities and infrastructure of the maximum extent tsunami scenario
- Hazus-MH analysis for both general building stock and critical facilities and infrastructure of the selected sea level rise projection
- Hazus-MH analysis for both general building stock and critical facilities and infrastructure of the maximum extent dam failure scenario

Once data has been validated, HAZUS outputs will be formatted into a format that will be incorporated into the final plan.

FPLOS District Infrastructure Reports

Information collected from the Risk Assessment will be used to develop a summary and FLPOS District Infrastructure report for current and future conditions for the assessed RLAs. The reports will be developed and submitted to the CPT and FMC for review and comment. This information will be collected and included in the RLAA Analysis and Reporting in Objective 3 and FMP under Objective 4.

Deliverables: Draft and Final Summary of RLA current conditions *(Task 10 Deliverable)*; Draft and Final Summary of RLA Future Conditions *(Task 13 Deliverable)*

RLAA and Sea Level Rise Modeling and Mapping

Under this task, Tetra Tech will develop a draft and final summary of the RLA mapping and analysis of the hazards from existing and anticipated future conditions. This will also include a summary of the findings from the sea-level rise models. The reports and exhibits will be developed and submitted to the CPT and FMC for review and comment. This information will be collected and included in the RLAA Analysis and Reporting in Objective 3 and FMP under Objective 4.

Mapping completed for the FMP and RLAA may be utilized for credit criteria under Activity 320- Map Information Service and Activity 440- Additional Map Data. Mapping may support committee duties under CRS Activity 330-Program for Public Information and Activity 370-Coverage Improvement Plan.

Deliverables: Draft and Final Summary of RLA mapping and hazard analysis for existing conditions *(Task 11 Deliverable)*; Draft and Final Summary of Sea Level Rise Models *(Task 12 Deliverable)*; Draft and Final Exhibits of RLA mapping and hazard analysis for future conditions *(Task 14 Deliverable)*

Objective 3 - Repetitive Loss Area Analysis Report Preparation/3.1.3 Repetitive Loss Area Analysis

Tetra Tech's planning team will perform the required analysis and reporting standards as defined under section 512.b of the CRS Coordinators Manual. Following FEMA standards, Tetra Tech will apply the safeguards in place for Personally Identifiable Information (PII) related to the historical NFIP flood insurance claims and policy data. In addition to PII guidelines, Tetra Tech will support the City in pursuit of current FEMA RL data by utilizing the Information Sharing Access Agreement (ISAA) procedures.

The depth grids identified by the Sea Level Rise Models, historical event data, and other applicable data will be utilized to define the draft repetitive loss areas. The RLAA will include the identification of each structure within each repetitive loss area, the expected depth of flooding (if available), and the determination of the cause of repetitive flooding. Each repetitive loss area will be mapped, and the inventory will be segregated by repetitive loss area. Much of the mapping analysis will be performed using the Hazus-MH model. The planning team will reference the current RL data of the City's CRS program to align updated RLA based on the data and mapping paired with the FMP and RLAA.

Under the RL mapping task, all properties identified as "repetitive loss" or within a repetitive loss area will be extracted from the Hazus results and populated into a separate database formatted such that it will be included in a repetitive loss area analysis document of the plan. This format will include structure address, area, number of stories, foundation type, date of construction, loss information, and probable cause of flooding. Using the information collected in the analysis, Tetra Tech will develop a list of mitigation measures under CRS credit criteria that can be used for RLAAs. This will be further explored during the plan and mitigation strategy development addressed below in Objective 4.

FEMA PII refers to the personally identifiable information of applicants and disaster survivors that FEMA collects, uses, maintains, and shares for the purpose of implementing its programs. PII includes personal details that can be used to identify individuals, such as names, dates of birth, SSNs, phone numbers, addresses, income information, and tax returns. FEMA has a responsibility to **safeguard and dispose of PII** consistent with applicable laws and regulations regarding privacy and confidentiality.

Tetra Tech will draft AW-501 forms following FEMA guidelines to support official updates to the City's CRS/FEMA Repetitive Loss list if applicable. This will include RL parcels identified outside of corporate limits through mapping and parcels with qualifying mitigation actions.

Deliverables: Draft and Final Summary of RLAA historical trends (Task 15 Deliverable), Draft and Final Summary of mitigation measures for RLAAs (Task 16 Deliverable)

Objective 4 - Recommendations and Final Report/3.1.4 Recommendations and Final Report

Tetra Tech will assemble the FMP (Report) utilizing all data generated throughout the project. The format and layout of the updated plan will be determined by the planning team and approved by the FMC. It will be a principal objective to format the plan such that it can easily be incorporated back into other plans that it can support or enhance, such as Emergency Operations Plans, Stormwater Management Plans, and the Local Mitigation Strategy.

Establish Goals and Objectives: Tetra Tech will facilitate the selection of a guiding principle, goals, and objectives for the plan. The basis for this review will be the current goals and objectives of the previous FMP and the Broward County LMS to assure consistency across plans. The confirmation of goals and objectives will be made by the FMC, based on feedback received via the public involvement strategy, and issues identified by the risk assessment. The primary goal of this task is to identify goals and objectives that are measurable and consistent with the needs and capabilities of the City.

Strengths, Weaknesses, Obstacles, and Opportunities (SWOO): Tetra Tech will support the City in a facilitated exercise that looks at the strengths, weaknesses, obstacles, and opportunities within the planning area as they pertain to dealing with the flood hazards.

Prior to the SWOO session, Tetra Tech will assess the regulatory capability of every regulatory body within the FMP covered area, comparing ordinances and statutes of the City. The comparison will be utilized to inform the FMP actions and will feed into this task's effort. The results of this session will be the basis for action identification by supporting and representing the alternatives review process.

Flood Hazard Mitigation Strategy: Tetra Tech will work with the City to develop a flood hazard mitigation strategy that includes a prioritization schedule for identified projects, capability actions, regulatory actions, or other strategies/activities, that will be utilized by the City in the selection of their mitigation action plan. A key element of this task will be an alternatives analysis that will identify a comprehensive range of both structural and nonstructural solutions. Under this Task, the planning team will support the City in establishing an action plan that includes:

- Identification of problems and necessary capital improvement projects, capability actions, regulatory actions, or other strategies/activities.
- Identify a comprehensive range of alternatives.
- Establish criteria for action selection.
- Categories that can be assigned to each project's cost and benefits that are reasonably measurable (i.e.: high, medium, and low) to show ratios of 1.0 or higher.
- Identify other measurable elements to be considered when prioritizing an action (i.e.: the number of goals and or objectives an action will meet).
- Identify funding options (i.e. grants, local sources. private sector sources)
- Create a guidance package for planning partners on how to prioritize projects once selected.
- Clearly identify whether the initiative will impact new or existing structures

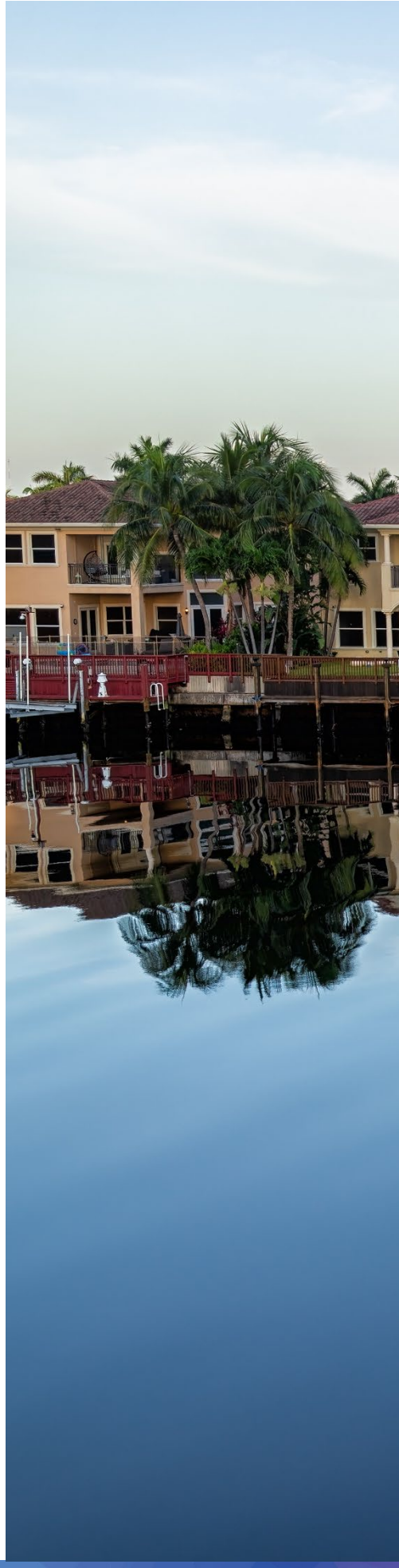
Develop Plan for Monitoring, Evaluating, and Updating the Plan: Tetra Tech and the CPT will work with the FMC to confirm a plan maintenance strategy for the completed plan. This strategy will include:

- Recommendations for FMC involvement
- Monitoring, Evaluating, and Updating the Plan
- Monitoring the Progress of Mitigation Activities and Public Involvement
- CRS 510 FMP progress report template to be utilized with annual CRS recertifications

The plan maintenance strategy allows the City to be prepared for CRS progress reports.

Author the Plan: The draft plan will be authored and assembled by Tetra Tech. Coordinating with the FMC, the planning team will format the plan layout to meet the objectives established for the planning process. Tetra Tech will prepare a plan that will include the following parameters:

- A description of the planning process
- A description of the public involvement campaign



- A comprehensive flood hazard risk assessment
- Planning area characteristics that focus on the physical and cultural characteristics of the watershed
- A capability assessment that includes: an inventory of the planning areas' missions, programs, and policies and an analysis of the capability to carry them out
- A comprehensive review of floodplain management policies in effect within the City and recommendations for changes or enhancement
- Illustrate the goals of the plan.
- The comprehensive range of alternatives considered by the plan
- A discussion on floodplain funding opportunities and management
- Include an action plan that will target agencies/departments for implementation, a targeted time frame for completion, and potential funding
- A summary of how the plan's progress will be monitored and establish a timeline for progress reports and updates
- Identification of the process for incorporating the plan requirements into other planning mechanisms within the planning area

Once the initial draft has been developed, the draft plan will be submitted for a technical/format edit to prepare the final draft plan that will be presented to the public for their review and comment. Once all public comments have been received, and the plan has been approved by reviewing agencies (the City and ISO), a final plan will be created under this task.

RLAA Annex: The final plan will include a completed document dedicated to the repetitive loss area analysis that will include the elements required under section 512.b of the CRS coordinators Manual. This chapter will be supported by the modeling and mapping results and include clearly identifiable actions to address the repetitive flooding problems identified. This chapter will be laid out such that it meets all requirements specified under section 512.b of the 2017 CRS Coordinators manual and will clearly address each identified repetitive loss area. This is a singular RLAA Annex that covers all the RLPs in the FMP-covered area. Credit would be dependent upon the adoption of the final plan and impact adjustment (if applicable).

Completion of Plan Review Crosswalk and Pre-Adoption Review: Tetra Tech will complete the CRS plan review crosswalks to illustrate the plan's compliance with the requirements of section 510 of the CRS Coordinators Manual. Additionally, Tetra Tech will prepare and submit the draft plan to the CRS administrator (ISO) to request their pre-adoption review and comment on the draft plan. Tetra Tech will include a CRS annual progress report template to support the required CRS annual recertification for the RLAA.

Implement and Adopt the Plan: Once pre-adoption approval has been received from the CRS administrator (ISO), Tetra Tech will support the City with adopting the final plan. This support will include the following:

- Sample resolutions for adoption.
- A "print-ready" digital copy of the plan.
- Preparation of PowerPoint presentation to be utilized in the presentation of the plan to the City Council for adoption. At the direction of the CPT, Tetra Tech will be available to support the presentation of the draft plan to the City Council.

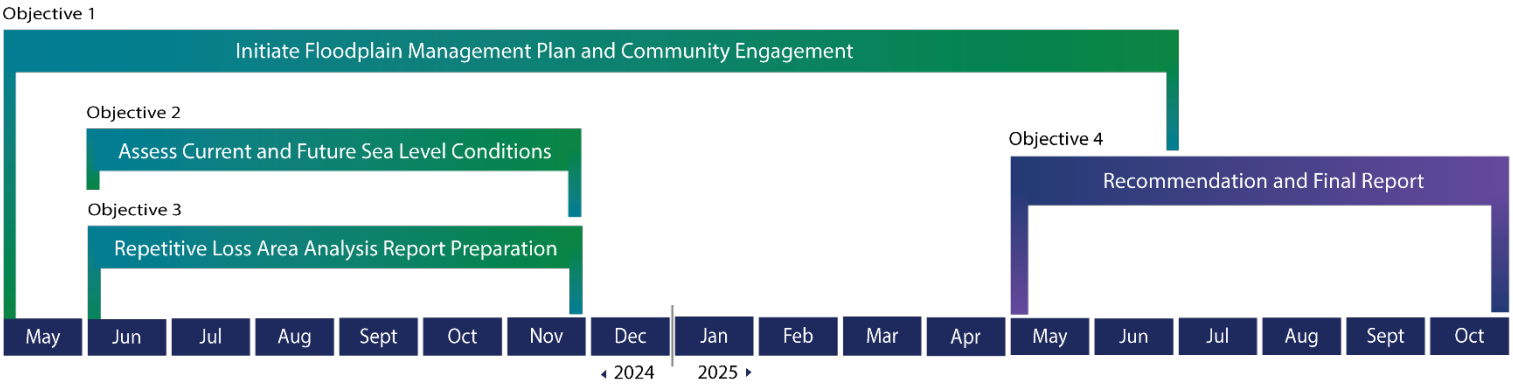
Additionally, Tetra Tech will update the AW-501 Repetitive Loss Worksheets and provide them with the final plan files.

Deliverables: Draft and Final FMP (Report) (Task 17 Deliverable); Updated AW-501 Worksheets (Task 18 Deliverable)

Implementation Schedule/Timeline (4.4 of RFQ)

Tetra Tech understands that the duration of the contract shall be 2 years (24 months) from the date of Notice to Proceed and that the tasks detailed in the scope of work shall be performed concurrently. In Exhibit 6, we have provided an overview of the planned implementation schedule.

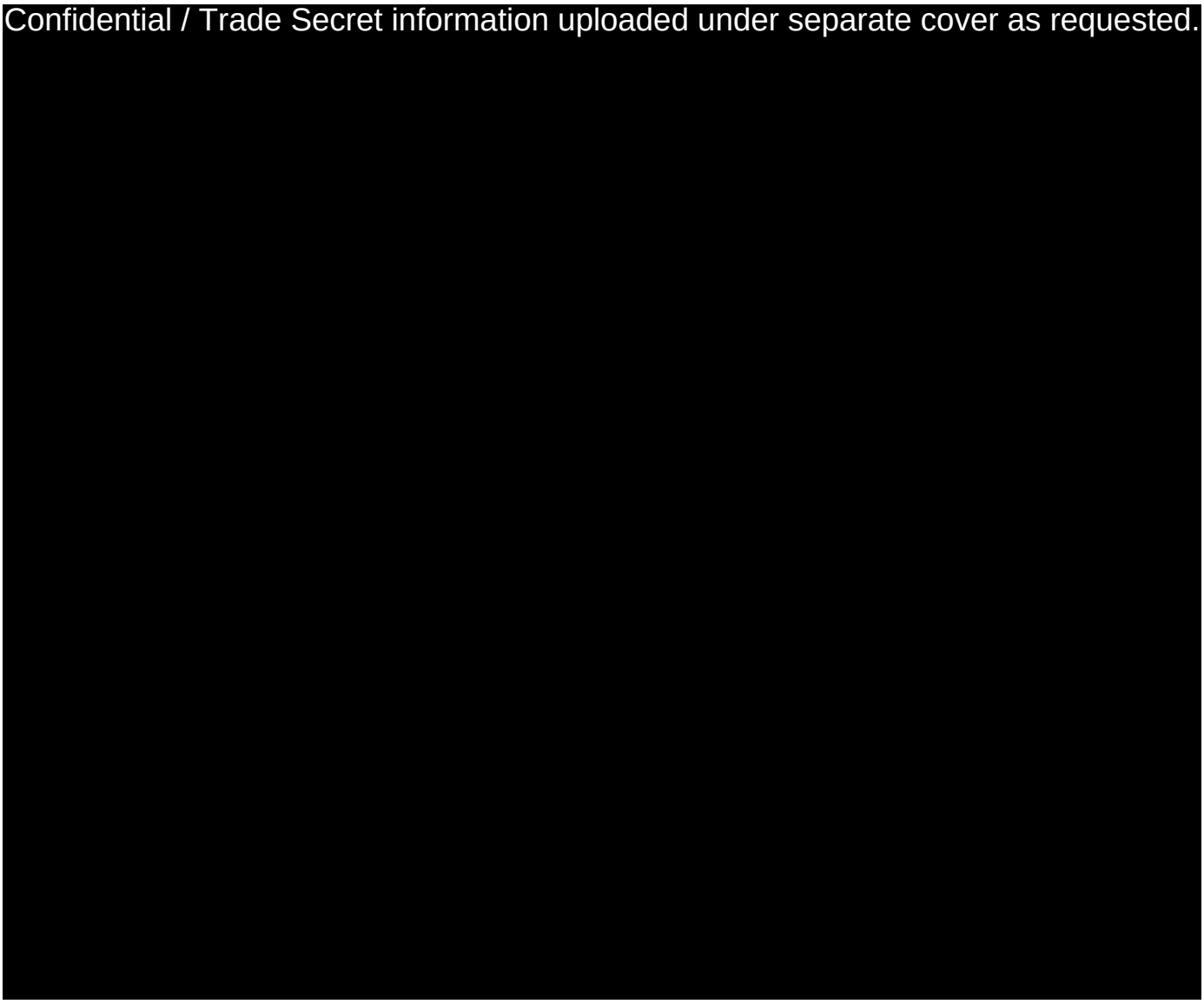
Exhibit 6. Implementation Schedule



Volume of Work

Tetra Tech supports more than 22,000 clients each year across 100,000 projects. We currently have more than 230 active projects across our emergency management and grant management practices. Our current workload related to similar projects is summarized in Exhibit 7, followed by a summary of our staff's availability in Exhibit 8 and our previously awarded work with the City in Exhibit 9.

Exhibit 7. Current Workload



Staff Availability

Allocating a dedicated team to complete this project is crucial for ensuring productivity, efficiency, and successful project outcomes. Below is a list of the proposed key staff members, availability, and commitment to support this project.

Exhibit 8. Availability of Key Personnel

Key Staff Member	Project Role	Current Utilization Percentage**	Commitment to Hollywood FMP Percentage**
Tony Subbio	Principal	55%	25%
Georgia Vince	Project Manager	70%	50%
Melissa Mitchell	Lead Planner	75%	65%
Lori Lehr*	CRS/Floodplain SME	60%	50%
Emma Kilkelly	Planning Analyst	75%	65%
Grace Altenberg	Planning Analyst	75%	65%
Ken Caban	Engineering Support	70%	15%
Diana Santander	Engineering Support	70%	15%
Steve Parker	GIS/Mapping Technical Manager	70%	25%
Kami Spahn	GIS Analyst	75%	35%
Cortney Thekan	Editorial Reviewer	50%	20%

*Denotes subcontractor

** Percentages may exceed 100% as current project work for some key personnel will end during the period of performance of this project

Exhibit 9. Previous Work with the City of Hollywood

Project Name	Start Date	End Date
Vulnerability Assessment	04/12/2023	12/31/2024
Engineering Services Related to the Stirling Road 8-inch Water Main Extension Project	01/01/2024	12/31/2024
Grant Application and Professional Engineering Support Services	01/30/2022	08/24/2024
Hollywood Beach Utility Infrastructure Improvements Ph 1	02/14/2021	03/29/2024
Boulevard Heights Partial Septic to Sewer Conversion. Preliminary Design, Design, Permitting, and Bidding Services	10/24/2022	03/29/2024
Design And Construction Services For 70,000 LF of Water Mains	05/07/2017	03/08/2024
Water Main/Royal Sewer-Construction Admin	07/14/2019	03/01/2024
Washington Park/Lawn Acres Septic to Sewer Conversion	07/08/2018	02/09/2024
Reapplication For CCCL Permit	09/28/2023	12/31/2023
Hallandale Beach FM Replacement - LUM 7	11/01/2020	11/06/2023
Stormwater Pump Station Conditions Assessment	12/31/2019	09/30/2022
Hallandale Fm & LUM-07 Design	03/17/2019	05/20/2021
Hollywood Royal Poinciana Septic to Sanitary	08/27/2017	12/18/2020
Water Main Replacement from Sheridan to Hollywood Blv, Federal Hwy to N 21st Ave	09/28/2014	07/10/2020
Hollywood Blvd JPA Addtnl Ca	08/12/2018	09/27/2019
Water Main Replacement for Hollywood Blvd to Harding St East of Federal Hwy	04/28/2013	12/28/2018
Design & Construction Services for 3000 Feet of 12" Water Main	12/27/2015	12/21/2018
Disaster Debris Monitoring	09/07/2017	10/26/2018
Water Main Replacement from Hollywood Blvd to Johnson St between N. 46th Ave & N 52nd Ave	06/05/2011	07/31/2014
Conversion of Pump Stations A4 N1 N5 N7 W20	11/10/2005	10/31/2007

E. References/Past Performances

Tetra Tech has provided completed reference forms within the portal for the following:

Reference #1	Reference #2	Reference #3
St. Lucie County, FL 2022 CRS Verification Oscar Hance, Emergency Management Division Manager 772-462-8219 hanceo@stlucieco.org *On behalf of subcontractor Lori Lehr Inc.*	**City of Snoqualmie, WA** On-call Technical Support Services Emily Arteche, AICP, Community Development Director 425-888-8007 earteche@snoqualmiewa.gov	**City of Hollywood, FL** Vulnerability Assessment Update Luis Lopez, Engineering Support Services Manager 954-921-3410 llopez@hollywoodfl.org

Appendix A: Resumes

Tony Subbio, CEM, CFM, PMP, MS

Principal

19 YEARS OF EXPERIENCE

$17.8M GRANT FUNDING

Areas of Expertise

Project management

Hazard mitigation and recovery planning and implementation

Floodplain management

Emergency planning

Key Training/Certifications

Certified Emergency Manager, 2007-2026

Certified Floodplain Manager, 2015-2023

Project Management Professional, 2012-2024

FEMA Advanced Professional Series

FEMA COOP Excellence Practitioner – Level I

Education

M.S., Emergency Management, Millersville University, Millersville, PA, 2009

B.S., Business Administration - Management, Millersville University, Millersville, PA, 2003

EXPERIENCE SUMMARY

Tony Subbio has 19 years of professional experience in emergency management, with special expertise in hazard mitigation, floodplain management, and emergency planning at the state-, region-, and county-levels. Mr. Subbio has led and contributed to projects including hazard mitigation planning, post-disaster community recovery (long-term) planning, all-hazards emergency operations planning, continuity of operations planning, and public health emergency planning. He has expertise in floodplain management and flood resilience.

As a Program Manager (PM), Mr. Subbio focuses on ensuring that the project scope, schedule, quality, and cost are maintained in accordance with the client's expectations. He ensures that communications with key stakeholders are maintained throughout the project, to ensure that any issues are resolved quickly and effectively, and to ensure that the client's business need is met. Mr. Subbio has managed projects with budgets ranging from $1,400 to $1 million.

RELEVANT EXPERIENCE

Community Rating System (CRS) Program Support

Los Angeles County, CA Repetitive Loss Area Analysis, 2019 – 2020. Mr. Subbio supported Los Angeles County by serving as the lead planner on the development of the Repetitive Loss Area Analysis (RLAA) for the unincorporated areas of Los Angeles County. In this effort, Mr. Subbio worked with representatives of the Los Angeles County Department of Public Works, Tetra Tech's project manager, and Tetra Tech's risk assessment experts to identify areas at risk to repeated flooding, assess the condition of structures in those areas, examine the cause of flooding, and develop potential actions to reduce vulnerability to flooding.

City of Los Angeles, CA Repetitive Loss Area Analysis, 2019 – 2020. Mr. Subbio supported the City of Los Angeles by serving as the lead planner on the development of a Repetitive Loss Area Analysis (RLAA). In this effort, Mr. Subbio worked with representatives of the City of Los Angeles Department of Public Works, Tetra Tech's project manager, and Tetra Tech's risk assessment experts to identify areas at risk to repeated flooding, assess the condition of structures in those areas, examine the cause of flooding, and develop potential actions to reduce vulnerability to flooding.

Floodplain Management/National Flood Insurance Program (NFIP) Compliance

Pennsylvania Emergency Management Agency (PEMA) Community Assistance Visits (CAV), 2023. Mr. Subbio conducted CAVs for Tamaqua Borough, Schuylkill County and Millheim Borough, Centre County. He also oversaw another floodplain management expert in conducting a CAV for Bristol Township, Bucks County.

Pennsylvania Municipal League, PA Municipal Administration Training Center (PA MATC), Floodplain Management and Hazard Mitigation Training Webinars, 2018-2019. Mr. Subbio developed and presented three webinars for municipal officials as part of the PA MATC's Planning Course- one on holistic floodplain management that addressed topics beyond simply regulating according to a local

floodplain management ordinance; one providing an introduction on hazard mitigation, mitigation planning, and mitigation project implementation; and one summarizing the duties and responsibilities of the municipal floodplain administrator. He conducted the holistic floodplain management webinar three times, the mitigation webinar twice, and the floodplain administrator webinar once.

Hazard Mitigation Planning

Mr. Subbio served as the project manager on multiple Hazard Mitigation Plan (HMP) updates. He coordinated the efforts of Tetra Tech and its team and worked with the steering committees and planning teams/partnerships (consisting of representatives of county, municipal, and private organizations) to assess the risks faced by counties and communities, gather information, identify capabilities, and develop mitigation goals, objectives, and actions for inclusion in the updated plans.

Pennsylvania High Hazard Potential Dam Grant Program Planning Support, 2022.
Mr. Subbio served as the project manager to update portions of the Somerset County, PA HMP to meet the requirements of FEMA's High Hazard Potential Dam Grant Program. On behalf of the Pennsylvania Emergency Management Agency (PEMA), Mr. Subbio and a small group of mitigation planners worked with PEMA, the County, municipal officials, and dam owners/operators to assess the risks that the dams in Somerset County face, along with the risks that those dams pose to the County and its communities and people.

Hazard Mitigation Grant Support

Brandywine Conservancy and Museum of Art – Museum of Art Floodproofing Grant Support and Benefit-Cost Analysis (BCA), 2023. Mr. Subbio served as the project manager and lead analyst to assist the Brandywine Conservancy and Museum of Art to secure public assistance funding to floodproof the Museum of Art building. Mr. Subbio developed the benefit-cost analysis that demonstrated that floodproofing the museum would be a cost-effective project that would protect the building and the priceless works of art inside. This BCA was critical in the Federal Emergency Management Agency's (FEMA) decision to award over $17 million in funding to protect the building and its contents.

Town of Alexander, New York HMGP Grant Application Support, 2021 – 2022. Mr. Subbio is currently serving as the project manager and technical reviewer to assist the Town of Alexander, New York in developing an application for Hazard Mitigation Grant Program (HMGP) funding to demolish an old highway garage and convert the property into open space uses. Mr. Subbio led the team of mitigation experts to gather information, develop the project budget, and compile the grant application.

FEMA Hazard Mitigation Technical Assistance Program (HMTAP) Support

HMTAP – NFIP Violations List Development and Management, September 2021 – Present. Mr. Subbio is currently serving as the Deputy Task Order Manager (TOM) for the Alliance for Resilience and Mitigation (ARM) joint venture serving FEMA as a HMTAP contractor. In this task order, Mr. Subbio contributed to development of standard operating procedures (SOP) that describe how data on minimum NFIP floodplain management violations are collected from the FEMA Regions and states. He then developed an SOP on the use of FEMA's National Violation Tracker (NVT), and developed and conducted a series of training sessions for FEMA Region and State NFIP stakeholders.

HMTAP – Federal Insurance and Mitigation Administration (FIMA) NFIP Data Sharing Support, 2021 - 2023. Mr. Subbio served as the Task Order Manager (TOM) for the Alliance for Resilience and Mitigation (ARM) joint venture serving FEMA as a HMTAP contractor. In this task order, Mr. Subbio led a team of resilience and mitigation experts from Tetra Tech and Michael Baker International to process, record, and fulfill requests for NFIP-related data; update FIMA's internal processes for sharing information with external partners; and develop privacy analyses for FIMA's Floodplain Management Division; and identify methods for FEMA to proactively meet the whole community's needs for NFIP information.

HMTAP - Federal Insurance and Mitigation Administration (FIMA) Local Substantial Damage Standard Operating Procedures (IDEAL STATE), 2021 - 2022. Mr. Subbio served as a floodplain management expert to help Orange County, Texas develop a Substantial Damage Plan. In this effort, Mr. Subbio reviewed Orange County's flood damage prevention ordinance to determine its incorporation of building code requirements and floodplain management best practices.

HMTAP - Insurance and Mitigation Readiness Division (IMRD) Strategy Support, 2021 - 2022. Mr. Subbio served as a facilitator for two full-day strategic planning sessions conducted by IMRD staff. In this role, Mr. Subbio facilitated conversations of the Disaster Operations Branch to identify branch-level tactics that support carrying out IMRD's goals and objectives.

TETRA TECH

Georgia Vince

Project Manager

24 YEARS OF EXPERIENCE

Areas of Expertise

Environmental Permitting

Agency Consultation

Resilience Planning

Coastal Management

Wetland Delineations

Education

BS, Biological Oceanography, Florida Institute of Technology, 1993

EXPERIENCE SUMMARY

Ms. Vince has over 23 years of experience with environmental programs and 12 years of project management experience with governmental entities. **She is currently serving as the project manager for Tetra Tech's work supporting the City on its Vulnerability Assessment for the Resilient Florida program,** and recently was the project manager for the St. Lucie County Vulnerability Assessment completed in 2021 and currently serves as the project manager for the Palm Beach County and Key West Vulnerability Assessment and Resilience Plans.

Her background in regulatory and permitting programs for state, federal, and local levels of government has provided her with a detailed understanding of Florida's regulation system. Ms. Vince has extensive experience in public speaking and coordinating with stakeholders on sensitive environmental issues. She is well known for her ability to meet project schedules and stay within budget with a high level of client satisfaction. Before joining Tetra Tech, Ms. Vince worked for the Florida DEP as a Program Administrator and the SFWMD as a Section Leader.

RELEVANT EXPERIENCE

Project Manager (2023 – Present)

City of Hollywood Vulnerability Assessment Update

- Project Manager for the City's VA Update Project which is funded by a state Resilient Florida Grant to update their previously completed VA to meet Chapter 380.093 F.S. requirements. The Adaptation Plan developed as part of the VA Update will include 50 conceptual design plans for adaptation projects and evaluation of state and federal grant opportunities for funding the prioritized projects.

Project Manager (2023 – Present)

Palm Beach County Vulnerability Assessment and Resilience Action Plan

- Manager for the County's first Vulnerability Assessment (VA) in accordance with Chapter 380.093 F.S. and development of a Resilience Action Plan to identify mitigation and adaptation strategies related to climate change and sea level rise. The project is funded by both a state Resilient Florida grant and Department of Economic Opportunity (DEO) grant.

Project Manager (2019 – 2021)

St. Lucie County Vulnerability Assessment

- Project Manager for the county wide sea level rise vulnerability assessment. Tetra Tech teamed with Erin L. Deady, P.A. and Clearview Geographic, LLC to prepare the St. Lucie County Vulnerability Assessment as a product of Resilience Planning Grant R2133. The Vulnerability Assessment was the first step in taking a systematic, data driven approach in developing a community-wide resilience plan to analyze natural hazard risks and identify strategies to mitigate and adapt to those hazards in a proactive, equitable, and cost-effective way. The Vulnerability Assessment is intended to provide a foundation to develop and implement a holistic community resilience plan.

Resume

Lori Lehr, CFM

Subject Matter Expert

EXPERIENCE

Lehr: 2015

Industry: 1998

AREAS OF EXPERTISE

Community Rating System Implementation and Compliance

National Flood Insurance Program Compliance

Florida Building Code

PROFESSIONAL ASSOCIATIONS

Association of State Floodplain Managers

Florida Floodplain Managers Association

PROFESSIONAL SUMMARY

Ms. Lehr has career long experience with floodplain management and Community Rating System that includes implementation and compliance with both FEMA programs. Ms. Lehr has assisted communities to achieve high levels of flood insurance discounts through the National Flood Insurance Community Rating System. Ms. Lehr also served as the lead trainer for the Community Rating System, at the Emergency Management Institute training government officials on the implementation of the program. Ms. Lehr currently works side by side with government officials across the nation to help their communities achieve better standings in the Community Rating System to enhance floodplain management compliance and promote resilience.

QUALIFICATIONS

Education
General Studies/St. Petersburg Collage

Registrations / Certifications / Licenses
Certified Floodplain Manager, Association of State Floodplain Managers

Training / Professional Development
Florida Floodplain Managers Association Community Rating System/Insurance Committee Chair

National Trainer for the Community Rating System

WORK EXPERIENCE

Lori Lehr Inc. | 2015 - Present
President

Insurance Service Office | 2007 - 2015
Community Rating System Specialist and Trainer

City of St. Petersburg | 1998 - 2007
Plans Examiner and Community Rating System Coordinator

TETRA TECH

Melissa Mitchell, CFM

Lead Planner

22 YEARS OF EXPERIENCE

Areas of Expertise

National Flood Insurance Program (NFIP)

FEMA's Community Rating System (CRS)

Floodplain Management

Local Government

Registrations/Affiliations

Association of State Floodplain Managers

Key Training/Certifications

PM 1

Certified Floodplain Manager (CFM)

E0273 NFIP, L0278 CRS, IS0279 Retrofitting, L0141 Instructional, IS212 HMAP, L276 BCA, IS30 eGrant

Education

Johnson County Community College – Overland Park, KS, A.G.S.

Vocational Certificate Construction Management

EXPERIENCE SUMMARY

Ms. Melissa Mitchell is a Floodplain Management Analyst for Tetra Tech. She has over 20 years of experience working with floodplain management, planning, and zoning, commercial and residential development, and local government. She provides technical support to existing FEMA Community Rating System (CRS) communities and leverages her background in the National Flood Insurance Program (NFIP), CRS, and knowledge of city government to help our clients.

RELEVANT EXPERIENCE

Instructor

Federal Insurance and Mitigation Administration (FIMA) Substantial Damage Estimator (SDE) Course Instructor | Advancing Resilience in Communities (ARC) Production and Technical Services (PST) Contract (June 2022 – Present)

Ms. Mitchell is serving as an instructor supporting the FEMA field deployed courses. Paired with FEMA Building Sciences, FEMA Region staff, State NFIP Specialist, and local jurisdictions, she supports FEMA's Substantial Damage Estimator course criteria and delivery.

Hazard Mitigation Planning, FEMA Community Rating System (CRS) and Floodplain Management

Township of Little Falls, New Jersey, and City of Woodland Park, New Jersey | Annual CRS Recertification Support (July 2023 – Present)

Ms. Mitchell is providing CRS technical support to aid in the completion of required annual recertifications, elevation certificate review(s), and analysis of CRS classification improvement.

Stone Harbor, New Jersey | Repetitive Loss Area Analysis (May 2023 – Present)

Ms. Mitchell is providing technical floodplain management support in the development of a CRS creditable Repetitive Loss Area Analysis. The analysis is a detailed mitigation plan for NFIP repetitive loss areas within the community. This project includes public outreach, stakeholder participation, data collection, and assessment of the flooding source with identified mitigation measures appropriate for the structure type.

Orange County, California | Floodplain Management Plan (March 2023 – Present)

Ms. Mitchell is supporting the development of a comprehensive floodplain management plan for the County of Orange. This multi-phase project includes a planning process, ordinance reviews, a steering committee, public outreach, coordination between stakeholders and participating communities, hazard assessment, mitigation possibilities, and identifying an action plan.

Snoqualmie, Washington | Repetitive Loss Area Analysis (March 2023 – Present)

Ms. Mitchell is providing technical floodplain management support with an emphasis on FEMA's Community Rating System program. This analysis includes public outreach, stakeholder participation, data collection, and assessment of the flooding source with identified mitigation measures appropriate for the structure type.

Kansas City, Kansas | NFIP Floodplain Management and FEMA CRS Support Services (October 2022 – Present)
Ms. Mitchell is delivering ongoing NFIP and FEMA CRS support to multiple departments within the City of Kansas City. Her focus is on supporting the daily duties and goals of the city's floodplain management program, NFIP compliance, and continued FEMA CRS success. Technical services have included CRS class improvement, ordinance review, Building Code Effectiveness Grading Schedule (BCEGS) survey guidance, recertification, staff training, and Flood Mitigation Assistance grant application support.

Long Beach, New York | Community Rating System Verification (December 2022 – July 2023)
Ms. Mitchell provided specialized support to the community with their 3-year CRS Verification application and aided in the development of a CRS Program for Public Information.

San Diego County, California | Community Rating System Verification (2022)
Ms. Mitchell has supported the city's ongoing CRS efforts which included annual recertification support, CRS verification technical services, and the completion of a baseline assessment analysis of their CRS program.

Bellaire, Texas | Community Rating System Verification (2023)
Ms. Mitchell provided support to the city's CRS verification/modification documentation with specific aid for the community's outreach program and drainage system maintenance.

Corte Madera, California | Community Rating System Verification (2022)
Ms. Mitchell provided support to the Town of Corte Madera with their CRS annual recertification and CRS verification visit. Services included CRS training for staff members.

Bellevue, Washington | Community Rating System Verification (2022)
Ms. Mitchell provided technical support with the completion of the city's CRS verification application and documentation.

Woodland Park, New Jersey, and Snoqualmie, Washington | Community Rating System Annual Recertifications (2022)
Ms. Mitchell aided both communities with the completion of their annual CRS recertifications.

Federal Insurance and Mitigation Administration (FIMA) | Local Substantial Damage Standard Operating Procedures (IDEAL STATE)
Ms. Mitchell provided support in the review and assessment of the substantial damage management plan templates to ensure consistency.

National Flood Insurance Program's Community Rating System, Insurance Services Office

CRS Specialist (2014 – 2022)
Ms. Mitchell served as the primary CRS Specialist assigned to six states within three FEMA Regions. This territory included the management of ninety-eight CRS communities within the states of Kansas, Missouri, Iowa, Nebraska, Arkansas, and Minnesota. CRS Specialist support was provided to communities in California, Tennessee, and Florida as needed.

Responsibilities included high-level technical services to support existing communities and foster the growth and interest of the CRS program. Duties included reviewing community requests for Community Rating Systems classifications, verifying creditable activities, and providing supportive workshops, presentations, conference participation, and user group support. In addition to supporting existing CRS Community participants, equal efforts were in place for interested communities. She aided as an instructor for FEMA's 4-day and 2-day CRS courses that were field-deployed nationwide.

Department of Urban Planning, Unified Government of Wyandotte County, Kansas

Development Review Committee Coordinator/Floodplain Administrator (2008 – 2014)
As the Development Review Committee Coordinator, Ms. Mitchell was responsible for the task management of commercial development permit applications. The position worked with seven departments during the plan review phase to ensure applicant needs were fulfilled and the project remained on track from the pre-application meeting to the issuance of the certificate of occupancy. Duties also included providing support for Planning Commission applicants. She served as the floodplain administrator and CRS Coordinator. Assisted with CRS entry applications for two out of the three cities within the County. Responsibilities included floodplain permit plan review, floodplain development permitting, and code enforcement.

TETRA TECH

Emma Kilkelly, AICP

Planner

8 YEARS OF EXPERIENCE

Areas of Expertise

Spatial Analysis

Data Analysis

Data Visualization

Dashboarding

Information Design

Key Training/Certifications

American Institute of Certified Planners, August 2022

Education

Master of City and Regional Planning, Rutgers, the State University of New Jersey

Bachelor of Arts in Environmental Humanities, Whitman College

EXPERIENCE SUMMARY

Ms. Kilkelly is a climate resilience professional with a background in risk management and data analytics. She balances liaising between technical and non-technical groups to develop holistic risk assessments. Ms. Kilkelly has eight years of experience in diverse roles spanning government consulting, project delivery, and program management.

RELEVANT EXPERIENCE

Senior Resilience Planner (August 2023 – Present)

Tetra Tech, Inc.

Ms. Kilkelly assists clients with resilience planning, risk management, and data analysis. In this capacity, she serves as a lead planner and project support for clients across the US.

Ms. Kilkelly has served as a lead planner on multiple climate vulnerability assessment projects. In this role, she has developed methods/frameworks, worked with GIS on execution, and transformed results into actionable/user friendly tools. These projects include

- City of Palm Beach's CDBG-MIT Climate Vulnerability Assessment
- City of Key West Resilient Florida Vulnerability Assessment
- Valley Water Flood Hazard Mitigation Plan

Ms. Kilkelly has served as project support on climate resilience, hazard mitigation update (HMP), and climate vulnerability assessment projects to include

- New Jersey Office of Emergency Management (NJOEM)-Developed State Local hazard mitigation plan standard operating procedures to incorporate climate change and risk-based decision making
- City of Los Angeles Climate Vulnerability Assessment: Developed the assessment method documentation/final report
- Rockland County HMP update
- American Rivers: Developed best management practices document to help Washington communities fund large-scale nature-based solutions
- Southeastern Michigan Council of Governments: Develop funding portfolio and roadmap to fund green infrastructure and climate resilience strategies
- Port Moody Flood Vulnerability Assessment: Developed public engagement strategy and helped develop final report

Resilience & Response Specialist (September 2022 – March 2023)

McKinsey & Company | Global Risk Function New York, NY

- Developed strategic programs for senior leadership to anticipate and mitigate high-profile threats and understand policy landscape across a global organization operating in 65 countries.
- Developed data-driven resilience assessment frameworks to streamline risk escalation and communication for senior leadership to improve continuity of operations during crises.

Resilience Planner (May 2021 – September 2022)

Dewberry Engineers, Inc. | Resilience Solutions Group New York, NY

- Leveraged climate expertise to deliver data-driven resilience strategies and solutions for local, state, and federal clients by breaking down highly technical and scientific information into digestible, action-oriented information.
- Liaised between clients and engineering teams to build quantitative risk assessments and interactive GIS tools that reflected clients' decision landscape while maintaining data and scientific integrity.
- Managed workstreams, mentored junior staff, and conducted advanced GIS and statistical analyses using big data and business intelligence tools.
- Leveraged climate expertise to deliver data-driven resilience strategies and solutions for local, state, and federal clients by breaking down highly technical and scientific information into digestible, action-oriented information.
- Managed workstreams, mentored junior staff, and conducted advanced GIS and statistical analyses using big data and business intelligence tools.
- Supported development of the Virginia Coastal Resilience Master Plan by writing final deliverable and supporting documents, developing structured frameworks for quantitative impact assessment and funding analysis, designing public-facing data explorer, and facilitating public engagement.
- Provided technical assistance to local and county governments through the North Carolina Resilient Coastal Communities Program to assess their risk to
  sea level rise by leading execution of vulnerability assessments, using results to identify shovel-ready projects, and coordinating public outreach strategy.
- Supported municipalities to incorporate climate change science into planning and decision-making processes through the Resilient NJ Program to bolster resilience against climate-related hazards (e.g., extreme heat, sea-level rise, coastal storms, and wildfires) by assessing vulnerability of critical assets, identifying adaptation projects, and facilitating public meetings.

Research & GIS Analyst (May 2020 – May 2021)

New Jersey Department of Environmental Protection | Environmental Public Health & Safety Trenton, NJ

- Developed environmental health exposure GIS analysis and public-facing tools, including literature review, data/spatial analysis, and multiple rounds of stakeholder engagement.

John D. Solomon Fellow (September 2020 – May 2021)

New York City Emergency Management | Risk Reduction & Recovery Bureau New York, NY

- Supported strategic planning for the City's internal COVID-19 recovery framework through policy research, data analysis, and stakeholder engagement.
- Leveraged data analytics skills to develop pandemic recovery metrics, deploy weekly dashboards to City agencies, and develop custom ESRI tools for public users.

TETRA TECH

Kenneth Caban, PE, LEED® AP

Engineering Support

29 YEARS OF EXPERIENCE

14 YEARS WITH TETRA TECH

Areas of Expertise

Water, Reuse, and Wastewater Conveyance and Treatment Systems

Master Planning and Design

Site Development

Capital Improvement Projects

Analysis, Design, Permitting, and Inspection

Construction Management

Professional Affiliation

American Water Works Association

Key Training/Certifications

Professional Engineer, Florida, No. 59276, 2003

Board Certified Environmental Engineer (BCEE)

Leadership in Energy and Environmental Design Accredited Professional (LEED AP)

Education

Florida International University, MS, Environmental Engineering

Florida International University, BS, Civil Engineering

EXPERIENCE SUMMARY

Mr. Caban has over two and a half decades of experience in the analysis, design, permitting, inspection, construction management, and program and project management of water, reuse, and wastewater conveyance and treatment systems, water, wastewater, and stormwater master planning and design, site development, and capital improvement programs for various water utilities in southeast Florida.

RELEVANT EXPERIENCE

Project Manager

Utilities Continuing Project | City of Hollywood, FL

This program includes water, wastewater, and other infrastructure and to date Ken has led the programs for water main replacement, septic to sewer, and wastewater. He assisted with the design and or construction of close to 400,000 feet of piping and other infrastructure. Tetra Tech has provided surveying, geotechnical evaluations, design, permitting, and construction administration services on multiple projects concurrently.

Principal, Project Manager, Engineer of Record

Water Main Replacement Program | City of Hollywood, FL

Overseeing multiple projects for the systematic replacement aged and undersized water mains throughout the City. The projects included surveying, geotechnical evaluations, design, permitting, and construction administration services on multiple projects being completed concurrently. The entire program is comprised of over 300,000 linear feet (56 miles) of water main replacement, reconnection of over 2,500 service connections, numerous underground and overhead utilities conflicts, permitting through multiple agencies, and construction within schedule and budget. Existing aged cast iron water mains were replaced with both DIP and PVC water mains, ranging from 4-inch to 24-inch diameters. The existing water mains were located within residential streets, paved and unpaved alleys, and easements in the rear of residential lots, which had become overgrown or encroached upon by property owners. Existing water meters located within unpaved alleys or rear easements were relocated to the front of the lots and included new water services within private property. Aged fire hydrants were replaced some water mains were upsized by one nominal size. Extensive asphalt pavement and pavement markings restoration and improvements were also included.

Principal-in-Charge/Quality Manager

Stormwater Pump Stations and Control Structures Assessments and Rehabilitation of Pump Station SW-02 | City of Hollywood, FL

Condition assessment and rehabilitation of the City's stormwater pump stations and upstream control structures, including backflow prevention valves. Mr. Caban will serve to deliver the City's expectations successfully on this project for condition assessment, design permitting, and construction. Pump Station SW-02, located on South Lake and within this project's area, will be rehabilitated and raised to coordinate with the latest seawall elevation recommendations, since the pump station's two discharge pipes currently pass above the existing seawall. Tetra Tech will assess the condition of the City's stormwater pump stations and develop a phased capital

program, to include pump station rehabilitation and upstream improvements in the vicinity of the pump stations, including control structures and backflow prevention valves.

Quality Manager

Royal Poinciana Sewer Expansion | City of Hollywood, FL

Septic to sanitary conversion project from Sheridan Boulevard south to Taft Street and from Federal Highway (US1) to N. 21st Avenue. Project included three preliminary sanitary sewer system design layouts for addition of a new lift station location on Coolidge Street, evaluation of the existing E-22 lift station at the current location, and a split-flow plan for flows being directed to a lift station at both E-22 and Coolidge Street. Prepared a preliminary routing and flow evaluation technical memo for approval prior to the final design layout and lift station siting. Performed land use/flow calculations using Broward County flows for each land use type, the various land use densities, and proposed future development, when necessary. The project consisted of approximately 80,000 feet of new gravity sewer piping ranging from 8- to 12-inches in diameter, over 100 new manholes, laterals to each parcel for future connections and abandonment of the existing septic tanks, abandonment and placing out of service five existing private lift stations with associated tie-ins to the new gravity sewer system, abandonment and placing out of service existing force main piping ranging from 4- to 6-inches in diameter, conflict resolution and soft digs due to the heavily congested corridors with existing utilities and duct banks, and relocation of water mains where necessary. In addition, the project included lift station siting, new duplex lift station design to handle the area's wastewater flows, and new control panel and electrical, mechanical, and structural system design. Permitting includes Broward County Environmental Protection and Growth Management (EPGMD) and City of Hollywood Building Department permitting for the wastewater system and Broward County right-of-way use for facilities located on N. 21st Avenue. Services included bidding services and evaluations with recommendation of award and construction administration services including monthly progress meetings, field inspections, review and approval of shop drawings, requests for information responses, record drawing production, substantial and final completions and certifications.

Project Manager

Stormwater Master Plan Update | Village of Key Biscayne, FL

Updates to Stormwater Master Plan and the Floodplain Management Plan, which is one of the components required by the Community Rating System (CRS) in order to maintain and obtain additional credit for the 5-year CRS Cycle Recertification. Tasks included inventorying and mapping stormwater infrastructure in the City; hydrologic and hydraulic modeling using XP SWMM; preparing a stormwater atlas based on the GIS platform; identifying existing and future levels of service (LOS) based on water level rises for varying stormwater conditions; preparing cost estimates for alternatives; prioritizing improvements; identifying phased capital improvements; funding requirements; and coordination with stormwater rate study.

Principal in Charge

Brickell Bay Drive Improvements | City of Miami, FL

Preparation of a design package for Brickell Bay Drive from SE 14th Steet to SE 15th Road. The purpose of this signature project is to adapt Brickell Bay Drive and protect it from future storm surge and sea level rise while encouraging waterfront connectivity, creating open space, and improving the natural environment and the local ecosystem. Creating a long-term stewardship structure that protects and enhances quality of life and public and private investments is essential to keeping the Brickell Bay Drive waterfront area a functional, long-term resilient and adaptable asset.

Project Director

20-Year Water Facilities Master Plan Update | Miami-Dade County Water and Sewer Department, FL

Series of task authorizations associated with planning and implementing projects necessary for re-issuance and compliance of Miami-Dade County's water use permit and completion of the water master plan. Directed a large project team on various projects, managed the individual projects, and served as an active team member for all of the task authorizations associated with this contract. Responsible for extensive high-level client interaction and service for this contract, meeting and corresponding with various Miami-Dade Water and Sewer Department Deputy and Assistant Directors and Division and Section Chiefs, among others. The task authorizations are listed and described below beginning with active task authorizations and continuing with completed task authorizations.

Project Manager

Task Authorization No. 4 – Alternative Water Supply Investigation and Water Use Permitting Assistance (20-Year Water Facilities Master Plan Update) | Miami-Dade County Water and Sewer Department, FL
Conduct this five-part project, which consisted of preparing a 10-Year Water Facilities Work Plan as required by the Department of Community Affairs, Groundwater Recharge Projects Evaluation, Stormwater Storage and Recharge, preparing water demand forecasts utilizing a Traffic Analysis Zone (TAZ) Methodology, and to assist Miami-Dade Water and Sewer Department with preparation of various technical submittals to support issuance of a 20-year Water Use Permit. Included in this analysis was a quantification of future water demands, the effect of conservation and reuse, the identification and quantification of alternative sources to supply future demands.

Project Manager

Task Authorization No. 3 – Initial Water Use Permitting Assistance (20-Year Water Facilities Master Plan Update) | Miami-Dade County Water and Sewer Department, FL
Assisted with initial water use permitting activities for the renewal of Miami-Dade Water and Sewer Department's 20-year Water Use Permit. This included preparation of support data, including population, historical water use, projected water demand, and initial evaluations of alternative water supplies, water conservation, and reuse measures.

Project Manager

Task Authorization No. 2 – Coastal Wetlands Rehydration Demonstration Membrane Pilot Plant Technical Memorandum, (20-Year Water Facilities Master Plan Update) | Miami-Dade County Water and Sewer Department, FL
Project Manager for the preparation of a technical memorandum for the preliminary design of a 1 MGD demonstration membrane plant and constructed wetlands. The treatment processes included nitrification, denitrification, phosphorous removal, ultrafiltration/microfiltration membranes, ultraviolet disinfection, reverse osmosis, and various advanced oxidation processes. This project also included baseline water quality monitoring of surrounding water bodies. Mr. Caban led the project team in meeting the regulatory schedule imposed and also led efforts in collaborating with the various stakeholders involved in the project, including the South Florida Water Management District (SFWMD), the Miami-Dade Water and Sewer Department (MDWASD), the Department of Environmental Resources Management (DERM), the Florida Department of Environmental Protection (FDEP), Biscayne National Park, and others.

TETRA TECH

Steven Parker

GIS Support

19 YEARS OF EXPERIENCE

Areas of Expertise

GIS

Hydrology and Hydraulics

Cartography/Mapping

Fluvial Geomorphology

Education

MA, Geography, San Diego State University

BA, Geography, Humboldt State University

EXPERIENCE SUMMARY

Mr. Steven Parker is an experienced geographer and GIS professional, acting as a project manager and analyst in environmental planning and hydrologic and hydraulic engineering. He has a strong background in remote sensing/image analysis, GIS, fluvial geomorphology, hydraulics, and hydrology. His experience includes management of projects for floodplain management (CRS, LOMR, Levee Certifications), as well as model expertise including the latest versions of HEC-RAS, as well as GeoRAS, FLO-2D, and HEC-HMS and GeoHMS. He acts as a mentor in GIS and ArcGIS for other staff and works well with design teams working in AutoCAD or Microstation.

RELEVANT EXPERIENCE

GIS Lead and Project Manager (2014 – 2019)

City and County of Los Angeles, CA | Floodplain Management Plans

GIS Lead and Project Manager. Separate City and County FMP plans were included as appendices to Hazard Mitigation Plans that form the basis of grant requests to FEMA. Tasks included assisting in developing the floodplain management plans for both the City and County of Los Angeles, using existing FEMA data and City and County supplied data to create flood depth grids for use in modeling potential damages through the FEMA HAZUS software package in those jurisdictions, and to better inform the plan, as well as the public, to the risks. In 2019, both the City and County updated their FMP plans and Mr. Parker managed the overall projects in addition to the assisting in the plan development, steering committee, and public engagement.

GIS Analyst (2019 – 2020)

Orange County, CA | East Orange County Water District Hazard Mitigation Plan

GIS Analyst. This effort was comprised of the development of a hazard mitigation plan for a water supply and sewer service water district in Orange County. As part of the HMP, a HAZUS database was developed and formatted with the district's water and sewer infrastructure for the analysis of potential damages, down time, and other impacts considered in the HMP. Flood depth grids from dam breach studies in the jurisdiction were compiled for HAZUS

GIS Lead (2014 – 2016)

Soboba Band of Luiseno Indians | Soboba Flood Damage Assessment and MDP

GIS Lead for a Master Plan of Drainage to address flooding issues throughout the reservation, including the adjacent casino property. Tasks included Hydrologic analyses using Advanced Engineering Software (AES) Rational Tabling Version and Synthetic Unit Hydrograph Version, and hydraulic studies using FlowMaster and FHA. Proposed facilities were identified to address flooding issues and prioritized based on benefit to the reservation. In addition, a floodplain study was performed in HEC-RAS along Poppet Creek to define the 100-year floodplain. The MDP and subsequent project results were used to assist with applications for FEMA grant programs (HMGP, 404, 406).

Hydraulic and GIS Lead (2021)

Manheim Borough, PA | Chiques Creek Channel Stream Improvement

Hydraulic and GIS Lead. This effort was to conduct a 30% design for stream channel improvements to improve the town resiliency to mid and low recurrence flood events that the city has struggled with.