City and County of San Francisco
Office of Contract Administration
Purchasing Division

First Amendment

THIS AMENDMENT (this "Amendment") is made as of **[insert date]**, in San Francisco, California, by and between **CH2M HILL Engineers, Inc.** ("Contractor"), and the City and County of San Francisco, a municipal corporation ("City"), acting by and through its Director of the Office of Contract Administration.

Recitals

WHEREAS, City and Contractor have entered into the Agreement (as defined below); and

WHEREAS, City and Contractor desire to modify the Agreement on the terms and conditions set forth herein to amend the contract scope, increase the contract amount, and update standard contractual clauses; and

WHEREAS, the Agreement was competitively procured as required by San Francisco Administrative Code Chapter 21.1 through an RFP issued on April 24, 2017 and this modification is consistent therewith; and

WHEREAS, the City's Port Commission approved this Agreement by Resolution No. 17-36 on August 8, 2017;

WHEREAS, the City's Board of Supervisors approved this Agreement by Resolution No. 351-17 on September 19, 2017;

NOW, THEREFORE, Contractor and the City agree as follows:

Article 1 Definitions

The following definitions shall apply to this Amendment:

1.1 **Agreement.** The term "Agreement" shall mean the Agreement dated October 2, 2017 between Contractor and City, as amended by the:

First amendment, dated [insert date of the first amendment]

1.2 **Other Terms.** Terms used and not defined in this Amendment shall have the meanings assigned to such terms in the Agreement.

Article 2 Modifications to the Agreement.

The Agreement is hereby modified as follows:

2.1 **Definitions.** *The following is hereby added to the Agreement as a Definition in Article 1:*

1.10 "Confidential Information" means confidential City information including, but not limited to, personally-identifiable information ("PII"), protected health information ("PHI"), or individual financial information (collectively, "Proprietary or Confidential Information") that is subject to local, state or federal laws restricting the use and disclosure of such information, including, but not limited to, Article 1, Section 1 of the California Constitution; the California Information Practices Act (Civil Code § 1798 et seq.); the California Confidentiality of Medical Information Act (Civil Code § 56 et seq.); the federal Gramm-Leach-Bliley Act (15 U.S.C. §§ 6801(b) and 6805(b)(2)); the privacy and information security aspects of the Administrative Simplification provisions of the federal Health Insurance Portability and Accountability Act (45 CFR Part 160 and Subparts A, C, and E of part 164); and San Francisco Administrative Code Chapter 12M (Chapter 12M).

2.2 **Notification of Legal Requests** *and* **Management of City Data and Confidential Information** *The following sections are hereby added and incorporated in Articles 11 and 13 of the Agreement:*

11.14 **Notification of Legal Requests.** Contractor shall immediately notify City upon receipt of any subpoenas, service of process, litigation holds, discovery requests and other legal requests ("Legal Requests") related to all data given to Contractor by City in the performance of this Agreement ("City Data" or "Data"), or which in any way might reasonably require access to City's Data, and in no event later than 24 hours after it receives the request. Contractor shall not respond to Legal Requests related to City without first notifying City other than to notify the requestor that the information sought is potentially covered under a non-disclosure agreement. Contractor shall retain and preserve City Data in accordance with the City's instruction and requests, including, without limitation, any retention schedules and/or litigation hold orders provided by the City to Contractor, independent of where the City Data is stored.

13. 4 **Management of City Data and Confidential Information**

13.4.1 **Access to City Data**. City shall at all times have access to and control of all data given to Contractor by City in the performance of this Agreement ("City Data" or "Data"), and shall be able to retrieve it in a readable format, in electronic form and/or print, at any time, at no additional cost.

13.4.2 **Use of City Data and Confidential Information.** Contractor agrees to hold City's Confidential Information received from or created on behalf of the City in strictest confidence. Contractor shall not use or disclose City's Data or Confidential Information except as permitted or required by the Agreement or as otherwise authorized in writing by the City. Any work using, or sharing or storage of, City's Confidential Information outside the United States is subject to prior written authorization by the City. Access to City's Confidential Information must

be strictly controlled and limited to Contractor's staff assigned to this project on a need-to-know basis only. Contractor is provided a limited non-exclusive license to use the City Data or Confidential Information solely for performing its obligations under the Agreement and not for Contractor's own purposes or later use. Nothing herein shall be construed to confer any license or right to the City Data or Confidential Information, by implication, estoppel or otherwise, under copyright or other intellectual property rights, to any third-party. Unauthorized use of City Data or Confidential Information by Contractor, subcontractors or other third-parties is prohibited. For purpose of this requirement, the phrase "unauthorized use" means the data mining or processing of data, stored or transmitted by the service, for commercial purposes, advertising or advertising-related purposes, or for any purpose other than security or service delivery analysis that is not explicitly authorized.

13.4.3 **Disposition of Confidential Information**. Upon termination of Agreement or request of City, Contractor shall within forty-eight (48) hours return all Confidential Information which includes all original media. Once Contractor has received written confirmation from City that Confidential Information has been successfully transferred to City, Contractor shall within ten (10) business days purge all Confidential Information from its servers, any hosted environment Contractor has used in performance of this Agreement, work stations that were used to process the data or for production of the data, and any other work files stored by Contractor in whatever medium. Contractor shall provide City with written certification that such purge occurred within five (5) business days of the purge.

2.3 **Assignment.** *The following is hereby added to Article 4 of the Agreement, replacing the previous Section 4.5 in its entirety:*

4.5 **Assignment.** The Services to be performed by Contractor are personal in character. Neither this Agreement, nor any duties or obligations hereunder, may be directly or indirectly assigned, novated, hypothecated, transferred, or delegated by Contractor, or, where the Contractor is a joint venture, a joint venture partner, (collectively referred to as an "Assignment") unless first approved by City by written instrument executed and approved in the same manner as this Agreement in accordance with the Administrative Code. The City's approval of any such Assignment is subject to the Contractor demonstrating to City's reasonable satisfaction that the proposed transferee is: (i) reputable and capable, financially and otherwise, of performing each of Contractor's obligations under this Agreement and any other documents to be assigned, (ii) not forbidden by applicable law from transacting business or entering into contracts with City; and (iii) subject to the jurisdiction of the courts of the State of California. A change of ownership or control of Contractor or a sale or transfer of substantially all of the assets of Contractor shall be deemed an Assignment for purposes of this Agreement. Contractor shall immediately notify City about any Assignment. Any purported Assignment made in violation of this provision shall be null and void.

2.4 **Withholding.** *The following is hereby added to Article 7 of the Agreement:*

7.3 **Withholding.** Contractor agrees that it is obligated to pay all amounts due to the City under the San Francisco Business and Tax Regulations Code during the term of this Agreement. Pursuant to Section 6.10-2 of the San Francisco Business and Tax Regulations Code, Contractor further acknowledges and agrees that City may withhold any payments due to Contractor under this Agreement if Contractor is delinquent in the payment of any amount required to be paid to the City under the San Francisco Business and Tax Regulations Code.

Any payments withheld under this paragraph shall be made to Contractor, without interest, upon Contractor coming back into compliance with its obligations.

2.5 **Consideration of Salary History.** *The following is hereby added to Article 10 of the Agreement, replacing the previous Section 10.4 in its entirety:*

10.4 **Consideration of Salary History.** Contractor shall comply with San Francisco Administrative Code Chapter 12K, the Consideration of Salary History Ordinance or "Pay Parity Act." Contractor is prohibited from considering current or past salary of an applicant in determining whether to hire the applicant or what salary to offer the applicant to the extent that such applicant is applying for employment to be performed on this Agreement or in furtherance of this Agreement, and whose application, in whole or part, will be solicited, received, processed or considered, whether or not through an interview, in the City or on City property. The ordinance also prohibits employers from (1) asking such applicants about their current or past salary or (2) disclosing a current or former employee's salary history without that employee's authorization unless the salary history is publicly available. Contractor is subject to the enforcement and penalty provisions in Chapter 12K. Information about and the text of Chapter 12K is available on the web at https://sfgov.org/olse/consideration-salary-history. Contractor is required to comply with all of the applicable provisions of 12K, irrespective of the listing of obligations in this Section.

2.6 **Limitations on Contributions**. *The following is hereby added to Article 10 of the Agreement, replacing the previous Section 10.11 in its entirety:*

10.11 **Limitations on Contributions.** By executing this Agreement, Contractor acknowledges its obligations under section 1.126 of the City's Campaign and Governmental Conduct Code, which prohibits any person who contracts with, or is seeking a contract with, any department of the City for the rendition of personal services, for the furnishing of any material, supplies or equipment, for the sale or lease of any land or building, for a grant, loan or loan guarantee, or for a development agreement, from making any campaign contribution to (i) a City elected official if the contract must be approved by that official, a board on which that official serves, or the board of a state agency on which an appointee of that official serves, (ii) a candidate for that City elective office, or (iii) a committee controlled by such elected official or a candidate for that office, at any time from the submission of a proposal for the contract until the later of either the termination of negotiations for such contract or twelve months after the date the City approves the contract. The prohibition on contributions applies to each prospective party to the contract; each member of Contractor's board of directors; Contractor's chairperson, chief executive officer, chief financial officer and chief operating officer; any person with an ownership interest of more than 10% in Contractor; any subcontractor listed in the bid or contract; and any committee that is sponsored or controlled by Contractor. Contractor certifies that it has informed each such person of the limitation on contributions imposed by Section 1.126 by the time it submitted a proposal for the contract, and has provided the names of the persons required to be informed to the City department with whom it is contracting.

2.7 **Appendix A.** Appendix A is hereby replaced in its entirety by Appendix A-1, attached to this Amendment and fully incorporated within the Agreement.

2.8 **Appendix B-1.** Appendix B-1 is hereby replaced in its entirety by Appendix B-1A, attached to this Amendment and fully incorporated within the Agreement.

2.9 **Appendix C.** Appendix C is hereby replaced in its entirety by Appendix C-1, attached to this Amendment and fully incorporated within the Agreement.

2.10 **Appendix D.** Appendix D is hereby replaced in its entirety by Appendix D-1, attached to this Amendment and fully incorporated within the Agreement.

Article 3 Effective Date

Each of the modifications set forth in Section 2 shall be effective on and after [specify either "the date of this Amendment" or other effective date].

Article 4 Legal Effect

Except as expressly modified by this Amendment, all of the terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[SIGNATURES ON FOLLOWING PAGE]

IN WITNESS WHEREOF, Contractor and City have executed this Amendment as of the date first referenced above.

CITY
Recommended by:

_____
Rod Iwashita
Deputy Director, Chief Harbor Engineer
Port of San Francisco

Recommended by:

_____
Elaine Forbes
Executive Director
Port of San Francisco

Approved as to Form:

Dennis J. Herrera
City Attorney

By: _____
Timothy Yoshida
Deputy City Attorney

CONTRACTOR
CH2M HILL Engineers, Inc.

_____
Patrick King
Senior Vice President

City Supplier number: 86818

Attached Appendices:

A-1: Scope of Services

B-1A: Calculation of Charges

C-1: Hourly Rate Schedule

D-1: Organizational Chart

Appendix A-1 [Example]

Appendix A-1
Scope of Services

Introduction

Waterfront Resilience Program

The Port of San Francisco manages 7.5 miles of bayside shoreline that is home to some of the region's most popular open spaces and attractions, a national historic district, hundreds of small businesses, nearby housing, and maritime and industrial uses. The Port's jurisdiction includes transportation networks like BART and Muni, critical utilities including drinking and wastewater, and key emergency response facilities. The Port's Waterfront Resilience Program efforts ensure the waterfront, and its important regional and citywide assets, are resilient in the face of hazards such as earthquakes, flooding, sea level rise due to climate change, shoreline erosion, and others. Efforts under this contract and scope of services support multiple aspects of the Port's Waterfront Resilience Program.

Waterfront Resilience Program Framework

The Port developed a Waterfront Resilience Framework to address immediate hazards including seismic and flooding, as well as longer term hazards like sea level rise. This adaptive planning framework allows the Port to act now to address risks to life safety and emergency response, while planning for mid- and long-term risks. It also allows the Port to be responsive to community priorities, changes in science, and funding and partnership opportunities

STRENGTHEN	ADAPT	ENVISION
Immediately implement highest priority disaster response and life safety projects.	Identify policies and projects that will result in a Port that is resilient to seismic and increasing flood risks, and responsive to changing priorities.	Develop visions that can respond to remaining seismic risk and increasing flood risks and long-term sea level rise.

The Port's Waterfront Resilience Program involves close coordination with other City department and regional partners to ensure the work aligns with Citywide and regional guidance, policies, projects, and other efforts

Port Embarcadero Seawall Program

The Seawall is the foundation of over three miles of the San Francisco waterfront stretching from Fisherman's Wharf to Mission Creek. The Seawall supports historic piers, wharves, and buildings that make up the Embarcadero National Historic District, stabilizes filled lands that contain critical City and regional transit and utility infrastructure, and protects Bayfront neighborhoods including Downtown from coastal flooding.

The Embarcadero Seawall Program ~~Seawall Resiliency Project~~ is a City priority ~~Project~~ in which the Port is acting as the lead agency to improve safety, reduce damage, and enhance the environment by repairing, altering, or replacing the Seawall and associated infrastructure.

The United States Army Corps of Engineers (USACE) San Francisco Waterfront Flood Resiliency Study (Flood Study) is also a City priority in which the Port is acting as the lead agency to improve safety,

reduce damage, and enhance the environment by designing and building flood management structures to protect public and private property.

Contractor agrees to perform the following services in accordance with the terms of this Agreement, the RFP, and its proposal dated **June 2, 2017**. The RFP and Contractor's proposal are incorporated by reference into this Agreement, however, the new scope of work herein and the authorized task orders take precedence over the RFP or proposal. ~~though fully set forth herein.~~ In the event of an inconsistency or conflict between the initial Original Contract, RFP and Contractor's proposal, the Original Contract shall take precedence.

1. Description of Services

Contractor will assist the Port in implementing the Seawall Resiliency Project. The Contractor shall provide qualified personnel to assist the Port in three phases: Planning and Program Development (Phase 1), Preliminary Design and Environmental Compliance (Phase 2), and Support Services during Final Design and Construction (Phase 3). Contractor will neither substitute nor remove from the Project any personnel designated as "Key Staff" in Appendix C, without written consent of the Port (which consent shall not be unreasonably withheld) and in those circumstances when substitution or removal of such personnel cannot be avoided, Contractor shall provide replacement personnel who are as equally if not more qualified than the designated personnel.

The following is a general summary of the tasks involved and required under this Agreement:

Phase 1	1.01.00	Management and Coordination of Services, Phase 1
	1.02.00	Community Planning and Stakeholder Engagement, Phase 1
	1.03.01	Data Collection and Review
	1.03.02	Additional Investigations
	1.03.03	Existing Conditions Report
	1.04.01	Earthquake Risk Assessment
	1.04.02	Flood Risk Assessment and Adaptation Plan
	1.04.03	Utility Risk Assessment
	1.04.04	Transportation Risk Assessment
	1.04.05	Land Use Planning and Regulatory Assessment
	1.04.06	Urban Design Assessment
	1.04.07	Disaster Response and Recovery Assessment
	1.04.08	Environmental Conditions and Opportunities
	1.04.09	Economic Impact Assessment
	1.04.10	MHRA Report
	1.05.00	
	1.05.01	~~Design Criteria~~ Strengthen
	1.05.02	~~Needs, Risks, and Aspirations~~ Adapt and Envision
	~~1.05.03~~	~~Alternative Formulation~~
	~~1.05.04~~	~~Alternative Comparison and Ranking~~
	~~1.05.05~~	~~Refine Design & Engineering of Highest Ranked Alternatives~~
	~~1.05.06~~	~~Final Evaluation, Selection and Preferred Program~~
	1.06.00	City Staff Training, Phase 1
	1.07.00	Seismic Peer Review Panel, Phase 1
	1.08.00	Port Alignment Workshop
	1.09.00	United States Army Corps of Engineer Feasibility Support Services
	1.10.00	Workforce Development and LBE Support Services
Phase 2	2.01.00	Management and Coordination of Services, Phase 2
	2.02.00	Community Planning and Stakeholder Engagement, Phase 2
	2.03.01	Design Basis Document (Initial Projects)
	2.03.02	Detailed Investigations, Design Level (Initial Projects)
	2.03.03	Preliminary Design, Engineering & Cost Est, General Plan (Initial Projects)
	2.03.04	Preliminary Design, Engineering & Cost Est, 15% (Initial Projects)

	2.03.05	Preliminary Design, Engineering & Cost Est, 35% (Initial Projects)
	2.03.06	Design/Build Contract Packages (Initial Projects)
	2.04.00	Pilot Projects
	~~2.05.00~~	~~Emergency Projects~~
	2.06.01	California Environmental Quality Act (CEQA) compliance
	2.06.02	National Environment Policy Act (NEPA) compliance
	2.06.03	Permitting
	2.07.00	City Staff Training, Phase 2
	2.08.00	Seismic Peer Review Panel, Phase 2
Phase 3	3.01.00	Management and Coordination of Services, Phase 3
	3.02.00	Community Planning and Stakeholder Management, Phase 3
	3.03.00	Value Engineering
	3.04.00	Independent Design Review

2. Task Orders

Performance of services under this Agreement will be executed according to a task order process, and Contractor shall provide adequate quality control processes and deliverables in conformance with the technical requirements of each particular task order. The Port Waterfront Resilience ~~Project~~ Director ~~Manager~~ or Port Task Leads will initially identify tasks and request the Contractor to propose a project scope, sub tasks, staffing plan, LBE utilization, schedule, deliverables, budget, whether the task order is time and materials or lump sum, and costs to complete the task in accordance with Appendix B-1, to be submitted to the ~~project~~ program manager for approval. All costs associated with the development of the scope of work for each task order shall be borne by Contractor, unless the effort exceeds more than two (2) meetings and one(1) revision of the scope of work If the effort exceeds this effort, then the Port shall compensate the Contractor for further scoping efforts that the Port requests through an existing task or a new task order or eliminate or modify the proposed scope of services. If the Port eliminates or modifies the proposed scope of services for a specific task under this section, nothing in this agreement will inhibit the Port's ability to procure such services from another source. However, if the Contractor's task budget (Appendix B-1), if applicable, is an estimate, the City reserves the right to modify the applicable budget allocated to any task as more specific information concerning the task order scope becomes available.

The Port's task order request will be processed for Controller certification of funding, only after which the Port will issue a *Task Order Authorization Notice to Proceed*. The Contractor is hereby notified and acknowledges that work cannot commence until the Contractor receives a written Notice to Proceed in accordance with the San Francisco Administrative Code. ***Any work performed without a Notice to Proceed will be at the Contractor's own financial risk.*** The calculations of costs and methods of compensation for all task orders under this Agreement shall be in accordance with Appendix B. Task Orders already executed are included in this Contract Amendment in Appendix E.

These following tasks provide general guidance to the Contractor as to the anticipated scope of work, for which the Port expressly reserves the right to modify or delete.

Services provided by the Contractor are intended to augment the City's workforce, through the provision of expertise in the development and management of this large-scale capital project; and, where needed, through supplementary services to meet peak workload demands of the ~~Seawall Resiliency Project~~ Port's Waterfront Resilience Program. The Project Manager, or his or her designee, reserves the discretion and authority to affect the initiation, augmentation, alteration, or cessation of specific services and tasks provided through this contract. The estimates of work hours that are included in this scope are intended as a reference for the level of effort anticipated for each task.

While the Port intends to authorize the Contractor to provide the services described below, the Port shall do so only when (a) sufficient funds for such services have been appropriated in accordance with the budget and fiscal provisions of the Port and City, and (b) the Port, in its sole discretion, without waiving any rights, has found that Contractor's prior services to date have been adequately performed.

Note that the Original Contract scope of services has been amended as follows:

- Where task orders have been authorized they are listed and referenced to Appendix E.
- Scope that has been replaced by task orders is shown in ~~Strikeout.~~
- Scope that has been eliminated from the Original Scope of Services is shown ~~in Strikeout Underline~~.
- New scope and language is shown as Underlined.

Contractor (CH2M) agrees to provide the services described below through its own forces or its subcontractors (collectively, the PEC Team):

PHASE 1

1.01.00 – Management and Coordination of Services, Phase 1

See Authorized Task Orders in Appendix E.

- Task Order 1.01.00 Management and Coordination Services-Phase 1
- Task Order 1.01.00 Management and Coordination Services – Phase 1-through 9/20/19 (ASR 26)
- Task Order 1.01.05 Project Management/Team Chartering – Part A (ASR 25)

1.01.01 – Charter

CH2M HILL Engineers, Inc. (CH2M), referred to herein as the Planning and Engineering Consultant (PEC) Team, will mobilize to initiate work upon notice to proceed, and to conduct a ~~kick-off~~ re-chartering meeting with the Port's team to review roles, tasks, and milestones; as well as to establish lines of communication.

1.01.02 – Project Management Work Plan (PMWP)

~~Develop a draft~~ Revise the PMWP to reflect both the Seawall Program and the Flood Study. The revised PMWP will provide the baseline for Project roles, responsibilities, and processes for managing and reporting safety, quality assurance/control (QA/QC), cost, schedule, risk, scope, document control, and communications. The PMWP will also define the Project Vision, Goals, Key Performance Indicators, and Targets and inform design criteria.

1.01.03 – Tools and Processes

Implement a web-based data management system and project dashboard for file management and an at-a-glance status of schedule, budget, performance metrics, and risk. Develop a cost-loaded work breakdown structure and detailed critical path milestone schedule. Work with the Port to ensure integration with existing tools and processes.

1.01.04 – Project Management

Provide daily management and control of budgets, costs, schedule, scope, and risks for the Waterfront Resilience Program, including the Embarcadero Seawall Program and the USACE Flood Study, for the increased duration of Phase 1. Conduct progress meetings and workshops to report progress and confirm alignment with Port milestones and objectives.

~~CH2M's~~ PEC Team Deliverables:

Kick-off Meeting; PMWP (draft and final); QA/QC Plan; Risk Register; Progress Meetings and Workshops, including Presentations, Agendas, and Meeting Summaries; Web-based File sharing Site; Monthly Reports and Invoices.

Assumptions:

- Internal project leadership team kick-off meeting.

- Prepare and coordinate project initiation (kick-off) meeting with the Port's team, including by preparing and distributing an agenda to meeting participants.
- Conduct Project Initiation (kick-off) meeting with the Port's team to Charter the Project, review roles, tasks, and milestones; as well as to establish lines of communication.
- Prepare meeting minutes, distribute and finalize.
- Conduct five development meetings for preparation of a draft PMWP and submit to Port for comments.
- Address Port's comments in revised PMWP.
- Submit final PMWP to Port.
- Prepare and coordinate PWMP discussion meeting with Executive team, including by preparing and distributing an agenda to meeting participants.
- Conduct meeting with the Port's Executive Steering Committee to review PMWP. Participants: Key ~~CH2M~~PEC Team key/lead team members with Port Staff.
- Prepare meeting minutes, distribute and finalize.
- Complete due diligence on Port's existing project management and tracking tools. Meet with identified port staff (one meeting).
- Develop tools and processes plan and discuss with Port to validate (one meeting).
- Implement a web-based data management system and project dashboard for file management and at-a-glance status of schedule, budget, performance metrics, and risks.
- Establish Initial Baseline, Scope, Schedule, and Budget for the entire Project.
- Prepare a cost-loaded work breakdown structure and update critical path milestone schedule. Submit to Port for review and comments and finalize.
- Provide daily management and control of budgets, costs, schedule, scope, and risks.
- Prepare monthly invoices.

1.02.00 – Community Planning & Stakeholder Engagement, Phase 1

The Port Communications Team has ~~is~~ developed~~ing~~ an overall Seawall Project communications strategy and is executing the effort that includes general messaging, public relations, stakeholder engagement, community outreach, and innovative outreach. The Port Communications Team will serve as the central manager of all Seawall Project related communications.

~~CH2M~~ The PEC Team, coordinating closely with the Port, will develop and execute a purpose-driven community planning process to ensure community members and stakeholders are involved early and often in project decision making, in a transparent and inclusive process, that educates on risks and the full implications of project decisions, seeks input on concerns and ideas, and builds trust with the project team and overall support for the Project. The community planning process shall engage the public with a series of meetings, workshops, and other innovative methods that will allow community members ample opportunity to participate in the project development process, to provide meaningful inputs for timely decision making and project advancement, and to build overall community support and excitement along the way. A key requirement of the community planning process is that it must be designed to seek timely input and build consensus for executing improvement projects that protect public safety and limit damage before disaster strikes. A process that stays on schedule is paramount. ~~CH2M~~ The PEC Team and Port staff will jointly run meetings and workshops with ~~CH2M~~ The PEC Team developing the relevant materials and documenting meetings, outcomes, and adapting the process as needed.

~~Targeted stakeholder engagement is also vital to advancing the Project development, including with key stakeholders such as resource agencies, City departments, Port tenants, local business owners, and~~

~~activists. CH2M will work closely with the Port Communications Team to facilitate engagement with these key stakeholders. CH2M will provide support to the Port's Communications Team to ensure communications and education are aligned with Project development, provide expertise and feedback in the development of the overall Project brand, use the Project brand in all materials, and lead communications with strategic stakeholders that are critical to Project advancement, and/or require detailed technical discussions. CH2M will develop and execute surveys for strategic stakeholders, and lead in strategic stakeholder engagement that is critical to project development.~~

~~CH2M's Deliverables:~~

- ~~Community planning strategy (distinguishing community planning, public relations, and marketing roles and tasks)~~
- ~~Community meetings, workshops, and innovative engagement (agendas, materials, presenters, notes & minutes)~~
- ~~Strategic Stakeholder surveys and interviews, documentation of findings~~
- ~~Materials for strategic stakeholder engagement and management~~
- ~~General Obligation Bond Report and other funding materials.~~

~~Assumptions:~~

- ~~Provide input on materials prepared to support project funding opportunities.~~
- ~~CH2M will support the Port Communications Team's efforts as described above.~~
- ~~Port staff to take an active role in developing and implementing the community planning strategy and stakeholder engagement;~~
- ~~Port Communications Team to manage and complete the following:~~
  - ~~Develop and implement a Seawall Resiliency Project Communications Plan (informed by, and consistent with, community planning and project development work by CH2M), centered around general education, messaging, and generating public support;~~
  - ~~Develop and implement market research including quantitative research, stakeholder interviews, polling, and focus groups, to assist in development of messaging, branding, identification of stakeholders, and identification of concerns and opportunities;~~
  - ~~Develop project specific branding and graphics;~~
  - ~~Develop general marketing, advertising, and educational materials including speaker talking points, press releases, digital media, video, op-eds, and media outreach;~~
  - ~~Create, update, and maintain a project stakeholder contact database, and manage overall stakeholder communication;~~

See Authorized Task Orders in Appendix E

- 1.02.00 Stakeholder Engagement -Initial Funding
- 1.02.03 Stakeholder Engagement Community Meeting #1-(Part A)
- 1.02.03 Stakeholder Engagement – Services through September 2018 (Part B)
- 1.02.03 Stakeholder Engagement – Services from October 2018 through Fall 2019 (Part C)
- 1.02.04 Stakeholder Engagement –Seawall Video- Revised
- 1.02.04 Stakeholder Engagement-Seawall Video Part B (ASR 16)
- 1.02.04 Stakeholder Engagement-Seawall Video Part C (ASR 21)

1.02.05 – Stakeholder Engagement Activities October 2019 through September 2022

This scope of work outlines stakeholder engagement efforts to be performed from October 2019 through September 2022, under both Phase 1 for year 1 (task 1.02.05) and Phase 2 for years 2 and 3 (task 2.02.00) for Waterfront Resilience Program efforts including the Seawall Program, USACE/Port Flood Study, and in coordination with the Islais Creek Mobility Adaptation Study. The engagement will occur in three geographic areas under Port jurisdiction—the Embarcadero, Mission Creek/Mission Bay, and Islais Creek/Bayview.

The scope of work will help the Port team achieve the following:

- Create opportunities for broad and accessible public engagement, including input to inform decisions about the Seawall Program, USACE Flood Study and other Waterfront Resilience Program efforts
- Identify and engage key stakeholders
- Create community support for immediate projects and understanding of long-term planning efforts
- Establish the Port as a resilience leader

The scope of work includes efforts across all Waterfront Resilience Program stakeholder engagement activities and includes precise hours and assumptions for each level of effort. However, work scope and budget are subject to change due to Port team requests, changes in timelines for key technical deliverables, and other unknown factors.

Deliverables and assumptions for each subtask are detailed on an annual basis but should be subject to change as the scope of work shifts. Budget check-ins at 25%, 50%, 75% complete should be included in the stakeholder engagement meetings with the Port team as part of Task 1.02.05.01 (subtask 1) to follow budget progress and identify updates to the scope of work assumptions.

This scope of work is based on the work plan laid out in the Communications and Stakeholder and Engagement Strategies and includes the following subtasks:

- Planning, Meetings, and Administration
- Materials Development
- Community Meetings and Workshops
- Targeted Stakeholder Engagement
- Contingency

1.02.05.01 – Planning, Meetings, and Administration

This subtask includes planning for stakeholder engagement work, project management, and coordination. It also includes preparation for and attendance at weekly 90-minute coordination meetings with the Port's stakeholder engagement team.

These working meetings will advance the planning and execution of engagement activities through the identification of needed decisions, review of draft materials, and action items.

Tasks:

- Stakeholder planning
- Project management and coordination
- Stakeholder engagement team meetings

Deliverables:

- Waterfront Resilience Program Communications and Stakeholder Engagement Plan and Execution Strategy, updated annually

- Ongoing project management support, as needed
- Weekly agendas, meeting coordination and notes and action items, as needed

Assumptions:

- Forty meetings per year to be attended by the Stakeholder Team Attendance by other firms will vary depending on need

1.02.05.02 – Materials Development

This subtask includes the creation and formatting of content for community meetings, including meeting activity and board(s) development, PowerPoint presentations, other engagement activity handouts, etc. The subtask also covers development of graphics to support community engagement efforts.

This subtask also includes online engagement tools and promotion related to the community meetings, as well as support for the Waterfront-wide Resilience website.

Tasks:

- Community meeting content creation (up to 13 community meetings per year)
- Workshop content formatting (content produced by others)
- Workshop activity and board development
- Workshop-related online engagement tools and promotion
- Summary/progress reports (progress update briefs for community consumption)
- Graphics
- Waterfront-wide Resilience website

Deliverables:

- PowerPoint presentations for each community meeting
- Handouts (up to three, as needed) for each community meeting
- Meeting activity, including printing (one per community meeting, as needed)
- Board development (up to three per community meeting, as needed)
- Graphics (up to three per community meeting, as needed)
- Online engagement tool (one per community meeting, as needed)
- Updates to Waterfront-wide Resilience website, as needed
- Translation of materials by InterEthnica, as needed
- Printing of materials by Copymat, as needed

Assumptions:

- Content generally should be derived from technical deliverables prepared under other tasks
- All interpretive materials of technical deliverables will be the responsibility of the stakeholder team. It is assumed that this material will be reviewed by the Port technical team.
- Level of effort for creation of the community meeting PowerPoint presentation development varies, based on the complexity of and anticipated interest in the meeting topics
- Posting of meeting notices to social media and mailing lists will be conducted under the Port's Seawall Communications contract
- Management and posting of materials on the Waterfront Resilience Program website will be conducted under this task
- Up to 13 community meetings or workshops per year will drive production of materials as needed, which also will support other stakeholder engagement efforts
- All roadshow and targeted briefings and other specialized outreach will be performed under this task.

1.02.05.03 – Community Meetings and Workshops

This subtask includes the detailed planning and implementation of up to 13 community meetings per year, typically quarterly at the three different locations. This includes:

- Finalization of process agendas in lead up to the meetings
- Coordination with Port staff around meeting logistics
- Meeting logistics (venue, food, sign-in sheets, etc.)
- Meeting set-up and clean-up
- Meeting notes and action items
- Attendance and support at community meetings

The subconsultant team will handle logistics for these meetings and will provide key materials for the meetings, and bring email signup sheets, comment cards, name tags for staff and consultants, and other tools. In-language support or translation will be provided as needed.

This subtask also includes hours for the Stakeholder Engagement Task lead to coordinate with the technical team, to ensure meeting content tracks with the technical progress, and to ensure that stakeholder input is carried into the development of the technical work.

Tasks:

- Workshop preparation (venue, nametags, etc.)
- Workshop attendance (up to 13 per year)

Deliverables:

- Finalized process agendas
- Community meeting preparation and attendance
- Engagement activity facilitation at community meetings
- PowerPoint presentation
- Creation of other materials
- Meeting logistics (nametags, food, venues, etc.)
- Meeting notes and action items

Assumptions:

- Meetings will be attended by up to 7 PEC Team staffers at up to 13 community meetings per year
- PEC Team will attend community meetings and, working with Port staff, facilitate up to six groups and provide note takers for six groups per meeting
- Translation services are included under this subtask
- Printing is included under this subtask

1.02.05.04 – Targeted Stakeholder Engagement

This subtask encompasses outreach and engagement to targeted stakeholder groups as outlined in the Communications and Stakeholder Engagement Strategy, as well as meeting support for key stakeholder groups. All engagement efforts will be developed and implemented to ensure the public and other stakeholders are able to inform decisions about the Seawall Program and other City Waterfront Resilience Program efforts.

The key stakeholder groups included under this subtask are as follows:

- Partner Stakeholders, including Port Staff and City Staff
  - Partner stakeholders refer to representatives from agencies that will partner with the Port in moving forward the Waterfront Resilience Program - including the Port itself. The stakeholder and engagement strategies include a plan for ongoing, robust engagement with these stakeholders to ensure they are able to inform decisions about the Seawall Program and other Waterfront Resilience Program efforts.
- Port Tenant Stakeholders
  - Port tenants are critical to the success of the Waterfront Resilience Program, and the engagement strategy includes a plan for engaging with them to gain trust and instill confidence and ensure they are able to inform decisions about the Seawall Program and other Waterfront Resilience Program efforts.
- Community Stakeholders and General Public Stakeholders
  - San Francisco has a rich tradition of strong neighborhood leadership, and the plan for stakeholder engagement to this key group reflects that. In addition, there are several community and advocacy organizations with interest in San Francisco's waterfront. While these community-based organizations' missions may or may not directly tie into infrastructure or resiliency, they all play key roles in maintaining the community fabric and must have the opportunity to inform decisions about the Seawall Program and other Waterfront Resilience Program efforts. Specifically, we will include these subgroups in the scope of work:
- Waterfront Visitors, Workers, and Recreationists
- Public Transportation Riders
- Policy, Regulatory, Funding Stakeholders, including Regional Partners
  - The engagement strategy includes a plan to engage these stakeholders early and consistently throughout the project. Since these stakeholders also answer to their own constituents, it will be critical to make sure that they receive information before or at least at the same time as other stakeholders. Close communication with City Officials and Supervisors should be maintained to ensure they are able to inform decisions about the Seawall Program and other Waterfront Resilience Program efforts. The Port is leading this effort with minimal support from the PEC Team.
- Partner and Political Stakeholders, including Contractors and Unions
  - Unions continue to provide a critical connection for two-way communication with large groups of workers. Many unions work directly for the City, on Port property, and near the waterfront. The engagement strategy includes an approach to reaching out to this key stakeholder group to ensure they are able to inform decisions about the Seawall Program and other Waterfront Resilience Program efforts.
- Big Business/Philanthropic Community
  - San Francisco's waterfront is home to several large businesses with strong brands, many employees, and even more customers and visitors. The engagement strategy includes an approach to engaging nearby businesses and the philanthropic community for a higher level of engagement.
- Policy and Partner Stakeholders
  - As key shepherds of the Waterfront Resilience Program, this stakeholder group must be involved in key decisioning making and able to inform decisions about the Seawall Program and other Waterfront Resilience Program efforts on an ongoing basis. We have outlined a plan for engaging:

- Board of Supervisors
- Port Commission
- Executive Steering Committees (Seawall and Flood Study)

Tasks:

The Port identified engagement work including tools and frequency of engagement for each stakeholder group identified above. The PEC Team will support this engagement work as detailed in the stakeholder work plans. This work will include the following tasks:

- Port Staff
  - Support for technical members of the Waterfront Resilience Program to present at Port division meetings on a quarterly basis
  - Support for the Waterfront Resilience Program engagement team to host quarterly engagement activities/community meeting pop-ups at Pier 1 and Pier 50
  - Support for Waterfront Resilience Program engagement team to host quarterly webinars
  - Support for Waterfront Resilience Program engagement team to host yearly "fun" activities such as a boat tour or others
  - Support for Waterfront Resilience Program engagement team to host Port staff-led tours or brown bag lunches to learn from division experts about current and future Port projects
- Port Tenants
  - Support for one-on-one meetings with Port tenants including Elaine Forbes, Mike Martin, Brad Benson, and select Port tenants (approximately 20) once or twice a year to update them on Program progress, hear feedback on efforts, and engage to mitigate impacts to businesses
  - Support for the Waterfront Resilience Program engagement team to host quarterly webinars for Port tenants
  - Support for the Waterfront Resilience Program engagement team to host yearly "fun" activities
  - Support for the Waterfront Resilience Program engagement team to host quarterly geographic specific community meeting pop-ups (one per year for four sections of the seawall)
  - Support for multi-hazard risk assessment (MHRA) outreach including letters to tenants, one-on-one meetings and smaller community meetings
  - Support for Roadshow Series: Roadshows 2019, 2020, 2021
- Community and General Public Stakeholders
  - Support for community meeting series (see Subtasks 2 and 3)
  - Support for the Waterfront Resilience Program engagement team to host quarterly webinars
  - Support for the Waterfront Resilience Program engagement team to host approximately three yearly "fun" activities
  - Support for Southern Waterfront Walking Tours to take place quarterly – two in Mission Creek area and two in Islais Creek area per year
  - Support for MHRA Speaker Series, a series of six expert panels through spring 2020
  - Support for Roadshow Series: Roadshows 2019, 2020, 2021
  - Support for the Waterfront Resilience Program engagement team to host engagement activities/community meeting pop-ups at already organized meetings

  - Support for the Waterfront Resilience Program engagement team to host southern waterfront stakeholder interviews series, and others on an as-needed basis
  - Support for hosting mixers, at least one in the northern waterfront and at least two in the southern waterfront on a yearly basis to inform public and harder to reach audiences of Program efforts
  - Support for partnering with other organizations to plan and execute one temporary installation such as artwork, exhibit, signage, and interpretations on a yearly basis to attract press, media, and grassroots attention
  - Support for the Port to meet quarterly with various transportation organizations including Bay Area Rapid Transit (BART), San Francisco Municipal Transportation Agency (SFMTA), and ferry providers to engage on program efforts and keep each other informed of projects and programs
  - Support for partnerships with various transportation agencies on one outreach campaign to last approximately 1 year to educate public transportation riders of program efforts and potential impacts to commutes and ride times
- Policy, Regulatory, Funding Stakeholders
  - Minimal support for the Port to host quarterly meetings that may include engagement activities, presentations, and other tools
- Partner and Political Stakeholders
  - Support to table at the Port's annual contract open house
  - Support to table at two City contracting events per year
  - Support for the Waterfront Resilience Program team to host southern waterfront mixers for contractors
  - Support for other activities for job pipeline to be developed when appropriate
- Big Business/Philanthropic Community
  - Support for partnerships with the SF Department of the Environment's BC3 group and other large businesses located in San Francisco to attend quarterly meetings to present on various efforts and stages of efforts
  - Support for other activities to be developed on an as-needed basis
- Policy and Partner Stakeholders
  - Minimal support for development of all materials to be presented to policy and partner audiences
  - Minimal support for the Waterfront Resilience Program Director and team and select Port staff to develop the agenda and content to engage with audiences
  - Minimal support for yearly one-on one meetings, or on as-needed basis, with select members

Deliverables:

- Charrettes
- Targeted briefings
- Quarterly engagement activities or community meeting pop-ups at Pier 1 and Pier 50 for partner stakeholders within Port staff
- "Fun" activities such as boat tours, bike tours, tenant happy hours, movie night, and "meet the engineer" for the different target stakeholder groups
- Port staff-led tours or brown bag lunches
- Webinars
- PowerPoint presentations
- Tenant door-to-door outreach

- Walking tours
- MHRA speaker series
- Roadshow series
- Mixers
- Art installations

Assumptions:

Current assumptions on the level of effort for each budget item are as follows:

- Community Engagement: Two to five yearly "fun" activities
- Roadshow Program: Support at up to 20 presentations yearly
- MHRA Engagement: Speaker series (6 events)
- Targeted Briefings: 30 briefings per year
- Charrettes: 10 charrettes per year
- City Staff: Minimal support for quarterly pop-ups, quarterly webinars, City staff tours or lunches
- Contractors/Union Stakeholders: Annual contract open house, two contract events annually, other activities
- Port Commission Meeting Support: Four meetings yearly
- Executive Steering Committee Meeting Support: Four meetings yearly
- Transportation Stakeholders: One long-term campaign to engage riders
- Port Staff Engagement: Two quarterly pop-ups, quarterly webinar, yearly "fun" activity, lunch series
- Port Tenant Engagement: Meetings with 20 tenants per year, quarterly webinar, yearly "fun" activity, yearly door-to-door outreach
- Southeast Waterfront Stakeholder Engagement: Quarterly walking tours, pop-up meetings, mixers
- Art Installation: One installation
- Big Business Engagement: Engagement activities defined by work plan, budget, and Port
- Other Audiences: Engagement Activities defined by work plan, budget, and Port
- Regional/Funding Stakeholders: Minimal support
- Advisory Committee Support: Minimal support
- Advisory Committee Support: Minimal support
- Regional Policy Groups: Minimal support

1.02.05.05 – Contingency

This subtask supports engagement and communications needs as they arise. All contingency activities will ensure the public and other stakeholders are able to inform decisions about the Seawall Program and other Waterfront Resilience Program efforts. This work is not budgeted and will require additional funding.

Tasks:

- Stakeholder Contingency

Deliverables:

- Additional materials and engagement activities to be determined as needed by the Port

Assumptions:

- Not to exceed 324 hours per year for only this task

1.02.06 – Embarcadero Seawall Education and Awareness Engagement Program

The Port and the Exploratorium began a partnership in 2017 to educate the public on the need to repair and or replace the Seawall. Some activities executed in the partnership included "King Tide Waterfront Walks" and social media "Seawall conversations." Partnering with the Exploratorium during these activities allowed the Port to access a diverse stakeholder audience, including a younger audience. Exploratorium staff involved in these activities were dedicated and knowledgeable about the Seawall Program and motived to support the Port in gaining public support for the Program.

The Exploratorium and Port's shared goals for this partnership include communicating action needed to address vulnerabilities of the Seawall and to engage an already active and informed community regarding elements of the Port's resilience and Seawall Program framework: "Strengthen"/Public Safety, "Adapt"/Mid-century Risks, and "Envision"/Forward-looking Planning.

The initial effort under this Task will require the development of a workplan that adheres to the objectives, describes the program efforts, tools, and exhibit(s), includes a schedule, and program deliverables that are in line with the contract budget.

Schedule/Deliverables:

- Draft Program Workplan within 1 month of the Notice to Proceed
- Final Workplan within 2 weeks of receipt of comments from the Port
- Other deliverables and schedule will be identified and apply upon approval of the Workplan

1.03.00 – Existing Conditions Review and Documentation

1.03.01 – Data Collection and Review.

Assess the initial list of data and databases and organize all relevant documents in a data repository; and identify data gaps, if any, for the Project. Develop a Project "data dashboard" for easy and secure computer access to data. Define phased data management goals that span predesign, design, construction, and operation and management.

See Authorized Task Orders in Appendix E:

- 1.03.01 Existing Conditions: Data Collection and Review

1.03.02 – Additional Investigations.

Based on data gaps identified in 1.03.01, present the findings and recommend and secure Port approval for site investigations. Recommendations for site investigations will consider the value of new information to risk assessment and design development. Anticipated investigations will include: geotechnical data collection, structural condition assessments (including above grade and underwater) and building data collection. Marine studies necessary to support permitting may also be identified at this phase.

See Authorized Task Orders in Appendix E

- 1.03.02 Existing Conditions: Additional Investigations
- 1.03.02.01 Geotechnical Pilot Site Investigation (ASR 3)
- 1.03.02.01 Geotechnical Pilot Site Investigation (ASR 3B)
- 1.03.02.02 Sitewide Geotechnical Investigation (ASR 6)

- 1.03.02.02 Sitewide Geotechnical Investigation (ASR 6) Part B
- 1.03.02.02 Sitewide Geotechnical Investigation (ASR 9) Part C
- 1.03.02.02 Sitewide Geotechnical Investigation (ASR 10) Part D
- 1.03.02.02 Sitewide Geotechnical Investigation (ASR 13) Part E and F
- 1.03.02.02 Sitewide Geotechnical Investigation (ASR 22) Part G
- 1.03.02.03 Bathymetry (ASR 5)
- 1.03.02.03 Bathymetry (ASR 18) - Deauthorization for completed task

1.03.03 – Existing Conditions Report.

Develop a comprehensive report detailing the existing conditions to serve as the baseline for subsequent Phases. This report shall provide information for subsequent detailed designs and include an initial asset inventory database (for example, building type, occupancy, criticality, condition, and other relevant information in a georeferenced format) for use in the multi-hazard risk assessment (MHRA) in Task 1.04. The report will link to previous studies, reports, and analysis through the data management system, and will include all past drawings in PDF or native files and all new drawings in AutoCAD.

See Authorized Task Orders in Appendix E:

- 1.03.03.00 Existing Conditions: Report – Part A
- 1.03.03.01 Existing Conditions Report-Main Geotechnical Site Characterization (ASR 20)
- 1.03.03.02 Existing Conditions Documentation – Aerial Mapping and Survey Support Part B (ASR 36)

~~CH2M's~~ PEC Team Deliverables:

Existing Data Inventory Report; Additional Investigations Technical Memorandum (TM); Existing Conditions Report (draft and final); GIS Database and Data Repository.

~~Assumptions:~~

- ~~Provide oversight of additional investigations by others – no labor for oversight if investigations included in the cost.~~
- ~~Cost of oversight of investigations themselves not included.~~
- ~~Marine and landside survey data investigation not included.~~
- ~~Underwater inspection diving services not included.~~
- ~~Design manual development not included.~~
- ~~Environmental investigation not included, such as soil sampling.~~
- ~~Utility investigation not included.~~
- ~~Hold one coordination/kickoff meeting.~~

1.04.00 – Multi-hazard Risk Assessment.

~~CH2M's~~ The PEC Team's MHRA will quantify risks and opportunities in common units (dollars) to allow the Port to make direct comparisons and inform infrastructure risk reduction decisions in a broader context of constraints and priorities. ~~The assessment will inform the evaluation criteria and the risks, needs, and aspirations that will be the basis of Alternatives Development (Task 1.05) and may identify emergency projects (Task 2.05).~~ The MHRA methodology shall identify critical assets (inventoried in Task 1.03), pair those assets with defined hazards and quantify impacts to assets and codependent infrastructure, such as utilities, transportation, and disaster response and recovery. Impacts shall be expressed in standardized terms as dollars per year, allowing relative ranking of risk.

1.04.01 – Earthquake Risk Assessment.

~~CH2M~~ The PEC Team will provide an assessment of earthquake vulnerability of the Seawall and structural risk that reduces existing uncertainty, results in the right level of design conservatism, and ensures hazards are not inadvertently underestimated. Assessment will be consistent with state-of-the-art practices. This assessment will serve as the basis for modeling earthquake hazards in CH2M's MHRA.

See Authorized Task Orders in Appendix E.

- 1.04.01 MHRA: Earthquake Risk Assessment - Part A
- 1.04.01 MHRA: Earthquake Risk Assessment - Part B
- 1.04.01.02 MHRA: Earthquake Risk Assessment – Determine Data Gaps and Recommend Further Vulnerability Assessment - Meetings
- 1.04.01.02 1.04.01.02.150 -C: Earthquake Hazard and Risk Assessment - Development of Input of Structural Analysis (ASR 12)
- 1.04.01.02 MHRA: Earthquake Risk Assessment - Alternative Ground Motion Return Period - Part D (ASR 27)
- 1.04.01.03 MHRA: Earthquake Risk Assessment – Additional Data Inventory Documentation Part E (ASR 31)
- 1.04.01.04 MHRA Earthquake Risk Assessment: Seismic Analysis and Seismic Peer Review Panel Preparation - Part F (ASR 32)
- 1.04.01.03 MHRA: Earthquake Risk Assessment – Additional Casualty Analyses Part G (ASR 37)
- 1.04.01.07 MHRA: Earthquake Risk Assessment - Basis of Assessment

1.04.01.02.200 – Advanced Earthquake Analysis of the Ferry Building

The Ferry Building area includes critical assets along the waterfront that warrant advanced earthquake analysis that goes beyond what is conducted under the MHRA. This analysis would incorporate more advanced 2D and/or 3D analysis depending upon the approach would require the demonstrated use of programs such as FLAC3D, LS-DYNA, ABAQUS, ADINA, ANSYS, SASSI, PERFORM3D, SAP2000, SHAKE, LPILE, and DEEPSOIL.

It is the intention that this work will be performed by a specialty consultant through a formal selection process. Upon approval by the Port, the selected consultant would be required to complete an initial task to develop objectives, methodology, analysis level of rigor including decision to employ a coupled or decoupled analysis, agreement on boundary conditions, level of SPRP review, identification of applicable programs, ground motions and other key relevant recommendations and assumptions. A work plan including key deliverables, schedule and budget are required as part of this initial task. This effort would be based upon the results of the MHRA. Coordination with the Port and the PEC Team will be clearly identified.

Deliverables:

Initial task methodology, workplan, schedule and level of effort. All other deliverables will be included in the workplan and adhered to accordingly.

~~**1.04.01.01 – Gather and review existing earthquake vulnerability assessments.**~~

~~CH2M will gather and review available earthquake vulnerability assessment reports performed for the Port, and relevant published research, information, and data to assess whether the work performed to-date is adequate for the characterization of the Seawall vulnerability or whether updates are warranted after considering comment from the Port.~~

~~**1.04.01.02 – Determine data gaps and recommend further vulnerability assessment.**~~

~~CH2M will summarize data gaps and/or shortcomings from adopted analytical methods from reviewed reports. Assumptions and limitations in their simplified analytical methods will be documented and presented to the Port. CH2M will summarize the limitations in existing vulnerability studies and propose additional analyses, if appropriate, to the Port.~~

1.04.01.03 – Complete additional vulnerability assessment as follows (subject to Port approval).

Upon approval, CH2M will conduct an additional vulnerability assessment. At the planning stage, the Port and CH2M anticipate this task will involve:

- Development of acceleration response spectra at Franciscan formation (three hazard levels, USGS 2008 source model, NGAWEST2 GMPEs, one representative location, and one representative shear wave velocity); Unless otherwise instructed by the Port, CH2M will not develop site-specific spectra per UCERF3 at this phase of the project;
- Development of three single-component horizontal motions spectrally matched to target response spectra;
- Development of idealized soil profiles and properties for subsequent evaluations (ten 2-D cross sections);
- 1-D site response analyses (four 1-D profiles, total stress using Deepsoil);
- Screening level liquefaction assessment (GIS-based, two empirical correlations (NCEER, B&I 2014));
- Screening level slope stability (ten 2-D cross sections, Pseudostatic analyses using PLAXIS);
- 2-D numerical model validation against case histories (one case history, one cross section);
- Advanced 2-D numerical analyses for slope stability (three 2-D cross sections per screening level study using FLAC); and
- Development of input for SE analyses (soil springs and surface acceleration response spectra).
- The analyses will be performed once.

1.04.01.04 –Determine earthquake performance criteria.

CH2M shall work with the Port to develop the earthquake performance criteria that is suitable for the Port Seawall structures and dikes. CH2M and the Port will jointly consider current structures and future developments as part of this criteria.

1.04.01.05 –Evaluate, assess, and summarize earthquake risk.

When finalized, CH2M will documents the analyses, discussions and recommendations in the draft and final reports. The final report will address one round of comments from the Port

1.04.01.06 – Earthquake Performance Criteria.

CH2M will quantify probabilistic earthquake hazards at selected locations along the entire Seawall for various timeframes, and quantify probabilistic consequences in terms of fragilities. Determine earthquake performance criteria to define potential consequences to critical assets. Develop preliminary design criteria to govern earthquake design events, seismic analyses, performance evaluations, and retrofit designs of the seawall structures and associated facilities.

1.04.01.07 – Basis of Design.

CH2M will develop a basis of design in close coordination with the Port, stakeholders, and other Project team members. Define performance criteria and acceptable risk depending on functionality, criticality, and overall impacts (for example, criteria will address when a location of structure can remain fully operational with minimum damage for critical facilities and describe repairable damage for noncritical facilities).

~~**1.04.01.08 – Likelihood and Consequence of Failure.**~~

~~Work with the Port to qualitatively rank likelihoods and consequences of failure (high to low); develop mitigation alternatives; evaluate mitigated relative risk; and identify highest priorities.~~

~~***CH2M's Deliverables:***~~

~~Earthquake Risk Assessment TM (draft and final).~~

~~***Assumptions:***~~

- ~~No ongoing support to the team after submitting the final report. In addition, there will be no iterations or re-analyses for works described above.~~
- ~~CH2M will evaluate only earthquake hazards in this Task. Limited retrofit alternatives will be evaluated in Task 1.05.~~

1.04.02 – Flood Risk Assessment ~~and Adaptation Plan.~~

~~CH2M~~ The PEC Team's work will result in the identification of flooding vulnerabilities. ~~and potential adaptation alternatives.~~

See Authorized Task Orders in Appendix E

- 1.04.02 MHRA: Flood Risk Assessment and Adaptation Plan - Part A
- 1.04.02 MHRA: Flood Risk Assessment and Adaptation Plan - Part B
- 1.04.02 MHRA: Flood Risk Assessment and Adaptation Plan - Part C (ASR 33)

~~**1.04.02.01 – Joint Probability Analysis.**~~

~~CH2M will develop a joint probability analysis to define the potential for combined high tide and rainfall events. Conduct swell and wind wave modeling to assess inundation and overtopping associated with the combined events at each planning horizon and sea level rise scenarios for combined high tide and rainfall.~~

~~**1.04.02.02 – Flood Impact Analysis.**~~

~~Identify impacts from wave overtopping, including damage to buildings and infrastructure, street closures, reduced wave protection, and loss of pedestrian access.~~

~~**1.04.02.03 – Flooding Criteria.**~~

~~Develop criteria to define thresholds and tipping points for responding to potential flood risks based on the occurrence probability of the various impacts.~~

~~**1.04.02.04 – Flood Adaptation Alternatives.**~~

~~Based on the above, develop range of flood protection options to address the identified flood risks. Develop probabilistic-based summary of potential flooding risk for each alternative and associated impacts due to still water inundation and wave overtopping.~~

~~***CH2M's Deliverables:***~~

~~CH2M will prepare and provide a TM Outline; Flood Risk Assessment and Adaptation Plan TM (draft and final).~~

Assumptions:

- Joint probability analysis that will involve developing a matrix of possible future extreme tide and hydrologic conditions and conducting joint probability analysis of coincident extreme tides and extreme rainfall events for selected points in the future (short, near, and long term) for sea level rise scenarios (low, medium, and high).
- CH2M will gather, review, synthesize, and summarize existing studies and data related to storm surge, tides, sea levels, and rainfall.
- CH2M will conduct only local wave modeling associated with select events to assess run-up and overtopping potentials.
- CH2M will develop annual exceedance probabilities for estimating future impacts.
- CH2M will perform a flood impact analysis through wave overtopping analysis, assessment of inundation extents and impacts, associated building/infrastructure damage, and hazard assessment modeling based on the sea level rise, storm surge, and rainfall scenarios developed.
- Develop flood criteria for choosing which coincident extreme tide and rainfall events will be considered.
- Review present sea level rise science to establish future extreme tidal predictions.
- Review future climate change scenarios and select three scenarios that represent low, medium, and high predictions.
- Use the annual exceedance probabilities and their potential impacts to define goals and criteria by which alternatives will be evaluated.
- Select the thresholds for response based on the impacts of greatest concern for the selected scenarios.
- Conduct two flood threat and design criteria workshops with the Port and City to aid in defining the events and scenarios (water levels, precipitation, wave conditions) that will be triggers or thresholds for action.
- For flood adaptation alternatives, the TM will consider rainfall and future interior drainage impacts in the alternatives.
- CH2M will conduct two flood hazard assessment workshops to screen and select preferred alternatives.
- No new sea level rise or surge modeling will be performed (review and use existing data to develop recommendations).
- No detailed modeling of existing City drainage system will be performed. Simplified drainage modeling and assessment of storm water drainage associated with flood adaption alternatives will be conducted.
- CH2M will select three flood adaption alternatives for additional assessment as part of the flood adaption alternatives task.
- Conduct one meeting to discuss team and client goals (define levels of flood risk and objectives).
- Coordinate with City of San Francisco agency efforts to study sea level rise, flooding, and seismic safety.
- Conduct four workshops and one technical panel on hazard assessment validation (flood treat, design criteria, hazard assessment results).

1.04.03 – Utility Risk Assessment

See authorized Task Orders in Appendix E.

~~CH2M~~The PEC Team will assess earthquake and flooding hazard utility vulnerability.

- 1.04.03 MHRA: Utility Risk Assessment - Part A
- 1.04.03 MHRA: Utility Risk Assessment - Part B
- 1.04.03 MHRA: Utility Risk Assessment - Methodology to Address Seismic Consequences - Additional Services Part C (ASR 30)

1.04.03 – MHRA: Utility Risk Assessment Additional Services-– Amendment Scope Part C

The level of effort anticipated to complete services under this task as described in the approved Task Authorization for Utility Risk Assessment requires a revision in the scope of work.

Collect additional information on the asset values (replacement costs and service populations) together with specific vulnerability and consequence assessments from seismic and flood risk studies that was not available from the agencies and are needed to feed into the economics analysis.

This will require an increase in gathering relevant data and align the data with specific utility assets and potential hazard scenarios.

Increased Scope of Work

1) Methodology development and agreement
   - The original methodology, agreed by the Port and PEC, called for PEC Team to develop a summary document (a "packet") outlined by the team then populated by utilities. To develop estimates of seismic and flood damages to utilities, in consultation with the Port and utility owners, the PEC Team will expand the process where there were gaps from the utility owners and develop vulnerabilities for critical utility functions to share with the utility owners for their feedback and comments including replacement costs and service loss in the event of "total loss" of assets in the project area.
2) Additional data inquiry, calculations, and iterations
   - The following additional actions will be taken:
     - Follow-on meetings to engage utility owners, in particular the SFPUC, on how they might develop rough-order-of-magnitude cost and disruption estimates related to their major assets.
     - Disruption durations estimated by the PEC Team to use as a starting point to collaboratively estimate disruption durations with utility staff.
     - The vulnerability to seismic and flood hazards be developed for known key assets in the hazard zone and shared with the utilities to support the consequence analysis (economic analysis).
     - The methodology for quantifying loss of service and direct physical damage calculations in the economic analysis to be modified to account for the actual data points obtained for service population, outage durations and replacement costs.
     - Loss of Service and Economic Consequences, describing the outcomes of a seismic or flood hazard event affecting the existing utility and mobility assets.
     - Incorporates the Seawall Program's final hazard data and refines the preliminary consequence assessment, providing a summary of expected qualitative and economic consequences for each system reported in specific areas within the Seawall Program boundary where appropriate.

- The Seawall Program's final hazard data will consist of four earthquake scenarios: the 43, 100, 225, and 975-year ground motion return periods.
- Incorporates flood hazard maps produced for the Seawall Program will encompass four sea level rise scenarios formulated using the USACE High sea level change curve: current conditions, 13.2 inches expected by 2038, 26.4 inches expected by 2061, and 39.6 inches expected by 2078. The inundation maps produced will not only represent stillwater elevations expected for the 10 percent, 4 percent, 1 percent, and 0.2 percent AEP events, but will include modeling for wind and waves as well. The Seawall Program's Flood Risk Analysis Methodology provides further detail on the modeling approach.
- The PEC Team will develop estimated disruption durations where no data or insufficient data was provided by the Agency as a starting point to collaboratively estimate disruption durations with utility staff.
- Existing Asset conditions including an overview, dates of installation and rehabilitation, physical properties, estimated replacement costs and service populations, and any planned changes or improvements
- Asset Exposures, Vulnerabilities, and Interdependencies, describing the exposure and vulnerabilities of existing assets to seismic and flood hazards, as well as their interdependencies.

3) Additional City staff meetings and preparation and follow up for meetings to obtain input and data

- The efforts described above will allow the PEC Team to complete the remaining deliverables for the Utility Risk Assessment task (the draft and final Technical Memorandum). Note that in consultation with the Port, this deliverable has been combined into a joint Utility and Mobility Systems report, and includes the following sections:
  - Approach and Methodology used to evaluate the potential consequences to utility systems associated with seismic or flooding hazards along the seawall.
  - Existing Asset conditions including an overview, dates of installation and rehabilitation, physical properties, estimated replacement costs and service populations, and any planned changes or improvements
  - Asset Exposures, Vulnerabilities, and Interdependencies, describing the exposure and vulnerabilities of existing assets to seismic and flood hazards, as well as their interdependencies. The systems are now organized by type:
    - Water
    - Auxiliary Water
    - Wastewater
    - Electric Power
    - Natural Gas
    - Telecom

Deliverables/Schedule:

The services covered under this Task will be integrated into the Utility/Mobility Risk Assessment Technical Memorandum (draft and final) in accordance with the approved schedule incorporating these services.

Assumptions:

- It is assumed that there may be up to an additional 6 follow up meetings with the agencies to resolve any comments and suggested changes to assumptions following their formal reviews of the draft and final Technical Memorandum.
- It is assumed there will be two meetings with the Port to finalize the Methodology

It is assumed there will be one meeting with the Port to review comments on the draft Technical Memorandum prior to finalizing the Final Report.

~~1.04.03.01 – At-Risk Utilities.~~

~~Using the asset inventory collected in Task 1.03 and the earthquake and flooding evaluations, CH2M will update the Project GIS to define at-risk utilities for each hazard scenario. Develop asset groupings (geographic) to provide a higher-level discussion of impacts and begin process of identifying Project reaches.~~

~~1.04.03.01 – Lifeline Council.~~

~~Coordinate with the Lifeline Council to evaluate impacts of hazards in light of criticality, redundancy, and system planning for electric, gas, water, sewer, and telecommunications infrastructure.~~

~~1.04.03.03 – Risk Analysis.~~

~~Evaluate the likelihood and consequence of failure for each hazard scenario. Estimate direct and indirect impacts, and the costs of repair and replacement.~~

~~CH2M's Deliverables:~~
~~Utility Risk Assessment TM (draft and final).~~

~~Assumptions:~~

- ~~Coordinate with approximately 15-20 private utility agencies and City departments/divisions including but not limited to PG&E, AT&T, Verizon, Comcast, Level 2, Zayo, XO, San Francisco Public Utilities Commission Waste Water Enterprise (SFPUC WWE), San Francisco Public Utilities Commission City Distribution Division (SFPUC CDD), Port of San Francisco (Port), Port utilities, San Francisco Public Utilities Commission Auxiliary Water Supply System (SFPUC AWSS), SFPUC Power Enterprise, San Francisco Municipal Transportation Agency (SFMTA), SFMTA Department of Parking and Traffic, SFMTA Sustainable Streets, and San Francisco Public Works.~~
- ~~Coordinate 10-12 meetings for each deliverable.~~

1.04.04 – Transportation Risk Assessment.

~~CH2M~~ In consultation with the Port, the PEC Team will assess transportation system vulnerability for earthquake and flooding hazards as follows.

See authorized Task Orders in Appendix E.

- 1.04.04 MHRA: Transportation Risk Assessment - Part A
- 1.04.04 MHRA: Transportation Risk Assessment - Part B

~~1.04.03.01 – At-risk Transit Infrastructure.~~

~~Based on Task 1.03 and the earthquake and flooding evaluations, update the City's GIS to define at-risk assets for each scenario.~~

~~1.04.03.01 – Transit Stakeholder Coordination.~~

~~Working with each transportation agency, determine criticality, useful life, operating costs, and system planning for water transportation services and the Embarcadero multimodal corridor.~~

~~1.04.03.03 – Risk Analysis.~~

~~Evaluate the likelihood and consequence of failure for each hazard scenario. Estimate direct and indirect impacts, and the costs of repair and replacement.~~

~~CH2M's Deliverables:~~
~~TM Outline; Transportation Risk Assessment TM (draft and final).~~

~~Assumptions:~~

- ~~Work with SFMTA and San Francisco Public Works to define Roadways using their current ownership responsibilities and emerging asset management standards. Assets to be considered include the following:~~

  ~~a) Roadway and all related signals and systems~~

  ~~b) Bus yard (Kirkland)~~

  ~~c) Rail yard (Muni Metro East)~~

  ~~d) Bus right of way (dedicated lanes, bus zones, and shelters)~~

  ~~e) Surface rail assets (trackway, stations, and systems)~~

  ~~f) SFMTA rail underground (tunnels, tracks, stations, and systems)~~

  ~~g) Bay Area Rapid Transit (BART) (tunnels, tracks, stations, and systems)~~

  ~~h) Other transit-related assets with potential risk such as Hotel Vitale property (leased by SFMTA) and the Transbay Transit Center~~

- ~~Coordinate with asset owners and seek initial clarification of assets related to their location, construction, and resiliency to threats.~~

- ~~Conduct seven meetings half-day meetings with major asset owning agencies: SFMTA bus; SFMTA rail; San Francisco Public Works; Water Enterprise Transportation Agency (WETA); Golden Gate Ferry Transit; BART; and additional agencies as needed.~~

- ~~Interface with agencies after initial meetings to locate and qualify assets.~~

- ~~Identify owners or operators of key assets with outstanding questions.~~

- ~~Compile, refine, and electronically document assets.~~

- ~~Submit requests for agencies to make an independent first-pass to classify assets in advanced of individual working meetings.~~

- ~~Conduct seven full day meetings with major asset owning agencies to define and refine classifications.~~

- ~~Compile and electronically update documentation of assets.~~

- ~~Meet with major asset owning agencies to assess risk to assets.~~

- ~~Major asset owning agencies to independently review the documented risk assessment for transportation assets.~~

- ~~Compile, refine, and electronically update documentation of assets.~~

1.04.04 – MHRA: Transportation Risk Assessment - Part C

The level of effort anticipated to complete services under this task as described in the approved Task Authorization for Transportation Risk Assessment and the Scope of Work requires a revision in the scope of work.

Collect additional information on the asset values (replacement costs and service populations) together with specific vulnerability and consequence assessments from seismic and flood risks for use in the consequence's analyses described in Task 1.04.09. This will require an increase in gathering relevant data and align the data with specific utility assets and potential hazard scenarios.

Increased Scope of Work

1) Methodology development and agreement

   – The original methodology, as agreed to by the Port and the PEC Team, required development of a summary document (a "packet") outlined by the team then populated by SFMTA. To develop

estimates of seismic and flood damages to SFMTA facilities, in consultation with the Port and SFMTA staff, the PEC Team will expand the process to include development of a vulnerability spreadsheet matrix to bring an additional level of detail to the SFMTA assets being tracked. The PEC Team will develop a set of direct asset inquiry questions (in MSWord) for SFMTA to provide quantitative answers regarding replacement costs and service loss in the event of "total loss" for SFMTA assets in the project area.

2) Additional data inquiry, calculations, and iterations

   - To augment the information provided in the data packets, the following additional services will be provided:
   - Additional meetings to engage SFMTA on how they might accomplish rough-order-of-magnitude cost and disruption estimates related to their major assets.
   - Additional cost estimates for similar assets outside of the Hazard Study Area.
   - An analysis of cost estimates to determine if it is possible to establish different levels of failure and/or replacement based on system sub components.
   - Cost estimates provided by SFMTA analyzed to determine whether they can be used to create an approximate estimate for similar infrastructure and systems within the Hazard Study Area.
   - Public data sources to generate likely costs based on adjusted national averages for major rail infrastructure (such as cost per mile of rail development).
   - Disruption durations to be estimated by PEC transportation professionals to use as a starting point to collaboratively estimate disruption durations with SFMTA staff.
   - Develop vulnerability matrix and detail the specific data points needed from SFMTA to serve the consequence analysis (economic analysis).

3) Number of meetings exceeded

   - Up to 4 SFMTA follow-up meetings were included in the original task authorization; 4 additional meetings and additional phone conferences beyond this meeting total will be required.
   - With this work completed, the PEC Team calculate replacement cost for specific assets.

Deliverables/Schedule:

The services covered under this Task will be integrated into the Utility/Mobility Risk Assessment Technical Memorandum (draft and final) in accordance with the subsequent approved schedule incorporating these services.

Assumptions:

- It is assumed that there may be up to an additional four follow up meetings with SFMTA
- It is assumed there will be two meetings with the Port to finalize the Methodology
- It is assumed there will be one meeting with the Port to review comments on the draft Technical Memorandum prior to finalizing the draft report.

1.04.05 – Land Use Planning and Regulatory Assessment.

~~CH2M~~The PEC Team will document current land uses in the Project area, as well as all applicable land use plans and policies, and will develop additional information to inform design criteria, risks, needs, and aspirations.

See Authorized Task Orders in Appendix E.

- 1.04.05 MHRA: Land Use Planning & Regulatory Assessment - Part A
- 1.04.05 MHRA: Land Use Planning & Regulatory Assessment - Part B

~~1.04.05.01 – Existing Framework.~~

~~Conduct a comprehensive review of existing land use planning and regulatory framework. Create maps to illustrate how various plans overlap the Project area, and develop matrices describing relevant policies, land use restrictions, and allowances. Frame land use constraints and identify opportunities consistent with Port goals and objectives.~~

~~1.04.05.02 – Planning Agency Stakeholder Coordination.~~

~~Attend working sessions with planning agency staff to define needs, goals, and aspirations. Community outreach is included in 1.04.06.~~

~~1.04.05.03 – Land Use and Funding Nexus.~~

~~Support the Port in evaluation of development revenue considerations, advancing the work conducted under the Waterfront Land Use Plan update, and coordinated with alternatives development and economic impact analysis. Evaluate trade-offs and opportunities.~~

~~CH2M's Deliverables:~~

~~TM Outline; Land Use Planning Assessment TM (draft and final).~~

~~Assumptions:~~

- ~~Port will provide CH2M with current Waterfront Land Use Plan (WLUP) and an update and schedule on the update process.~~
- ~~CH2M will attend WLUP update meetings.~~

1.04.06 – Urban Design Considerations and Assessment.

~~CH2M~~The PEC Team will document the existing conditions with a focus on highlighting value, priorities, and aspirations for the future.

See Authorized Task Orders in Appendix E.

- 1.04.06 MHRA: Urban Design Assessment - Initial Funding
- 1.04.06 MHRA: Urban Design Assessment - Part A
- 1.04.06 MHRA: Urban Design Assessment - Part B

~~1.04.06.01 – Review Existing Plans, Policies, Studies, and Regulations.~~

~~CH2M's initial review has identified over 40 of these types of documents, from area and public realm plans to transit studies to design guidelines. CH2M will develop a thorough inventory of applicable documents, followed by a summary of alignment, conflicts, and potential gaps.~~

~~1.04.06.02 – Historical Resources.~~

~~Review historical resource goals, constraints, trade-offs, and opportunities. Develop a historical preservation strategy.~~

~~1.04.06.03 – Public Life Survey.~~

~~Present a summary of Gehl Architects' approach to performing the renowned Public Life Public Space survey. With the Port's endorsement, Gehl will conduct the survey, using volunteer stakeholders.~~

~~1.04.06.04 – Urban Design Community Charrettes.~~

~~Conduct internal City and public charrettes to gain input on needs and aspirations. The form of charrettes will be informed by stakeholder surveys and Port preferences.~~

~~CH2M's Deliverables:~~

~~CH2M will prepare and submit a Public Life Survey; TM Outline; Urban Design Considerations and Assessment TM (draft and final), as described below.~~

1.04.07 – Disaster Response and Recovery Assessment.

~~CH2M~~The PEC Team shall assess the vulnerability of City and Port lifeline and disaster response assets and plans as described below.

See Authorized Task Orders in Appendix E.

- 1.04.07 MHRA: Disaster Response and Recovery Assessment - Part A
- 1.04.07 MHRA: Disaster Response and Recovery Assessment - Part B

~~**1.04.07.01 – Existing Framework.**~~

~~Work with Port's homeland security staff, Water Emergency Transportation Authority, and City Office of Emergency Services, to assess existing City-wide disaster response plans, vulnerability assessments, and future needs.~~

~~**1.04.07.02 – Disaster Response and Recovery Risk Criteria.**~~

~~Develop criteria for the application to the alternatives formulation, specific to disaster response plans and lifeline facilities.~~

~~***CH2M's Deliverables:***~~
~~CH2M will prepare a Disaster Response and Recovery Assessment TM (draft and final).~~

~~***Assumptions:***~~

- ~~Review and comment on City and Port disaster response plans as well as policies, procedures, staff training, and exercising.~~
- ~~Review existing plans against the current emergency response planning state-of-the-practice generally as well as specifically against the standards of the National Incident Management System (NIMS), the National Response Framework (NRF) for securing resources, the State of California Standardized Emergency Management System (SEMS), and the Homeland Security Exercise and Evaluation Program (HSEEP).~~
- ~~Additional plan reviews will consist of the City and County's Emergency Management Agency Emergency Operation Plan (EOP), and the Area Maritime Security Plan (AMSP), coordinating with the United States Coast Guard (USCG) Captain of the Port (COTP) and US Customs and Border Protection if needed.~~
- ~~Conduct risk assessment of the Port's physical assets that are specific to disaster response and recovery with respect to both the earthquake and flood hazards. These are assumed to be physical assets such as emergency shelters apart from the seawall assets and, therefore, not already captured in the earthquake and flood risk assessments.~~
- ~~Meet with Port's homeland security staff to identify and gain an overview understanding of Port-specific disaster response plans and related documents including policies, procedures, staff training plans, and disaster exercise plans or Multi-Year Training and Exercise Plans (MYTEPS). This meeting will also cover the relationships among the Port and the other agencies involved in disaster response and the intersections among their disaster response plans and programs.~~
- ~~Meet with Water Emergency Transportation Authority and City Office of Emergency Services to identify and gain an overview understanding of respective disaster response plans and related documents as they would pertain to the Port.~~
- ~~Summarize content of each plan, relationships among involved agencies with respect to Port disaster response, and identify any gaps with respect to the state-of-the-practice regarding disaster response as well as general conformance with NIMS and SEMS principles as applicable.~~
- ~~Prepare draft technical memorandum summarizing findings, conclusions, and recommendations and provide to Port for review and comment.~~

- ~~Meet with Port to discuss their review comments and incorporation into a final technical memorandum.~~
- ~~Prepare and submit final technical memorandum.~~
- ~~Assume three plan review meetings with two CH2M team participants, review of up to eight response plans, and one technical memorandum review meeting with two CH2M team participants.~~
- ~~Evaluate the risks associated with lifeline facilities with respect to the earthquake and flooding hazards used in the previous tasks.~~
- ~~Meet with Port staff to identify, discuss, and obtain documentation regarding existing lifeline facilities (e.g., shelter-in-place facilities) and/or other physical assets necessary for disaster response but not already addressed in the earthquake and flood risk assessment. This may be conducted in accordance with FEMA ESF 6.~~
- ~~Review documents that describe the lifeline facilities and/or other assets identified including mutual aid agreements to gain a fuller understanding of their intended uses, capacities, capabilities, locations, and relationships to the disaster response plans reviewed in the previous tasks.~~
- ~~Develop a list of critical assets for these lifeline facilities and assets.~~
- ~~Document the earthquake and flood hazard threats to be paired with these assets.~~
- ~~Hold workshop/s with the Port team to confirm the critical hazard-asset pairs to be carried forward in the analysis and to jointly begin to develop the consequences to these assets associated with the earthquake and flood events.~~
- ~~Perform risk analysis and provide results for Port review and validation.~~
- ~~Meet with the Port team to review and solicit input on the results and discuss possible ways to improve the lifeline facilities/assets.~~
- ~~Incorporate Port comments and finalize risk analysis.~~
- ~~Prepare draft technical memorandum documenting risk analysis results and provide to the Port for review and comment.~~
- ~~Incorporate Port review comments and finalize the technical memorandum.~~
- ~~Submit final technical memorandum documenting the results.~~
- ~~Coordinate one documentation review meeting with two CH2M-Arcadis team participants.~~
- ~~Review up to six documents regarding the disaster response assets~~
- ~~Lead one hazard-asset pair and consequence development Port workshop with two CH2M-Arcadis team participants.~~
- ~~Lead one risk analysis Port workshop with two CH2M-Arcadis team participants~~.

1.04.07 – MHRA: Disaster Response and Recovery Assessment - Part C

Increased Scope of Work

The level of effort anticipated to complete this work as described in the approved Task Authorization for Disaster Response and Recovery Risk Assessment and the Scope of Work and Assumptions included in Appendix A of the Agreement between CH2M HILL Engineers, Inc. and the City and County of San Francisco, requires a revision in the scope of work. The increased scope items requiring greater level of effort than originally estimated due to the complexity of the Port's disaster response functions, integration with City efforts and required coordination, as summarized below:

For this subtask 1.04.07.01—Existing Framework: Evaluate existing Port and related disaster response plans. Due to a thorough gap analysis of the disaster response plans additional effort is required to collect additional disaster response plans than originally anticipated

During close review of the City and County of San Francisco (CCSF) Emergency Response Plan (ERP) it became evident additional plans required analysis beyond what was originally included in the scope. The CCSF ERP references several associated Emergency Support Function (ESF) documents, including one with a large appendix that also required review. These documents contained the most specific language of all the plans regarding the Port's emergency involvement. Here are the additional ESF-related documents:

- CCSF ERP ESF #1: Transportation Annex (29 pages)
- CCSF ERP ESF #3: Public Works and Engineering Annex (27 pages)
- San Francisco Debris Management Plan (Appendix to ESF #3, 110 pages)
- CCSF ERP ESF #10: Oil & Hazardous Materials Response Annex (17 pages)
- CCSF ERP ESF #15: Joint Information System Annex (34 pages)

1.04.07.02—Disaster Response and Recovery Critical Asset Assessment additional services required:

- The scope anticipated that the PEC would review and confirm the disaster response inventory and categorize the disaster response assets within the Port jurisdiction. Due to the Port incomplete inventory to categorize the disaster response assets within the Port jurisdiction, additional effort required to complete inventory, or a fully vetted understanding of what assets would be used for various disaster response functions, thus this effort also includes required meetings with Port staff. The additional work included:

Completing the disaster response asset inventory requires additional site walks and data requests to:

- Add a new group of assets (i.e., the seawall lots)
- Add overlooked assets (e.g., Pier 39 Blue and Gold excursion ferry terminal)
- Correct existing assets (e.g., Pier 52 boat launch and dock are in reality located at Pier 50 ½)

Additional scope efforts:

- A PowerPoint presentation which graphically represented multiple "re-weightings" of the LOS categories for major assets, seawall sections, and zones.
- Detailed Department of Emergency Management request to update GIS to include the City Emergency Response Map with the complete list of disaster response assets and locations.
- Additional effort to prepare provide disaster response needs and opportunities analysis to assist the Port to develop emergency response goals such as:
  - Survivor evacuation goal (in hours)
  - Assembly and queuing area management (i.e., disaster response goals)
  - Deep draft berth and staging area management (i.e., disaster recovery goals)
  - This work will be integrated into Task 1.04.03 Technical Memorandum (draft and final)

1.04.07.03 – Disaster Response Training and Tabletop Exercise

This scope of work describes training and exercise activities designed to inform the joint emergency planning efforts of the Port of San Francisco (Port), the Department of Emergency Management (DEM), the Office of Resilience and Capital Planning (ORCP), the Department of Public Works (Public Works), the San Francisco Municipal Transportation Agency (SFMTA), the Metropolitan Transportation Commission (MTC), the Water Emergency Transportation Agency (WETA), Golden Gate Bridge Highway & Transportation District (GGBHTD), the Federal Emergency Management Agency (FEMA), and the U.S. Army Corps of Engineers (USACE). The Embarcadero Seawall Program has developed new information

regarding earthquake risks to Port, City and regional infrastructure along The Embarcadero. After a large earthquake, The Embarcadero waterfront is expected to facilitate waterborne evacuation of up to 250,000 people; entry of first responders and equipment; care and evacuation of injured; the storage, processing and transport of debris; and bringing materials and supplies into the City. Port capabilities are a key element in an overlapping array of local, regional, and state emergency plans. The activities of this scope are designed to accomplish two main objectives:

- Test relevant plan assumptions, analyze findings, identify gaps, and incorporate results into the Port's Department Emergency Operations Plan, City and regional emergency response plans, and the Port's restoration targets identified in the Draft Lifelines Restoration Project.
- Inform the prioritization of the Embarcadero Seawall Program investments with a focus on Life Safety and Disaster Response, including the inspection of critical infrastructure.

1.04.07.03.100 – Project Initiation and Research

The Jacobs Team will conduct a conference call with Port and DEM representatives to initiate the project and review planning steps for the exercises. In addition, the Jacobs team will have reviewed the following documents:

- Emergency response in the Great Hanshin-Awaji (Kobe) Earthquake and associated reports; and
- Seawall Disaster Response and Recovery Asset Risk Assessment Report recommendations
- Lifelines Council 2014 Interdependency Study and the Draft Lifelines Restoration Project

The purpose of this review is to develop earthquake scenario models consistent with the Multi-Hazard Risk Assessment of the Seawall Program. The earthquake scenario concepts will be designed to test the following local, regional, and state plans:

- City and County of San Francisco Emergency Response Plan (ERP), including:
- ERP, Earthquake Annex
- Emergency Support Function (ESF) # 1: Transportation Annex
- ESF #1: Operation Return Appendix
- ESF #3: Public Works and Engineering, and Emergency Route Reopening Annex
- ESF : Fuel
- CCSF Post Disaster Safety Assessment Guide (SAP)
- CCSF Windshield Damage Survey Guide
- Water Emergency Transportation Authority (WETA) Emergency Response Plan
- Port of San Francisco Emergency Operations Plan
- Port of San Francisco infrastructure and building inspection program, including the Building Occupation Resumption Program
- San Francisco Bay Area Regional Emergency Coordination Plan
- San Francisco Bay Area Port Recovery Plan
- San Francisco Bay Area Regional Transportation Emergency Management Plan
- Bay Area Earthquake Plan

This review will focus on key assumptions in these plans related to moving people from Downtown to ferries, returning Disaster Service Workers and first responders to the City, and bringing materials and supplies into San Francisco after an event.

1.04.07.03.100 – Deliverables

Project Initiation Meeting Notes

1.04.07.03.200 – Emergency Response along Tabletop Exercise (TTX) A

In conjunction with City staff, the Jacobs team will research emergency response after large earthquakes damaged other waterfronts.

- 1993 Guam Earthquake
- 1995 Kobe, Japan Earthquake
- 2010 Haiti Earthquake
- 2011 New Zealand Earthquakes

How did the earthquake damage affect responders a) during the initial 0-24 hours, and b) during the sustained response phase (72 hrs+)? What were immediate waterfront repairs that were made in the week after the event and for what reasons? Did damage frustrate response, and if so, how? How long did it take to for waterfront areas to recover in terms of providing emergency response and regular operations after these events? Did aftershocks occur and if so how did the affect the response and recovery effort?

1.04.07.03.200 – Deliverables

Based on this review, and the results of the MHRA, the Jacobs team will develop injects and discussion questions to support two workshop/exercises designed to: A) Initial Response – Moving People, B) Transporting Materials and Supplies, and C) inspecting and clearing critical infrastructure and buildings.

1.04.07.03.300 – 'Whole Port' Stakeholder Engagement and Earthquake Resilience Seawall Facility Prioritization Workshops

Background

A key priority for the City's overall earthquake response and resilience planning is managing the transportation and movement of people to (Disaster Service Workers), and from (impacted residents, visitors, etc.) the City in the immediate response phase (0-24hrs) through the sustained response phase (72 hrs+) following a catastrophic earthquake.

Funding was procured to improve the resilience of the Port Seawall along the Embarcadero. Because funding is phased, Port and DEM emergency planners are seeking to determine the order in which Seawall areas should be prioritized for retrofitting/updates to maximize overall City/County capabilities to respond to, and recover from, an earthquake impacting the City.

The overarching question Task 3 seeks to answer is: If you had the choice to improve one or more areas, or specific facilities, which areas/facilities would you improve to enhance the City's emergency response operations after a major earthquake? Are there steps the Port, City and other stakeholders should take to be better prepared to respond given expected levels of earthquake damages?

Additional objectives for this task, subject to input by the planning team, include:

1) Enhance existing multi-agency, multi-discipline coordination to expand the City/County/Port of Francisco's, ability to respond to, and recover from a catastrophic earthquake.
2) Provide participants with updates and information regarding earthquake risks to the Port, City and regional infrastructure along the Embarcadero.
3) Test and validate key plan elements and assumptions with key internal and external Port stakeholders.
4) Develop an increased understanding of cross-agency/department and cross-jurisdictional stakeholder resource interdependencies and response capabilities.
5) Demonstrate measurable improvement in participants knowledge of "whole port" roles, responsibilities. response actions in an emergency

6) Encourage a culture of preparedness through the whole port.

7) Engage 'whole port' stakeholders in the opportunity to provide input into the facility/area prioritization project in support of the Embarcadero Seawall Program.

1.04.07.03.300 Scope and Deliverables:

1) To achieve the objectives, it is anticipated that a Delphi[1] or other methodology designed to engage and assist diverse stakeholders in achieving consensus regarding prioritization of resilience projects in support of the Embarcadero Seawall Program will be utilized. The process should allow for:

   a) Diverse stakeholder input

   b) Measurable, objective project prioritization and reports

2) Deliverable 1 processes will be employed with the input of the EPT, utilizing Jacobs Team/Mozaik analytical processes and tools to conduct two (2) "whole port"/multi-agency stakeholder (2) workshop (WS)/tabletop exercises (TTX) to educate/inform stakeholders and to prioritize Port facility/areas in support of the Embarcadero Seawall Program.

3) All WS/TTXs will utilize the Homeland Security Exercise Design and Evaluation (HSEEP) process guidelines. For all exercises the following design, conduct and evaluation processes will be conducted:

   a) Support Port-DEM in identifying and scheduling the multi-jurisdictional Exercise Planning Team(s) (EPTs)

      - Agencies anticipated to participate in the EPT, include: DEM, Port, ORCP, SFMTA, MTC, WETA, SFPD, SFFD, Cal OES, FEMA

   b) Develop invitations, meeting packets/materials, multi-media presentation, sign-ins, meeting minutes, etc. and facilitate the following exercise planning meetings:

      - Concept & Objectives*
      - Initial Planning Meeting*
      - Mid-Planning Meeting, and develop a Master Scenario Events List (if needed)
      - Final Planning Meeting

      *May be combined

   c) Develop exercise materials appropriate to the exercise type and scope, such as:

      - Exercise scenario(s)
      - Participant Handbook/Situation Manual (SITMAN)
      - Facilitator/Controller/Evaluator Handbook/Manual
      - Participant and Evaluator Evaluations
      - PowerPoint/multi-media presentation

   d) Support Port-DEM in exercise logistics, as mutually agreed. Logistical support which may include:

      - Providing printed exercise materials
      - Procuring acceptable venues, refreshments, audio-visual technology, badges, and other supplies/equipment, as necessary and mutually agreed
      - Assist and support the invitation process and track participant registration, includes printing of appropriate badges for participants, observers and controller/facilitators

   e) Lead the conduct of the exercise to include facilitation, provide controllers/facilitators/evaluators as required for successful conduct and in support of the EPT. To include set-up, tear-down and necessary controller/facilitator/evaluator briefings.

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1 RAND developed the Delphi method in the 1950s as a consensus building tool. It uses surveys, presented in multiple iterations, to gather data from informed, selected participants. In each survey round (or iteration), the number of survey items is reduced based upon input received from the collective group until consensus is achieved.

f) Facilitate the After-Action Reporting Process as follows:

- Draft the Seminar Report (Seminar/Workshop) or After-Action Report ([AAR], Tabletop/Functional Exercise)*
- Conduct the After-Action Conference (as determined by the EPT)
- Produce an Executive Summary within two (2) weeks of the exercise addressing the two key objectives of this task that identifies issues associated with the Port, City and Regional Plans and makes recommendations to address them going forward.*
- Develop the Improvement Plan and finalize the AAR (as applicable)*

g) Meeting minutes shall be produced within five (5) business days of any planning team meeting or other formal meeting

Note the Parties agree that further discussion is required to finalize the scope for Task 1.04.07.03.

1.04.08 – Environmental Conditions and Opportunities.

~~CH2M~~The PEC Team shall develop a detailed understanding of design related environmental conditions, critical constraints, and opportunities, as described below.

See Authorized Task Orders in Appendix E.

- 1.04.08 MHRA: Environmental Conditions and Opportunities - Phase 1

~~1.04.08.01 – Review Existing Plans, Policies, Studies, and Regulations.~~

~~Using variable information key environmental conditions, including historic structures, biological habitat, spills, groundwater, water quality, traffic constraints, public access areas, and critical utilities to support environmental review and permitting.~~

~~Work Products:~~

- ~~Environmental Conditions and Opportunities Report;~~
- ~~Summary of environmental conditions for all resource areas;~~
- ~~Existing Biological Conditions and Opportunities section (included in overall Conditions and Opportunities Report);~~
- ~~Existing mapped resources and field review of existing conditions;~~
- ~~Aquatic resources and permitting constraints review;~~
- ~~GIS mapping of existing biological and permitting conditions, including agency jurisdictional limits;~~
- ~~Identify areas of potential sea wall habitat enhancements and other habitat enhancement opportunities;~~
- ~~Description of major regulatory policies and practices expected to be drivers of the permitting process and have the potential to influence design/construction;~~
- ~~Attendance at up to four team meetings (four to six hours each, in San Francisco) to support alternatives selection process;~~

~~1.04.08.02 – Environment/Regulatory Early Start.~~

~~Develop a permitting roadmap, assemble a CEQA/NEPA strategy, and identify data gaps and initiate additional studies.~~

~~CEQA/NEPA strategy (ICF):~~

- ~~Identify environmental clearance approach to project, program, pilot projects and emergency projects;~~
- ~~Consult with Corps, Port, and Environmental Planning to develop and confirm strategy;~~

- ~~Established critical path schedule for environmental clearance.~~

~~Permitting Roadmap~~

- ~~Identify anticipated permits needed and underlying assuming major in-water work will be required;~~
- ~~Identify relationships between permits;~~
- ~~Identify statutory permitting time frames and estimate permit processing duration;~~
- ~~Describe timing for permit preparation and submittal based on time frames identified;~~
- ~~Identify data needed to complete permit applications and information gaps that may exist or are anticipated to be requested by agencies;~~
- ~~Attend two team meetings, up to four hours each in San Francisco.~~

~~CH2M's Deliverables:~~

~~Prepare and submit a CEQA/NEPA Strategy Memorandum; Environmental Conditions and Opportunities TM (draft and final); Draft and Final Permitting Plan, based upon the following.~~

~~Assumptions:~~

- ~~Assumes two draft and one final version of biological section of the Conditions and Opportunities Report.~~

1.04.09 – Economic Impact Assessment.

~~CH2M~~The PEC Team shall incorporate the economic work that the Port and City have done to quantify cost of inaction using United States Army Corps of Engineers (USACE) economic standards as described below.

See Authorized Task Orders in Appendix E.

- 1.04.09 MHRA: Economic Impact Assessment - Part A
- 1.04.09 MHRA: Economic Impact Assessment - Part B

~~1.04.09.01 – Existing Framework.~~

~~Evaluate the Port's existing database of real estate; critical landowner/real estate; and local demographic, economic, and market trends. Evaluate the Cost of Inaction methodology and recommend refinements for enhanced risk/benefit capture.~~

~~1.04.09.02 – Economic Impact Assessment Methodology.~~

~~Develop Project-wide standards to ensure alignment with USACE cost-benefit guidelines. Work with the Port's finance team to ensure consistency with prior analyses and City financing. With input from the Finance Working Group, further develop concepts related to Infrastructure Finance Districts and risk avoidance benefit capture.~~

~~1.04.09.03 – Risk and Benefit Capture.~~

~~Coordinate with other 1.04 subtasks to model economic impacts and benefits of infrastructure risk-reduction scenarios.~~

~~CH2M's Deliverables:~~

~~Economic Impact Assessment TM (draft and final).~~

~~Assumptions:~~

- ~~One round of engagement, including preparation with team, support of materials.~~
- ~~Regular remote attendance to MHRA team calls, etc. and six in person meetings (three people) during the MHRA Task development.~~

1.04.10 – Multi-Hazard Risk Assessment Report.

~~CH2M~~The PEC Team shall incorporate the economic work that the Port and City have done to quantify cost of inaction with USACE economic standards. ~~CH2M~~The PEC Team will also prepare an MHRA Report. This will be a compendium report, integrating work performed for each individual risk assessment. ~~CH2M~~The PEC Team will present the preliminary and final findings in a milestone workshop with the Port.

See Authorized Task Orders in Appendix E.

- 1.04.10 MHRA: Report - Initial Funding
- 1.04.10 MHRA: Report - Part A
- 1.04.10 MHRA: Report - Part B
- 1.04.10 MHRA: Report - Part C (ASR 29)

~~***CH2M's Deliverables:***~~

~~CH2M will prepare and submit the MHRA Report (draft and final) and conduct the Workshop based upon the following.~~

~~***Assumptions:***~~

- ~~Consolidate the outputs of the individual risk assessments and applicable supporting efforts described in Tasks 1.04.01 through Task 1.04.09 to enable comparison of assets and hazards~~
- ~~Conduct individual risk assessments that will address all consequences, vulnerabilities, and threats; no other risk component included in this task.~~
- ~~Compile assessment results, work with the Port and stakeholders to review and analyze the results, and prepare the draft and final Multi-Hazard Risk Assessment reports.~~
- ~~Provide MHRA expertise, support, and continuity throughout the component risk assessments to ensure consistency of approach, assumptions, tools, and deliverables.~~
- ~~Summarize risk assessment results in a single risk summary spreadsheet compiling the results of the individual risk assessments. Meet with Port to confirm the exact format based on the outcome of the previous tasks~~
- ~~Present hazard-asset pairs; their consequence, vulnerability, and hazard likelihood values; and the resulting annual risk values in both matrix/tabular and graphical form.~~
- ~~Conduct two half-day workshops with Port and stakeholders to present intermediate and final results of the risk summary; ensure the Port and stakeholders have a full and shared understanding of the results to provide a solid basis for the development of risk reduction measures, cost and risk reduction benefit estimations, and ancillary costs and benefits in subsequent tasks.~~
- ~~Incorporate the workshop feedback from the Port and stakeholders into the MHRA process and risk summary tool.~~
- ~~Prepare outline of final MHRA report and incorporate the Port's feedback; finalize the outline to serve as a foundation for the final report.~~
- ~~Prepare and submit draft and final MHRA report, soliciting and incorporating one set of Port and/or stakeholder feedback at each step.~~
- ~~Take ten trips, five days per trip for modeling and analysis review.~~

1.05.00 – ~~Alternatives Development, Analysis, and Preferred Program~~ Strengthen, Adapt and Envision

~~CH2M shall develop design criteria, define the framework for alternatives development, formulate alternatives, evaluate alternatives against evaluation criteria, and select a masterplan vision and preferred program. At the outset of this task, CH2M will work with the Port to confirm methodology, select preferred tools and outputs, and confirm sequencing of City internal and external engagement.~~

See Authorized Task Orders in Appendix E.

- 1.05.07 Alternatives Development Analysis and Preferred Program Alternatives Methodology
- 1.05.10 Seawall Incubator

Background

The Port's Resilience Framework includes three elements-Strengthen, Adapt and Envision. The framework is designed to provide the Port with a way to address risks based on urgency, available resources and in a way that balances a variety of objectives and priorities. The framework is intended to ensure the most efficient, transparent and accountable approach to building resilience into the shoreline and to enable the Port to reduce risk while preserving and enhancing the current waterfront assets and services and limiting disruption to critical services and shoreline businesses and visitor serving businesses wherever possible.

The Strengthen Element is designed to reduce risks to the current waterfront and prioritizes improvements to life safety and emergency response. The Strengthen Element is envisioned to be the first projects for the Embarcadero Seawall Program to reduce the urgent, near term risk to the current waterfront.

The Adapt Element provides the Port with an approach for adapting the current waterfront over time to reduce existing seismic risks and increasing flood risks. The Adapt Element consists of the Adapt Plan, which in anticipated to be updated every five years to incorporate changes in priorities, context and science. The Adapt Plan provides for a broad range of actions, from site-specific, phased approaches to landscape scale approaches and significant changes. The decision-making framework will include a robust analysis that includes performance metrics, evaluation criteria and adaptation and implementation pathways to determine the most effective actions to take at the time of each update. The Adapt Plan is envisioned to be able to advance the USACE Flood Study effort and recommended actions, as well as other actions that the Port and others may take as part of the Historic Piers Rehabilitation Program, the Floodproofing the Piers project, the Islais Creek Adaptation Study and other actions necessary to reduce the risk of, and advance improvements to, the waterfront and shoreline and adapt it over time.

The Envision Element will be developed through a series of meetings, design charettes and workshops and included as a section of the Adapt Plan. It is intended to provide the Port and its partners a long-term perspective within which they can make focused, site-specific changes to reduce near term and high consequence risks to the waterfront and the shoreline while considering how well these changes build toward alternatives to reduce the longer range, landscape scale risks posed by the higher water levels projected for the end of the century. The sea level rise scenarios are grouped more closely together in projections from now until 2050 and the range of alternatives is easier to implement as there are fewer unknowns. However, the sea level rise scenarios for 2100 and beyond present quite a wide range of potential futures and the risks of making decisions that are either overbuilding the shoreline and waterfront and thus causing unnecessary damage and disruption to the environment, the Port and City's cultural, maritime and historic resources and spending a more resources than necessary to address an uncertain risk. Alternatively, there is a risk of building projects that do not consider the higher projections and for the Port and the City to have adequate plans, funding and timing to address the real risks. The Envision Element provides the Waterfront Resilience Program and the Adapt Plan with a way of planning for a range of futures and ensuring that current decisions consider these range of futures.

1.05.01 – Strengthen

1.05.01.01 – Seismic Solutions Strategy Study - Methodology Definition &

Detailed Work Plan

1.05.01.01.100 – Develop Work Plan, Level of Effort and Methodology:

The PEC will work with the Port to develop a workplan for completing a seismic solutions strategy study. This subtask includes the planning and implementation of a maximum of four (4) workshops with the Port staff to define the methodology to be followed, the schedule and the level of effort for the full Seismic Solutions Strategy Study Task.

1.05.01.01.110 – Selection of Solution Strategies and the engineering analysis approach:

Seismic solution strategies will be identified, and their application will be evaluated given constraints, opportunities and considerations. The evaluations will be performed using engineering judgement; no geotechnical, structural or utility / mobility modeling will be performed during this subtask. The seismic solution strategies will be grouped for the purpose of modeling like-solutions in a later task (not covered by this authorization). This scope document assumes the solution strategies (schemes) to be evaluated will be as follows:

- Fix All Fill Liquefaction
- Fix Corridor of Liquefaction
- Fix Foundation Soils
- Hold Dike in Place
- Offshore Buttress
- Wharf Buttress
- Onshore Geotechnical Buttress
- Onshore Structural Buttress
- Structural Replacement & Fix

In this subtask, the PEC will make simplifying assumptions on the overall dimensions of the solution elements and an on the properties of improved soil/structure using engineering judgment.

A brainstorming/scoping session attended by the Port and PEC geotechnical, structural and civil engineers will be held to sketch out the solution strategies (schemes) and agree upon the properties/dimensions to be used at the outset of modeling during a later task.

Representative geotechnical conditions will be identified for the purpose of modeling like-conditions in a later task (not covered by this authorization). Four representative geotechnical conditions will be selected to approximate the performance across the 3 miles of waterfront. These representative sections will align with existing FLAC 2D models already developed under a previous task. A brainstorming/scoping session attended by the Port and PEC geotechnical, structural and civil engineers will be held to agree on the geotechnical sections to be used.

The outcome of this subtask will be used in later tasks not covered by this authorization request, and will establish the basis for developing a general understanding of how modifications to the soil properties using a variety of seismic solutions can impact the lateral spreading and liquefaction potential of the representative cross sections.

1.05.01.01.120 – Conceptual Performance Criteria discussions:

The Utility and Mobility System consultant will work with the team to identify an initial draft of relevant performance objectives for the Port to be able to establish the performance criteria of these systems. The main goals in this subtask will be:

- Identify (or develop) methods to establish the relationship between ground movements and utility impacts and determine if adjustments to the methods are warranted for each of the utility assets.
- Utilities include electrical, natural gas, telecommunications, water, sewer, storm, AWWS. Mobility systems refer to streets, and Muni.

Given the lifeline-to-lifeline and lifeline-to-Port facility interdependencies in disaster response and recovery, it is important that the providers and the Port collectively agree upon various criteria such as probabilities and ground motions when establishing performance objectives for their assets. These objectives, and the measures required to achieve them, may vary for a given event and asset. Additional alignment of criteria could be considered, and / or an analysis conducted to compare the costs and benefits of preventative work (measures) versus post-event repair.

In addition, the PEC will work with the Port to develop seismic performance criteria for marine structures. This would include structures to be retrofitted and new structures. It is expected that the criteria may vary given the range of structures, occupancies and seismic performance improvement measures being considered.

The methodology herein defined will consider the analysis of the assets (marine structures) by representative groups and typologies, and this will be considered when developing the alignment on their performance criteria. This will be done in a later task and is not included in this subtask.

This subtask includes the planning and implementation of one (1) workshop with the Port staff to establish the basis for the further definition by the Port of the Utility and Mobility systems and the planning and implementation of one (1) workshop with the Port staff to establish the basis for the further definition by the Port of the marine structures Performance Criteria.

The detailed Performance Criteria will be established by the Port once the results of the sensitivity analysis for the seismic solutions (schemes) are provided as part of the Methodology defined in this task and posteriorly implemented.

1.05.01.02 – Seismic Solutions Strategy Study

1.05.01.02.100 – Seismic Performance Criteria

Marine Structures

The PEC Team will work with the Port to develop seismic performance criteria for marine structures. This would include structures to be retrofitted and new structures. It is expected that the criteria may vary given the range of structures, occupancies and seismic performance improvement measures being considered.

Utility and Mobility Systems

The PEC Team will work with the Port and utility and mobility system providers to develop agreed-upon performance criteria that are consistent with the Seawall program goals of life safety and disaster recovery. Utilities include electrical, natural gas, telecommunications, water, sewer, storm. Mobility systems refer to streets and Muni.

Given the lifeline-to-lifeline and lifeline-to-Port facility interdependencies in disaster response and recovery, it is important that the providers and the Port collectively agree upon various criteria such as probabilities and ground motions when establishing performance objectives for their assets. These objectives, and the measures required to achieve them, may vary for a given event. Additional alignment of criteria could be considered, and / or an analysis conducted to compare the costs and benefits of preventative work (measures) versus post-event repair.

Deliverable:

Draft and Final Seismic performance criteria for marine structures and utility and mobility systems will be documented in a Technical Memorandum

Schedule:

Upon NTP the draft

Assumptions:

Meetings with Port are limited to up to three for two hours each, and with up to five PEC team members present.

1.05.01.02.120 – Seismic Solutions Strategy Study

The objective of this task is to improve the understanding of performance, cost, constructability and economic impact associated with generalized seismic solution strategies for the marine structures and utility and mobility systems. The activities are:

- Pick the solution strategies (scoping exercise)
- Pick the representative geotechnical conditions (scoping exercise)
- Run sensitivity analyses for slope stability and liquefaction potential
- Define means and methods to achieve each solution strategy
- Estimate unit cost for each method
- Define construction or mitigation factors per representative area and/or strategy influencing cost
- Parametric cost analysis
- Benefit cost evaluation
- Pick the solution strategies (scoping exercise)

1.05.01.02.130 Pick the solution strategies (scoping exercise)

In order to narrow the list of potential seismic solutions, this first task will be used to identify solution strategies rather than specific means and methods of how that solution is executed. The purpose of this will be to easily implement small changes to existing analysis tools to roughly understand the potential change in the seismic performance. This scope document assumes the solution strategies would be as follows:

- Fix All Fill Liquefaction
- Fix Corridor of Liquefaction
- Fix Foundation Soils
- Hold Dike in Place
- Offshore Buttress
- Wharf Buttress
- Onshore Geotechnical Buttress
- Onshore Structural Buttress
- Structural Replacement & Fix
- Limit Liability

At this phase, the PEC Team will make simplifying assumptions on overall dimension of the solution elements and properties of improved soil/structure based on engineering judgment.

A brainstorming/scoping session attended by the Port and PEC Team geotechnical, structural and civil engineers will be held to sketch out the solution strategies and agree upon the properties/dimensions to be used for each strategy. It is expected that this brainstorming session will be concurrent with subtask 2.2.

1.05.01.02.140 Pick the representative geotechnical conditions (scoping exercise)

Four representative geotechnical conditions will be selected to approximate the performance across the 3 miles of waterfront. These representative sections will align with existing FLAC 2D models. A brainstorming/scoping session attended by the Port and PEC Team geotechnical, structural and civil

engineers will be held to agree on the geotechnical sections to be used. It is expected that this brainstorming session will be concurrent with subtask 2.1.

1.05.01.02.150 Run sensitivity analyses for slope stability and liquefaction potential

Geotechnical analyses will be performed to understand how varying the soil properties will impact the lateral spreading and liquefaction potential of the representative cross sections. Analysis results will be characterized as a percentage reduction in ground displacement (horizontal and/or vertical). These results will be compared to the benefit computations for marine structures (assuming stepped reductions in deformations) performed in the MHRA to determine the benefits (social, environmental and economic) corresponding to a given reduction in ground displacement. It is expected that each strategy will be applied to each representative section to create a table that indicates percent reduction to the displacement as compared to the baseline as determined by the MHRA. Also, it is assumed that the structural analyses corresponding to the 37 fragilities as performed in the MHRA will be used and that no additional modelling will be necessary. For example, the models will not be revised to include seismic joints.

Similarly, the percentage reduction in ground displacements will be compared to the benefit computations for utility and mobility systems performed in the MHRA to determine the benefits corresponding to a given reduction in ground displacement. For the purpose of this scope, we have assumed a total of 40 combinations of a geotechnical section and a solution strategy

1.05.01.02.160 Define means and methods to achieve each solution strategy

Concurrent with subtask 2.3, the means and methods for achieving each strategy will be explored and evaluated based on engineering judgment. The goal of this step is to associate feasible means and methods with the changes/improvements made to the shoreline. For example, the “Fix All Fill Liquefaction” strategy may be achieved through a large number of means such as chemical grouting, compaction grouting, jet grouting, excavation and replacement, etc. each of which has its advantages and disadvantages. For each method, the pros/cons will be listed along with significant constraints that impact the feasibility of the method to 1) be a viable technique along the waterfront and 2) produce the expected results based on the known variables within the site. Note that several solution strategies share common means and methods, however the particulars of a given method’s applicability may vary depending upon the strategy for which it is applied.

1.05.01.02.170 Estimate unit cost for each solution strategy

In line with 2.4, the means and methods used to achieve the various solution strategies will be costed out on a unit basis to a Class 4/5 estimate level. These costs should be informed by information gathered through the incubator phase, past projects completed along the SF waterfront, and projects completed by CH2M Team around the world. A limited number of contractor meetings may be required to validate costing assumptions, but the focus will be on developing a consistent level of detail among the several means and methods within the solution toolbox since these will be used in a comparative fashion at later stages of this process. To that end, costs which are estimated in this subtask will be those associated directly with the solution strategy. Costs for other measures necessary for a marine structure to satisfy the performance criteria will be estimated separately in task 3.

1.05.01.02.180 Define construction or mitigation factors per representative area and/or strategy influencing cost

In addition to the unit cost estimated for each solution strategy, there will be factors that cannot be captured in the generalization of the cost. These will be approximated and applied using engineering judgement rather than performing location-specific cost estimates. The goal is to identify the building blocks that can be used to build up a number of comparative cost estimates.

These factors can be broken into a few different groups as outlined below

- Location Factors (Fisherman’s Wharf, Ferry Building, etc.)

- Construction Access
- Construction Mitigation Requirements (i.e. detours, traffic management, noise, etc.)
- Solution Strategy Factors
- Alignment (roadway, promenade, offshore, etc.)
- Utility Impact
- Construction Mitigation Requirements (i.e. detours, traffic management, noise, etc.)
- Environmental Mitigation (i.e. bay fill mitigation, in water work windows, etc.)
- Method Factors
- Reliability (i.e., some methods are more certain relative to unknown ground conditions)
- Noise/Safety Hurdles
- Schedule Driven Costs
- A working session attended by the Port and PEC Team including geotechnical, structural and civil engineers and cost estimator will be held to determine and agree on an appropriate number of factors to be incorporated, consistent with the budget.

1.05.01.02.190 Parametric cost analysis

Using the building blocks set out in subtasks 1.05.02.05 (unit costs) and 2.6 (factors), comparative costs for each solution strategy along each reach of the waterfront will be developed using the average properties for each reach (i.e. depth to competent soil, length of marginal wharf, etc.). Because each solution strategy could be implemented using a number of means and methods, it is expected that this summary is done using a high, low and average unit cost estimate for each solution strategy.

1.05.01.02.195 Benefit cost evaluation

The social, environmental and economic benefits of the seismic strategies determined in subtask 2.3 will be combined with the rough order of magnitude costs to determine a series of benefit cost ratios for marine structures, and for utility and mobility systems. The benefit to cost ratio will be provided on an event specific basis or through an annualization calculation used to balance the consequence with probability of occurrence. Additionally, the benefit can be expressed as reduction in predicted casualties relative to cost of mitigation for each reach along the waterfront.

Schedule and Deliverables:

The resulting product from 1.05.02 will be a series of sketches, tables and a high-level narrative compiled into a draft and final technical memorandum describing the approach and results of the subtasks outlined above. The schedule will be determined upon approval of the Task Order.

Assumptions:

- The number of solution strategies and accompanying means and methods outlined in this Task may vary and it is expected to be commensurate and balanced against the Amendment budget allocation and approved by the Port in the Task Authorization.
- It is assumed that the structural analyses corresponding to the 37 fragilities as performed in the MHRA will be used and that no additional modelling will be necessary.
- A total of 40 combinations of a geotechnical section and a solution strategies will be analyzed.

1.05.01.02.200 Seismic Solutions to Meet Performance Criteria

Additional Seismic Strengthening Measures

Additional Seismic Strengthening Measures may be needed to complement the seismic strategies determined in subtask 1.05.02. These may be needed to provide a solution at each reach that satisfies the seismic performance criteria for marine structures and/or utility and mobility systems. For example, retrofit of an existing structure may be needed to address inertial loads and/or residual kinematic displacements.

Schedule and Deliverables:

The resulting product from Task 1.05.02 will be a high-level narrative compiled into a draft and final technical memorandum describing the approach and resulting cost estimates. The schedule will depend upon the resulting retrofits per reach and determined upon approval of the Task Order.

Assumptions:

- The number of measures will be determined in cooperation with the Port and the PEC Team and may require additional funding.
- No additional analysis will be performed to establish a likely retrofit which can be estimated.
- The costs to implement a retrofit will be based on engineering judgement and Port and industry data available.

1.05.02 – Adapt and Envision

Under this Task, PEC Team will support the Port team as it leads the development of the Adapt Element and Envision Element.

The following scope of work is structured based on the anticipated outline of the Adapt Plan. The Adapt Plan is intended to be the home for the Resilience Program and to provide the framework for decision-making for the Phase 1 Strengthen projects, the first Adapt Plan recommendations for actions and the first three to five Envision Element concepts developed as part of the Adapt Plan planning and engagement process.

In general, Port staff will be leading and managing the development of the Adapt and Envision elements and preparation of the Adapt Plan. The PEC Team will partner with and support the Port with technical input, preparation of some sections, review of others, facilitation of workshops and integration and production of the Adapt Plan. This scope of work is organized by section of the report to clarify the level of support expected of the PEC Team for each section of the Adapt Plan.

1.05.02.01 – Support Executive Summary and Purpose of the Adapt Plan

The Executive Summary is to be developed upon completion of the Draft Plan and will summarize the purpose of the plan, the Port Resilience Framework, Key findings and Recommendations. It will provide a high-level compelling, visual and clear overview of the Adapt Plan.

The Purpose of the Adapt Plan (3 to 4 pages) will carefully define the Plan as follows:

- Describe the purpose and function of the Adapt Plan and the Port's Resilience Framework
- How does the Adapt Plan relate to the Waterfront Land Use Plan, Port Strategic Plan, Port Capital Plan?
- What are the sources of material for the Adapt Plan and what is included in the Plan?
- How does the Adapt Plan advance action? What are types of actions will be advanced from the Plan?
- Is the Plan enforceable? In what way? How will the Port use the Plan? Is the Port accountable to the Plan?
- The Port is the primary author of both the Executive Summary and the Purpose of the Adapt Plan however the PEC Team will provide support with content, layout, graphics, editing and design.

Deliverables:

- Review and edits of first draft to be provided by Port Team
- Final section for inclusion in the Adapt Plan

Assumptions:

- The Port team will develop the first draft of both the Executive Summary and the Purpose of the Adapt Plan sections.

1.05.02.02 – Support Resilience Program Visions, Principles, Goals and Objectives

Through the Resiliency Program team's retreat subcommittee, a draft of visions, principles, goals and objectives is currently under development.

The draft visions, principles, goals and objectives for the program are drawing from the following sources:

- Embarcadero Seawall Program goals
- Waterfront Land Use Plan Update material
- Port Strategic Plan
- USACE Flood Study material
- Visions, Principles, Goals and Objectives from similar resilience efforts
- Engage the Port Resilience Team and the PEC Team in an exercise to introduce the draft visions, principles, goals and objectives in a way that makes it easy to provide input and feedback
- Revise material based on input received and provide for final round of feedback

Under this task, the PEC Team will support finalizing the Visions, Principles, Goals and Objectives for incorporation into the Adapt Plan.

Deliverables:

Visions, Principles, Goals and Objectives

Assumptions:

- The Retreat visions subcommittee has developed the first draft of VPGO.
- The PEC Team will work with Port staff to design and facilitate the VPGO workshop with the Port Resilience Team.
- The PEC Team will revise the material based on input received.
- the PEC Team engagement in this task limited to x hours.

1.05.02.03 – Support Scope and Scale of the Port Resilience Program Section

The PEC Team will support the Port staff in developing this section of the Adapt Plan. This section will include:

- Lead, partners, stakeholders, affected parties (e.g. Port, City, region, USACE, tenants, community, commuters)
- Program geographic area and map (e.g. hazard zones for both seismic and flood scenarios)
- Program issue area list (e.g. seismic, flooding, historic resources, Public Trust, Federal Interest)
- Program assets, services, facilities and functions list (Port and non-Port- everything in the geographic area map and issue area list)
- Related efforts at local, regional, state and federal scales (Resilience Atlas, Adapting to Rising Tides Bay Area, RBD Islais Creek, SPUR Mission Creek, Citywide SLR V&C, Citywide Hazard and Climate Resilience Plan, BART SB1 Grant, Islais Creek, Pier 70, Mission Creek, etc.)

- Summary of the issues in the City and the region (e.g. housing, homelessness, deferred maintenance, jobs, transportation safety and services, historic resources, current and future hazards other than flood and seismic)

Deliverables:

- List of participants
- Map and description of the geographic area
- List of the issues to be considered and included in the Adapt Plan
- List of assets, services, facilities and functions
- Brief summary of related efforts and projects (can contribute to the USACE Future without Project conditions)

Assumptions:

The Port is leading this effort overall.

The PEC Team will lead on items b, and d, listed above.

- Existing data available for Seawall Program will be used for Seawall Section
- For Southern Waterfront, new information will need to be developed.
- Port staff will lead on a, c, e and f. on the developing the list of participants, the list of issues to be considered and included in the adapt plan, and the summary of related efforts and projects.
- The PEC Team will integrate information developed by Port staff and the PEC Team into cohesive Section on the Scope and Scale of the Port Resilience Program.

1.05.02.04 – Summary Engagement and Communications Approach and Activities supporting Adapt Plan

This section of the Adapt Plan will include the following with respect to describing the approach to stakeholder engagement and communications:

- Philosophy and approach
- Describe the tools used- Roadshow, seawall tours, community and City events, Port staff on panels + speaking events, press stories, community meeting series in three geographic areas, Resource Agency Working Group, City department collaboration, website, advisory groups, etc.
- Who did we engage? How did we engage specific audiences?
- What did we hear? How did it guide us? What changes were made in response to input received? Was the input different depending upon the audience?
- Engagement and communications next steps- what happens during construction? How will the Port continue to engage and communicate about resilience?

Deliverables:

- A summary of the philosophy and approach for engagement and communication for overall Resilience Program and its projects
- A summary (with photos and images and examples) of the tools used for engagement
- A list of who was engaged and how many types of events (how many roadshows, how many tours, how many community events, etc.?) (Appendix to be prepared in Task 1.02 be referenced in this section of the report)
- A summary of the input received and how it shaped outcomes

- A roadmap for future engagement and communication

Assumptions:

- Port Communications lead for the Resilience Program is the lead for this Task.
- The PEC Team to support this effort through the Communications Team.
- This is to support the development of the chapter in the Adapt Plan, no stakeholder effort is included in this task, that work is performed under 1.02.
- The Port Team writes the initial draft
- The PEC Team will support on editing / updating up to two drafts of the initial approach
- Tracking will be ongoing, but reporting done annually

1.05.02.05 – Hazards-Science and Scenarios

This task brings the work completed in the MHRA for the Seawall portion of the waterfront into the Adapt Plan. .

- For the area of the southern waterfront outside of the Seawall, the PEC Team will rely on the City-wide Sea Level Rise study to describe hazards, and or USACE Flood Study work.
- To describe the seismic hazard in the southern waterfront, the PEC Team will rely on the work to be developed by USACE for the Flood Study and the Port's Southern Waterfront Seismic Vulnerability Assessment. The PEC Team will take the work prepared by USACE and integrate into the Hazards Science and Scenarios Chapter of the Adapt Plan.

Drawn from the MHRA, contents of this section will include:

- **Seismic Hazards**- liquefaction, lateral spreading, ground shaking, soil conditions,
  - Scenarios chosen and what did downscaled analysis tell us about the risk at different scenarios? Risks at the seawall, the roadway and the Port above seawall described and depicted (through images)
  - Methodology/models chosen to assess risk (Hazus, etc.)
  - Level of confidence with findings
  - Summary of key findings
  - Differences between these findings and those of previous studies (if any)
- **Flood Hazards-** Current and future, coastal, groundwater, precipitation and overland flooding
  - Scenarios chosen and why and what did a downscaled analysis tell us about the risk
  - Methodology/models used
  - Describe any differences between USACE analysis and Program analysis and explain
  - Port nearshore and shoreline environment (bathymetry, shoreline type and condition)
  - Level of confidence with the outcomes? How does the level of confidence change over time?
  - Summary of key findings (thresholds for the project area, near term flood risk, high consequence flood risk, depth and duration, etc.)
  - Differences between these findings and those of previous studies (if any)

Deliverables:

Draft description of Hazards – Science and Scenarios to include:

- Maps of the hazards (in the form of a mapbook)- geographic location, severity
- Summary of the seismic and flood scenarios selected and why
- Overview of the seismic and flood methodology/models used

- Summary of nearshore environment and any additional work done to assess and understand it (maps and photos)
- Summary of level of confidence/probabilities
- Key findings identified including hazard thresholds (for example, conditions from ballpark to Bay Bridge indicate that this area is at less risk from seismic event)
- Any assumptions change from previous studies? What does this information tell us about priorities and considerations?

Assumptions:

- The PEC Team will draw primarily from their work in the MHRA and draft documents from the USACE Flood Study and the Southern Waterfront Feasibility Study to produce the work required for the Adapt Plan.
- No additional analysis will be developed.
- It is assumed that the geotechnical information provided by USACE and the Southern Waterfront Feasibility Study is a sufficient to characterize the seismic hazard in the southern waterfront for the Adapt Plan.
- It is assumed that flooding information provided by USACE from G2CRM will be sufficient to characterize the flooding hazard.
- For the Southern Waterfront it is assumed that minimal re-work will be required – not to exceed 80 hours for Seismic and 80 hours for flood for the Southern Waterfront

1.05.02.06 – Vulnerability, Risks and Consequences

For this section of the Adapt Plan, the PEC Team will draw on the information developed for the MHRA and modify it as needed for the Adapt Plan for the Seawall section. For the areas outside of the Seawall, the PEC Team will draw on information on flood vulnerability and consequences from the City-wide SLR, the GHD report and the USACE Flood Study. For seismic vulnerability, risks and consequences, in the Southern waterfront, the PEC Team will use the USACE information on geotechnical conditions to provide a qualitative analysis of vulnerability.

Overall this section will include the following:

Description of Assets in the Study Area:

- **Seawall Section** – Relying on the MHRA.
  - For each asset category the PEC Team will include the following information:
    - For seismic: Include scenarios and assets categories affected by each scenario; vulnerability, risks and consequences for the three zones (seawall, roadway, buildings) using the risk metrics for the program
    - For flooding: Include scenarios and assets and services affected by each scenario (water level at which the shoreline/seawall overtopped, key thresholds at which area of flooding increases) using the metrics for the program
    - Evaluate the combination of the hazards and identify any issues or considerations associated with the overlay of the flood and seismic risk (areas where both are more or less near term or have more or less consequence)
    - Example content for each asset category:
      - Definition of the asset category and summary of existing conditions
      - List of the assets and services included and excluded.

- Vulnerability + Risks + Consequences to seismic (ground shaking, liquefaction, ground conditions, building type and condition)
- Vulnerability + Risks + Consequences to flooding (coastal, groundwater, stormwater, combined flood risk, etc.)
- Consideration of both hazards to the asset or asset category
- Summary of key findings, including highest consequences, earliest vulnerabilities, governance and financing opportunities or challenges

- **Southern Waterfront Section** – Relying on Existing Data (City-wide SLR Vulnerabilities and Consequences Assessment, and USACE Flood Study and Southern Waterfront Seismic Vulnerability Assessment as they develop): Note this section will mirror the Seawall Section described above, to the extent possible. However, because there has not been a full MHRA in the Southern Waterfront section, this portion will be more qualitative in nature. For example, while there will be flood scenarios to include, there will not be various seismic scenarios to include.

Deliverables:

Draft Vulnerability, Risk and Consequences Section of the Adapt Plan

Section to include the following:

- High Level overview of the assets and services vulnerable per seismic scenarios with graphics and maps to depict the information in a way that is easy to understand
- Overview of the assets and services vulnerable per flood scenario (likely will be coastal flooding only, but possibly incorporate combined flood scenarios) with graphics and maps to depict the information in a way that is easy to understand
- Maps and graphics of both hazards and identification of important factors to consider when assessing the hazards together
- A chapter of between eight and 10 pages per asset category with a focus on key findings- highest consequences, earliest vulnerabilities, governance and financing opportunities and challenges and considerations related to environment, economy, community and equity.

Assumptions:

- Sufficient information is available in existing and under development through the USACE Flood Study and the Southern Waterfront Seismic Vulnerability Assessment to complete the Southern Waterfront portion of this section without additional analysis or data collection.
- For the Northern Waterfront, this section will rely predominantly on the summary to be developed for the MHRA.

1.05.02.07 – Development of Metrics, Performance and Evaluation Criteria

The development of metrics and evaluation criteria will be led by the Port Resilience Program staff. The PEC Team will provide support in the development of metrics criteria and review and edit the draft section. The draft section will include the following:

- Introduction: How do metrics and evaluation criteria connect to principles, vision, goals and objectives? What is their role in decision-making?
- Program Metrics: How were they selected? How will they be used? Are there challenges around data and information? Describe the role for both quantitative and qualitative metrics.
- Program Evaluation Criteria: Provide the same information as required for metrics. Provide additional detail related to weighting criteria used for Phase 1 Strengthen projects and a description of how

evaluation criteria may change in subsequent Program phases. For example, the Strengthen Element the focus is on life safety, emergency response, limiting disruption, and adaptability. The other criteria can be used to evaluate and communicate a full picture for each of the alternatives that achieve those objectives and the suite of criteria can be used for future Adapt and Strengthen phases.

- Summary: Describe how metrics and evaluation criteria are used in decision-making, measuring progress, ensuring that the vision, principles, goals and objectives are being met and ensure consistency with the Resilience Program.

Deliverables:

- Review draft of chapter prepared by Port staff.
- Edited final draft for inclusion in Adapt Plan

Assumptions:

- Port Resilience Program staff will draft this section for the Adapt Plan.
- The PEC Team will provide input during its preparation through attendance at up to 2 meetings, including one meeting with the Management Oversight Committee.
- The PEC Team will review and edit the draft for consistency and to be integrated into the full Adapt Plan.
- Three workshops to be held as part of 1.05.10.08 will also inform this task.

1.05.02.08 – Framework for Decision-Making

Under this task, the PEC Team will work closely with the Port to finalize a framework for decision-making that will be documented in and used to develop the Adapt Plan and in particular to select the initial projects and lay out a process for selecting future projects. This Section of the Adapt Plan will include the following:

- Program Decision-Making: How will the first alternatives be developed? How will a final alternative or suite of alternatives be selected?
- Identify and describe other factors in decision-making, such as:
  - Unique opportunities that accelerate its prioritization (such as funding opportunity or a partner taking action) or unique challenges that decelerate its prioritization (such as high costs or permitting and regulatory constraints or additional analysis needed or lack of support)
  - Consistency of approach with partner such as USACE or FEMA, etc.
  - When available, life cycle of assets and how the action intersects with replacement schedule
  - Desire to address another issue, such as emergency response or improved mobility for example
  - Changes in priorities of the City, Port or other partners
  - After a hazard event
  - Desire to address additional high consequence or near-term risks
  - Cost and construction considerations when advancing actions. For example, it is often less expensive to do conduct additional work when a project is already taking place

Deliverables:

Draft Framework for decision-making chapter for the Adapt Plan, to include:

- Summary of the approaches considered and the factors contributing to the selected approach
- Identify other considerations in decision-making (funding or partnering opportunities, etc.)

- Describe the tools evaluated for the decision-making and applicability for each element in the Program
- Draft decision-making framework

Assumptions:

- The PEC Team will lead up to three workshops with the Port team to develop the Draft Framework for decision making
- The workshops will also address the development of evaluation criteria and metrics described in the previous task.

1.05.02.09 – Design Framework

Design Framework

Development of the design framework for the Adapt Plan will be a collaborative effort between Port staff, SF Planning and the PEC Team to establish guiding principles and design strategies for flood protection through 2080. The PEC Team will lead production of the Urban Design component of the Design Framework Report, informed by (2) workshops with Planning/Port/PEC Team and coordination and working sessions with the Urban Design Team. The Urban Design component of the design framework will include the following products and content:

- Define the need for design framework or design language for the Adapt Plan- difference between a masterplan approach and adapting over time requires that guidelines be established to ensure consistency of design as projects are implemented
- Examples of design framework and design language from other large-scale projects or specific/ area plans within and outside of San Francisco

Design framework report

- Executive summary and organization
- Overall objectives, standards and guidelines, building upon the Envision Element
- Urban design component objectives, standards and guidelines, with categories similar to what has been analyzed in the Seawall MHRA. For example, historic resources (buildings and districts), promenade, parks and recreation areas, plazas and public gathering spaces, nature spaces, bike facilities, pedestrian safety measures, public art, programming and activation events, etc.
- Historic resource analysis and feasibility for the Ferry Building, Agriculture Building, Union Iron Works complex (1 building), and 1 representative pier structure, or the equivalent effort.
- Precedent examples.
- Illustrative plans and renderings for up to 7 focus areas, describing how the guidelines can be applied to create an improved public realm for different adapt scenarios. Up to 2 scenarios will be illustrated for each focus area.

Deliverables:

- Draft chapter of Design Guidelines for the Adapt Plan
- Summary of existing guidelines and contribution of existing guidelines to Program guidelines
- Description of the role of Adapt Plan Design Guidelines
- Draft design guidelines for the Program including a governance structure for implementation
- Final design guidelines for the Program

Assumptions:

- Members of the PEC Team will prepare for and facilitate two workshops with Port staff, SF Planning and members of the Resilience team on the topic of developing design guidelines and governance for design guidelines.

1.05.02.10 – Measures and Approaches

This section of the Adapt Plan lays out the various measures approaches that could be taken along the waterfront. This section includes measures and approaches that address

- Seismic Hazards
- Flood Hazards
- Other Public Benefits

Opportunities to improve community, ecological and economic assets and services:

- Introduction on the suite of measures and approaches that can be taken to reduce seismic and/or flood risk, from policies and partnerships, to structural, non-structural, grey, green and blue infrastructure, etc. Describe the need to address the vulnerabilities in a way that is consistent with the visions, principles and goals and address multiple social benefits
- Summary of findings and concepts from previous projects, assessments and efforts, including SPUR Mission Creek, RBD Islais Creek, expansion at the Ferry Terminal, CAP 103, Seawall Incubator, early Seawall concepts, Resilience Atlas, Bayland Habitat Goals Update, Adapting to Rising Tides, etc.
- Summary of possible measures and approaches using examples from elsewhere including USACE Engineering with Nature, examples from New York, New Jersey, Boston, USACE efforts, etc.
- In the form of a Profile or Fact Sheet, recommended approaches to address seismic risk when considering:
  - Best at addressing building, utility, roadway or seawall vulnerability?
  - Adaptability
- Performance, cost and other criteria from evaluation criteria above
- Options to reduce impacts and increase social benefits
- Shoreline type, building type, soil condition, etc. (Maybe use New York shoreline typologies project as an example of matching measures and approaches to specific conditions
- Identification of partners and funding sources based on measure and approach
- Recommended approaches to address flood risk in a fact sheet format, when considering:
- Program Element: Strengthen, Adapt and/or Envision
- Addresses temporary flooding? More frequent flooding? Larger flood risk?
- Best at addressing asset, area or larger landscape?
- Adaptability and compatibility with seismic solutions
- Performance, cost and other criteria from evaluation criteria above
- Graphic depiction of measures and approaches

Deliverables:

Chapter of the Adapt Plan with the content outlined above

Assumptions:

- All flood management measures in the Southern Waterfront will be developed by USACE under the Flood Study
- Seismic measures in the Seawall section will be developed under Task 1.05.01 and 1.5.02
- Lifecycle and sensitivity of the asset analyses are not included in the PEC Team scope.
- Conceptual seismic measures for the Southern Waterfront will be initially developed through the Southern Waterfront Seismic Vulnerability Assessment.

1.05.02.11 – Alternatives Formulation

Under this task the PEC Team, together with the Port team will formulate, evaluate and select alternative(s) building on the work developed in the 1.05.01 Strengthen task and the USACE flood study Task 1.09.08 Civil, Urban and Cost Estimating. The goal is to conduct an integrated alternatives formulation and selection process that results in identification of an initial Strengthen project within the context of the Tentatively Selected Plan (TSP) for the Flood Study for the full waterfront. This effort will also identify the Locally Preferred Plan (LPP).

The PEC Team will support the Port as they convene various stakeholders to define both an initial Strengthen Project and the LPP for use in the USACE Flood Study. The LPP and the initial Strengthen Project are both a culmination of all the previous tasks/Adapt Plan sections including, the visions, principles, goals, objectives, the flood scenarios, vulnerability and consequence findings, decision-making process (metrics, evaluation criteria, etc.), all stakeholder input (community, decision-makers, regulatory and resource agencies, etc.), feasibility, the design criteria and the possible alternatives identified and developed through Envision and the measures.

This section of the Adapt Plan will describe the process used to formulate and select the Strengthen project and LPP, including the development of alternatives, the selection and application of evaluation criteria and the selected project (s). This section will also include a summary of the selected project(s) and TSP including a detailed description of the seismic and flood measures (if applicable), any additional features or mitigation measures, the status of permitting and overall regulatory compliance and schedule for implementation.

The approach to alternatives formulation will likely require up to five iterations and will be coordinated between Task 1.05.02 (Seismic Solutions) and 1.09.08-(Flood Solutions). The parties agree that further work is required to integrate the scopes for Civil Design, Plan Formulation and Urban Design subsections of this Section 1.09 and work described in Section 1.05.04.

Deliverables:

- Section of the Adapt Plan that summarizes the Strengthen Project and TSP Alternatives formulation and selection process, including summary of the selected Alternative(s)

Assumptions:

- The PEC Team will be the primary author of this section and it will be based on information developed in 1.05.01.
- Port will lead in developing the description of the LPP.
- The PEC Team will support with graphics as needed
- The PEC Team will review draft of the LPP prepared by the Port.

1.05.02.12 – Resource and Regulatory Considerations for Adapt Plan

This section of the Adapt Plan will describe the regulatory context for the Adapt Plan and will include the following:

- Summary of the regulatory and resource agency laws, policies, permit requirements, guidance, assessments and adaptation and climate requirements
- Identification of critical considerations for potential actions, including limitations on fill, mitigation requirements, water quality considerations, historic resource and district issues
- Use existing ICF "Permitting Roadmap" as well work conducted by BCDC, Flood Control 2.0 and BCDC's "Policies for a Rising Bay" for content for this section of the Plan
- CEQA and/or NEPA considerations
- Description of the Resource and Regulatory Agency Working Group, summary of meetings, key findings from these meetings

Deliverables:

Draft Resource and Regulatory Considerations for Adapt Plan

- Five to seven pages on the regulatory and resource agency policy and legal landscape and the approach the Program took to coordinate with these agencies to better understand how proposed measures and approaches described above will be evaluated

Assumptions:

- The PEC Team to prepare Draft chapter with input from the Port.
- The PEC Team will incorporate the permitting roadmap conducted under Task 1.05.08.
- The Permitting roadmap will be updated to reflect the measures contemplated in the Adapt Plan

1.05.02.13 – Funding and Financing of Adapt Plan Recommendations

This section will summarize funding and financing sources and opportunities for the Adapt Plan including the following:

- Identify existing and potential funding and financing sources for the Adapt Plan recommendations building on the Seawall Financing Working Group, and add, if relevant, information that was developed by BCDC's Financing the Future, Resilient by Design's Finance tools, the Office of Planning and Research work on funding and financing, the Resource Legacy Fund and any other relevant work.
- Using the measures and approaches described above and the Adapt Plan recommendations identify potential partners or funding sources for more specific actions
- Identification of partnerships and coalitions at City, Port, regional and/or state level that could advance opportunities for funding
- Development of strategies to advance public and private funding and financing opportunities

Deliverables:

The PEC Team to review and edit Financing section for incorporation into the Adapt Plan

Assumptions:

Port Resilience Finance team with support from SF Office of Capital Planning are primary authors of this section.

1.05.02.14 – Envision Element

Under this task the PEC Team will support the development of the Envision element through a series of stakeholder engagements as well as document the outcome of the engagement for the Adapt Plan.

This section of the Adapt Plan will describe the purpose of the Envision Element and its building blocks and document the outcomes of the stakeholder engagement that will guide the development of the Envision scenarios/visions.

The development of the Envision Element will help direct short-term projects by modeling various long-term scenarios for urban design and the public realm. Two time/flood horizons will be evaluated: approximately 2080 and 2100 – final selection of flood horizons/elevations will be determined in collaboration with the Port. Data from the Existing and Near Future conditions analysis will inform the work, as will input from Community Engagement meetings and the Urban Design Research listed above. The following sub tasks are included:

- **Community Engagement Meetings** (under Task 1.02). The PEC Team will support and participate in up to four community engagement meetings focused on Envision. The organization of the meetings and the content development for the meetings is by others. The PEC Team will make all relevant information we have at the time of the meeting available for use in the community engagement effort. Scheduling of the meetings should be coordinated with the Envision work plan to make best use of the urban design information.
- **Urban Design Workshops.** The PEC Team will plan and manage the organization of two Urban Design Workshops intended to gain insight on best practices and urban design thinking of waterfront resiliency. Three firms will be invited to participate, which may include Scape, WXY, and Studio Gang. The workshops goals are to jump start the Envision process by generating new and provocative ideas and proposals. Preliminary workshop format is as follows:
  - The PEC Teem will invite participants and, once confirmed, send a preliminary project brief.
  - Upon completion of the Southern Waterfront existing and near future conditions analysis, a summary of existing conditions report will be prepared to share with the selected design firms and Workshop #1 will be scheduled. –
- **Workshop #1 Agenda**
  - *Morning* - Presentation to the invited participants of Sea wall key issues by: the Urban Design team, select SF Port, SF Planning and technical consultant team experts. Presentations may include additional presentations by other City departments regarding specific infrastructure.
  - Late Morning-Site walk
  - *Afternoo*n - Discussion of issues and big ideas for overall waterfront and specific areas. At the end of the day, each participant will select a specific area on the waterfront for study.
  - Upon return to their home office, each participant will generate an overall waterfront strategy for the two time/flood horizons that may emphasize a particular theme, i.e. nature, mobility, neighborhood development, etc. Each participant will then develop in greater specificity an area of the waterfront in which to apply their strategy in more detail to illustrate the possibilities. This task is limited to 2-3 weeks and a specific list of expected deliverables will be provided to each participant to focus the effort on design/planning content and not on professional renderings, etc.
- **Workshop #2** will be a presentation by the participants of their conceptual vision for the overall waterfront and of a specific focus area to further elaborate in greater details the concept vision to the Port staff and consultant team, followed with a robust conversation and discussion on the merits of each proposal. At the end of the day, a summary presentation and reception will include other select stakeholders and city agency members for soliciting inputs and comments.

- **Synthesis.** The PEC Team will synthesize the workshop outcomes and Port feedback to create three to five visions that are based on specific areas of concern (For example: focus on environment, focus on mobility, focus on preservation of piers…) and hazard scenarios (For example: middle curve at end of century and high curve at end of century) and are feasible based on current information and future projections.

Deliverables:

- The PEC Team shall lead in the production of a report containing:
- Urban design principles, goals and objectives
- Urban design narrative
- Systems diagrams: historic assets, land use and building use opportunities, architecture/building use opportunities, circulation and mobility, recreation, nature, water access, gathering spaces
- Integration of Lines of Defense concepts (3)
- Focus area illustrative plans and renderings showing character of various scenarios and alternatives for up to 7 focus areas.
- Section drawings illustrating topography, sea level rise adaptation and relationships between circulation, public space and building uses.
- Flood protection measures toolkit.
- Case studies and precedent imagery, including advanced infrastructure systems, from other places.

1.05.02.15 – Recommended Actions, Adaptation Pathways and Implementation Pathways

Based upon work developed above, stakeholder input, City Department engagement, Resource and Regulatory Agency input, Port Division, Port Commission, Port ED and others develop the following types of resilience actions that will support the Embarcadero Seawall Program and the USACE Flood Study:

- Policies
- Further research
- Planning studies
- Monitoring
- Maintenance and operations
- Pilots
- Education and interpretation
- Engagement and communication
- Shoreline reconfiguration
- Construction projects to reduce seismic and/or flood risk (including flood proofing, ground improvement, relocation of critical assets and services, new construction, etc.)
- USACE Project (TSP, LPP, NED)
- Strengthen Phase for the Embarcadero Seawall Program
- Adapt Plan Actions

For each action include:

- Scope and scale of the action (actions advanced from the Adapt Plan can be small, asset specific actions, Port-wide policies or significant, landscape scale actions)
- Implementation Pathway which will include:
  - Description of the action and any related actions
  - Vulnerability addressed
  - Consequence reduced

  - Lead for the action
  - Partners for the action
  - Type of action
  - Regulatory and resource considerations, including permits and approvals needed
  - Cost of action
  - Other benefits of the action
  - Timeline for the action
  - Funding and financing for the action

- Adaptation Pathway which will include:
  - Time horizon for the action
  - Adaptability of the action
  - Threshold for future action
  - Complexity of action and lead time necessary for implementation
  - Adaptation Pathways and Mapping

Deliverables:

Draft Recommended Actions Section of the Adapt Plan to include:

- Types of actions
- Scope and Scale for each action
- Implementation Pathways
- Adaptation Pathways
- Suite of actions for implementation

Assumptions:

- Additional work required to clarify the PEC Team role in this substantial effort will be defined in the specific task order

1.05.02.16 – Resilience Program Risk Reduction Dashboard

- Description of the purpose and intent of the Risk Reduction Dashboard: The Adapt Plan will include a Resilience Program Dashboard that keeps track of the projects and actions that have been implemented, the type of action, the risk reduced (seismic risk reduction to x asset or geography, etc.), the assets and services that have been preserved and enhanced
- Identify examples of similar communication tools such as the Metropolitan Transportation Commission's Vital Signs, the Joint Venture's Wetland Tracker, etc.
- Develop the Waterfront Resilience Program Dashboard:
- Identify the information to communicate
- Develop a page on the website for the Dashboard

Deliverables:

- Draft and final simple, static data metrics tracking graphics for up to 30 data points for public consumption on website
- Content to provide context for dashboard and for data points (content drafted once, minor updates in out years)
- Updates to static metrics tracking graphics annually for three years

Assumptions:

- Port team will approve selected data and background information

- Dashboard will be a single page living on the sfseawall.com website
- Unlike MTC's Vital Signs, graphics will be simple, static graphics rather than uniquely created maps and charts for each metric (no movement, no click-throughs)
- Like MTC's Vital Signs, content will provide context for data points and why they're important
- Raw datasets can be made available
- Page to be updated annually, not periodically

1.05.02.17 – Adapt Plan Integration and Production

Under this task, the PEC Team will complete the Draft and Final Adapt Plan. The Adapt Plan will include a synthesis of the deliverables in the previous subtasks. A detailed draft Adapt Plan outline will also be developed collaboratively with the Port (based on this scope of work) for review prior to completion of any of the sections.

Deliverables:

- Draft Adapt Plan Outline
  - To include format and design of Adapt Plan
- Final Adapt Plan Outline
- Draft Adapt Plan
- Final Adapt Plan

Assumptions:

- The Port will be primary author on the sections listed on the attached table.
- The PEC Team will be primary author on the sections listed on the attached table.
- The PEC Team will edit all sections for consistency and integrate into Adapt Plan document.
- Assumptions will include anticipated hours required to integrate document.

~~**1.05.01 – Design Criteria.**~~

~~Establish project design criteria that will drive technical solutions and alternatives development. Planning level design criteria will be performance-based, depending on the assets that require protection.~~

~~**1.05.01.01 – Outline.**~~

~~Develop an outline to gain alignment on content and process.~~

~~**1.05.01.02 – Civil/Structural Criteria.**~~

~~Develop civil criteria, based on San Francisco Public Works and SFPUC standards, to be updated as needed. Confirm marine structures performance criteria refer to ASCE 61, Seismic Design of Piers and Wharves and Port Building Code criteria. Confirm buildings criteria refer to American Society of Civil Engineers (ASCE) 41, Seismic Rehabilitation of Existing Buildings, which have been accepted by Bay Conservation and Development Commission (BCDC) for rehabilitation of marine structures and buildings.~~

~~**1.05.01.03 – Flooding Criteria.**~~

~~Develop criteria that consider potential scenarios, such as the 100-year and 500-year storm tides, and that address expected design life, sea level rise projections, acceptable flooding, FEMA funding guidelines, and impacts on the character of the waterfront, land use, urban design, and the environment.~~

~~**1.05.01.03 – Urban Design Criteria.**~~

~~Develop planning-level urban design criteria reflecting stakeholder input and City plans and guidelines.~~

~~**1.05.01.04 – Environmental Design Criteria.**~~

~~Develop planning-level design criteria for environmental mitigation and enhancement.~~

1.05.01.05 – Socio-Economic Criteria.

Develop planning-level design criteria that reflect community values.

CH2M's Deliverables:

CH2M shall develop design Criteria Reports (draft and final) and conduct Workshops based upon the following.

Assumptions:

- Workshop will be limited to one workshop with Port staff, no public participation.
- Criteria development will identify applicable current industry standards and codes, and determine their application to the proposed projects.
- Marine/structural criteria will have to consider and incorporate both building and marine structure criteria, i.e. the criteria and applicable codes for an occupied/public building over water with a marine pile foundation.

1.05.02 – Risks, Needs, and Aspirations.

CH2M's work performed in 1.04 will be synthesized into the Risks, Needs, and Aspirations Report. This critical document will detail risks of no action under various scenarios and demonstrate risk reduction priorities. Aspirations will articulate the vision and define opportunities for waterfront public realm improvements and resilience improvements master plan. This Report will provide the foundational data for the subsequent Alternatives Formulation. To aid in public outreach, a Summary Fact Sheet will be developed.

CH2M's Deliverables:

CH2M will prepare the Risks, Needs, and Aspirations Report (draft and final) and Public Fact Sheet (draft and final) based upon the following.

Assumptions:

- Develop a report and fact sheet based on already available information from task 1.04.
- No additional investigation or risk development is part of this cost and effort.
- No workshops are part of this effort.
- No action risk scenarios will be developed.

1.05.03 – Alternatives Formulation.

CH2M will conduct a series of charrettes, through which CH2M will collaborate with the Port to develop a range of alternatives, which will build upon the design criteria formalized in earlier tasks and will respond to the Project risks, needs, and aspirations. Alternatives will include waterfront–wide concepts and reach-specific concepts. CH2M will combine and present a range of alternatives to Port staff in working sessions for further refinement. Additional input from City and Port stakeholders will be sought with the intent of selecting four to six viable alternatives for comparison and ranking.

CH2M's Deliverables:

CH2M will prepare an Alternatives Report (draft and final) based upon the following.

Assumptions:

- No additional investigation nor risk development is part of this effort.
- Participate in two charrettes is part of this effort, charrette planning and conduct by separate vender procured by the Port.
- Participate in two meetings/workshops with client/city stakeholders held as part of this effort.
- Concept alternative development will be limited to a baseline concept with an alternative description and three sheets per alternative.

- Concepts will be limited to 1-2% development under this subtask.
- Initial alternatives will be limited to three waterfront wide and eight reach specific concepts.
- Participation by CH2M team in charrettes and workshops will require travel for some attendees, cost not included in this estimate.

1.05.04 – Alternatives Comparison and Ranking.

CH2M will compare and rank the five to seven viable alternatives.

1.05.04.01 – Finalize Evaluation Criteria.

Work closely with the Port to confirm evaluation criteria reflect the Port's values and objectives. Assign specific metrics to each criterion so alternatives can be objectively measured and compared.

1.05.04.02 – Evaluate Alternatives Concepts.

Assess each alternative concept against elevation criteria such as constructability, fundability, construction impacts, public impacts and benefits, order of magnitude cost, and attainment of Projectwide goals.

1.05.04.03 – Formulate Programmatic Alternatives.

Formulate three to four programmatic alternatives incorporating high ranking waterfrontwide concepts and reach-specific concepts. Define the required level of detail necessary for Program formulation.

1.05.04.04 – Compare and Rank.

Compare alternatives against each other, as compared to evaluation criteria. This working-session-based approach will provide the Port and other City stakeholders with the opportunity to discuss the nuances of the performance of each alternative relative to the criteria. Endorse two to three alternatives for further refinement and public input. The Port will provide direction on Commission engagement prior to community workshops.

1.05.04.05 – Community Workshop.

Present the two to three highest ranking programmatic alternatives for public discussion, evaluation, and input. The goal of the workshop(s) will be to further refine each alternative and gain broad-based community support for a master plan vision.

Assumptions:

- Participate in one public workshop.
- Workshop participation by CH2M team will require travel for some attendees, cost not included in this estimate.
- No additional investigation nor risk development is part of this effort.
- No further concept development will be done under this subtask.

1.05.05 – Refine Design and Engineering of the Highest ranked Alternative.

CH2M will advance the design of the preferred alternative to a level of detail sufficient to develop cost estimates, construction sequencing, develop schedule, and initiate environmental process. At the end of this process, CH2M will have a list of prioritized capital projects, each with baseline scope, budget, and targeted schedule.

CH2M's Deliverables:

CH2M will prepare documentation of alternatives necessary for decision-making including plans, renderings, cost estimates, schedules, construction sequencing, environmental review process, entitlement process, risk register, and public process summary.

Assumptions:

- No participation in neither public nor client workshops will be part of this effort.

- ~~Concept development limited to 3-5% development.~~
- ~~Concept alternative development limited to a baseline concept narrative and 20 sheets per alternative.~~
- ~~The Alternative to be developed will consist of one waterfront-wide concept and up to three reach-specific concepts within the water-front wide concept.~~
- ~~Cost estimate and schedule development based on level of concept development.~~
- ~~A cost schedule risk analysis is not part of this cost.~~

~~1.05.06 – Final Evaluation, Selection, and Preferred Program.~~

~~Once a decision has been made as to what will be built where, the Program must be developed to optimize funding and schedule, while minimizing risk and impacts. Opportunities for schedule compression through accelerated financing can significantly reduce escalation costs and meet Port resiliency goals sooner. Using Tailored Analytics and Comparative Techniques (TACT), CH2M's economic modeling platform, CH2M, as described below, will evaluate alternative sequences, project acceleration scenarios, and funding stacks, to optimize the preferred Program. Through collaborative scenario development, CH2M will apply the TACT tool to evaluate cost benefit ratios, and evaluate the inter-related variables of schedule and funding, to identify an optimized Program.~~

~~CH2M's Deliverables:~~

~~CH2M will prepare a Preferred Program and Master Plan (draft and final).~~

~~Assumptions:~~

- ~~Execute planning and sequencing concepts that have already been developed.~~
- ~~No participation in neither public nor client workshops will be part of this effort.~~

1.06.00 - City Staff Training, Phase 1

The PEC Team will prepare and participate (2) half day training sessions for Port and City engineering and technical staff on topics related to the Project. The content will include advanced earthquake analysis of soils and structures, tools for soil structure interaction, predicting and generating site specific earthquake response spectra, and marine construction techniques.

~~CH2M's~~ PEC Team Deliverables:

~~CH2M~~The PEC Team will provide instructor and all training materials.

Assumptions:

Training sessions are limited to two half day training sessions.

1.07.00 - Seismic Peer Review Panel, Phase 1

See Authorized Task Orders in Appendix E.

- 1.07.01 Seismic Peer Review Panel - initial funding
- 1.07.01 Seismic Peer Review Panel - Parts 2 and 3 (Partial)
- 1.07.01 Seismic Peer Review Panel - Parts 2 and 3 (Complete Funding & ASR 7))
- 1.07.01 Seismic Peer Review Panel Phase 1 Geotechnical Summit Part 4 (ASR 15)
- 1.07.01 Seismic Peer Review Panel - Member Addition (Part 5)

The following individuals are the Seismic Peer Review panel:

- **Seismic Peer Review Chairman**
  - Shahriar Vahdani, Ph.D., P.E., G.E. – Geotechnical Consultants, Inc.

- **Seismic Peer Review Vice-Chairman**
  - Stephen Dickenson, Ph.D., P.E., D. PE - New Albion Geotechnical, Inc.
- **Seismic Peer Review Members At-Large**
  - Jonathan Bray, Ph.D., P.E., NAE , U.C. Berkeley – Geotechnical Consultants, Inc.
  - Daryl English, P.E., S.E. - ~~Berger-Abam~~ Moffatt and Nicol
  - Mark Salmon, P.E., S.E. – MGE Engineering
  - Thomas O'Rourke - PhD, D.GE(Hon.), NAE, Dist.M.ASCE Cornell University, Ithaca, NY
- **Seismic Peer Review Liaison with the Project Design Team**
  - Don Anderson, Ph.D., P.E. - CH2M
  - Nason McCullough, Ph.D., P.E. - CH2M

Based upon PEC work and activities remaining in Phase 1, the SPRP will be expected to attend additional meetings and reviews beyond what was previously authorized, as described below:

1) complete reviews of existing documents and back checks
2) periodic check-in progress meetings to address specific subtask in Task 1.03, ~~and~~ 1.04 and 1.05
3) Additional reviews of key deliverables that will included but not be limited the following:
   a) Review Methodology for the Risk Assessment for the Utilities and Mobility Life Lines assets in the Embarcadero
   b) Seismic Risk and Consequences Draft Report and back check
   c) Seismic Safety Solutions to be conducted under Task 1.05 Strengthen, Adapt and Envision

PEC members will present current status of activities, a summary of available results, key findings, and the approach and plan for the work to be accomplished for the interval leading up to each meeting and will include:

- Power Point presentations or summary results of findings will be provided by the PEC prior to meetings. Review process to date primarily at the meetings, with focused follow-up phone calls if needed for clarification.
- Meeting minutes to be circulated after meeting to be used to log comments, responses, and action items; key decision items agreed upon during the meetings will be identified and "frozen" to aid in moving the project forward. Meeting minutes to be coordinated with the PEC liaison Nason McCullough.

~~CH2M~~The PEC Team Deliverables:

- Coordinate, schedule with the Port and host Seismic Peer Review Panel Meetings, monthly or as needed and identified in individual Task Authorizations.
- Prepare meeting agendas and review materials
- Document meetings and summarize recommendations to the acceptance of the Panel.
- Respond to Panel recommendations and document process to resolve issues and gain concurrence.

Assumptions:

SPRP Meeting Frequency and type: There will be a total of seven (7) meetings face to face approximately 4- hours per meeting per panel member with preparation and review of material provided in advance estimated not to be more than 4 hours per panel member.

PEC will attend up to seven (7) face to face meetings approximately 4- hours per meeting per PEC member, preparation of agenda and coordination of presentations provided in advance estimated 4 hours.

~~a) Attend three face to face meetings~~

- ~~Prepare for Kick-off Meeting – Review approach for seismic risk assessment (outlined in 1.04.01.01-1.04.01.03), with an estimated 16 hours for each panel member.~~
- ~~Kick- off face to face meeting with Panel~~
- ~~Full day discussion on the PDT approach as outlined in Scope of Work for items 1.04.01.01-1.04.01.03, suggestions and advice;~~

  ~~a) Prepare meeting notes on approach and revisions for PDT and Port's consideration; and~~

  ~~b) Assume 20 hours each panel member; 28 hours for chairman.~~
- ~~Conduct two other face to face meetings~~
- ~~Full day meetings to discuss key deliverables including Basis of Design, refine design/engineering alternatives analysis/mitigation measures, draft reports~~

  ~~a) 16 hours each member for preparation and review~~
- ~~Prepare meeting notes on approach and revisions for PDT and Port's consideration~~

  ~~a) Assume 20 hours each panel member; 28 hours for chairman~~
- ~~Monthly meetings (13) – Teleconference~~
- ~~Chairman prep time – one hour~~
- ~~Meeting/review time – two hours all members (Don Anderson every other meeting)~~
- ~~Chairman summary of meeting – one hour~~
- ~~Independent Quality Assurance Review~~

  ~~a) Peer Review members five individuals 40 hours each~~

  ~~b) Liaison members two individuals 20 hours each~~
- ~~Assume no on-gong support to the team after submitting final report.~~
- ~~Assume no iterations or need for re-analysis for work described above.~~

1.08.00 – Port Alignment Workshop

See Authorized Task Orders in Appendix E.

- 1.08.00 PORT Alignment Workshop (ASR 1)
- 1.08.00 PORT Alignment Workshop (ASR 19) - Deauthorization for completed task

1.09.00 – USACE – Port of San Francisco Non-Federal Sponsor In-Kind Services

~~CH2M~~ The PEC Team will provide strategic and technical support to the Port for In Kind services associated with the USACE projects including both the CAP 103 effort and the GI Feasibility Study.

See Authorized Task Orders in Appendix E.

- 1.09.01 USACE: Feasibility Study Strategy (ASR 2)
- 1.09.02 USACE: CAP 103 Feasibility Study In-Kind Contributions (ASR 4)
- 1.09.02 USACE: CAP 103 Feasibility Study In-Kind Contributions (ASR 17) - Deauthorization for completed task

- 1.09.03 USACE: GI Feasibility Study (New Start) Support (ASR 8) - REV 1
- 1.09.03 USACE: GI Feasibility Study (New Start) Support - Part B (ASR 24)
- 1.09.03 USACE: GI Feasibility Study (New Start) Support - Part C (ASR 34)
- 1.09.04 USACE Stakeholder Engagement Support (ASR 23)
- 1.09.05 USACE Flood Risk Management G2CRM – Numerical Modeling (ASR 35)

In 2018, USACE awarded San Francisco a "new start" study appropriation to commence a general investigation feasibility study, which would consider and recommend potential project alternatives that would reduce coastal flood risk along the San Francisco waterfront. The project study is entitled "San Francisco Waterfront Flood Resiliency Study" (Flood Study) and the study area (Figure 1.09 1) is approximately 7.5 miles of waterfront between Aquatic Park (to the North) and Heron's Head Park (to the South). The study will be conducted by USACE San Francisco District with the Port of San Francisco as the non-federal sponsor (NFS).

As the Non-Federal Sponsor, the Port of San Francisco is responsible for 50% of the study cost. They are allowed to utilize their resources and the PEC Team to support the study providing In-Kind Services to in-lieu of required monetary 50% share required of the Port. The Port has requested the following services to be undertaken by the PEC Team and are outlined below by Subtasks for the study.

Note: these scopes of work have not all been coordinated with the USACE Team. To assure that the Port receives in-kind credit, review and approval by the Corps for the Scope and associated fee is required.

The following subtasks are included in the in-kind services as follows:

- 1.09.06 - Economics Support Services
- 1.09.07 – Geospatial Information System (GIS) Data Support Services
- 1.09.08 - Civil, Urban and Cost Estimating
- 1.09.09 - Geosciences Activities/As-needed Support
- 1.09.10 - USACE Stakeholder Engagement
- 1.09.11 - NEPA Documentation

1.09.06 – Coastal Flood Risk Assessment Economic Support Services

1.09.06.01 – Support Compilation of Building Asset Inventory

Support Building Asset Inventory needed for National Economic Development (NED) in the flood, including all fields needed for G2CRM:

- Building structures over land and building structures over water
- Marine structures (piers, wharves, etc.) (not included in the first pass of G2CRM)
- Utility system infrastructure (sewer, power, comms, etc.) Includes point assets only i.e. (pumping stations etc.)
- Transportation system infrastructure (track, power, comms, etc.) Includes point assets only (i.e., BART portal etc.)

1.09.06.02 – Create Unique Depth-Damage Functions

- Customize depth-damage functions for unique utility and transportation systems assistance for the following assets, including QA/QC:
  - BART
  - MTA – LRV
  - MTA – Surface
  - SFPUC – Sewer
  - SFPUC – Water

  - PG&E – Power
  - Comcast/Verizon/AT&T - Comms

- Data management for import into flood risk software (G2CRM)
- Quality control of fragility functions
- Customize fragility functions for unique assets (i.e., marine structures, utility and transportation systems)

1.09.06.03 – Seismic Risk Assessment

Subject to concurrence by USACE and the Port, a seismic risk assessment will be completed to measure the seismic risk and consequence for a FWOP condition. Measure the impact of flood protection measures (FWP) on reducing seismic risk and consequences. These tasks consist of:

- Data management for import into seismic risk software (HAZUS)
- Complete, debug, and run HAZUS model

1.09.06.04 – RED & OSE Analysis

Regional Economic Development (RED) and Other Social Effects (OSE) Analyses shall be completed to measure project impacts on regional local socio-economic conditions. This will include identification of the relevant existing socio-economic considerations and how those considerations will change over time in the FWOP and the FWP.

These analyses will be undertaken at a level of detail commensurate with their importance to TSP determination.

It is anticipated that the PEC Team will take the lead on developing the RED and OSE analyses with USACE input, review, and concurrence. RED and OSE analytical tasks to include:

- Identification of relevant RED and OSE parameters/ considerations
- Development of approach, assumptions, and methods consistent with the appropriate level of detail
- Documentation

Assumptions:

Upon concurrence by USACE and the Port to develop a Seismic Risk Assessment as outline above, a methodology, scope of work, deliverables and level of effort will be developed for their review and approval prior to commencing work.

1.09.07 – Geospatial Information System (GIS) Data Support Services

The PEC Team will be collecting and providing GIS data sets to support generation of figures, graphics, and build of the G2CRM model. Additionally, the NFS will be providing an updated Digital Earth Model (DEM), incorporating recent changes to marine structures (piers, wharves, etc.). This data set approaches the information needed for the Digital Surface Model (DSM), but does not include building height information. The final role of the NFS will be review of information created and reported by USACE to ensure consistency with NFS knowledge of the local systems and information presented in this study.

Deliverables:

- One Updated Digital Earth Model
- GIS data sets to USACE to support G2CRM model along 3-mile historic northern waterfront
- QA/QC review comments of material generated by USACE and directed by the Port

Schedule:

- Deliverable dates will be determined in collaboration with the Port and USACE

Assumptions:

- QA/QC level of effort is assumed to be no more than one PEC Team lead a total of 3 weeks over a period of 2 years upon NTP.

1.09.08 Civil, Urban and Cost Estimating

1.09.08.01 – Civil Design Activities

The primary civil design objective during the feasibility phase is to provide engineering data and analyses sufficient to develop the complete project schedule and cost estimate. Other objectives include plan formulation support and support for evaluation of alternatives for the Northern Waterfront where the Port will lead alternative formulation. The management of the civil design effort includes, but is not limited to, scoping work, scheduling work, verifying that work meets scope requirement, managing design budget, contract management, scheduling and facilitating progress and coordination meetings, and coordinating efforts between multiple engineering agencies. Sufficient engineering and design will be performed in conjunction with any efforts by the PEC Team during the feasibility phase to enable refinement of the features of the preferred plan to be completed by USACE. Preparation of estimates the baseline cost estimates as outlined below.

The USACE plan formulation process will likely require 5 up to five iterations. The parties agree that further work is required to integrate the scopes for the Civil Design, Plan Formulation and Urban Design subsections of this Section 1.09 and work described in Section 1.05.04.

In the context of this scope of work and associated cost estimate to complete the work, conceptual design means general descriptions and arrangements of the Lines of Defense (LoDs) and flood control measures, schematic and/or engineering drawings with general arrangements and descriptions of main features, and indication of principal dimensions and typical materials which may or may not be supported by cursory calculations. Costs for the conceptual design(s) will be estimated at the Class 5 level in accordance with AACE International System.as described in Task 1.09.08.03- Cost Engineering.

The following sections describe in detail the proposed scope of work, deliverables, and fee. The schedule and conditions will be provided upon decision relative to the scope, deliverables and fee review by the Port and USACE.

- **Collection and Review Information**

  The characterization of the site, from both waterside and landside perspectives, is critical for the development of alignments and for the selection of suitable flood defense measures. Data already collected, by the PEC Team, for the northern 3.5 miles of the Embarcadero Seawall area will be utilized and will be supplemented with observations to be made in a site visit, data/information collected in meetings with the Port, USACE, City and agencies, and online search. It will include, but not limited to:

  - Bathymetry
  - Nautical charts
  - Side-scan sonar surveys
  - Topography
  - Benchmarks data sheets
  - Geology and geotechnical conditions, including seismic
  - Metocean conditions (waves, water levels, wind, currents, and precipitation)

- Climate change scenarios
- Project lifetime
- Sea level rise projections
- FEMA FIRM maps
- Design flood elevations (DFE)
- Ecological habitats
- Water quality
- Drawings and condition assessments of existing waterfront structures, infrastructure and facilities
- Aerial/drone photos
- Built maps (parcel, block, lot and street; land use, ownership, retail frontage, development sites, open space, zoning, historic and cultural assets, view corridors, road widths, rights-of-way, loading docks, curb cuts, built/vacant lots, buildings, connectivity, etc.)
- Utilities (water, wastewater and storm water; gas, electrical, cable, internet, subsea pipelines and cables, intakes and outfalls, etc.)
- Routes and traffic data for truck, bike, public transit, marine commercial and recreational vessels
- Short- and long-term waterfront development project information
- Reports, memos and presentations of work done to date, or other relevant to the Study.

This information will be used, by each discipline, to characterize waterside physical conditions, structures, infrastructure and facilities, and waterside areas where potential flood defense measures may be erected; and to develop a baseline knowledge of the project and characterize site conditions to the conceptual level required by the Study. Any gaps of information will be assumptions based on engineering judgment and standard engineering practice. Geospatial data and information collected will be stored and made available in GIS format.

- **Develop Conceptual Flood Defense Measures for Northern Waterfront**

  In principle, a Line of Defense (LoD) could consist of three connected components:

  - In-water barrier
  - Upland defenses
  - Natural elevation

  The LoD components would consist of one or more flood defense measures.

  Flood defense measures that could be used along the LoDs in-water and upland components will be identified, and cross-sections and plan view conceptual drawings developed. The measures will be described in fact sheet-type tables (similar to CAP103 Task 1.09.02 fact sheets) in aspects such as general description; design, architectural, urban design and historic design considerations; installation and constructability; operations and maintenance; and cost, pros and cons, etc.

  The flood defense measures will be analyzed in the context of site-wide vision scenarios to ensure that the measures considered will be consistent with the Port's and City of San Francisco vision for the future of the waterfront, and that these align not only with the short-term but with the long-term goals for the waterfront. Typical cross-sections and plan views would be developed depicting the potential types of measures that could be used along the 3.5-mile Embarcadero Seawall area.

  Potential measures to consider for the in-water barrier include breakwaters, gates, living shorelines, wetlands, beach nourishment, etc. Upland flood defense measures can be permanent or deployable structures which feasibility would depend on the site conditions. Consideration will be given to

permanent structures such as earthen berms, vertical floodwalls, bulkheads and revetments, and deployable structures such as slide, roller or swing gates; removeable panels; self-raising barriers; raised planters; floodproofing; etc.

To assist in the identification of flood defense measures, lessons learned and best practices from flood defense projects in the United States and overseas, applicable to the San Francisco Waterfront, will be compiled. The lessons learned, and best practices will be categorized under topic areas such as land use, navigation and transport, bathymetry and geomorphology, topography, hydrology, hydraulics and hydrodynamics, climate, engineering and design, environment, operations and maintenance, regulatory impacts, etc.

Thirty-five typical cross-sections and thirty-five plan view conceptual drawings of the measures will be produced. The measures would be representative of the various features/types of solutions (exemplar sites) along the 3.5 miles of Embarcadero Seawall area under consideration. These exemplar sections will be mapped/extrapolated across the length of the study area.

- **Evaluation Criteria and Screening Methodology**

  The evaluation criteria and screening methodology for the alternatives will be developed, utilizing the following principles as agreed upon by the Port and USACE:

  - Develop a transparent tool for multiple audiences to understand the evaluation and screening process
  - Provide a documented approach to screen potential LoD(s) alternatives toward the preferred alternative
  - Capture engineering, environmental, urban, historic, community, and implementation considerations
  - Ensure compatibility with USACE-accepted approaches and terminology
  - Reflect the broad range of local benefits, interests, and policy goals
  - Quantitative evaluation and screening

  The criteria will use categories that are consistent with terminology used by USACE in its planning regulations, namely effectiveness, efficiency, completeness, and acceptability; plus, resilience and adaptability.

- **Focused Array Conceptual Design (7 Alternatives)**

  Design flood elevations (DFE) will be defined for the three potential components of the LoD so that effective alignments and flood defense measures can be identified for the 7 alternatives in the focused array. The DFEs for each LoD component are anticipated to be different due to the difficulty and expense of constructing flood defense measures which depend on location. For example, in-water barrier measures are more difficult and expensive to construct than upland flood defense measures, therefore the former would be higher. The natural elevation would be the existing topographic elevation, plus allowances for freeboard and sea level rise (SLR), that would not be exceeded in an extreme event (e.g., 100-year flood event).

  The approximately 3.5-mile Embarcadero Seawall area will be analyzed, and flood defense measures will be selected for each of the 7 alternatives in the focused array. The analysis and selection will be performed considering site characteristics and conditions, opportunities to improve public safety, recreation and tourism, environmental enhancements, and site-wide vision scenarios. The site-wide vision scenarios will ensure that the alternatives considered will be consistent with the Port's and City of San Francisco vision for the future of the waterfront, and that the alternatives being selected align not only with the short-term but with the long-term goals for the waterfront, to the maximum extent practicable while remaining in compliance with USACE policies. The Port, in consultation with the

USACE PDT, may alter the number and type of alternatives and measures required under this subsection provided that it does not change the overall level of effort.

For the 7 alternatives in the focused array, conceptual drawings (20 plan view conceptual drawings including flood defense measures) and AACE Class 5 cost estimates will be developed.

In a collaborative manner (e.g., meetings, workshop, etc.) the USACE PDT will review the alternatives, perform an evaluation and screening of the alternatives, and will select 5 alternatives for the final array, to possibly include 3 structural alternatives, 1 LPP, and 1 non-structural.

- **Final Array Conceptual Design (5 Alternatives)**

  Based on comments and recommendations received from the USACE PDT, the 5 alternatives will be refined, and corresponding plan view conceptual drawings and Class 5 cost estimates will be revised as needed. Descriptions of the 5 alternatives including urban design and historic considerations and recommendations will be developed along with 20 (twenty) cross-section and 20 (twenty) plan view conceptual drawings, including, for each alternative, suitable flood defense measures. The Port, in consultation with the USACE PDT, may alter the number and type of alternatives and measures required under this subsection provided that it does not change the overall level of effort.

  In a collaborative manner (e.g., meetings, workshop, etc.) the USACE PDT will review the alternatives, perform an evaluation and screening of the alternatives, and will select 2 alternatives for the NED & LPP array.

- **NED & LPP Conceptual Design (2 Alternatives)**

  Based on comments and recommendations received from the USACE PDT, the 2 alternatives will be refined, and corresponding plan view conceptual drawings and Class 5 cost estimates will be revised as needed. Descriptions of the 2 alternatives including urban design and historic considerations and recommendations will be developed along with 15 (twenty) cross-section and 15 (twenty) plan view conceptual drawings, including, for each alternative, suitable flood defense measures.

  In a collaborative manner (e.g., meetings, workshop, etc.) the USACE PDT will review the alternatives, perform an evaluation and screening of the alternatives, and will select the TSP.

- **TSP Conceptual Design**

  Based on comments and recommendations received, the TSP will be refined, and corresponding plan view conceptual drawings and Class 5 cost estimates will be revised as needed. Descriptions of the TSP will be finalized along with urban design and historic considerations and recommendations. Ten (10) final cross-section and 10-plan view conceptual drawings will be finalized including suitable flood defense measures. A draft report for Civil Design will be submitted.

1.09.08.02 – Urban Design/Architecture

Note: The costs for this full scope of work will be shared between the Port and USACE as indicated in the cost table.

- **Design Framework**

  Development of the design framework for the Waterfront Resilience Program will be applicable to the alternatives formulation to be completed as part of the Flood Study. The effort will be a collaborative effort between the Port, SF Planning, USACE and the PEC Team to establish guiding principles and design strategies for flood protection through 2080. The Urban Design component of the design framework will include the following products and content:

- Define the need for design framework or design language for the Adapt Plan- difference between a masterplan approach and adapting over time requires that guidelines be established to ensure consistency of design as project are implemented
- Examples of design framework and design language from other large-scale projects or specific/ area plans within and outside of San Francisco
- Design framework report (2 drafts and 1 final).
  - Executive summary and organization
  - Overall objectives, standards and guidelines, building upon the Envision Element
  - Urban design component objectives, standards and guidelines, with categories similar to what has been analyzed in the Seawall MHRA. For example, historic resources (buildings and districts), promenade, parks and recreation areas, plazas and public gathering spaces, nature spaces, bike facilities, pedestrian safety measures, public art, programming and activation events, etc.
  - Historic resource analysis and feasibility for the Ferry Building, Ag Building, Union Iron complex (1 building), and 1 representative pier structure, or the equivalent effort.
  - Precedent examples.
  - Illustrative plans and renderings for up to 7 focus areas, describing how the guidelines can be applied to create an improved public realm for different adapt scenarios. Up to 2 scenarios will be illustrated for each focus area.

- **Urban Design Alternative Formulation**

  The design alternatives for flood and seismic protection will be informed by the above urban design framework. The areas south of Mission Creek will be advanced by the USACE engineering team, while the areas north of Mission Creek will be advanced by the PEC engineering team. As the alternatives are narrowed and advanced in engineering, the urban design team will review and comment to advise on consistency with the urban design framework. Where more detail is required for the LPP, the Urban Design team will refine design accordingly. The PEC Team will lead the production of the urban design alternatives with input from the overall Urban Design team. The intentions of the urban design work in this task are to:

  - Review and comment on USACE and PEC Team engineering designs to ensure that urban design objectives are realized.
  - Develop the urban design for the LPP to adequately communicate desired local benefits.

Deliverables:

- Revised sections of the Urban Design Framework, as needed.
- For the locally preferred plan:
  - Design narrative
  - Illustrative plans
  - Cross sections
  - Renderings of public realm and buildings within the alternative area of impact.
  - Precedent images
  - Project narrative for cost estimating

1.09.08.03 – Cost Engineering

Cost Engineering Activities

The cost engineer will develop existing cost estimates necessary to evaluate the alternative plans developed under the Civil subtask 1.09.08.01 and 1.09.08.02. The estimates will include all flood

measures, construction features, relocation of facilities and utilities and other elements to allow for a cost that supports the decision making and selection of alternatives. The cost will be an AACE International, Cost Estimate Classification System Class 5 rough order of magnitude estimate.

Deliverables

- Cost Workbook with assumptions

Assumptions:

- Cost estimating for regulatory mitigation will be based on assumptions provided by the Port and developed in a low -medium and -high framework based on level and type of impact and not developed for individual alternatives.
- USACE will develop the final selected project cost that supports project authorization.
- Will not include use of MII / MCACES or coordination with the Cost MCX

1.09.09 – Geo Sciences Activities

The PEC Team will provide available information concerning the geology and subsurface conditions along the approximate 3.5 miles of the Port's historic Northern Waterfront area. The data review will include work produced by the PEC Team, including publicly available data, geotechnical reports, geologic maps, historic topographic maps and aerial photographs, and published reports. No additional field exploration or laboratory testing are included in this scope.

The PEC Team will coordinate with USACE Geo-sciences Branch. PEC will review USACE analyses methods, results, and conclusions, as needed.

The PEC Team will provide assistance in evaluating the incidental NED benefits associated with the construction of coastal storm risk management measures. Such evaluation requires establishing a baseline measurement of seismic damage for the FWOP conditions and comparing to the reduced damage associated with the flood protection project. The primary benefits are expected to be reduced damages to infrastructure and buildings associated with reductions in lateral spreading and/or liquefaction hazards that occur as a result of flood protection measures. HAZUS, developed by FEMA, uses a standard tool for evaluating damage from multiple hazards at a macro scale. However, at a smaller scale with specific assets being considered, the off the shelf tool does not provide the necessary resolution and accuracy to predict damages with confidence due to unique structures. Customization of HAZUS fragility curves is expected to be required.

Determine earthquake vulnerability of existing shoreline flood protection structures and suitability for modification to improve flood protection.

Determine foundation systems and/or ground improvements needed for flood protection structures that will achieve required earthquake performance. Include consideration of settlements due to consolidation of underlying marine clays.

Assist civil and economics disciplines to evaluate incidental NED benefits associated with construction of a seismically stable coastal storm risk management measure(s).

Assumptions:

- Prior to commencement of work, the PEC Team will develop a methodology, scope of work, deliverables and level of effort for their review and approval by the Port and USACE.
- The determination and level of analysis of flood protection foundation systems and/or ground improvement measures will only address those alternatives being developed under the 1.09.08 Civil subtask

1.09.10 – Stakeholder and Public Engagement

The complete stakeholder and public engagement scope of work is included in Task 1.02.05 of this Contract Amendment scope of work. Costs for the full scope of work detailed under task 1.02.05 will be shared between USACE and the Port. The final scope of work to be included as in-kind services will be developed and approved by USACE and the Port.

1.09.11 – NEPA Evaluation

The scope included in this amendment is based on high-level scope assumptions used to support the preliminary cost estimate for the NEPA only portion of a combined project-level EIR/EIS for the USACE/Port of San Francisco Flood Project. For the purposes of this scope, assumptions regarding the project and the range of alternatives have been made. The project is assumed to include flood improvements and related seismic upgrades along 7.5 mile Port waterfront and the EIR/EIS is presumed to include up to 4 build alternatives analyzed at equal level of detail.

These scope assumptions and the associated cost estimate are preliminary at this time as the project alternatives have not been identified or developed to provide an adequate description for the purposes of cost estimating. In addition, the specific analytical methodologies, scale, and scope have not been developed by the USACE, the Port of San Francisco, San Francisco Environmental Planning, or by the PEC Team. As such, this scope and the associated cost estimate are for project planning purposes only. A refined, detailed scope and budget-level cost estimate will be developed in collaboration between the parties that will include alternatives definition as well as specific work plan development of analytical methodologies, scale and scope.

Each task below is annotated as either “joint”, “Port-Lead” or “USACE-Lead”. These annotations refer to whether the task will be implemented jointly by USACE, led by the Port (and the PEC Team) or led by USACE. The level of effort developed for each of these tasks corresponds to who is leading. This allocation of responsibility was identified jointly between the Port and Environmental Planning and USACE.

This scope does not include costs for CEQA only technical sections, those costs are included in Phase 2, Task 2.06.

Note: Costs for the full scope of work detailed under this task, 1.09.11 will be shared between USACE and the Port. The final scope of work to be included as in-kind services will be developed and approved by USACE and the Port.

1.09.11.01 – Project Management and Meetings

USACE PDT Meetings (joint)

This task includes hours to attend meetings with the Port and USACE. Assumes a total of 40, one-hour, in-person meetings by two management staff over the course of the entire project.

Scoping/Draft EIR/EIS Meetings

NEPA/CEQA scoping meetings, NOI, NOP (USACE lead)

This task includes participation in combined NEPA/CEQA Scoping meetings. Given 7.5-mile expanse, there will likely be at least 4 scoping meetings (1 at Planning Commission; 3 in different geographies)

- Assumes USACE / EP lead meetings.
- The PEC Team supports creating meeting materials including posters/handouts/signage.
- PEC handles distribution of notices for each meeting (4).
- Up to 2 staff people at each meeting (4).
- The PEC Team creates scoping notice for both CEQA and NEPA

  - Assume one notice for each process, 8 notices total.
  - Four drafts of each notice and one final draft.
  - Notices not longer than 4 pages (2 sheets) each. 2 graphics per notice.

- The PEC Team files draft with regulatory agencies (SCH for CEQA, fed register for NEPA)
- Assumes a court reporter will be present at each meeting.

NEPA/CEQA meetings on Draft EIR/EIS (USACE lead)

Combined NEPA/CEQA Scoping meetings recommended. Given 7.5-mile expanse, likely at least four meetings (one at Planning Commission; three in different geographies). EP requires all comment meeting to be formal and have recording/transcription.

- Assumes USACE / EP lead meetings.
- The PEC Team supports creating meeting materials including posters/handouts/signage.
- The PEC Team handles distribution of notices for each meeting (4).
- Up to 2 staff people at each meeting (4).
- The PEC Team creates EIR/EIS notice for both CEQA and NEPA
  - Assume one notice for each process, 8 notices total.
  - Four drafts of each notice and one final draft.
  - Notices not longer than 4 pages (2 sheets) each. 2 graphics per notice.
- The PEC Team files a draft with reg agencies (SCH for CEQA, fed register for NEPA)
- Assumes a court reporter will be present at each meeting.

Resource Agency Meetings/Coordination

Working Group (joint)

Port has initiated Resource Agency Working Group (RAWG) already. Will need to integrate USACE.

- Assumes eight meetings over the course of the project including preparing agenda and background materials.
- Assumes facilitation of meetings.

Resource Agency Coordination (joint)

USACE coordination with federal agencies (but Port also participates); Port coordinate with state agencies (but also possible USACE participation).

- Assumes USACE will lead this effort but consultant team will support as needed at up to five meetings. Could include meetings with BCDC, Regional Board, CDFW, etc.

Project Management (joint)

- Management of EIR/EIS process and document
  - Assumes bi-weekly phone meetings by 2 staff members for duration of project (3 years)
  - Assumes monthly in-person meetings by 2 staff members

1.09.11.01 – Technical Evaluations for EIR/EIS (becomes Chapter 3 and 4 of EIR/EIS and supporting tech studies)

Startup tasks, scoping, preparing outline for joint doc, data collection, etc.

- Involves finalizing overall EIR/EIS scope and technical approach including scope / approach for each individual technical study.

- Involves 3 in-person meetings with 3 PEC Team staff to discuss overall scope.
- Assumes 4 drafts of full scope (including tech studies).
- Assumes larger efforts, such as Cultural Resources or Air Quality, will require multiple phone calls and possibly additional drafts of the scope before finalizing.
- Data collection involves cataloging all data needs for the EIR/EIS and cataloging data received. Assumes multiple iterations and calls regarding data requests. Also assumes refinements of construction assumptions will be needed.
  - New technical studies (beyond what are part of the EIR/EIS process) to support the EIR/EIS and major data collection efforts not assumed to be needed. Data provided will be from the Port's seawall effort, information from USACE's flood study effort, and readily available sources.
- Assumes 4 drafts of outline of EIR/EIS.

Aesthetics (Port lead)

- 30 simulations total covering all alternatives (30 total, not 30 each)
- Preparation of EIR/EIS section.
- No technical report needed.

Air Quality (Port lead)

Port/Consultant team will do the technical analysis and the EIR/EIS section. Port/Consultant team will coordinate with USACE in terms of determining need for conformity analysis and preparing if needed.

- Assumes development of Air Quality Technical Report and that the document meets all of the needs for NEPA.
- Evaluates construction impacts only (no operational).
- Assume a health risk will be conducted at up to four locations.
- Meets all BAAQMD requirements.
- Includes general conformity analysis.
- Preparation of EIR/EIS section (in addition to technical report).

Biological Resources (USACE lead)

- Port/Consultant provides input on components of Biological Technical Report to ensure it meets CEQA and NEPA needs.
- Port team reviews initial draft and provides comments on up to 2 drafts.
- USACE provides written EIR/EIS section to team and consultant team inserts CEQA conclusions, edits, formats, and prepares figures in appropriate format for EIR/EIS.
- Assumes primary author of technical report and EIR/EIS section is USACE.
- The PEC Team supports on developing and validating mitigation/enhancement strategies.

Historic / Cultural Resources (Port lead)

The primary cultural resources issue for the project will be the built environment historic resources including historic districts and numerous historic buildings potentially affected. As such, the cultural resource effort should be led by a senior architectural historian meeting the Secretary of Interior qualifications. The Corps and Port should collaborate on the SHPO consultation (as the federal lead) in conjunction with Port and SF Planning, given the Port/Consultant team are already heavily engaged in historic resources within the Port's jurisdiction.

- Assumes formal evaluations will be needed for up to 10 properties. All other age-eligible properties in the Area of Potential Effect will have been previously evaluated.

- Assumes preparation of an Archaeological Research Design and Treatment Program will be required and that the report will meet all of the NEPA requirements as well as CEQA.
- Assumes technical reports and preparation of EIR/EIS section.

Energy Requirements (Port lead)

- This effort is embedded within the Air Quality budget. No additional budget assumed.

Socioeconomics, Environmental Justice, Community Impacts (Port lead)

- Prepare NEPA-required analysis for these topics.
- No technical report assumed.

Geology / soils (to include discussion of earthquakes) / Paleo (USACE lead)

Under CEQA guidelines, paleontology in now included in Geology section.

Port/Consultant provides input on components of Geology/Soils Technical Report to ensure meets CEQA and NEPA needs.

- Port team reviews initial draft and provides comments on up to 2 drafts.
- Review is not a formal technical peer review, just ensuring compliance with NEPA requirements and making sure sufficient info is available for CEQA conclusions.
- USACE provides written EIR/EIS section to team and consultant team inserts CEQA conclusions, edits, formats, and prepares figures in appropriate format for EIR/EIS.
- Consultant team prepares paleontology analysis.
- Assumes technical report and EIR/EIS section. Primary author USACE.

Greenhouse Gasses (Port lead) – CEQA Only

- CEQA only. Costs reflected in Task 2.06

Growth Inducement (Port lead)

- Embedded in front/back matter.

Hazardous, Toxic, Radioactive Waste/Soil Quality (Port lead)

- Port/PEC Team has information for Seawall project reaches.
- Information will be obtained for remaining 4.5 miles, via EDR search.
- No phase I or phase II investigation is included.
- As needed, appropriate mitigation measures will be developed.
- Preparation of EIR/EIS section.
- No technical report needed.

Hydrology / hydraulics (to include flooding and sea level rise) (USACE lead)

Port/Consultant will have over the shoulder review

- USACE provides written EIR/EIS section to team and consultant team inserts CEQA conclusions, edits, formats, and prepares figures in appropriate format for EIR/EIS.
- Assumes technical report and EIR/EIS section. Primary author USACE.

Land Use (Port lead)

- Preparation of EIR/EIS section.
- No technical report needed.

Natural or Depletable Resource Requirements/Mineral Resources

- Embedded in front/back matter

Noise and Vibration (Port lead)

- Analysis focused primarily on construction effects.
- Budget includes minor operational analysis of up to 3 roadways should roadway realignment (or some other change in the overall operations in the project area) result from the project.
- Preparation of EIR/EIS section.
- No technical report needed.

Plans and Policies (Port lead) (CEQA Only)

- CEQA only. Scope and Costs included in Task 2.06.

Population and Housing (Port lead) (CEQA Only)

- CEQA only. Scope and costs included in Task 2.06.

Public Health and Safety (Port lead)

- Preparation of EIR/EIS section.
- No technical report needed.

Public Outreach (joint)

- Scope and budget include in Task 1.09.10.

Public Service and Utilities (Port lead)

- Preparation of EIR/EIS section.
- No technical report needed.

Recreation and Access (Port lead)

- Preparation of EIR/EIS section.
- No technical report needed.

Shadow (Port lead) (CEQA only)

- CEQA only. Cost to be developed at later date.

Transportation (Port lead)

- Preparation of EIR/EIS section.
- Technical report needed focused primarily on construction effects.

Urban Design, Historic and Cultural Resources, and Design of the Built Environment

- Embedded in other tasks above

Water Quality (Port lead)

- Preparation of EIR/EIS section.
- No technical report needed.

Wind (Port lead) (CEQA only)

- CEQA only. Cost to be developed at later date.

Front and Back Matter

- Prepare all EIR/EIS required front and back matter.

1.09.11.03 – Other Compliance Evaluations

- BA/EFH assessment (USACE lead)
- Consistency Determination (USACE lead)
- Clean Water Act 401 analysis (pending 404 jurisdiction and deferral to PED discussions) (USACE lead)
- Clean Water Act 404 (pending 404 jurisdiction decision) (USACE lead)
- FWCA SOW; PAL; CAR coordination and review (USACE lead)

For the tasks above, the PEC Team will review and provide expert advice on behalf of the Port on the deliverables prepared by USACE. The focus of the review will be to ensure that the documents satisfy the Port's expectations and comply with the Port's overall goals of the project. Level of effort assumes one meeting per deliverable and two rounds of review and comments.

Clean Air Act applicability analysis (Port lead)

This is included in the scope for the Air Quality Technical Report.

1.09.11.04 – CEQA/NEPA Document Preparation

The PEC Team Prepares Admin Draft-1 (Port lead)

- Cost embedded in Milestone Technical Reports Sections above.

The PEC Team Prepares Admin Draft-2 (Port lead)

- Respond to comments from USACE and EP on Admin Draft-1

The PEC Team Prepares Admin Draft Screencheck (Port lead)

- Respond to comments from USACE and EP on Admin Draft-2

The PEC Team Prepares Admin Draft Print Check (Port lead)

- Respond to comments from USACE and EP on Screencheck.

Publication and Distribution of Draft EIS/EIR (Port lead)

- Public document

The PEC Team Prepares Final EIR/EIS and Response to Comments (RTC)-1 (Port lead)

- Assumes 350 non-repeating, discrete comments
- No new technical analysis as a result of comments.
- No substantive changes for EIR/EIS as a result of comments.

- PEC Team compiles comments and codes each comment. Will modify and revise complication up to one time.
- Responses will be prepared collaboratively: USACE will respond to USACE-specific comments, Port will respond to Port-specific comments, the PEC Team will respond to all other comments.
- Prepare draft 1 of Final EIR/EIS and RTC.

The PEC Team Prepares Final EIR/EIS and RTC-2 (Port lead)

- Respond to comments, prepare draft 2

The PEC Team Prepares Final EIR/EIS and RTC Screencheck (Port lead)

- Respond to comments, prepare screencheck draft

The PEC Team Prepares Final EIR/EIS and RTC Print Check (Port lead)

- Respond to comments, prepare printcheck draft

Publication and Distribution of Final EIR/EIS and RTC (Port lead)

- Publish

Record of Decision (USACE lead)

- Assume USACE prepares with Port and the PEC Team review only.

USACE files/published

1.10.00 – Workforce Development and Local Business Enterprise (LBE) Support Services

Given the unique nature of the Embarcadero Seawall Program and Flood Study and the specialization of the work in the planning, engineering and construction, the Port has recognized that creative methods and strategies will be required reach significant levels of LBE participation and to attract and train a pool of local resident workforce qualified to work on the Embarcadero Seawall Program. To enhance the objectives of this effort, communications and outreach will also be included to support the underlying goals of this task.

This scope of work includes services to develop strategies and implementation reflecting a collaborative initiative between the Port and PEC Team members as described below

1.10.01 – Workforce Development

The Port seeks to develop opportunities to grow sustainable jobs that can be utilized on the Seawall Program and on-going opportunities for similar Port work. This Task describes the activities and deliverables to assist the Port with development and implementation of a workforce strategy designed to maximize local participation on the Seawall Program.

Description of Strategy and Objectives:

Working with the Office of Economic and Workforce Development's Sector Academies and Community Based Organizations (CBO) providing pre-employment services, the PEC Team will assist the Port in creating a workforce strategy. This strategy will focus on educating, training and placing residents in careers from construction through end-use. A resident training strategy presents an opportunity to leverage and expand the current Sector Academies to include all 26 trades and professional service trades and create a pool of resident workers qualified to work on Seawall construction.

The following describes summary of services to be provided under this task.

1.10.01.01 – Strategy Development

- Develop strategy that is in alignment with Citybuild's 18-month program and training strategy to the future "demand" in selected job categories.
- Approach to educating the workforce on skill requirements and training needs for selected job categories
- Identify approach to engage and build relationships with training specialists or certifying organizations (if not currently secured) to leverage resources to meet the demand.
- Identify specific job categories and skills required to inform the training curriculum, a deep dive into the pipeline of seawall projects and a forecast of employment opportunities aligned with those projects required.
- Develop recruitment and training timelines to mirror the Seawall pipeline of projects with the objective of having trained workers to fill the project opportunities before the project start dates.
- Analyze existing workforce development strategies city-wide, identify trends and develop a implementation strategy to reflect employer's needs in project program and service offerings.
- Develop strategy for capacity building with partnering agencies
- Create training sequencing/timeline to align with the project start dates

1.10.01.02 – Strategy Refinement

This subtask will allow for stakeholder input to the strategy developed in 1.10.01 with the objective of revising the strategy accordingly. Stakeholder meeting will be set up individually or collectively to gain input on the strategy as identified below:

- Convene Union Stakeholders
- Convene workforce stakeholders
- Convene potential resident workers
- Convene likely employers
- Refine the adult workforce development program strategy and align with the Port, partners and City-wide workforce development efforts to meet the skill needs for the future positions.

1.10.01.03 – Technical Training Identification

- Perform national research for innovative training models for marine infrastructure and other unique skills identified in the Strategy.
- Review and identify City College and other educational institutional offering for skill enhancements
- Research and identify required certifications for specialized work.

1.10.01.04 – Worker Availability (Supply and Demand)

- Assess current local workforce
- Forecast jobs by trade
- Forecast job opportunities by project phase

1.10.01.05 – Skill Gap Analysis (Current Local Workforce)

- Clarify work opportunities (job slots) by tier/level of experience and expertise required
- Align training/education strategy with project needs/requirements
- Review current training programs and assess past participant skill level

1.10.01.06 – Union and Employer-Led Training

- Craft specific skill enhancement training
- Develop curriculum development for acquisition of required skills
- Schedule training in accordance to the project schedule

1.10.01.07 – Workforce Implementation and Tracking

- Create a coordination council framework for agencies providing programs and services
- Facilitate the resident placement
- Create and monitor placements and retention
- Generate monthly placement reports
- Manage the seawall workforce strategy

Deliverables:

- Strategy memorandum including an Implementation plan and timeline for capacity building with partnering agencies
- Partnership agreement and delineation of activities and responsibilities
- Project description for major project and the workforce development strategy for each
- Skills/competencies matrix and required competency level required
- Training sequence timeline integrating project activities
- Recommendations to support of funding the strategy program
- Implementation strategy/plan securing funding streams

Schedule:

- Overall performance of work commences upon NTP and concludes December 31, 2022.

Assumptions:

- The scope of work outlined above represents summary of activities to be performed and will require coordination and final approval by the Port prior to commencement of services.

1.10.02 – Local Business Enterprise

The objective of this task is to optimize maximum engagement of LBE firms including disadvantaged business enterprises (DBE) and minority and women owned firms in the planning, design, engineering and construction of the seawall. The following Scope of Work reflects a collaborative effort among PEC Team members to identify goals and create an implementation plan to increase LBE including minority and women owned firm participation on the Seawall Project.

This first phase of the project is to:

- Assist in strategy development of concepts, plans and resource analysis to discern best means and methods to ensure maximum LBE/DBE project participation.
- Assist in establishing the current base line of LBE/DBE presence on Port or Port-related projects, and possibly, the availability of firms doing similar marine-related work at the Port of Oakland
- Assist in the setting of goals and objectives relative to including ways to measure and quantify outcomes.
- Outreach, training and education to build capacity of LBE and DBE firms
- Track and measure progress and improvement in increasing the number of LBEs/DBEs with capacity to perform work at the Port (e.g., increasing the number specialized marine project)

- Assist in the creation of innovative contracting mechanisms to increase LBE and DBE contracting on Port projects, such as:
  - Inclusivity language /evaluators in RFPs
  - Tailored LBE set aside scopes
  - Negotiated sub contracts
- Develop project-specific contractor training model and curriculum
- Support the Port's communications efforts described in Task 1.10.03 to develop branding and communications to promote the LBE and Workforce Development aspects of the Seawall Program

The second phase of the project would include full implementation of the above, plus:

- Assist in the development of project-specific mentor protégé program
- Create a Technical Assistance and Resource Hub

1.10.02.01 – Phase I Strategies and Early Implementation

1.10.02.01.100 – Assessment of Small Business Participation on Port Projects

This task includes gaining an understanding of the current state of LBE and DBE contracting with the Port of San Francisco over the last 3- to 5-year time period, including size, certification and qualifications, type and quantity of work performed.

1.10.02.01.200 – Goal Setting

Collaborate with the Port in setting goal for improving the state of current contracting, including goals and objectives and ways to measure and quantify outcomes. Share findings, identify champions and agree on future goals.

1.10.02.01.300 – Tracking

Track and measure progress and improvement in increasing the number of LBEs with capacity to perform work at the Port (e.g., increasing the number specialized marine project)

1.10.02.01.400 – Innovative Contracting Mechanisms

Assist in the creation of innovative contracting mechanisms to increase LBE contracting on Port projects, such as:

- Inclusivity language /evaluators in RFP's
- Tailored LBE set aside scopes
- Negotiated sub contracts

Work with the Port to develop language and criteria for RFPs and RFQs, which will incentivize proposers' creativity in helping the Port to meet its inclusivity goals. The PEC Team will analyze future work program and based on the analysis of the Port's pipeline of projects will help identify optimum set aside scopes, unbundling, and negotiation opportunities, to maximize utilization of LBEs and DBEs.

1.10.02.01.500 – Training and Education

The team will organize and develop training to build LBE and DBE interest and capacity in Port/Seawall work. Recognizing the unique challenges of working on Port projects (e.g. cost of equipment, specialization required, etc.), training and support will be provided by qualified members of the PEC Team including Port staff.

The number of trainings and outreach events will be determined based on schedule, Prime and Port needs, and in coordination with other trainings provided by other business, industry and community

resources. The training will include workshops, focus groups and 1:1 counseling and technical assistance session. This task includes outreach to target firms, chambers, community-based organizations. Businesses beyond the immediate Bay Area geography will also be included in the outreach.

The team will assist Port staff with the development of quality assurance strategies and tools (i.e., satisfaction surveys, needs assessments, action plans, etc.) to provide continuous program improvement and to report on program success and effectiveness.

1.10.02.01.600 – Support the Efforts Under Task 1.10.03 to Develop Branding and Communications to Promote and Highlight Seawall Project Opportunities and Success Stories (Workforce and LBE/DBE Impact)

Work with the Port including the PEC Team Task 1.10,03 Lead and Port's communication team to develop a brand identity for the Seawall workforce and LBE/DBE initiatives. This would include multi-media promotion including print and strong Port website presence including impact videos.

Deliverables:

- Reporting progress and improvement in increasing the number of LBEs
- Memorandum summarizing the training plan
- Develop, maintain and update data base of firms in both professional services and construction.

1.10.02.02 – Phase II Implementation of Strategies

1.10.02.02.100 – Provide Technical Assistance and Establish Resource Hub

To increase the likelihood of success, the PEC Team will assist the Port in creating a Small Business Impact Hub at one of the Port's existing facilities, which will serve as a physical location to promote the Port's future work program, facilitate prime/subcontractor match-making, and provide technical assistance to small businesses. It will also serve as resource for community partners including college and universities, chambers of commerce and others involved in small business development. The purpose of this task is to provide support to small businesses owners. The support will be provided by technical staff to help them understand they have assistance in pursuing Port work.

The primary objectives for the technical assistance and resource hub are to:

- Inform and educate small businesses regarding what is required for them to qualify to bid on Port professional services and construction contracts
- Help small businesses understand the requirements of the procurement process (proposals and bids) and how to put together supporting materials (e.g., qualifications, cost estimates, schedules, etc.)
- Help successful bidders to understand processes, procedures, systems, and other requirements (e.g., fee negotiation, invoicing, estimating, scheduling, etc.) for administering and performing the work successfully after award
- Create "partnerships" between the Port's prime contractors and LBE/DBE small businesses
- Engage Port staff in the program to provide opportunities for small businesses to understand Port organization, decision making processes, issues, and requirements related to winning and performing public works projects
- Setting-up and administering list of small business participant contacts
- Developing content related to LBE/DBE participation opportunities for the Port's website
- Conducting periodic surveys to determine interest and measure performance

The resource hub would serve as a single point of contact to help small, local, and disadvantaged businesses to be able to better position and compete for, win and perform professional services and construction work related to the Port's capital improvement projects. It could be staffed pre-determined days/hours of the week.

Activities will include:

- Provide Technical Assistance
- Provide small business coaching
- Maintenance of database of small businesses
- Conduct trainings and curriculum; bidding & marketing, cost estimating, contract specifications, general and special conditions, and technical considerations
- Supporting Pre-bid meetings
- Facilitate GC and subcontractor matchmaking and mentor-protégé assignments
- Create "brand" for Port resource hub and a place to pursue business

1.10.02.02.200 – Mentor Protégé Program

The team will assist Port staff with the development of a project-specific mentor protégé program mentorship program to attract and support LBE and DBE business owners in future work activities.

Schedule/Deliverables:

- Will be developed as part of the Task Authorization Process.

Assumptions:

- The Phase 1 scope outlined above characterizes activities to be performed and will require coordination with the Port and PEC Team and final approval of the budget and scope by the Port prior to commencement of the services.
- The Phase 2 scope reflects an understanding that additional budget may be necessary and discussions regarding scope and budget will be necessary to implement both Phase 1 and 2 to achieve the goals throughout both Phases of work.
- Costs and structure for Phase II would be discussed once we have completed Phase I.

1.10.03 – LBE Outreach Communications

The following is an overview of the range of communications services that could support of the local business enterprise (LBE) outreach work, including outreach to disadvantaged and minority- and woman-owned businesses (DBE and MWBE) for the Port of San Francisco will provide a full range of communications services to choose from to effectively reach targeted LBE's in various trades.

The final scope of work will be coordinated with the Port Communications team and the PEC Team.

1.10.03.01 – Messaging and Strategy

- **Identify stakeholder groups and target audiences**
  - certified LBE's (including DBE's, MWBE's) that have previously worked on local government contracts (i.e. DPW, PUC, SFO, SFMTA etc.)
  - LBE's that were engaged in recently completed large-scale and waterfront projects in San Francisco (e.g. Chase Center Warriors Arena)
  - local government agencies that work directly with LBE's (CMD, OEWD, OCII)
  - relevant industry and trade associations

- **Craft messages and outreach strategies that resonate with targeted LBE's**
  - hone the Port's messaging to highlight and promote available and upcoming LBE and/or other workforce opportunities
  - translate Port-specific jargon, policies, or other technical terminology into common industry terms or layman's terms.
  - solicit and incorporate LBE feedback to develop relevant and compelling messages that speak directly to common needs, barriers, misconceptions, and questions.
  - Profile LBE success stories on Port projects.
- **Leverage the most effective outlets for reaching target audiences (print, online, video, in-person outreach)**
  - local and ethnic publications
  - targeted online and social media ads (by industry/profession, geographic area, industry or association affiliation etc.)
  - cross-promotion via partner web-site and distribution lists (government agency partners, local industry associations, small business groups, etc.)
  - tabling or formal presentations at community-based or trade-based events
- **Content Development**
  - copywriting for web and promotional materials consistent with messaging strategy
  - adapting informational materials where they exist for consistency with messaging strategy

1.10.03.02 – Communications, Outreach, and Engagement Tools

Objectives:

- Raise awareness about and spark interest in upcoming Port/Seawall contracting opportunities among qualified/potentially qualified LBE's.
- Dispel "myths" or misconceptions/demystify working with the Port.
- Illustrate how common trade skills and experience (i.e. work with DPW, PUC, SFO, SFMTA, etc.) can translate to Port work qualifications.
- Direct potentially qualified LBE's to additional technical resources.

Tools:

- **Print Collateral**
  - fact Sheets/FAQ's
  - flyers/Brochures/leave-behinds
  - direct mail to targeted LBE's
- **Ad Campaigns (Targeted)**
  - print (local, community publications, trade association journals or newsletters)
  - digital (targeted to local LBE's, social media, trade or industry association websites or e-newsletters)
- **Produce Videos**
  - creative option: feature successful LBE's who have transitioned to Port work from general contracts ("a day on the job")
  - creative option: demystifying port contracts: "myth vs. reality"

- creative option: feature trade-specific examples and information (plumbing, concrete, electrical, etc.)
- short (60-90 seconds) videos suitable for social media distribution (Youtube, Facebook, Twitter, etc.)/
- longer (3-5 minutes) videos suitable for showing at presentations, meetings, events.

- **Webinars**
  - informational/instructive, next-level - targeted to those with a high-level of interest, greater detail than videos or ads
  - provide Q&A with knowledgeable Port staff following presentation
  - sessions recorded, continue to be used as accessible online resource
- **Newsletters**
  - e-Newsletters or print
  - appeal broadly to local contractor/trades community
  - highlight local LBE successes and Port opportunities
- **Stakeholder Meetings**
  - plan, coordinate, and promote "meet the prime" style events or informational meetings tailored to specific trades, or general LBE/DBE/MWBE opportunities.
- **Direct Outreach at Community/Industry Events/Conferences/Trade Shows**
  - participate in partner events (i.e. local agencies, NAMC Northern California Chapter, etc.)
- **Focus Groups & Interviews**
  - gauge common needs/barriers among target LBE's
  - feedback helps to focus messaging strategy
  - provide Port with qualitative data and insights to inform outreach efforts
- **Surveys**
  - paper or e-survey development, distribution, collection, and analysis
  - gauge common needs/barriers among target LBE's
  - provide Port with quantifiable data and insight to inform outreach efforts
- **Translations/Multilingual Presentations**
  - commonly spoken languages in San Francisco (especially city-required Spanish, Chinese, Tagalog) as needed for digital and print communications; also, able to provide skilled presenters/translators.

1.10.03.03 – Creative Design

- Creative and photography-based artwork for online and print collateral
- Collateral
- Infographics
  - tell a visual story using easily digestible pictographs and images to represent data
- Marketing materials
  - create a recognizable "brand" that will continue to add value to future outreach efforts to targeted LBE community.
  - branded promotional items tailored to targeted audiences (e.g. tape measure, leveling tool, LED flashlight, etc.)

1.10.03.04 – Management

- Progress meetings, project milestone tracking, metrics
- Quarterly reporting on outreach activities, LBE participation to board, oversight entities
  - "Jobs Report" style presentations (see attachment)
- Facilitate LBE access to existing technical assistance resources as needed
- Metrics and impact

Deliverables/Schedule:

- To be coordinated with the Port and Task 1.10.02 prior to Notice to Proceed

Assumptions:

- This Task is Time and Materials basis and will be implemented in cooperation with other Task efforts, activities and schedule outlined in Task 1.10.

PHASE 2

2.01.00 – Management and Coordination of Services, Phase 2

~~CH2M~~The PEC Team will refine the organizational structure to reflect the design-focused Phase 2 tasks and to support the advancement of the CEQA/NEPA process and permitting. Update the PMWP to reflect Phase 2 activities. Continue focus on QA/QC throughout Phase 2.

2.01.01 – Charter

~~CH2M~~The PEC Team will conduct a Phase 2 kick-off meeting with the Port's team to review and update the Charter.

2.01.02 – Update Project Management Work Plan (PMWP)

Update the PMWP as needed to reflect Phase 2 activities and results of Phase 1 work.

2.01.03 – Tools and Processes

Continue to implement and use tools and processes developed in Phase 1. Revise tools and processes as needed for Phase 2.

2.01.04 – Project Management

Provide daily management and control of budgets, costs, schedule, scope, and risks. Conduct progress meetings and workshops to report progress and confirm alignment with Port milestones and objectives.

~~CH2M~~The PEC Team Deliverables:

Kick-off Meeting; PMWP Update for Phase 2 (draft and final); QA/QC Plan; Risk Register; Progress Meetings and Workshops, including Presentations, Agendas, and Meeting Summaries; Web-based File sharing Site; Monthly Reports and Invoices.

Assumptions:

- ~~20~~ 25-month duration
- Prepare and coordinate Phase 2 (kick-off) meeting with the Port's team, including by preparing and distributing an agenda to meeting participants.
- Prepare meeting minutes, distribute and finalize.
- Address Port's comments in revised PMWP.

- Submit final PMWP Update to Port.
- Prepare meeting minutes, distribute and finalize.
- Update tools and processes plan and discuss with Port.
- Continue use of web-based data management system and project dashboard for file management and at-a-glance status of schedule, budget, performance metrics, and risks.
- Update Baseline, Scope, Schedule, and Budget for the entire Project.
- Update cost-loaded work breakdown structure and critical path milestone schedule. Submit to Port for review and comments and finalize.
- Provide daily management and control of budgets, costs, schedule, scope, and risks.
- Prepare monthly invoices.

2.02.00 – Community Planning and Stakeholder Engagement, Phase 2

Note that the scope and budget for Community Planning and Stakeholder Engagement, Phase 2 is described under task 1.02.05 which covers a 3 year time period. Years 2 and 3 will be covered under Phase 2.

~~CH2M will adapt community planning and stakeholder Engagement Strategy in Phase 2 to ensure alignment with design, engineering, and permitting tasks.~~

~~2.02.01 – Community Planning and Stakeholder Engagement Strategy Update~~

~~CH2M will adapt community planning and stakeholder Engagement Strategy in Phase 2 to ensure alignment with design, engineering, and permitting tasks.~~

~~CH2M's Deliverables:~~

- ~~Survey~~
  - ~~a) Interviews (15)~~
  - ~~b) Focus group-style meetings~~
  - ~~c) Electronic survey~~
  - ~~d) Prepare survey findings (TM)~~
- ~~Draft updated strategy~~
- ~~Meetings to review/endorse~~
  - ~~a) PR team~~
  - ~~b) Port staff~~
  - ~~c) Technical team leads~~
- ~~Final updated strategy~~

~~Assumptions:~~

- ~~Check-in survey with key stakeholders (a subset of participants in the initial survey) to evaluate engagement to date~~
- ~~Record renewed recommendations on engagement strategy in an updated strategy document and present to Staff and/or Committee/s.~~

~~2.02.02 Community Planning Stakeholder Engagement.~~

~~CH2M will execute the revised community planning and stakeholder engagement strategy.~~

~~***CH2M's Deliverables:***~~

- ~~Meeting agendas~~
- ~~Meeting summaries~~
- ~~Meeting materials and presentations~~
- ~~Meeting facilitation~~
- ~~Technical input for website content~~
- ~~Technical input for newsletter~~
- ~~On-the-waterfront engagement content and materials (in collaboration with other team members)~~
- ~~Environmental Justice specific outreach materials~~

~~***Assumptions:***~~

- ~~Conduct eight workshops~~
  - ~~a) Phase 2 workshops support the environmental process. Five workshops assumed in support of CEQA/NEPA and three workshops available to expand on engagement around specific milestones, or to support non-Environmental Review-related topics.~~
- ~~Only providing technical content for website~~
  - ~~a) Assumes website design and hosting by Port as part of their existing website.~~
- ~~On-the-waterfront interactive engagement~~
  - ~~a) In collaboration with other team members~~
  - ~~b) Assumes a decrease in activity relative to Phase 1.~~
- ~~Environmental Justice outreach activities (meetings, information tables, etc.)~~
  - ~~a) Collaborate with RDJ on Environmental Justice activities~~

2.03.00 - Initial Projects, Preliminary Design

~~CH2M~~The PEC Team will ensure that the design leads who led the work during the alternatives evaluation phase will continue to advance the Project through design. Preliminary design milestones include 5%, 15%, and 35%, with the preparation of bid packages for alternative delivery included at the 35% milestone.

Overall Deliverables for Task 2.03.00: ~~CH2M~~The PEC Team *will prepare and submit the following.*

- DBD Outline; DBD (draft and final), 5%, 15%, and 35% design packages (including drawings, technical specifications, front end specifications

Overall Assumptions for Task 2.03.00:

- Three initial projects, construction value $654.5 million.
- Architectural and Landscape architectural to develop only concept level design (5% design).
- One meeting with Port for each design phase, total of three meetings, two hours long each, attended by: Project Manager, DM (design manager), Geotechnical lead, Lead Architect.

2.03.01 – Design Basis Document (DBD)

~~CH2M~~The PEC Team will develop a Program-level DBD to provide overarching design guidance. Conduct workshops to develop a DBD through an iterative process. Conduct bi-weekly working sessions to pose questions on standards and preferences, update code lists, and gain endorsement from key stakeholders.

2.03.02 – Detailed Investigations, Design Level

Develop a prioritized list of additional site investigations required to complete the concept and preliminary design. Review the scope and estimated cost of investigations with Port staff to select priority studies for execution. Develop and execute a site investigation plan, prepare summary reports, and incorporate data into the GIS database. Present the results of investigations to Port staff in working meeting settings.

~~CH2M~~The PEC Team Deliverables:

- List of Site Investigations; Site Investigation Reports (draft and final).

Assumptions:

- Costs of detailed inspections is not included, only hours to identify what inspections are needed.

2.03.03 – Preliminary Design, Engineering & Cost Estimating, General Plan.

The General Plan level of development will advance the design of the initial improvements to 3% to 5% level of design.

2.03.03.01 – Design Development.

Complete preliminary design and engineering for initial improvements. Generate a building information modelling model and selected drawings to 3% to 5%. Conduct bi-weekly working sessions to pose design questions and alternative solutions, and to seek endorsement to enable design progression. Develop additional conceptual renderings with landscape architects and architects. Prepare calculations and models.

2.03.03.02 – Technical Memorandum.

Prepare a TM documenting design assumptions, interdependencies, and issues to address in next design phase; review this with Port team.

2.03.03.03 – Environmental/Regulatory Coordination.

Coordinate with the NEPA/CEQA/ permitting team to identify potential pre-mitigation design considerations, construction constraints, and other design considerations.

2.03.03.04 – Cost Estimate.

Develop a Class 5 schedule and cost estimate for initial projects.

2.03.03.05 – Design Review Workshop.

Conduct a General Plan Workshop to review and confirm design decisions.

~~CH2M~~The PEC Team Deliverables:

General Plan Design, Engineering, and Cost Estimate Package.

2.03.04 – Preliminary Design, Engineering & Cost Estimating, 15% Design.

This task will progress preliminary design to 15%. Concept development will support the development of a Class 3 cost estimate, schedule, and contingency budget. Activities will be as in 2.03.03, but also will include development of initial specification list and Cost and Schedule Risk Analysis (CSRA) based on the USACE process.

~~CH2M~~The PEC Team Deliverables:

15% Plan Design, Engineering, and Cost Estimate Package; Initial Specification List; Milestone Workshop.

2.03.05 – Preliminary Design, Engineering & Cost Estimating, 35% Design.

Based on input from the 15% design review, ~~CH2M~~The PEC Team will advance design to 35%. This will involve developing additional detail, specifically in areas of high risk or areas of construction where defining the scope is key to the permitting process. For example, in-water scope will be expedited to support CEQA/NEPA. Port input on decisions that may affect usage, design life, and long-term operations and maintenance costs will be sought. Design elements and concepts will be frozen at the completion of the 35% design package. ~~CH2M~~The PEC Team will perform a constructability review, develop a Class 2 schedule and cost estimate, and update risk information and the CSRA. ~~CH2M~~The PEC Team will be focused on "Continuity of Operations" during design and construction phase by leveraging Best Practices and Lessons Learned, to ensure minimal impact to the Port's operational excellence and reputation.

~~CH2M~~The PEC Team Deliverables:

35% Plan Design, Engineering, and Cost Estimate Package; Draft Specifications.

2.03.06 – Design/Build Contract Packages.

This task includes the development of a procurement strategy that aligns with Port objectives and design/build contract packages for alternative delivery procurement of initial projects, based on ~~CH2M~~The PEC Team experience supporting SFPUC, San Mateo, and other clients. ~~CH2M~~The PEC Team will consider interactions between operations continuity, community impacts, schedule impacts, construction sequencing, project logistics, schedule impact, budget savings, project criticality, risk transfer, and private sector involvement.

~~CH2M~~The PEC Team Deliverables:

Three Design/Build Contract Packages; Support to Port Staff in Discussions with City Attorney on Bidding Strategy and Bidding Documents.

2.04.00 - Pilot Projects

See Authorized Task Order in Appendix E.

- 2.04.01 (Partial) – Pilot Projects – Alternative Delivery Procurement Selection Process

As set forth below, ~~CH2M~~The PEC Team will develop pilot projects to evaluate the site investigation techniques and preferred retrofit options prior to a broader implementation. Findings will be used to refine the geotechnical and structural models to better determine the effectiveness of the retrofit options. Fugro USA Land, Inc. (Fugro) will work with the design team to develop a pilot-project workplan describing objectives and benefits, data to be collected, and means and methods. Anticipated pilot projects will involve:

- Evaluation of the effectiveness of various techniques of assessing existing seawalls and associated infrastructure. Use techniques such as ground LiDAR, single- and multi-beam bathymetry surveys, geophysical surveys, and small- and large-diameter coring to delineate the locations, geometry and composition of structures. Coring can be conducted to confirm composition and quality of dikes, seawalls and piles, and pile-integrity testing can be used to determine pile length and;
- Development of preferred mitigation measures. Evaluate the feasibility and cost-effectiveness of mitigation measures, such as structural upgrades, cement deep soil mixing, jet grouting, stone columns, and/or ground compaction. For example, cement deep soil mixing has many significant advantages over jet grouting to stabilize the seawall including costs and the ability to work offshore and avoid onshore disruptions. The key issues will involve the cost of predrilling through the seawall

(large diameter coring and backfilling with sand to facilitate rapid deep mixing) and containment of spoils to mitigate environmental concerns. A pilot project can be developed to assess the level of effort required and costs for these key activities.

~~CH2M~~The PEC Team Deliverables:

~~CH2M~~The PEC Team will prepare and submit Recommended Pilot Projects TM; Drawings and Specifications; Field Reports; Draft and Final Pilot Project Reports.

Assumptions:

- Up to two pilot projects will be implemented.
- Contractor costs to implement the pilot projects not included.
- The duration of the field aspects of each pilot project is anticipated to be no more than two weeks.

Environmental Review and Permitting for Pilot Projects

~~CH2M~~The PEC Team will provide environmental clearance (NEPA/CEQA) and permitting for identified pilot projects. Emphasis will be on the use of streamlined environmental review approaches (categorical exemption/categorical exclusions) and streamlined permits for investigatory activities (such as Nationwide Permit 6) where appropriate. As the pilot projects have not yet been identified or developed, the specific level of effort included in the cost estimate is a placeholder and assumed only limited permitting effort. As pilot projects are identified, the environmental team will develop and environmental strategy for the most efficient environmental clearance and regulatory permitting in consultation with the Port and the Regulatory Agency Working Group.

~~CH2M~~The PEC Team Deliverables:

~~CH2M~~The PEC Team will prepare and submit environmental clearance memo(s), NEPA and CEQA documentation, regulatory permit applications (USACE, SFRWQCB, SF BCDC, CDFW, consultation with SHPO for NHPA Section 106 and with NMFS/USFWS for ESA Section 7, NMFS IHA).

Assumptions:

- One draft and one revised draft permit application package for one pilot project.
- Use of nationwide USACE permits and streamlined other permits.
- Use of categorical exemption under CEQA and Categorical Exclusion under NEPA.
- Permit application fees are not included in cost.
- Cost does not include implementation of mitigation or avoidance/minimization measures.

~~**Task 2.05.00 – Emergency Projects**~~

~~CH2M will perform the permitting and engineering necessary to bid and construct projects that may be required under emergency circumstances. To expedite design, CH2M has identified its California PE team to ensure an immediate and effective design delivery. Emergency projects are CEQA exempt; however, a NEPA categorical exclusion may be necessary. USACE also has issued Regional General Permit allowing for emergency actions.~~

~~***CH2M's Deliverables:***~~

~~CH2M will prepare and submit Emergency Project Design Deliverables based upon the following.~~

~~***Assumptions:***~~

- ~~Construction costs $50 million.~~
- ~~Three projects.~~
- ~~Three meetings of each project with five teams members, four hours each meeting.~~
- ~~Assumed design, bid, build and minimal construction assistance (submittal and RFI review only)~~

- No construction management cost included.

Environmental Review and Permitting for Emergency Projects

Emergency projects are generally exempt from CEQA. A categorical exclusion may however be necessary under NEPA. The San Francisco District of the U.S. Army Corps of Engineers has also issued Regional General Permit that allows for emergency actions. There are other provisions for emergencies in regards to other state permits, for example, from the SF RWQCB. CH2M will develop an emergency project environmental clearance/permitting plan and consult with the regulatory agency working group to ensure procedures are acceptable and that the plan can be employed in the event of emergency conditions.

CH2M's Deliverables:

CH2M will prepare and submit an environmental clearance memo, NEPA documentation, regulatory permit applications (USACE, USCG, SF RWQCB, SF BCDC, CDFW, and consultation with SHPO for NHPA Section 106 and with NMFS/USFWS for ESA Section 7, NMFS IHA).

Assumptions:

- One draft and one revised draft permit application package emergency projects
- Permit application fees are not included in budget estimate
- Does not include implementation of mitigation or avoidance/minimization measures

2.06.00 - Environmental Review and Permitting

The scope included below replaces the scope in the original contract for 2.06.

2.06.01 – CEQA and NEPA Compliance for the USACE Flood Study

2.06.01.01 – NEPA Compliance for the USACE Flood Study

The complete NEPA compliance scope of work for the USACE Flood Study is included in Task 1.09.09 of this Contract Amendment scope of work. Costs for the full scope of work detailed under task 1.09.09 will be shared between USACE and the Port. The final scope of work to be included as in-kind services will be developed and approved by USACE and the Port.

2.06.01.02 – CEQA Compliance for the USACE Flood Study

The CEQA compliance for the USACE Flood Study is not eligible for cost-sharing with USACE, therefore this scope is included to cover the CEQA only portion of the EIR/EIS, as described below.

The following high-level scope assumptions support the preliminary cost estimate for the CEQA-only portion of a combined project-level EIR/EIS for the USACE/Port of San Francisco Flood Project. The project is assumed to include flood improvements and related seismic upgrades along a 7.5 mile section of the SF waterfront, and the EIR/EIS is presumed to include up to 4 build alternatives analyzed at equal level of detail.

These scope assumptions and cost estimate are preliminary at this time as the project alternatives have not as yet been identified or developed sufficiently to provide an adequate description for the purposes of cost estimating. In addition, the specific analytical methodologies, scale, and scope have not yet been developed by the USACE (to the extent this would affect CEQA analyses), the Port of San Francisco, San Francisco Environmental Planning (EP), or by the consultant team (Consultant). As such, this scope and the associated cost estimate are for project planning purposes only. A refined, detailed scope and budget-level cost estimate will be developed in collaboration between the parties that will include alternatives definition as well as specific work plan development of analytical methodologies, scale, and scope.

Project Management / Start Up Tasks

These tasks include additional project management time and start-up activities required for the CEQA topics that are separate from the NEPA process. Examples include time spent discussing, overseeing, or strategizing on topics such as wind, shadow, plans / policies, or greenhouse gas emissions or certain subtopics within a larger environmental topic that pertain only to the CEQA analysis. For example, the noise analysis may require analyses beyond what is typically performed under NEPA to achieve CEQA compliance.

1) Aesthetics
   - Assumes limited effort related to minor additions, review, revisions to ensure overall analysis achieves CEQA compliance.
2) Air Quality / GHG
   - Includes labor to achieve compliance with EP's Air Quality Technical Report procedures and completion of the Greenhouse Gas Emissions checklist.
3) Biological Resources
   - Assumes limited effort related to minor additions, review, revisions to ensure overall analysis achieves CEQA compliance.
4) Cultural Resources
   - Assumes substantial amount of effort involved to achieve compliance with CEQA since the NEPA process will not address state-level resources.
5) Geology and Soils
   - Local City level of detail necessary to explain seismic issues more clearly to local audience given that seismic vulnerability is a seawall project element and a key local issue.
6) Hazards and Hazardous Materials
   - Assumes moderate level of effort involved to achieve compliance with CEQA and to address consistency with local programs such as San Francisco Maher Ordinance.
7) Hydrology and Water Quality
   - Assumes moderate level of effort involved to achieve compliance with CEQA and to address consistency with local water quality programs.
8) Land Use and Planning
   - Assumes limited level of effort involved to achieve compliance with CEQA and to ensure that the discussions adequately addresses all local topics.
9) Noise
   - Assumes limited level of effort involved to achieve compliance with CEQA and to ensure that the discussions adequately addresses all local topics, such as nighttime construction issues which might otherwise not be covered in the NEPA document.
10) Plans and Policies
   - Not a NEPA topic. Assumes level of effort necessary to adequately address the project's consistency with governing plans and policies.
11) Population and Housing
   - Not a NEPA topic although data can be shared (and will be consistent) with NEPA sections that include demographic analyses. Assumes level of effort necessary to complete the population and housing discussion consistent with standard practice. Assumes project would not substantially affect population and housing.

12) Public Outreach

- Assumes tasks that would be necessary to comply with outreach to local groups consistent with standard EP practice.

13) Public Service and Utilities

- Assumes moderate level of effort involved to achieve compliance with CEQA and to address local issues that NEPA may not cover.

14) Recreation

- Assumes limited level of effort involved to achieve compliance with CEQA and to ensure that the discussions adequately addresses all local topics.

15) Shadow/Wind

- Not a NEPA topic. Assumes level of effort necessary to complete full analysis. For shadow, assumes no major shading of public spaces would occur and affected spaces would be limited to four areas. Assumes a wind tunnel test would not be required.

16) Transportation

- Assumes limited level of effort involved to achieve compliance with CEQA and to ensure that the discussions adequately addresses all local topics.

17) Front and Back Matter

- Assumes limited effort needed to include various CEQA-only requirements such as "other CEQA considerations", etc.

18) Admin Draft 2 through Publication of Draft EIR/EIS

- Assumes level of effort needed to respond to CEQA-only comments from project team and finalize CEQA-only analysis for publication.

19) Responses of Comments through Final EIR/EIS

- Assumes level of effort needed to respond to public CEQA-only comments on the Draft EIR/EIS and CEQA-only revisions through certification of the EIR.

Deliverables:

- Admin Draft 1 of CEQA Compliance sections for integration into the EIR/EIS
- Admin Draft 2 of CEQA Compliance sections for integration into the EIR/ES
- Response to comments for CEQA specific comments for Final EIR/EIS

Assumptions:

- The Compliance document is combined EIR/EIS
- Most environmental topics require some level of additional CEQA-only effort to ensure the analysis is consistent with and adequately addresses local plans/programs and follows standard local CEQA procedures.
- Alternatives
  - Presume up to 3 to 4 build alternatives
  - Does not presume analysis of an offshore barrier alternative
  - Does not presume any alternative that requires a major, permanent roadway reconfiguration

2.06.02 – Project Level CEQA/NEPA Compliance for the Initial Strengthen Project

Task 1.05 will result in the identification of an initial Strengthen Project that will require some level of environmental compliance depending on the scope of the project, potential impacts and the extent of

federal nexus. For the purposes of this scope of work we have assumed that a combined EIR/EIS will be required, however, once the project is defined this assumption should be revisited to assure that the most efficient and defensible compliance strategy is executed. Additionally, once the scope of the project and potential impacts are understood, a thorough scope that includes the required technical analyses will be developed. Until the project is defined, the following scope of work is included as a placeholder:

Prepare Project Description. Based on the work in Task 1.05 a project description will be developed in collaboration with the Port. Gaining agreement on the project description is critical to moving forward with the impact analysis for the environmental document.

Conduct Scoping. With approval of the project description, CH2M will conduct scoping activities in collaboration with EP and the Port. This includes issuance of the NOI/NOP and holding scoping meeting and developing the scoping report.

Conduct Technical Analyses. The multi-disciplinary team will prepare existing setting and impact analysis for all required technical analyses under CEQA and NEPA. Once more details about the project are known, additional scope detail can be provided regarding extent of analysis. As needed mitigation measures will be developed and described.

Develop Administrative, Screen Check and Draft EIR/EIS. In adherence with the review protocols of City of SF EP department the team will prepare two administrative drafts, a screen check draft and final draft for review by the EP and the Port.

Notice of Availability and Federal Register Notice. As required by CEQA and if needed NEPA CH2M will prepare the Notice of Availability documents for publication by EP.

Develop Administrative, Screen Check and Final EIR/EIS. In adherence with the review protocols of the City of SF EP department the team will prepare two administrative drafts, a screen check draft an final of the Final EIR/EIS which includes the response to comments received by the community on the Draft EIR/EIS.

Other Requirements. ~~CH2M~~The PEC Team will complete additional CEQA/NEPA requirements including final notice of availability of the Final EIR/EIS. A Notice of Determination and/or Record of Decision as appropriate and the Mitigation Monitoring and Reporting Plan (MMRP).

Deliverables:

- Notice of Intent (NEPA)/Notice of Preparation (CEQA)
- Scoping Report
- Technical Reports
  - Air Quality Technical Report
  - Biological Technical Report
  - Biological Assessment
  - Cultural Resources Inventory Report (prepared in Phase 1)
  - Hazards and Hazardous Materials
  - Noise Technical Memorandum
  - Transportation Report
- Administrative Draft #1 EIR/EIS
- Administrative Draft #2 EIR/EIS
- Screen Check Draft EIR/EIS
- Notice of Availability and Federal Noticing
- Public Draft EIR/EIS
- Administrative Final #1 EIR/EIS
- Administrative Final #2 EIR/EIS

- Screen Check Final EIR/EIS
- Notice of Availability and Federal Noticing
- Final EIR/EIS
- Notice of Determination (CEQA)
- Mitigation Monitoring and Reporting Plan (CEQA)
- Record of Decision (NEPA)

Assumptions:

- The scope and budget for both the CEQA/NEPA and the permitting of the initial projects cannot be fully determined until the projects are more fully defined and an understanding of the impacts and permitting requirements are better understood. Once the project is fully defined the task order for CEQA/NEPA and permitting can be completed and an assessment of the sufficiency of the budget for CEQA/NEPA and permitting can be assessed.
- Combined EIR/EIS
- Sediment quality sampling not assumed to be required for EIR/EIS, therefore cost not included.
- Sampling of benthic invertebrate communities, may be required for the Biological Assessment, cost not included.

2.06.03 – Permitting

As outlined in the approach and below, the PEC Team will initiate the permitting effort early in the planning phase with the establishment and functioning of the Regulatory Agency Working Group, the identification of critical agency impact issues, and the development of mitigation approaches. Through understanding the needs of each agency in detail, the PEC Team will develop compliance strategies in advance of the actual permitting process. Permit applications will be developed during the CEQA/NEPA process to avoid potential delays in permit issuance after completion of environmental review.

The PEC Team's scope of work includes the following tasks:

- Draft permit applications for the U.S. Army Corps of Engineers (Individual Permit, unless Corps does internal permitting and project sponsor), San Francisco Regional Water Quality Control Board, San Francisco Bay Conservation and Development Commission, and California Department of Fish and Wildlife (Incidental Take Permit)
- Obtain Incidental Harassment Authorization from National Marine Fisheries Service
- Attendance at Reginal Advisory Working Group (RAWG) meetings
- Attendance at up to five Design Review Board and Engineering Criteria Review Board meetings, or combination meetings with the Waterfront Design Advisory Committee

Deliverables:

- Permit Applications; Continued updates to Phase 1 Permitting Roadmap

Assumptions:

- The scope and budget for the permitting of the initial projects cannot be fully determined until the projects are more fully defined and an understanding of the impacts and permitting requirements are better understood. Once the project is fully defined the task order for permitting can be completed and an assessment of the sufficiency of the budget for CEQA/NEPA and permitting can be assessed.
- One draft and one revised draft permit application package for the project
- Permit application fees are not included in budget estimate
- Does not include implementation of mitigation or avoidance/minimization measures

- Assumes up to three formal revisions of the permitting roadmap based on RAWG meetings
- State Lands and Public Trust consistency determination/property interest is not included in this budget estimate
- Completion of permit applications during CEQA/NEPA process. If sufficient design is not available to support permit applications, then this effort would shift to Phase 3.
- Does not include long term funding necessary to manage and maintain mitigation and habitat enhancements
- Assumes a maximum of five mitigation and habitat enhancement sites
- Does not include mitigation construction drawings
- Assumes integrated habitat enhancement construction drawings, cost not included.
- Includes permits for one initial Strengthen project only.

~~As outlined in the approach and below, CH2M will commence with background studies early in the planning phase to support design and to get a head start on the environmental process. CH2M will also complete an early identification of potential impacts and mitigation strategies in order to incorporate as much mitigation into project design and to further robust and acceptable environmental outcomes. CH2M will integrate the concerns of the public, stakeholders, and agencies as derived from the outreach process into environmental studies and analyses.~~

~~2.06.01 – CEQA and 2.06.02 – NEPA.~~

~~Prepare and issue appropriate scoping documents for both Program and Project-level environmental documents, and hold scoping meetings. Provide early identification of potential impacts and mitigation strategies to incorporate mitigation into project design and further assure robust and acceptable environmental outcomes. Combined Program CEQA/NEPA (likely an EIR/EIS) and an initial improvements CEQA/NEPA document (possibly an EIR/EA or EIR/EIS). Work closely with the Port, USACE, and Environmental Planning and stakeholders to clearly define project objectives and develop an appropriate range of alternatives.~~

~~CH2M's Deliverables:~~ *~~CH2M will prepare and submit the following.~~*

- ~~Notice of Intent (NEPA)/Notice of Preparation (CEQA)~~
- ~~Scoping Report~~
- ~~Technical Reports~~
  - ~~a) Air Quality Technical Report~~
  - ~~b) Biological Technical Report~~
  - ~~c) Biological Assessment~~
  - ~~d) Cultural Resources Inventory Report (prepared in Phase 1)~~
  - ~~e) Hazards and Hazardous Materials~~
  - ~~f) Noise Technical Memorandum~~
  - ~~g) Transportation Report~~
- ~~Project EIR/EIS and Program EIR/EIS~~
  - ~~a) Administrative Draft #1 EIR/EIS~~
  - ~~b) Administrative Draft #2 EIR/EIS~~
  - ~~c) Screen Check Draft EIR/EIS~~
  - ~~d) Notice of Availability and Federal Noticing~~
  - ~~e) Public Draft EIR/EIS~~
  - ~~f) Administrative Final #1 EIR/EIS~~
  - ~~g) Administrative Final #2 EIR/EIS~~
  - ~~h) Screen Check Final EIR/EIS~~
  - ~~i) Notice of Availability and Federal Noticing~~
  - ~~j) Final EIR/EIS~~
  - ~~k) Notice of Determination (CEQA)~~

l) Mitigation Monitoring and Reporting Plan (CEQA)
m) Record of Decision (NEPA)

Assumptions:

- Combined EIR/EIS documents for project and program.
- Sediment quality sampling not assumed to be required for EIR/EIS, therefore cost not included.
- Sampling of benthic invertebrate communities, may be required for the Biological Assessment, cost not included.

2.06.02 – See 2.06.01

2.06.03 – Permitting

As outlined in the approach and below, CH2M will initiate the permitting effort early in the planning phase with the establishment and functioning of the Regulatory Agency Working Group, the identification of critical agency impact issues, and the development of mitigation approaches. Through understanding the needs of each agency in detail, CH2M will develop compliance strategies in advance of the actual permitting process. Permit applications will be developed during the CEQA/NEPA process to avoid potential delays in permit issuance after completion of environmental review.

CH2M's scope of work includes the following tasks:

- Draft permit applications for the U.S. Army Corps of Engineers (Individual Permit, unless Corps does internal permitting and project sponsor), San Francisco Regional Water Quality Control Board, San Francisco Bay Conservation and Development Commission, and California Department of Fish and Wildlife (Incidental Take Permit)
- Obtain Incidental Harassment Authorization from National Marine Fisheries Service
- Attendance at Reginal Advisory Working Group (RAWG) meetings
- Attendance at up to five Design Review Board and Engineering Criteria Review Board meetings, or combination meetings with the Waterfront Design Advisory Committee

CH2M's Deliverables:

Permit Applications; Continued updates to Phase 1 Permitting Roadmap;

Assumptions:

- One draft and one revised draft permit application package for the project
- Permit application fees are not included in budget estimate
- Does not include implementation of mitigation or avoidance/minimization measures
- Assumes up to three formal revisions of the permitting roadmap based on RAWG meetings
- State Lands and Public Trust consistency determination/property interest is not included in this budget estimate
- Completion of permit applications during CEQA/NEPA process. If sufficient design is not available to support permit applications, then this effort would shift to Phase 3.
- Does not include long term funding necessary to manage and maintain mitigation and habitat enhancements
- Assumes a maximum of five mitigation and habitat enhancement sites
- Does not include mitigation construction drawings
- Assumes integrated habitat enhancement construction drawings, cost not included.

2.07.00 - City Staff Training, Phase 2

~~CH2M~~The PEC Team shall provide additional training to City and Port staff on relevant topics, as in Phase 1. The topics will be based on the upcoming decisions and work in Phase 2, such as site investigation techniques, use of GIS-based tool, and construction and management of geotechnical retrofits.

~~CH2M~~The PEC Team Deliverables:

~~CH2M~~The PEC Team will provide instructor and all training materials.

Assumptions:

Training sessions are limited to 3 (three) half day training sessions.

2.08.00 - Seismic Peer Review Panel, Phase 2

~~CH2M~~The PEC Team shall perform services in continuation of its scope as appropriate in Phase 2 and as directed by the Port.

Assumptions:

- Quarterly meetings (nine) via teleconference
- Chairman prep time – one hour
- Meeting/Review time – two hours all members
- Chairman summary of meeting – one hour

PHASE 3

Support Services during Final Design/Engineering & Construction, Initial Project(s)

As described below, CH2M shall provide services that include expert technical and environmental services during final design and construction as other consultants and contractors complete final design, permitting, construction, and mitigation and monitoring plans.

3.01.00 - Consultant Team Management, Final Design & Construction

Services shall be similar to Task 1.01.00 but modified as directed by the Port to reflect Phase 3 contract scope of services.

3.02.00 - Stakeholder Engagement, Support

The Port and other consultants will take the lead in stakeholder engagement during this phase. However, CM2H will provide supporting materials and attend meetings only to support consultant work scope during this Phase.

3.03.00 - Value Engineering

~~CH2M~~The PEC Team shall develop and lead one-day value engineering (VE) workshop for all project(s) including preparation of all necessary materials, documenting workshop discussions, and preparation of results and outcomes. Facilities will be provided by the Port. VE workshops shall follow USACE guidance. For budgeting, assume (3) projects.

3.04.00 - Independent Design Review

~~CH2M~~The PEC Team shall lead an independent Design Review process for each final design/construction project to be executed by others. This design review shall include input from

independent technical experts in each of the technical/engineering/environmental fields required for each project, including but not limited to: civil engineering, coastal engineering, hydraulic engineering, geotechnical engineering, structural engineering, environmental impacts, constructability, and cost estimating. Review shall take place at each formal step in design (assume Design Basis, revised 35% Design, 65% Design, 95% Design, 100% Design) and include review of technical reports, calculations, plans, specifications, cost estimates, and operations & maintenance plans. For budgeting, assume three projects.

Assumptions:

- Assumed ten projects, five Independent Review Meetings per a project, four hours each meeting.
- Meeting attendees will be the Project Manager only.
- Technical experts will be supplied for the Independent review consultant (by others).
- ~~CH2M~~The PEC Team The PEC Team to lead meetings only.

APPENDIX B-1A

PHASE I: PLANNING		Original Contract	New Total Contract
1.01.00	Management and Coordination of Services, Phase 1	$ 2,307,635	$ 5,041,286
1.02.00	Community Planning and Stakeholder Engagement, Phase 1	$ 548,308	$ 2,093,732
1.03.00	Data Collection, Review, and Existing Conditions	$ 744,896	$ 3,937,858
1.04.00	Multi-Hazard Risk Assessment	$ 3,957,708	$ 7,471,595
1.05.00	Alternatives Formulation, Analysis and Program Development	$ 2,381,399	$ 6,580,713
1.06.00	City Staff Training, Phase 1	$ 35,460	$ 35,460
1.07.00	Seismic Peer Review Panel, Phase 1	$ 264,017	$ 864,135
1.08.00	Alignment Workshop	$ -	$ 60,225
1.09.00	USACE - General Investigation	$ -	$ 7,589,800
1.10.00	LBE Support and Workforce Development	$ -	$ 1,228,500
	TOTAL PHASE I	$ 10,239,424	$ 34,903,305

PHASE II: PRELIMINARY DESIGN & ENGINEERING, INITIAL PROJECTS			
2.01.00	Management and Coordination of Services, Phase 2	$ 3,429,455	$ 3,429,455
2.02.00	Stakeholder Engagement, Phase 2	$ 700,414	$ 845,387
2.03.00	Initial Projects, Preliminary Design	$ 4,098,308	$ 3,020,758
2.04.00	Pilot Projects	$ 604,939	$ 604,939
2.05.00	Emergency Projects	$ 4,396,914	$ -
2.06.00	Environmental Review and Permitting	$ 5,186,989	$ 5,186,989
2.07.00	City Staff Training, Phase 2	$ 53,190	$ 53,190
2.08.00	Seismic Peer Review Panel, Phase 2	$ 34,944	$ 34,944
	TOTAL PHASE II	$ 18,505,154	$ 13,175,663

PHASE III: FINAL DESIGN & CONSTRUCTION, INITIAL PROJECTS			
3.01.00	Management and Coordination of Services, Phase 3	$ 7,072,754	$ 7,072,754
3.02.00	Stakeholder Management, Phase 3	$ 161,440	$ 161,440
3.03.00	Value Engineering	$ 215,049	$ 215,049
3.04.00	Independent Design Review	$ 155,920	$ 155,920
	TOTAL PHASE III	$ 7,605,162	$ 7,605,162

	TOTAL ALL PHASES	**$ 36,349,740**	**$ 55,684,130**
	CONTINGENCY	**$ 4,292,941**	**$ 59,977,071**

Appendix C-1
Hourly Rate Schedule

Company	Name	Position	Hourly Rate
A G S Inc	Khamanehpour, Bahram	Principal Geotechnical Engineer	$253.61
A G S Inc	Litle, Kenneth	Principal Civil Engineer	$253.61
A G S Inc	Tsao, James	Principal Structural Engineer	$215.71
Arcadis	Appelbaum, Stu	USACE Feasibility Analysis	$273.56
Arcadis	Atkinson, John	SME - Resiliency Flood Hazard	$207.74
Arcadis	Baumy, Walter	USACE Feasibility Analysis	$270.02
Arcadis	Bosch, Lauren	Economic Assessment	$87.30
Arcadis	Burges, Stephen	Task Lead	$272.43
Arcadis	Bradley, Rachel	Economic Assessment	$146.24
Arcadis	Castrucci, Luca	Coastal Modeler	$107.72
Arcadis	Clinch, Kevin	Structural/Principal Engineer	$269.52
Arcadis	Decapio, Vince	Senior Engineer, Water Resources	$156.19
Arcadis	Dircke, Piet	Technical Advisory - Coastal Resiliency	$297.05
Arcadis	Fernandez, Edward	Flood/Coastal Resiliency Planning	$151.43
Arcadis	Foster, Carly	Flood/Coastal Resiliency Planning	$206.48
Arcadis	Fulks, David	Senior Civil Engineer	$209.36
Arcadis	Garcia, Chris	Project Assistant	$57.62
Arcadis	Gomez, Rebeca	Project Engineer	$181.64
Arcadis	Gravenmier, Josh	Emergency Response and Recovery	$253.98
Arcadis	Henderson, Aaron	Resilience Planning	$161.64
Arcadis	How, Cindy	GIS/Flood Mapping	$193.58

Company	Name	Position	Hourly Rate
Arcadis	Lindawson, Brian (1)	Project Coordinator	$118.82
Arcadis	Manguno, Rich	Economic Analysis	$247.30
Arcadis	Marrone, Joe	Coastal Modeling/Engineering	$285.63
Arcadis	McMillan, Jamie	Project Assistant	$89.25
Arcadis	Meza, Emily	Economic Assessment	$101.48
Arcadis	Nelson, Timothy	Resilience Planning	$99.08
Arcadis	Novak, Martina	Senior Engineer	$171.02
Arcadis	Pomales, Melissa	Key Technical Lead - Project Controls	$288.68
Arcadis	Powell, Nancy	Resilience Technical Expert	$263.79
Arcadis	Project Coordinator (Arcadis) (1)	Project Coordinator (Arcadis)	$118.82
Arcadis	Reddick (formerly Thurson), Kelli	Resiliency Planning	$141.29
Arcadis	Roberts, Hugh	Hydrodynamic Modeling	$248.53
Arcadis	Roth, Lawrence	Geotechnical Engineering/Risk Analysis	$279.99
Arcadis	Sprague, Heather (1)	Project Coordinator	$118.82
Arcadis	Staff Professional (Arcadis)	Staff Professional (Arcadis)	$222.29
Arcadis	Stoddard, Ryan	Civil Engineering	$203.65
Arcadis	Welch, Wayne	Civil Engineering	$298.99
Arcadis	Westerhoff, Edgar	Resiliency Planning	$233.42
Arcadis	Wijsman, Peter	Global Resiliency Expert	$296.39

Company	Name	Position	Hourly Rate
Arcadis	Zhou, Haihong	Probability Analysis	$131.96
Arcadis	Zou, Shan	Senior Engineer, Water Resources	$154.21
BAYCAT	Baycat	Baycat	$185.00
Bonner Communications	Bonner, Noelle	CEO/Principal	$210.00
Bonner Communications	Souva, Suzanne	Account Manager	$150.00
Bonner Communications	Williams, Jaimee	Graphic & Digital Designer	$135.00
C H S Consulting Group	Kluter, Andrew	Senior Transportation Planner	$153.88
C H S Consulting Group	Liberman, William	Transit Planner	$290.00
C H S Consulting Group	Shao, Chi-Hsin	Traffic Engineering Principal	$290.00
CA Davis Engineering	Davis, Craig	Lifelines Engineer	$298.99
Carollo Engineers, Inc	Bundy, Summer	Ongoing Project Integration	$246.77
Carollo Engineers, Inc	Cruz, Emilio	Carollo PIC/Technical Advisor	$298.99
Carollo Engineers, Inc	Dadik, Mike	Structural/Resiliency	$246.77
Carollo Engineers, Inc	Deslauriers, Sarah	Sustainability/Climate Change	$172.21
Carollo Engineers, Inc	Harold, Eric	CSOs/Collection System	$261.18
Carollo Engineers, Inc	Karam, Walid	Ongoing Project Integration	$290.00
Carollo Engineers, Inc	Prabhakar, Pavitra	Ongoing Project Integration	$206.56
Carollo Engineers, Inc	Pyle, Richard	Alternative Delivery Evaluation	$290.00
Carollo Engineers, Inc	Reisinger, Dan	Seawall/CSOs	$138.78
Carollo Engineers, Inc	Warriner, Michael	Construction Management	$290.00
CH2M	Alan, Milad	Aerial Mapping	$131.43

Company	Name	Position	Hourly Rate
CH2M	Aldrich, Jeff	Marine Structural and Assessments and Design	$287.98
CH2M	Anderson, Don	Seismic Peer Review	$298.99
CH2M	Anderson, Todd	Multi-Hazard Analysis	$242.10
CH2M	Askeland, Karen	Staff Professional	$148.12
CH2M	Barash, Andrew	Engineering	$254.10
CH2M	Bassetti, Luce	Coastal Modeling/Engineering	$194.67
CH2M	Bell, Brian	Director of Federal Affairs	$182.87
CH2M	Benson, Chris	Transportation Engineering	$271.27
CH2M	Bhalerao, Camille	Seismic Analysis	$190.56
CH2M	Black, Stacey	Table Top Exercise Lead	$266.50
CH2M	Bloomberg, Loren	Transportation	$298.99
CH2M	Burkhart, Michelle	Alternate Delivery	$253.54
CH2M	Chemali, Tony	Construction Management	$298.99
CH2M	Cheung, Philip	Aerial Mapping	$234.40
CH2M	Chiller, Matthew	Federal and State Policy	$298.99
CH2M	Climan, Vania	Project Controls Manager	$185.01
CH2M	Cumming Meyer, Loretta	Socioeconomics/NEPA/CEQA	$281.16
CH2M	Das, Tapash	Climate Change/Sea Level Rise	$208.85
CH2M	Demarco (formerly Coates), Erin	Civil	$197.66
CH2M	Douglas, Ed	GIS Project Professional	$145.58

Company	Name	Position	Hourly Rate
CH2M	Dutkiewicz, Carly	Planner	$87.22
CH2M	Elledge, Lon	QA/QC	$298.99
CH2M	Eller, Mike	Project Engineer	$156.64
CH2M	Ellis, Megan	Professional Technologist	$218.87
CH2M	Englesmith, Jaason	Sustainable Asset Management and Funding	$298.99
CH2M	Fassardi, Claudio	Coastal Modeling/Engineering	$298.99
CH2M	Fuller, Brady	Drainage	$245.06
CH2M	Gist, Forrest	Multi-Hazard Analysis	$298.99
CH2M	Granzow, Edward	Transportation Planning	$298.99
CH2M	Harnish, Laura	Environmental Assessment and Permitting	$298.99
CH2M	Hatchett, Steve	Economic Analysis	$298.99
CH2M	Hayes, Jack	Cost Estimating	$252.29
CH2M	Hesner, Rex	Principal Professional	$279.97
CH2M	Heuston, Leo	Transportation Engineering	$298.99
CH2M	Heyerdahl, Luke	Senior Consultant Professional	$221.90
CH2M	Highstreet, Allan	USACE Feasibility Analysis	$298.99
CH2M	Hill, Tim	Information Solutions Specialist	$298.99
CH2M	Hosking, Adam	Global Resilience Specialist	$207.98
CH2M	Hosley, Lynne	Permitting/Biology	$298.99
CH2M	Hsu, Wilfred	Drainage	$266.20
CH2M	Hulett, Kristen	Building Design	$250.12

Company	Name	Position	Hourly Rate
CH2M	James, Anna	Associate Professional	$191.07
CH2M	Jaworski, Mark	Living Shorelines	$255.48
CH2M	Jeter, Drew	Program Management	$298.99
CH2M	Jones, Stacey	Project Manager	$309.30
CH2M	Kadiyala, Raja	Data Management	$298.99
CH2M	Kapoi, Christina	Other Facility Structures	$142.54
CH2M	Kealy, Mary Jo	Economic Analysis	$288.63
CH2M	King, Patrick	Global Executive Sponsor	$298.99
CH2M	Kingery, Don	Coastal Modeling/Engineering	$234.34
CH2M	Kramer, Jill	Senior Technologist	$211.75
CH2M	Kupp, Amanda Chavez	Unknown	$162.15
CH2M	Lai, Andrew	Underwater Inspection	$195.20
CH2M	Lobedan, Derek	Marine Engineer	$235.01
CH2M	Matichich, Michael	Financing/Funding	$286.10
CH2M	McAmis, Michael Steve	Civil	$184.97
CH2M	McCullough, Nason	Procurement Delivery Specialist	$247.19
CH2M	Melhorn, Les	Delivery Methods	$241.20
CH2M	Mendoza, Juan	Marine Structural and Assessments and Design	$218.58
CH2M	Miranda, Julio	Building Design	$286.66
CH2M	Mogray, John	Underwater Inspection	$172.67

Company	Name	Position	Hourly Rate
CH2M	Munevar, Armin	Climate Change/Sea Level Rise	$298.99
CH2M	O'Hara, Ginny	60-Day Start Up	$298.99
CH2M	O'Neil, Sean	Coastal Modeling	$298.99
CH2M	Onodera, Maki	Marine Structural and Assessments and Design	$266.79
CH2M	Owen, John Brinley	Transportation Planning	$298.99
CH2M	Paparis, Bill	Marine Structures	$298.99
CH2M	Perez Zaragoza, Ramon	Project Manager	$298.99
CH2M	Petersen, Mike	Health and Safety	$197.68
CH2M	Pitzler, Daniel	Decision Process Lead/Facilitator	$285.32
CH2M	Playter, Doug	Principal Marine Structures	$298.99
CH2M	Pontee, Nigel	Living Shorelines	$158.95
CH2M	Reinking (formerly Proctor), Lauren	Transportation Engineering	$166.05
CH2M	Roberts, Kelly	Health and Safety	$269.75
CH2M	Rosidi, Dario	Geology	$298.99
CH2M	Schelpe, Charles	Senior Technical Consultant	$165.42
CH2M	Schmitz, Barbara	Project Controls	$298.99
CH2M	Schulte, Robert	Engineering	$298.99
CH2M	Speaks, Joe	Transportation Planning	$265.41
CH2M	Speicher, Daniel	Decision Process Lead/Facilitator	$297.24
CH2M	Strauder, Gerald	Principal Engineer	$289.99

Company	Name	Position	Hourly Rate
CH2M	Strosnider, Megan	Scheduling	$202.59
CH2M	Tomasino, Giuseppe	Safety Specialist/ Water Engineer 3	$165.61
CH2M	Walia, Natasha	Aerial Mapping	$207.27
CH2M	Winslow, Kyle	Hydrology/Water Quality	$271.27
Civic Edge Consulting	Al-Sharif, Alia		$225.00
Civic Edge Consulting	Dulka, Annie	Project Assistant	$160.50
Civic Edge Consulting	Harris, Zoe		$175.00
Civic Edge Consulting	Kipp, Finley	Graphics Manager	$125.00
Civic Edge Consulting	Lauterborn, Peter	Project Manager	$160.50
Civic Edge Consulting	Project Assistant		$60.00
Civic Edge Consulting	Rockholt, Lily	Project Manager	$150.00
Civic Edge Consulting	Shipley, Amber		$225.00
Civic Edge Consulting	Sunshine, Lisbet	Project Director	$225.16
Civic Edge Consulting	TBD	Project Manager	$150.00
Civic Edge Consulting	TBD	Project Assistant	$60.00
Civic Edge Consulting	Okamoto, Tira	Project Manager	$150.00
Civic Edge Consulting	Dilger, Rosie	Director	$165.50
CMG Landscape Architecture	Cogan, Wesley	Designer	$77.99
CMG Landscape Architecture	Conger, Kevin	Director	$284.01
CMG Landscape Architecture	Conrad, Pamela	Project Landscape Architect	$220.00

Company	Name	Position	Hourly Rate
CMG Landscape Architecture	Designer	Designer	$77.97
CMG Landscape Architecture	Guillard, Chris	Principal Designer	$237.52
CMG Landscape Architecture	Lenahan, Kate	Designer	$77.99
CMG Landscape Architecture	Moss, Willett	Principal Designer	$237.52
CMG Landscape Architecture	Phillips, Jamie	Project Landscape Architect	$247.42
CMG Landscape Architecture	Simon, Cathy	Urban Design and Planning	$284.01
CMG Landscape Architecture	Staff Professional (CMG)	Staff Professional (CMG)	$144.34
CMG Landscape Architecture	Wright, Nico	Designer	$139.18
Davis and Associates Communications Inc.	Davis, Darolyn	Principal	$250.00
Davis and Associates Communications Inc.	Johnson, Ryley	Communications Associate	$150.25
Davis and Associates Communications Inc.	Pepperdine, Mark	Graphic Designer	$172.70
Davis and Associates Communications Inc.	Rooney, Jay	Social Media Manager	$172.70
Davis and Associates Communications Inc.	Wall, Jennifer	Project Manager	$190.00
Exploratorium	Feeney, Allyson	Project Lead	$78.53
Exploratorium	Lani, Shawn	Director of Studio for Public Space	$112.96
Exploratorium	Schwartzenberg, Susan	Director of Environment	$126.83

Company	Name	Position	Hourly Rate
Fugro	Braud, Dillon	Senior Staff Engineer	$124.96
Fugro	Celinder, Kyle	Lead Geophysicist	$114.92
Fugro	Dean, Cornelia	Site Exploration and Characterization	$185.27
Fugro	Fernandez, Alfredo	Seismic Hazard Assessment	$176.33
Fugro	Herlache, Andy	Geotechnical Retrofit Solutions	$298.99
Fugro	Laverty, Paul	Regional Service Line Manager	$161.49
Fugro	Mouton, Matt	Project Manager (Office)	$117.22
Fugro	Mouton, Matt	Project Manager Field Prevailing Wages	$153.80
Fugro	Mouton, Matt	Project Manager Field Prevailing Wages (Instrumentman)	$152.18
Fugro	Mouton, Matt	Project Manager Field Prevailing Wages (Instrumentman)	$211.88
Fugro	Mouton, Matt	Project Manager Field Prevailing Wages (Instrumentman)	$282.51
Fugro	Pratt, Cynthia	Operations Manager	$145.09
Fugro	Project Professional (Fugro)	Project Professional (Fugro)	$145.82
Fugro	Senior Professional (Fugro)	Senior Professional (Fugro)	$218.74
Fugro	Sowers, Janet	Principal Geologist	$225.17
Fugro	Staff Professional (Fugro)	Staff Professional (Fugro)	$127.60
Fugro	Suarez, Gilbert	Chief Hydrographer (office)	$158.31
Fugro	Suarez, Gilbert	Chief Hydrographer (office)	$186.57

Company	Name	Position	Hourly Rate
Fugro	Suarez, Gilbert	Chief Hydrographer (Chief of Party) (Field Prevailing Wage)	$187.47
Fugro	Suarez, Gilbert	Chief Hydrographer (Chief of Party) Overtime	$228.27
Fugro	Suarez, Gilbert	Chief Hydrographer (Chief of Party) Weekend	$304.37
Fugro	Tardif, Annik	Deliverables Coordinator	$125.46
Fugro	Tovar, Herb	Project Manager (Office)	$117.22
Fugro	Tovar, Herb	Project Manager Prevailing Wage	$153.80
Fugro	Tovar, Herb	Project Manager Field Prevailing Wage (Instrument)	$152.18
Fugro	Tovar, Herb	Project Manager Field Prevailing Wage Overtime (Instrument)	$211.88
Fugro	Tovar, Herb	Project Manager Field Prevailing Wage Weekend (Instrument)	$282.51
Fugro	Travasarou, Thaleia	Lead Geotechnical Engineer	$298.99
Fugro	Ugalde, Jose	Earthquake Vulnerability Assessment	$174.33
Fugro	Van Hoff, Deron	Principal Engineer	$280.51
Fugro	Wood, Ray	Site Exploration and Characterization	$298.99
GEHL Architects	Bela, John	Public Life Research & Community Engagement	$290.00
GEHL Architects	Jeanty, Aja	Urban Designer	$164.99
GEHL Architects	Merker, Blaine	Public Life Research & Community Engagement	$290.00
Geotechnical Consultants Inc	Agnew, Dustin	Staff Engineer	$138.73

Company	Name	Position	Hourly Rate
Geotechnical Consultants Inc	Bray, Jonathan	Seismic Peer Review Members At-Large	$298.99
Geotechnical Consultants Inc	Khatri, Kavin	Staff Engineer	$120.92
Geotechnical Consultants Inc	Neelakantan, Neel	Principal/Geotechnical Engineer	$265.24
Geotechnical Consultants Inc	Patterson, Aurie	Senior Geologist	$139.96
Geotechnical Consultants Inc	Peterson, Mark	Senior Engineer	$265.24
Geotechnical Consultants Inc	Sastry Jayavani	Project Assistant	$112.74
Geotechnical Consultants Inc	Seibold, Joe	Senior Geotechnical Engineer	$198.36
Geotechnical Consultants Inc	Thurber, James	Lead Geologist	$213.50
Geotechnical Consultants Inc	Vahdani, Shahriar	Seismic Specialist	$278.37
Hollins Consulting Inc	Cooper, Derrick	Utility/Interagency Coordination	$179.68
Hollins Consulting Inc	Futnani, Kali	Utility/Interagency Coordination	$143.50
Hollins Consulting Inc	Hollins, Guy	Utility/Interagency Coordination	$228.35
Hollins Consulting Inc	McCrimmon, Catherine	Utility/Interagency Coordination	$155.98
Hollins Consulting Inc	Musugu, Anish	Scheduler	$149.97
Hollins Consulting Inc	Mitchell, Mark	Senior Scheduler/Project Controls	$205.95
HR&A Advisors, Inc.	Barthakur, Amitabh	Partner in Charge	$290.00
HR&A Advisors, Inc.	Jang, Brittany	Analyst	$165.00

Company	Name	Position	Hourly Rate
HR&A Advisors, Inc.	Moss, Olivia	Project Manager	$290.00
HR&A Advisors, Inc.	Project Professional (HR&A)	Project Professional (HR&A)	$145.00
HR&A Advisors, Inc.	Sand, Pamela	Director	$275.00
HR&A Advisors, Inc.	Silvern, Paul	Senior Advisor	$290.00
HR&A Advisors, Inc.	Torres Springer, Jamie	Senior Advisor	$290.00
ICF Jones & Stokes, Inc.	Andersen, Jennifer	Senior Environmental Planner	$118.70
ICF Jones & Stokes, Inc.	AQ / Noise Analyst (ICF)	AQ / Noise Analyst (ICF)	$99.62
ICF Jones & Stokes, Inc.	Archaeologist (ICF)	Archaeologist (ICF)	$101.42
ICF Jones & Stokes, Inc.	Ban, Jennifer	Aesthetics	$151.51
ICF Jones & Stokes, Inc.	Beckstrom, Chad	Port Environ Compliance Sr. Advisor	$263.74
ICF Jones & Stokes, Inc.	Boyce, Gretchen	Archeology/History	$200.00
ICF Jones & Stokes, Inc.	Buehler, Dave	Noise	$244.72
ICF Jones & Stokes, Inc.	Cascella, Melissa	Archeology	$200.00
ICF Jones & Stokes, Inc.	Chapman, Kirsten	Senior Environmental Planner	$146.08
ICF Jones & Stokes, Inc.	Clendenin, Gary	Geo and Hazmat	$197.74
ICF Jones & Stokes, Inc.	Document Production (ICF)	Document Production (ICF)	$137.99
ICF Jones & Stokes, Inc.	Efner, Erin	CEQA Task Lead	$217.98
ICF Jones & Stokes, Inc.	Elder, James (Tait)	Archeology	$143.80
ICF Jones & Stokes, Inc.	Elliott, Chris	Corps Environ Compliance Sr. Advisor	$272.25

Company	Name	Position	Hourly Rate
ICF Jones & Stokes, Inc.	Envtl Planner (ICF)	Envtl Planner (ICF)	$148.71
ICF Jones & Stokes, Inc.	Foley, Elizabeth	Noise	$150.00
ICF Jones & Stokes, Inc.	GIS Analyst (ICF)	GIS Analyst (ICF)	$117.92
ICF Jones & Stokes, Inc.	Hatcher, Shannon	Air Quality/GHG	$192.17
ICF Jones & Stokes, Inc.	Historian (ICF)	Historian (ICF)	$128.64
ICF Jones & Stokes, Inc.	Huber, Anne	Hydrology/Water Quality	$142.64
ICF Jones & Stokes, Inc.	Lassell, Susan	Cultural (built) Resources	$215.64
ICF Jones & Stokes, Inc.	Mathias, John	Editor/Pub Spec	$115.00
ICF Jones & Stokes, Inc.	Matsui, Cory	AQ	$99.61
ICF Jones & Stokes, Inc.	Messick, Tim	Graphics	$137.84
ICF Jones & Stokes, Inc.	Mitchell, Bill	Bio	$214.28
ICF Jones & Stokes, Inc.	Parker, William (Bill)	GIS	$117.93
ICF Jones & Stokes, Inc.	Permitting Support (ICF)	Permitting Support (ICF)	$115.32
ICF Jones & Stokes, Inc.	Roberts, Diana	Paleontology	$120.86
ICF Jones & Stokes, Inc.	Rusch, Jon	Archeology/History	$160.00
ICF Jones & Stokes, Inc.	Senior Advisor (ICF)	Senior Advisor (ICF)	$263.73
ICF Jones & Stokes, Inc.	Senior Noise Analyst (ICF)	Senior Noise Analyst (ICF)	$244.97
ICF Jones & Stokes, Inc.	Senior Technical Specialist (ICF)	Senior Technical Specialist (ICF)	$203.87
ICF Jones & Stokes, Inc.	Stock, Jen	Aesthetics/Visual Quality	$151.51
ICF Jones & Stokes, Inc.	Tavel, January	Arch. History	$143.47

Company	Name	Position	Hourly Rate
ICF Jones & Stokes, Inc.	Trisal, Shilpa	Enviro. Justice/Socioeconomic	$183.63
ICF Jones & Stokes, Inc.	Vurlumis, Caroline	Envtl Planner	$125.00
ICF Jones & Stokes, Inc.	Walter, Rich	Lead Environmental Engineer	$263.33
ICF Jones & Stokes, Inc.	Wong, Ter	AQ	$200.00
ICF Jones & Stokes, Inc.	Yoon, Laura	AQ	$175.00
ICF Jones & Stokes, Inc.	Yuk, Oiwa	Archeology/History	$115.00
InterEthnica, Inc.	Abboud, Lisa	President	$187.94
InterEthnica, Inc.	Abboud, Mona	Cultural Anthropologist	$133.65
InterEthnica, Inc.	Castanon, Elena	Spanish Outreach Lead	$133.65
InterEthnica, Inc.	de Mesa, Carla	Senior Project Manager	$125.28
InterEthnica, Inc.	Deborah, Oh	Account Manager	$153.14
InterEthnica, Inc.	Puerta, Ayali	Spanish Linguist	$173.75
InterEthnica, Inc.	TBD	Miscellaneous Bilingual Outreach Staff	$81.02
InterEthnica, Inc.	Wong, Monica	Chinese Linguist	$173.75
InterEthnica, Inc.	Yu, Mandy	Chinese Outreach Lead	$97.43
Kearns & West	Associate (Kearns & West)	Associate (Kearns & West)	$113.00
Kearns & West	Cross, Ellen	Vice President	$270.00
Kearns & West	De Cuir, Nora	Director	$171.60
Kearns & West	Gettleman, Ben	Senior Director	$187.51
Kearns & West	Poncelete, Eric	Principal	$270.00

Company	Name	Position	Hourly Rate
Kearns & West	Project Coordinator (Kearns & West)	Project Coordinator (Kearns & West)	$97.69
Kearns & West	Rugani, Kelsey	Senior Associate	$112.51
Keyster Marston	Kern, Debbie	Economic & Fiscal Analysis	$252.64
Lower Case Productions	Graphic Designer		$110.00
Lower Case Productions	Katsikas, Sarah	Senior Designer	$110.00
Lower Case Productions	Pechacek, Jennifer	Project Manager	$110.00
Lower Case Productions	Reider, Dan	Senior Designer	$110.00
Lower Case Productions	Schellinger, David	Creative Director	$115.00
Merriwether & Williams Insurance Services	Merriwether, Ingrid	Project Executive	$275.00
Merriwether & Williams Insurance Services	Reagan, Bernida	Project Manager	$225.00
Merriwether & Williams Insurance Services	Singharath, Judy	Project Administrator	$150.00
MGE Engineering	Salmon, Mark	Seismic Peer Review Panel	$278.00
Moffat and Nichol	English, Daryl	Seismic Peer Review Members At-Large	$278.00
RDJ Enterprises LLC	Badgett, Herman	Local Business Liaison	$108.42
RDJ Enterprises LLC	Dilger, Rosemary	Public Relations	$90.44
RDJ Enterprises LLC	Fontenot, Jessica	Community Based Organization Lead	$90.44
RDJ Enterprises LLC	Higgenbothan, Christpher	Meeting Facilitation Community Engagement	$74.97
RDJ Enterprises LLC	Hopkins, Vivian Ann	Meeting Facilitation Community Engagement	$108.42

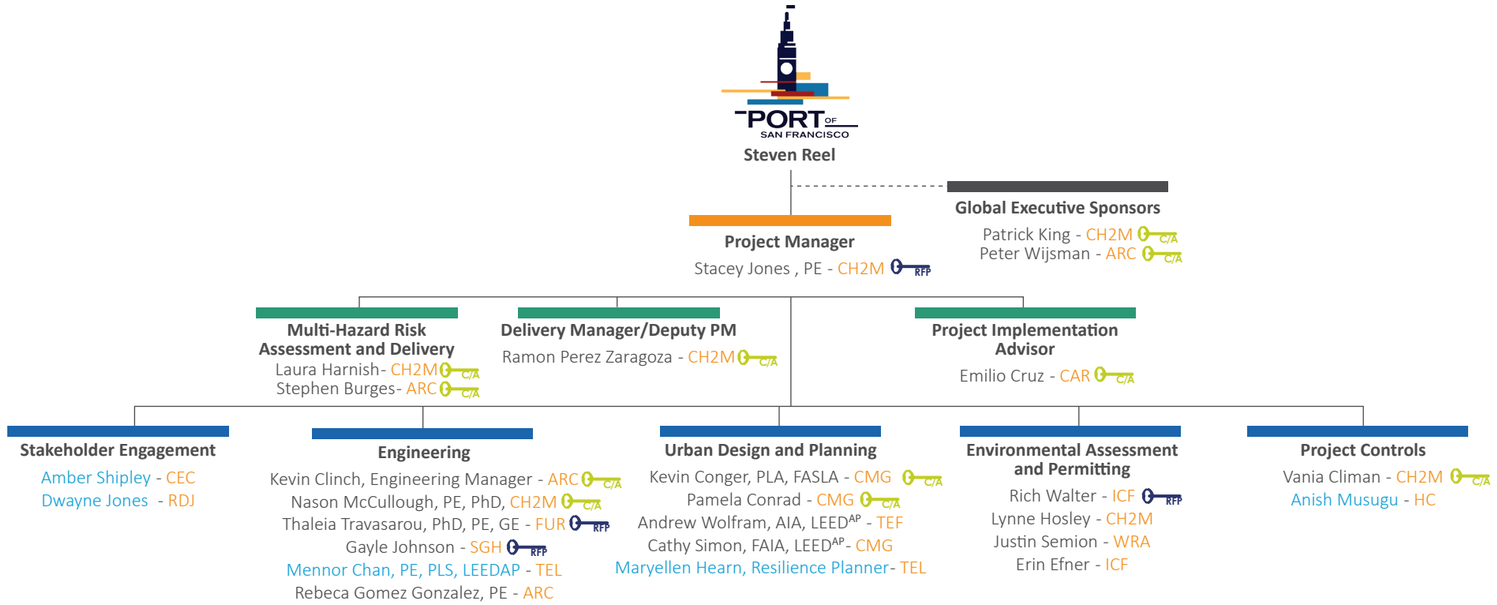
Company	Name	Position	Hourly Rate
RDJ Enterprises LLC	Jones, Rudolph Dwayne	LBE Coordination	$154.12
RDJ Enterprises LLC	Patton, Ellouise	Project Manager	$90.44
RDJ Enterprises LLC	Sandoval, Christina	Public Housing Lead	$74.97
RDJ Enterprises LLC	Seals, Taula	Faith Based Liaison	$90.44
RDJ Enterprises LLC	Outreach Team	Outreach Team	$75.00
Saylor Consulting Group	Ritchie, Ed	Senior Infrastructure Estimator	$222.87
Saylor Consulting Group	Saylor, Brad	Principal Estimator	$222.87
Sedway Consulting Inc	Herman, Amy	Sr Project Manager	$280.00
Sedway Consulting Inc	Sedway, Lynn	Principal	$290.00
Sedway Consulting Inc	Smitheram, Mary	Sr Project Manager	$280.00
Sedway Consulting Inc	Stockton, Steve	Principal Consultant	$200.00
Silvestrum Climate Associates LLC	Mak, Michael	Senior Associate	$140.00
Silvestrum Climate Associates LLC	May, Kris	Principal	$180.00
Silvestrum Climate Associates LLC	Mohan, Abigal	GIS Technician	$95.00
Simpson, Gumpertz & Heger	Cortes, Samuel	Structural Engineer	$118.91
Simpson, Gumpertz & Heger	Galbraith, Julie	Structural Engineer	$186.85
Simpson, Gumpertz & Heger	Naeem, Muhammad	Structural Engineer	$156.28
Simpson, Gumpertz & Heger	Phan, Brian	Structural Engineer	$124.00

Company	Name	Position	Hourly Rate
Simpson, Gumpertz & Heger	Pyun, Justin	Structural Engineer	$140.99
Simpson, Gumpertz & Heger	Hardy, Steve	Structural Engineer	$247.14
Simpson, Gumpertz & Heger	Argo, Maximo	Staff 1	$118.91
Simpson, Gumpertz & Heger	Bruin, William M.	Structural Engineer	$298.99
Simpson, Gumpertz & Heger	Iversen, Rune	Marine Engineer	$224.22
Simpson, Gumpertz & Heger	Johnson, Gayle	Structural Engineer	$298.99
Simpson, Gumpertz & Heger	Lewis, Aaron	Structural Engineer	$298.88
Simpson, Gumpertz & Heger	Moore, Kevin S.	Structural Engineer	$298.99
SiteLab Urban Studio	Anand, Guneet	Senior Designer	$175.00
SiteLab Urban Studio	Budnyk, Anastasiia	Intermediate Designer II	$115.00
SiteLab Urban Studio	Cheng, Mu-Ping	Intermediate Designer I	$125.00
SiteLab Urban Studio	Conceicao, Nadia	Senior Designer	$175.00
SiteLab Urban Studio	Crescimano, Laura	Founding Principal	$300.00
SiteLab Urban Studio	Garcia, Alyssa	Intermediate Designer I	$125.00
SiteLab Urban Studio	Price Patel, Amit	Principal	$300.00
SiteLab Urban Studio	St. Pierre, Michel	Principal	$300.00
SiteLab Urban Studio	Wagy, Nicole	Intermediate Designer II	$115.00
Square One Productions	Carroll, Nichola	Production Artist	$121.34

Company	Name	Position	Hourly Rate
Square One Productions	Lin, Angela	Project Manager	$174.09
Streetwyz/ISEEED	Akom, Antwi	Principal	$300.00
Streetwyz/ISEEED	Cruz, Tessa	Project Manager	$125.00
Streetwyz/ISEEED	Mathias, Brenda	Community Trainer	$100.00
Streetwyz/ISEEED	Shah, Aekta	Project Director	$175.00
Structus Inc	Chang, Fu-Lien (Henry)	Project Manager	$290.00
Structus Inc	Chappell, Don	QA/QC Manager	$227.24
Structus Inc	Seligson, Hope	Structural Engineer	$210.01
Structus Inc	Surjana, Burhan	Project Engineer	$140.95
Structus Inc	Yu, Peter	Structural EOR	$256.01
T.D. O'Rourke	O'Rourke, T.D.	Geotechnical Consultant	$300.00
TEF Design	Cooper, Paul	Project Manager	$231.00
TEF Design	Rose, Samantha	Project Designer	$161.70
TEF Design	Rostami, Maryam	Project Designer	$161.70
TEF Design	Tom, Douglas	Managing Principal	$290.00
TEF Design	Verzhbinsky, Alyosha	Consulting Principal	$290.00
TEF Design	Vithalani, Viral	Project Architect	$176.22
TEF Design	Wolfram, Andrew	Project Principal/Design Principal	$290.00
Telamon Engineering	Chan, Mennor	Project Manager	$266.76
Telamon Engineering	Chan, Stephen	Contract Support	$125.54
Telamon Engineering	Decosta, Paul	Party Chief - Field	$141.70

Company	Name	Position	Hourly Rate
Telamon Engineering	Graves, Simmie	CAD Manager	$172.61
Telamon Engineering	Hearn, Maryellen	Resilience Planning Professional	$156.01
Telamon Engineering	Kwok, Wayne	Project Coordinator	$60.05
Telamon Engineering	Lei, Alvin	Engineer 2	$120.70
Telamon Engineering	LyLy Lam	Civil Engineer 1	$94.15
Telamon Engineering	Mak, Toni	Project Coordinator	$84.74
Telamon Engineering	Martinez, Georgina	Engineer II	$136.40
Telamon Engineering	Munoz, Amador	Field Survey Crew	$116.31
Telamon Engineering	Nguyen, Khang	CAD Tech	$100.43
Telamon Engineering	Rodriguez, Ray	Utility Locator	$94.15
Telamon Engineering	Salinas, Veronica	Field Survey Crew	$126.01
Telamon Engineering	Tran, Joe	CAD Tech	$94.15
Telamon Engineering	Woods, Earl	Survey Manager	$188.30
Telamon Engineering	Zuuring, Doug	Senior Engineer	$164.77
The Allen Group	Abrams, Leamon	Project Analyst/Manager	$275.00
The Allen Group	Vasquez, Christopher	Project Administration	$142.00
The Allen Group	Walker, Laurie	Technical Specialist	$221.00
The Allen Group	Wiecha, Elizabeth	Technical Specialist	$290.00
WRA, Inc	Bello, Nate	Mitigation Specialist	$198.15
WRA, Inc	Chase, Daniel	Fisheries Biologist	$140.19
WRA, Inc	Kalnins, Mark	Regulatory Permitting Specialist	$140.19

Company	Name	Position	Hourly Rate
WRA, Inc	Knecht, Ellie	Regulatory Permitting Specialist - BCDC	$107.44
WRA, Inc	Lazarotti, Leslie	Regulatory Permitting Specialist	$198.15
WRA, Inc	Salvaggio, George	Landscape Architect	$216.07
WRA, Inc	Semion, Justin	Aquatic Biologist/Permitting	$207.02



INTERGRATING SERVICES

Health, Safety, and Environment
Mike Peterson- H&S Officer
Kelly Roberts, CSP, OHST- CH2M

Sustainable Asset Mangement and Funding
Jaason Englesmith - CH2M

Financing/Funding
Michael Matichich - CH2M
Carly Foster, CFM, AICP- ARC

Data Management
Raja Kadiyala, PhD - CH2M

60-Day Start Up
Ginny O'Hara - CH2M

QA/QC
Lon Elledge, PE - CH2M

Stakeholder Engagement/Communications
Noelle Bonner- BON
CopyMat
Alison Feeney- EXP
Lisa Abboud- INE

Workforce Development/LBE Support Servcies
Darolyn Davis- DAV
Leamon Abrams- TAG

21% LBE

Coastal Modeling/ Engineering
Joseph Marrone, PE- ARC
Luce Bassetti, PhD, PE - CH2M ●
Kyle Winslow,PhD, PE- CH2M
Don Kingery, PE - CH2M
Claudio Fassardi - CH2M
Charles Shelpe - CH2M
Gerry Strauder - CH2M

Marine Structural and Assessments and Design
Maki Onodera, PE- CH2M ●
Juan Mendoza, PE- CH2M
Jeff Aldrich, PE, SE- CH2M
William Bruin, PE- SGH
Julie Galbraith- SGH
Gayle Johnson, PE- SGH

Flood/Coastal Resiliency Planning
Edgar Westerhof - ARC

Site Exploration and Characterization
Ray Wood - FUR
Cornelia Dean, RG, CEG - FUR

Seismic Analysis
Jennifer Elmwood, PE, SE- CH2M
Camille Bhalerao, PE- CH2M

Seismic Hazard Assessment
J. Alfredo Fernandez, PhD, PE - FUR
Hope Seligson- STR

Living Shorelines
Nigel Pontee - CH2M
Mark Jaworski - CH2M

Geotechnical Earthquake Vulnerability
Wey-Yu Chen, PhD, PE, GE- FUR
José Ugalde, PE- FUR
Dario Rosidi, PhD, PE, GE - CH2M
Larry Roth, PE, GE - ARC
Deron van Hoff, PE, GE- FUG

Multi-Hazard Analysis
Forrest Gist, PE, CPP- CH2M ●
Todd Anderson , PE- CH2M
Rex Hesner- CH2M

Building HAZUS
Ron Hamburger, PE, GE- SGH

Other Facility Structures
Christina Kapoi, ENV SP - CH2M

Geotechnical Retrofits
Andy Herlache, PE, GE- CH2M
Bahram Kamenehpour, PhD, GE- AGS

Building Design
Kristen Hulett, PE, SE- CH2M
Julio Miranda, PE, SE- CH2M
Henry Chang, SE- STR

Stormwater and Coastal Drainage
Brady Fuller, PE- CH2M
Paul Tschirky, PhD, PEng- ARC
Wilfred Hsu, PE- CH2M

Resiliency Flood Hazard Analysis
John Atkinson, PhD- ARC

Resiliency Planner
Summer Bundy- CAR
Lisa May- SIL

Civil
John Staphorsius- ARC
Steve McAmis, PE- CH2M
Erin Coates, PE- CH2M
Shailee Sztern, PE- CH2M ●
Wayne Welch, PE- ARC ●
David Fulks, PE- ARC
Ryan Stoddard, PE- ARC ●

Constructability
Lon Elledge, PE- CH2M

Value Engineering
Paul Johnson, CVS- CH2M

Emergency Response and Recovery
Josh J. Gravenmier- ARC

USACE Feasibility Analysis
Walter Baumy, PE- ARC ●
Allan Highstreet, PMP- CH2M
Stu Appelbaum- ARC

Alternate Delivery
Michelle Burkhardt, PE- CH2M ●

Cost Estimating
Jack Hayes- CH2M
Edward Ritchie- SC
Brad Saylor- SC

Transportation Planning
Joe Speaks- CH2M
Brin Owen- CH2M
Loren Bloomberg, PE- CH2M
Edward Granzow- CH2M

Transportation Engineering
Lauren Proctor, PE- CH2M
Christopher Benson, PE- CH2M
Leonard Heuston, PE- CH2M

Urban Planning/ Financal Analysis
Willett Moss, PLA, FAAR- CMG
Olivia Moss- HRA
Blaine Merker- HRA
Nico Wright- CMG
Lynn Sedway- SCI
Debbie Kern- KMA
Antwi Akom - SW
Aekta Shah - SW
Laura Crescimano- SIT

Architecture
Alyosha Verzhbisky, FAIS- TEF
Paul Cooper, AIA, LEED AP- TEF

Sustainable Buildings
Maryam Rostami, LEED AP- TEF

Historic Structures
Samantha Rose- TEF

Youth Management
Villy Wang- BAY

NEPA/CEQA
Jasmin Mejia- CH2M
Chad Beckstrom- ICF
Loretta Meyer, AICP- CH2M

Aesthetics
Angela Lin- SQ1

Biology
Justin Semion- WRA
Lynne Hosley- CH2M

Biological Mitigations
Nathan Bello- WRA

Fisheries Biologist
Daniel Chase- WRA

Geology
Dario Rosidi, PhD, PE, GE- CH2M

Geology/Hydrology
Gary Glendenin, PG- ICF

Economic Analysis
Steve Hatchett, PhD- CH2M

Air Quality/Noise
Shannon Hatcher- ICF

Climate Change/Sea Level Rise
Armin Munévar, PE- CH2M
Tapash Das, PhD- CH2M
Sarah Deslauriers, PE- CAR

Hydrology/Water Quality
Kyle Winslow, PhD, PE – CH2M

Recreation
Jessica Veramontes- ICF

Socioeconomics
Shilpa Trisal- ICF
Loretta Meyer, AICP- CH2M

Cultural Resources
Susan Lassell- ICF
J. Tait Elder, RPA- ICF

Permitting
Mark Kalnins- WRA
Lynne Hosley- CH2M

BCDC
Ellie Knecht- WRA

USFWS
Jason Vakich- WRA

NOAA
Dan Chase- WRA

Corps of Engineers (404)
Mark Kalnins- WRA

RWQCB
Leslie Lazarotti- WRA

SHPO
Susan Lassell- ICF

Economics Analysis
Mary Jo Kealy- CH2M
Rich Margino- ARC
Kelli Reddick- Arcadis

Underwater Inspection
John Mogray, PE- CH2M
George Dinos, PE- CH2M
Andrew Lai- CH2M

SEISMIC PEER REVIEW

Nason McCullough, PhD, PE- CH2M
Don Anderson, PhD, PE- CH2M
Shahriar Vahdani, PhD, PE- GTC
Stephen E. Dickenson, PhD, PE, DPE- NA
Jonathan Bray, PhD- GTC/UC Berkeley
Daryl English, PE, SE - MOF
Tom O'Rourke- TO
Mark Salmon, SE- MGE

GLOBAL EXPERTS

Waterfront Planning Andrew Barash, PE - CH2M ●

Ferry Facilities
Doug Playter, PE - CH2M ●

Marine Structures
Bill Paparis, PE - CH2M ●

Coastal Modeling
Sean O'Neil, PhD, PE- CH2M ●

Principal Architect
Douglas Tom, FAIA- TEF

USACE Civil Works
Steve Stockton- CH2M
Charles Schelpe, CH2M ●

Program Management Drew Jeter- CH2M

Coastal Resiliency
Piet Dircke- ARC

Seismic Lifelines
Craig Davis- CD

Resilience Planning Adam Hosking- CH2M

Legend
FIRMS AND LBE'S

CH2M	CH2M
AGS	AGS *(LBE)*
TAG	The Allen Group
ARC	Arcadis
BON	Bonner Communications *(LBE)*
CAR	Carollo
CHS	CHS Consulting *(LBE)*
CEC	Civic Edge Consulting *(LBE)*
CMG	CMG
COP	Copymat *(LBE)*
CD	Craig Davis
DAV	Davis & Associates Consulting *(LBE)*
EXP	Exploratorium
FUG	Fugro
GEH	Gehl
GTC	GTC *(LBE)*
HC	Hollins Consulting *(LBE)*
HRA	HR&A
ICF	ICF
INE	InterEthnica *(LBE)*
K&W	Kearns & West
KMA	Keyser Martson Associates
MGE	MGE Engineering
MOF	Moffat Nichol
NA	New Albion Geotechnical
RDJ	RDJ Enterprises
SC	Saylor Consulting *(LBE)*
SCI	Sedway Consulting Inc. *(LBE)*
SGH	SGH
SIL	Silvestrum
SIT	SiteLab *(LBE)*
SQ1	SquareOne *(LBE)*
SW	StreetWyze
STR	Structus *(LBE)*
TEF	TEF
TEL	Telamon *(LBE)*
TO	Tom O'Rourke
WRA	WRA

(LBE) *LBE Firms noted in key*
RFP *Key /Lead Team Member per the RFP*
C/A *Key /Lead Team Member identified by the CH2M/Arcadis Team*
● *Non CA PE*

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