

Exhibit A

Scope of Work

Planning and Engineering Services for the Master Plan for Resiliency and Recovery of King County's Regional Wastewater Treatment Facilities

Contract No. E00425E16

INTRODUCTION

The purpose of this contract is to provide services to assist King County in developing a comprehensive strategy for preparing the County Wastewater Treatment Division's (WTD) conveyance and treatment facilities for the impacts of a major earthquake. The intent of this project is to identify vulnerabilities in WTD's collection and treatment systems from earthquake related damage and to identify mitigation actions that can be taken before and after an earthquake to reduce impacts on the system. The project will develop remediation and resilience strategies for the benefit of ratepayers, system partners, employees, and residents.

PROJECT BACKGROUND

King County protects water quality and public health in the central Puget Sound region by providing high quality and effective treatment to wastewater collected from local sewer agencies. WTD serves about 1.5 million people within a 415-square-mile service area, which includes most urban areas of King County and parts of south Snohomish County and northeast Pierce County.

King County's wastewater system includes the following assets.

1. Three large regional wastewater treatment plants (the West Point Plant in the City of Seattle, the South Plant in the City of Renton, and the Brightwater Plant near Woodinville)
2. Two small wastewater treatment plants (one on Vashon Island and one in the City of Carnation)
3. One community septic system (Beulah Park and Cove on Vashon Island)
4. Four combined sewer overflow (CSO) treatment facilities (Alki, Carkeek, Mercer/Elliott West, and Henderson/Norfolk – all in the City of Seattle)
5. Over 391 miles of sewer pipelines
6. 25 regulator stations
7. 47 pump stations
8. 38 CSO outfalls
9. A regional SCADA system, providing regional and local control of facilities

On September 11, 2013 King County Executive Dow Constantine launched the "Resilient King County" initiative – a County-wide planning process for crafting a comprehensive long-term strategy for recovery following a major earthquake or other catastrophe.

The Resilient King County initiative seeks to establish a framework to assist individuals, families, businesses, and government to recover the community in a manner that sustains our physical, emotional, social, and economic well-being. This vision shall balance the need for rapid recovery with the deliberativeness required to meet the vision and value of our communities.

The Executive's initiative is based upon the recognition that WTD, as well as other agencies within King County, fulfills responsibilities to County residents to protect their health and safety during and after a disaster event. This project is to realistically assess WTD's ability to survive and respond to disasters in a way that maintains, to the extent possible, its primary goal of protecting the public from the negative impacts of uncontained and untreated wastewater.

The benefits to be realized from implementation of the resiliency plan shall include the following.

1. Minimization of injury or loss of life among WTD staff during an earthquake and in the response and recovery phases by improving the resilience of WTD facilities.
2. Minimization of public health risks following a disaster by improvement in facility resilience and more rapid resumption of conveyance and treatment operations.
3. Reduction in the expected cost of recovery by, where possible, mitigating identified weaknesses in the system to prevent damage before an earthquake occurs.
4. Improved ability to accomplish post-earthquake rebuilding and to expeditiously restore the system through consideration of long term survivability and resiliency of WTD facilities.

SCOPE OF WORK

CONTRACT OBJECTIVE

The scope of this contract is to develop a "Master Plan for Resiliency and Recovery of King County's Regional Wastewater Treatment Facilities". The plan shall identify and prioritize the vulnerability of WTD's facilities to damage or failure following a major earthquake and identify retrofits that may improve the reliability and continued operation of those facilities. The plan shall also identify strategies for recovering from facility damage following a major earthquake. Once the assessment is completed, the results may be used to apply for Hazard Grant Mitigation Program funding.

SCOPE ASSUMPTIONS

1. The project shall focus on three scenarios presenting the highest risk to the County: earthquakes on the 1) Cascadia Subduction Fault, 2) Seattle Fault, and 3) the South Whidbey Island Fault (SWIF). Published scenarios shall be used relying on ground motion scenarios that have been developed by the U.S. Geological Survey (USGS) for peak ground acceleration (for liquefaction analysis).
2. The County will identify and secure meeting locations, telephone conference lines, and audio-visual equipment (as necessary) for meetings to be held at King County facilities.
3. The County will identify and invite County staff and other stakeholders (as needed) to participate in project meetings that include the County.
4. The County will lead and execute Geographical Information System (GIS) work in support of this project, except as noted for specific Task 200 and Task 600 activities.

5. The County will provide a SharePoint site, consultant access, and instructions for the posting of Project documents for County/Consultant collaboration within two weeks of issuing Notice to Proceed.

DELIVERABLES STANDARDS

The Consultant shall meet the following deliverables standards for Draft and Final submittals to the County, unless otherwise specified in a particular task in this scope.

1. Consultant documents labeled and watermarked as "DRAFT" until finalized in agreement with the County.
2. One unbound printed copy (for plans, reports, technical memoranda, design documents).
3. One digital copy in searchable PDF format on media such as DVD, portable storage device, email, e-room, or other electronic media as approved by the County's Project Representative (PR).
4. One copy in native file format on media such as DVD, portable storage device, email, e-room, or other electronic media as approved by the PR.
5. Maps and other similar printed documents shall be 11"x17" or larger.
6. Digital copies of maps and similar documents shall be in AutoCAD® as well as searchable PDF; PDF files shall have the capability to print as high quality 11"x17" or D-size (22"x34") sheets.

COUNTY REVIEW PROCESS

Where Draft and Final submittals are defined in the scope, the County will review the submittals and transmit 1 set of consolidated review comments via email to the Consultant using WTD's standard comment tracking form or using track changes for review of report and technical memoranda. County comments will be submitted to the Consultant within 15 business days of receipt of the submittal unless specified otherwise within a particular task in this scope. The Consultant shall use the form to provide a written response to the County for each comment within 15 business days of receipt of the comments, unless specified otherwise with a particular task in this scope. Comment responses shall describe how the comment shall be addressed. The Consultant shall identify comments resulting in changes that impact schedule and scope. Response to comments impacting scope or schedule shall be reviewed with the WTD project team to reach consensus on resolution. The Consultant shall submit the adjudicated responses which confirm comments were incorporated with the Final deliverable.

TASK 100 - PROJECT MANAGEMENT

The purpose of this task is to provide services for the management, administration, and coordination of Consultant and subconsultant activities in accordance with the Project Management Institute's standards and WTD's project management system.

The Consultant shall provide the following services:

1. Subtask 100.01 – Project Management Plan

Prepare Draft and Final Project Management Plan (PMP), including instructions and details pertaining to the following Project Management elements. Draft shall be submitted to the County within 15 days of Notice to Proceed.

- a Work Breakdown Structure (WBS)
- b Responsibility Assignment Matrix (RAM)
- c Communication Plan
- d Quality Management Plan
- e Health and Safety Plan (including preliminary Field Safety Plan). HDR Field Safety Plan (FSP) shall include County-specific requirements and guidance if more stringent than HDR requirements. No field work shall be performed until the FSP has been reviewed and approved by the WTD Safety Office.
- f Project Schedule
- g Risk Register
- h Meeting Agenda
- i Progress Report Template
- j Decisions/Issues Changes Log
- k Action Items Log

2. Subtask 100.02 – Management of Scope, Schedule, Budget, and Progress

Manage the scope, schedule, and budget throughout the life of the contract, including the following.

- a Perform ongoing project management.
- b Prepare monthly project reports, including a description of work accomplished in the previous month, work expected to occur in the next month, and schedule status updates.
- c Perform overall project risk management activities.
- d Prepare Draft and Final Initial Overall Project Schedule, using critical path method, showing key milestones and deliverables. Provide input to County regarding monthly updates, which will be prepared by the County.
- e Prepare Draft and Final Initial detailed Workflow showing meetings and deliverables. Provide input to County regarding monthly updates, which will be prepared by the County.

3. Subtask 100.03 – Check-in Calls with King County

Participate in up to 32, ½-hour duration, bi-weekly project check-in calls with the County to discuss progress and upcoming work. Check-in calls shall occur on the off-weeks of project management meetings and shall include the Consultant's Project Manager. Update the Action/Decisions/Change Log as needed after project check-in calls.

4. Subtask 100.04 – Meetings with King County

Participate in up to 32, 1-hour duration, bi-weekly project management meetings with the County to discuss scope, schedule, methodology, results, budget, and other project issues. Project management meetings shall occur on the off-weeks of check-in meetings and shall be attended by the Consultant's Project Manager and up to 2 Consultant Task Leads as necessary. Prepare meeting agendas for project management meetings, and update the Action/Decisions/Change Log as needed.

DELIVERABLES

1. Project Management Plan (PMP), Draft and Final.
2. Draft and Final Initial Microsoft Project Schedule.
3. Draft and Final Initial detailed Workflow.
4. Monthly Progress Reports.
5. Action/Decisions/Change Log updates.

TASK 200 - FACILITY RESILIENCY REVIEW

The purpose of this task is to review existing information relevant to the seismic design and resiliency of WTD facilities, conduct field and/or additional analysis for the highest risk assets, and develop a prioritized list of capital improvement projects for the County's 20-year planning timeframe.

The Consultant shall provide the following services:

1. Subtask 200.01 - Preliminary Evaluation and Kickoff Meeting
 - a Select three scenarios and acquire ground motion data in GIS format. Scenarios to be considered for selection include the following.
 - i Cascadia Subduction Zone – M9.0
 - ii Seattle Fault M7.1
 - iii South Whidbey Island Fault – limited to northern portion of service area/Brightwater M7.0
 - b Review available geotechnical and flood hazard data provided by the County, including the following.
 - i Liquefaction
 - ii Landslide and permanent ground deformation mapping in GIS format from the following sources.
 - 1) Seattle Public Utilities (SPU)
 - 2) Central Puget Sound Water Suppliers Forum (WSF)
 - 3) King County GIS Group
 - 4) Washington State Department of Natural Resources (DNR)
 - 5) 2016 Regional Water Supply Resiliency Project, Earthquake Vulnerability Assessment Technical Memorandum (concurrent work, as available for use)
 - 6) 2008 Sea Level Rise Evaluation – KC WLRD
 - 7) 2015 Digital Coast Mapping

- c Review the following documentation and seismic assessments.
 - i 2006 – List of KC WTD Facilities and Sewers – prioritized based on consequence of failure/criticality (Ed Cox database, Asset Management Database)
 - ii 1985, Revised 1990 and 1994 – KC WTD Offsite Facilities and Miscellaneous Structures Manual, Volume 1 and Volume 2
 - iii 1987 Seismic Assessment - Kennedy/Jenks
 - iv 1990s WWTP/PS seismic improvements (list of facilities where red-line improvements were suggested, along with implementation status) – Kennedy/Jenks
 - v 1990s West Point Expansion/Upgrade/Seismic Evaluation (list of facilities in the remaining original plant area where red-lined improvements were suggested, along with implementation status)
 - vi 2003 – Conveyance System Seismic Assessment – HDR/ABS
 - vii 2006 – Brightwater Seismic Assessment and Design Criteria
 - viii 2001 – Seismic Assessment of West Point Off-Site Facilities – several reports, TetraTech
 - ix 2010 – Tier 1 Evaluation of WPTP Primary Sedimentation Area Roof Structures - MLA
 - x 2016 – Conveyance System Facility/Pipeline Map in GIS format showing pipe materials
 - xi 2016 – Regional Water Supply Resiliency Project, Earthquake Vulnerability Assessment Technical Memorandum (GIS Maps)
 - xii Individual KC WTD assets (name, picture, site plan, type of facility, date of construction, function) per specific request by Consultant and as available from County
 - xiii System Operational Maps – individual KC WTD system mapping per specific request by Consultant and as available from County
 - xiv King County Equity and Social Justice Plan, 2016 - 2022
- d Provide input and review County-developed preliminary GIS map overlay of the following WTD facilities. The GIS overlay will be combined with the ground motion and hazard maps acquired in Subtask 200.01 (a-c) to create a map showing potential seismic threats for each facility.
 - i Three large regional wastewater treatment plants
 - 1) West Point Treatment Plant in the City of Seattle
 - 2) South Plant in the City of Renton
 - 3) Brightwater Plant near Woodinville
 - ii Two small wastewater treatment plants
 - 1) Vashon Island
 - 2) City of Carnation
 - iii One community septic system
 - 1) Beulah Park and Cove on Vashon Island
 - iv Four combined sewer overflow (CSO) treatment facilities (all located in the City of Seattle)
 - 1) Alki
 - 2) Carkeek
 - 3) Mercer/Elliott West
 - 4) Henderson/Norfolk

- v Over 391 miles of sewer pipelines
 - vi 25 regulator stations
 - vii 47 pump stations
 - viii 38 CSO outfalls
 - ix A regional SCADA system, providing regional and local control of facilities
- e Prepare for and facilitate a 3-hour Project Kickoff Meeting to charter the team, discuss details of the project work plan and approach, and initiate the desktop assessments. The meeting shall be attended by the Consultant Project Manager, the four Task Leads, up to two additional Consultant staff, and County staff. The Kickoff meeting shall include the following topics, with an agenda developed jointly by the Consultant and the County prior to the meeting. Meeting notes shall be prepared by the Consultant.
- i Administrative Overview
 - 1) Draft Project Management Plan (including communications, field safety, and QA/QC)
 - 2) Schedule
 - ii Preliminary discussion of system operation.
 - iii Identification of areas that are already of concern and early prioritization input to help with subsequent work.
2. Subtask 200.02 - Desktop Risk Assessment and Desktop Risk Assessment Review Workshop - With assistance from the County, the Consultant shall identify opportunities to group facility types and identify the most representative sites to minimize desktop and field review efforts. The facility types and components shall be defined as follows.
- a The three large regional WWTPs are subdivided to address five groups of facilities at each WWTP as follows.
 - i Pre-Treatment
 - ii Primary
 - iii Secondary
 - iv Solids Handling
 - v Disinfection/Discharge
 - b Brightwater Treatment Plant seismic information will be reviewed only to verify that no additional seismic assessment is needed related to this Scope of Work. This task does not include desktop or field assessment of the Brightwater Treatment Plant.
 - c The two small WWTPs and the CSO treatment facilities shall be considered as one group per facility.
 - d Commonalities shall be identified within types of facilities for Regulator Stations and Pump Stations to allow site visits of typical facilities.
 - e This task does not include desktop or field assessment of the following administrative buildings: King Street Center, the Jameson Building, and the Arc Weld Building. Consultant shall note the exclusions in deliverables as appropriate.
 - f Develop criteria for Risk Based Prioritization considering the following factors.
 - i Likelihood of occurrence (based on the three scenario return periods)
 - ii Vulnerability (using fragility relationship curves relating ground motion to probability of failure, such as Hazus, FEMA's methodology for estimating potential losses from disasters; and age-based standards such as ASCE 41-13 / Table 4-6, to identify

buildings that do not require further evaluation). Vulnerability rankings shall consider the following factors.

- 1) Date of construction
 - 2) Type of construction
 - 3) Liquefaction susceptibility
 - 4) Foundation type
 - 5) Deficiencies noted in previous KC studies, relayed to the County by KC staff from anecdotal knowledge, or shown in previous field visit photos
- iii Consequence of failure (using information provided by the County that identifies areas with highest concerns related to public health impacts, environmental issues, catastrophic damage to other critical infrastructure caused by a WTD facility or pipeline failure, and equity/social justice considerations).
- g Prioritize Facilities for Further Investigation
- i Using data from Subtask 200.01, prioritize facilities for further evaluation (as described in Subtask 200.02.i) based on the following facility prioritization categories.
 - 1) High Risk: more detailed evaluation required, as well as field inspection. For cost estimating purposes, it is assumed that 30 of 132 facilities will fit this category.
 - 2) Moderate Risk: limited additional evaluation required, no field inspection required. For cost estimating purposes, it is assumed that 40 of 132 facilities will fit this category.
 - 3) Low Risk: no additional evaluation required or field inspection required. For cost estimating purposes, it is assumed that 62 of 132 facilities will fit this category.
- h Prioritize sewer pipelines for further investigation.
- i Using data from Subtask 200.01, evaluation of expected performance for three scenarios in GIS, and American Lifelines Alliance (ALA) methodology, prioritize sewer pipelines for further investigation based on the following facility prioritization categories. No field inspections shall be conducted for the sewer systems.
 - 1) High Risk: more detailed evaluation required; no field inspection. This category will pertain to sewers in liquefiable soils. Assume that 1/3 of the 391 miles of sewer pipelines will fit this category.
 - 2) Moderate Risk: more detailed evaluation required; no field inspection. This category will pertain to sewers in non-liquefiable soils, that may discharge to receiving water and sewers with a high potential for consequential damage, but not public health hazard (e.g., a sewer under a critical transportation facility where sewer failure would not pose a public health hazard, but could impede passage). Assume that 1/3 of the 391 miles of sewer pipelines will fit this category.
 - 3) Low Risk: no additional evaluation required. Assume that 1/3 of the 391 miles of sewer pipelines will fit this category.
 - i Obtain and evaluate additional information required for facilities and pipelines.
 - i Conduct additional engineering evaluation for High and Moderate Risk Facilities; and High and Moderate Risk Pipelines. The desktop investigations shall include the following.
 - 1) Structural – compatible with Rapid Visual Screening (RVS) methodology
 - 2) Geotechnical – investigate foundation/pipe alignment

- ii Site visits for High Risk facilities shall be conducted in Task 200.03.
 - j Prepare summary of desktop risk assessment results, including the following.
 - i Date of construction
 - ii Type of construction
 - iii Foundation type
 - iv Soil liquefaction susceptibility
 - v Deficiencies noted in previous studies, photos, or anecdotal information regarding the facilities, as reviewed by Consultant.
 - k Prepare for and facilitate a 3-hour Desktop Assessment Review Workshop to discuss findings of the desktop assessments and impacts to the project approach. The meeting shall be attended by the Consultant Project Manager, the four Task Leads, up to three additional Consultant staff, and County staff. The Desktop Assessment Review Workshop shall include the following topics, with an agenda developed jointly by the Consultant and the County prior to the meeting. Meeting notes shall be prepared by the Consultant.
 - i Preliminary findings determining which facilities require field investigations.
 - ii County validation of potential risks identified in desktop assessment (based on County institutional knowledge).
 - iii Identification of impacts to the project approach resulting from desktop assessment findings.
3. Subtask 200.03 – Field Inspections for High Risk Facilities
- a Finalize Field Safety Plan and obtain County WTD approval.
 - b Coordinate Consultant logistics for field inspections.
 - i Review field inspection sequencing plan and schedule as provided by the County, and coordinate Consultant staffing and scheduling. County field inspection sequencing plan and schedule will define the order, timing, and coordination related logistics for Consultant and County participants in field investigations. The County’s plan and schedule will be developed through consultation regarding staff availability and work-planning activities with Consultant PM and Consultant field inspection Task Leads.
 - ii Arrange for rental vehicles, if needed to supplement available Consultant vehicles for field inspection crews
 - iii Provide Personal Protective Equipment (PPE) and investigation tools to field inspection staff if needed to supplement County-provided supplies
 - c Develop Field Inspection Forms relevant to the following types of facilities.
 - i Building superstructures: similar to the visual assessment portions of FEMA 154 Rapid Visual Screening Checklists
 - ii Buried concrete structures such as wet wells and dry wells
 - iii Basins such as secondary clarifiers
 - d Collaborate with County to prepare and deliver Field Inspection Training for data collection protocols. Each crew shall be observed by the trainers during their first field investigation for purposes of answering questions, verifying understanding of the training, and ensuring consistency in data collection and recording.
 - e Read and sign-off on the HDR Field Safety Plan prior to visiting the field (Consultant field staff).

- f Participate in County-conducted Field Safety Training. County shall provide Field Safety Training to 6 Consultant field staff and accompanying County staff who are familiar with the facilities and able to describe functions of components.
 - g Conduct Field Inspections using the inspection forms and methodology developed in Subtask 200.03.c. Assume field inspections will be conducted by two field crews on a total of up to 30 high risk facilities. Each field crew shall consist of two staff, assisted as needed by an electrical specialist. Assume electrical specialist will participate in eight field inspections. Assume four hours per facility for each field inspection.
 - h Compile field inspection reports for each site (1 set per facility inspected) and perform quality review.
4. Subtask 200.04 –Additional Desktop Evaluation for High Risk Pipelines, Prioritization, and Workshops
- a Conduct additional desktop evaluation of high risk sewer pipelines beyond the initial desktop assessment, considering the pipeline material, expected damage mechanisms associated with the material, and expected ground deformation to determine what is causing the high risk.
 - b Identify high-risk facility vulnerability based on site evaluation results.
 - c Evaluate overall system vulnerability considering the following opportunities to respond post-event on a service area basis.
 - i Move sewage away from people
 - ii Move sewage to alternate discharge points (CSO treatment plants, pump and regulator stations, outfalls), where possible discharging to salt water rather than fresh water bodies
 - iii Move sewage to alternate treatment location
 - d Update the preliminary prioritization with information from site visits and more detailed analysis.
 - e Conduct a four-hour Expected System Performance Workshop to review component risk ratings and ability to mitigate consequences. Validate Consultant evaluation results and provide institutional knowledge that may inform the development of mitigation solutions. Consultant PM, Task Leads and up to two additional Consultant staff shall participate in the workshop led by Consultant Risk Workshop Facilitator. County staff, including environmental impacts, health policy, and community involvement experts will participate.

The Expected System Performance Workshop shall identify three order-of-magnitude levels of investment and evaluate probable expected post-earthquake system performance in terms of restoration time for key facilities. When considering the three scenarios presenting the highest risk to the County, two scenarios shall be full scenarios, and one scenario shall be a limited scenario. It is outside this Scope of Work to establish Level of Service (LOS) factors. Available LOS determination outcomes from work currently underway in Vancouver BC, Portland, San Francisco, and the City of Seattle (SPU) shall be reviewed by the Consultant team prior to the workshop to establish reference points for the conversation.

 - i Prepare workshop materials, to include the following topics:
 - 1) Review of system component performance

- 2) Expected system performance and preliminary discussions of level of investment related to the following interests.
 - a) Public health
 - b) Environmental impact (prioritization of potential emergency overflow locations)
 - Puget Sound
 - Lake Washington
 - Lake Sammamish
 - Other Water Bodies
 - 3) Reestablishing system performance considering the following topics
 - a) Impact of discharge of raw sewage to fresh water (lakes and streams)
 - b) Impact of discharge of raw sewage to salt water
 - c) Discharge of treated sewage to receiving water
 - d) Recovery strategies and recovery times
 - ii Participate in workshop
 - f Conduct a four-hour Preventative Actions Prioritization Workshop to identify and prioritize up to 25 capital improvement projects and ten policy and programmatic initiatives for further development during Task 400 Preventative Recommendations and Cost Estimates. Assume mid-range “level of investment” when identifying the improvements to advance to Task 400. Workshop invitees to include the same list from prior day’s Expected System Performance Workshop.
 - i Prepare workshop materials
 - ii Participate in workshop
 - g Prepare a combined set of workshop notes for both workshops of Subtask 200.04.
 - h Prepare Draft Technical Memorandum (TM) with a prioritized list of facilities and sewers (approximately 15-page including a map showing listed priorities). The TM shall be finalized by incorporating County review comments during development of the Final Resiliency Plan.
5. Subtask 200.05 – Consultant Team Meetings
- Conduct up to ten, two-hour duration, monthly Consultant team meetings to monitor progress, coordinate task activities and discuss technical topics. Consultant team meetings shall be attended by the Consultant’s Project Manager and the Task Leads (as appropriate to the work being conducted), with flexibility for participation by phone if appropriate.
6. Subtask 200.06 – Task 200 GIS Support
- a Provide up to 14 hours input and review for the following Task 200 preliminary work.
 - i Preliminary Evaluation
 - ii Preliminary GIS Overlay
 - iii Meetings
 - b Provide up to 54 hours of support to the County for the following Task 200 Desktop Risk Assessment work.
 - i Design of an analysis and scoring scheme for the risk evaluations using GIS data inputs in collaboration with the development of risk criteria (lead with County assistance)

- ii Preparation of summary of desktop risk assessment (assist County)

ASSUMPTIONS

1. The County will provide listed documents, information in GIS format, and high/medium priority facility structural drawings.
2. The County will provide list of individual facilities and sewers and their locations.
3. The County will provide an explanation of the type and general configuration of SCADA systems for the WW treatment system.
4. The County will gather and review utility efforts to prepare for and recover from natural hazards similar to those that could occur in the WTD service area. If information of use to this planning effort is collected, it will be shared with Consultant for use in project development.
5. Subsurface exploration is not included in this scope of work; conclusions regarding soil conditions shall be based solely on available mapped soil conditions and record drawing information for each facility, published studies, and WTD staff knowledge of each site.
6. It is likely that more than 30 facilities will require investigation in the near term. If the desktop analysis results in the identification of more facilities that warrant field investigation, the Consultant team will notify the County.

DELIVERABLES

1. Three sets of workshop notes for the four workshops (includes combined notes for the back-to-back Subtask 200.04 workshops).
2. Summary of desktop assessment results for facilities and pipelines.
3. Completed Field Inspection Forms.
4. A Draft Technical Memorandum containing a prioritized list of vulnerabilities for the facilities studied.

TASK 300 - DIGESTER CONCRETE CONDITION ASSESSMENT

The purpose of this task is to perform a visual assessment of the condition of the concrete in six digesters at WPTP and five digesters at SP, unless different quantities are stated below. If conditions are encountered that suggest the presence of damage to the pre-stressing or post tensioning reinforcement, they shall be identified for further consideration by the County.

The Consultant shall provide the following services:

1. Subtask 300.01 - Condition Assessment of West Point Treatment Plant (WPTP) and South Plant (SP) Digesters
 - a Conduct desk-top evaluation of digesters.
 - i Obtain and review as-built construction drawings of the digesters
 - ii Prepare inspection record documents
 - b Prepare for field work by finalizing Field Safety Protocols as they pertain to this task, coordinating with County to schedule visits, gathering PPE and inspection tools, explaining safety and data collection protocols with team members and participating in inspection consistency training.

- c Visually inspect and sound accessible portions of the interior of the digester walls above the digesters' floating roofs at WPTP.
 - d Visually inspect and sound accessible portions of the exterior of the digester walls at WPTP.
 - e Visually inspect and sound the lowest levels of the interior walls of one digester at WPTP (the lowest levels are those that can be reached without the aid of scaffold or ladders while standing on the upper limit of the conical floor slab).
 - f Visually inspect and sound the conical floor slab for one digester at WPTP.
 - g Visually inspect and sound accessible portions of the interior of the digester walls above the digesters' floating roofs at SP.
 - h Visually inspect and sound, the lowest levels of the interior walls of one digester at SP (the lowest levels are those that can be reached without the aid of scaffold or ladders while standing on the upper limit of the conical floor slab).
 - i Visually inspect and sound the conical floor slab for one digester at SP.
2. Subtask 300.02 – Draft and Final Digester Technical Memoranda (Condition Report)
- a Prepare and submit Draft Technical Memorandum (Condition Report) containing findings of the Condition Assessments performed in Subtask 300.01 and a projection of the possible remaining life of the concrete for the digesters.
 - b Prepare for and conduct meeting to discuss Technical Memorandum with King County and receive review comments. The Project Manager, Seismic Vulnerability Assessment Lead, and one additional Consultant staff member shall participate.
 - c Revise and complete the Final Technical Memorandum (Condition Report), incorporating County comments.

ASSUMPTIONS

1. Seismic assessment will be conducted under Task 200 as part of the overall desktop effort. If one or both facilities is identified as falling within the 30 facility high-risk category, then field assessment (Rapid Visual Screening) will also be performed during the field efforts.
2. Services do not include invasive testing or assessment of the digesters' floating roofs.
3. Inspection work in the interior of one digester each at West Point and South Plant is contingent upon a digester being emptied, cleaned and accessible for inspection during the course of the other Task 300 inspections.
4. The field inspection time (combined staff hours) is assumed as 300 hours.
5. The County will provide as-built drawings of all digesters being inspected.
6. The County will provide access to all surfaces to be inspected.
7. If confined space entry is required, the County will provide confined space support, ventilation, lighting, and supervision necessary to access confined spaces.

DELIVERABLES

1. Draft and Final reports of condition assessments and estimated remaining life span for inspected digesters.

TASK 400 - PREVENTIVE RECOMMENDATIONS AND COST ESTIMATES

The purpose of this task is to develop concept level, prioritized capital improvement project (CIP), programmatic, and policy recommendations with cost estimates to address findings from Tasks 200 and 300.

CIP recommendations shall be presented by facility types as “concepts” (e.g. “anchor equipment at 41 pump stations”) and assigned “ranges of probable costs” for strategic planning purposes (e.g. less than \$1M, \$1M to \$5M, \$5M to \$10M, \$10M to \$50M). Probable construction cost recommendations shall be based on conceptual cost information derived from various sources including: King County Tabula; parametric pricing from similar projects; and professional consultant judgment. Program/Policy recommendation costs shall be developed based on County-provided full-time employee (FTE) and resource costs. All cost estimates developed are intended for planning level purposes only.

The Consultant shall provide the following services:

1. Subtask 400.01 – CIP Concepts and Ranges of Probable Costs

Develop planning-level concepts and ranges of probable costs for the Capital Improvement Projects identified as representing the “baseline investment” in Task 200 (up to 25 projects). A 50% design contingency, adjusted for inflation, should be applied to the cost prior to the accuracy range application.

2. Subtask 400.02 – Policy/Programmatic Concepts and Ranges of Probable Costs

Develop planning-level concepts and ranges of probable costs (in terms of potential resource allocation estimates) for the policy and programmatic projects identified as representing the “baseline investment” in Task 200 (up to ten policies and/or programs).

3. Subtask 400.03 – Range of Concepts by Investment Levels

Using the concepts and ranges of probable costs developed in Subtasks 400.01 and 400.02 for these “mid-level of investment (baseline investment)” concepts, develop a table indicating the range of additional projects and policies/programs that could be implemented for “lower-level investment” and “higher-level investment”, as identified in Task 200.

4. Subtask 400.04 - Draft Technical Memoranda (TM)

Prepare Draft Technical Memoranda (TM) of improvements, mitigation, or remediation measures recommended for implementation within a 20-year timeframe for facilities, prioritized according to the risks (likelihood and consequence of failure) posed by potential seismically induced damage and including probable estimates of cost. Include the developed “baseline investment” strategies and extrapolation to “lower-level investment” and “higher-level investment”, as identified in Task 200.

5. Subtask 400.05 – Consultant Team Meetings

Conduct up to two, two-hour duration, monthly Consultant team meetings to monitor progress, coordinate task activities and discuss technical topics. Consultant team meetings shall be attended by the Consultant Project Manager and Task Leads as appropriate to the work being conducted.

DELIVERABLES

1. Draft Technical Memorandum. County review comments shall be addressed in the production of the Final Task 600 deliverable.

TASK 500 - DEVELOP SYSTEM-WIDE PREPAREDNESS RECOVERY PLAN

The purpose of this task is to develop a System-Wide Recovery Plan that identifies strategies and implementation approaches that will be necessary after initial emergency response activities. The plan shall form the strategic framework to improve recovery following a major earthquake and serve as a platform to develop site-specific plans in follow-on project phases. It shall also outline recovery strategy implementation priorities and schedule, and identify resiliency strategies that can be addressed through preparedness and mitigation activities prior to and after an earthquake. The purpose of this recovery plan is to guide policy and financial decisions regarding investments in basic supporting infrastructure both prior to and following an event, to guide effective prioritizing of repair and replacement projects.

The Consultant shall provide the following services:

1. Subtask 500.01 – Plan Approach, Analysis, and Recovery Strategies
 - a Conduct a four-hour Plan Content Meeting with the County (including Emergency Management representation) to outline System-Wide Recovery Plan Table of Contents, appendices, and formats, taking into consideration other related planning documents and planning needs. Consultant PM, Emergency Response Lead, Seismic Lead, and up to one additional Consultant staff shall participate in the workshop.
 - b Develop a Draft annotated Recovery Plan Table of Contents for County approval based on conversations during the Plan Content Meeting.
 - c Develop System-Wide Recovery Strategies.
 - i Work with County staff to identify stakeholders and up to seven strategic emergency planning documents of relevance to the System-Wide Recovery Plan development, including County Emergency Management response plan(s).
 - ii Review up to five existing and developing framework documents relevant to WTD's emergency response activities, including those below. Identify key strategic linkages and system-wide strategies for consideration in the development of the WTD System-Wide Recovery Plan.
 - 1) City of Seattle Disaster Recovery Framework – most relevant existing framework
 - 2) National Disaster Recovery Framework (NDRF) – national level
 - 3) Resilient Washington State – state level, vague on recovery framework
 - 4) Resilient King County initiative – in white paper format only. Shall use City of Seattle Disaster Recovery Framework as a Guide
 - 5) Seattle Public Utilities – Emergency Response Plan. No Recovery Plan Framework but most relevant utility
 - iii Coordinate with and review Resiliency Planning team efforts for continuity in project planning document deliverables for this Task.
 - iv Develop system-wide strategies through two half-day workshops (one “internal” for KC operations and management staff with Consultant; one “external” for representatives of County operations and management with Consultant and identified key stakeholders) and up to 25 hour-long interviews. The interviews will involve the Consultant, County WTD Staff, and identified key stakeholders (such as Washington State Department of Emergency Management, WSDOT, SDOT, and selected local utilities). Interviews shall be conducted by phone or webinar.

- d Provide decision support and analyze approach and strategy.
 - i Identify and analyze recovery suggestions offered by County experts and stakeholders gained through the workshops, meetings and interviews.
 - ii Prepare for and conduct a three-hour Consultant workshop to identify feasible recommendations to take to Strategy Screening Meeting with County in Subtask 500.03.c. Consultant PM, Seismic and Emergency Response Leads, Equity and Social Justice (ESJ) Consultant, and up to three additional technical support staff on the Consultant team shall participate in a review and screening of potential solutions organized by type of infrastructure.
 - iii Prepare for and conduct two three-hour Strategy Screening Meetings on consecutive days with County project management and other identified County staff such as financial planning, emergency management, environmental, and operations representatives, to provide input into finalization of recovery strategies, mitigation priorities and sustainability and ESJ recommendations. Consultant PM, Seismic and Emergency Response Leads, ESJ Consultant, and up to two technical support staff on the Consultant team shall participate in a review and screening of potential solutions organized by type of infrastructure. This meeting is intended as a high-level sharing of ideas and challenges with the intent of setting the stage for County decisions regarding which issues are truly significant and which potential strategies warrant further development. The meeting will frame discussions and reviews to be held by the County after the Strategy Screening Meeting, resulting in recommendations to the Consultant on recovery strategies to move forward into the Recovery Plan.

2. Subtask 500.02 - Draft and Final Recovery Plan

- a Refine Table of Contents and finalize format based on available data, to address the expected content similar to what is shown in the following outline.
 - i Recovery
 - 1) Overview (1 page)
 - 2) System-Wide Impact Summary (8 pages)
 - a) Cascadia Subduction Fault
 - Overview & Facility Damage Characterization
 - Operating Environment and Resources Availability
 - System-wide Impact Map with general list of impacts and recovery priorities
 - b) Seattle Fault
 - Overview & Facility Damage Characterization
 - Operating Environment and Resources Availability
 - System-wide Impact Map with general list of impacts and recovery priorities
 - c) South Whidbey Island Fault
 - Overview & Facility Damage Characterization
 - Operating Environment and Resources Availability
 - System-wide Impact Map with general list of impacts and recovery priorities

- 3) Strategies (20 pages)
 - a) System-Wide & Regional Recovery Strategies
 - b) General WTP Recovery Strategies
 - c) General Conveyance Recovery Strategies
 - d) General Pump Station Recovery Strategies
 - e) Combine Sewer Overflow Recovery Strategies
 - f) Sewer Interceptors & Trunks Recovery Strategies
 - g) Regulator Stations Recovery Strategies
 - h) Regional SCADA System Recovery Strategies
 - 4) System-Wide Resiliency Strategies (3 pages)
 - a) Mitigation (Capital projects)
 - b) Preparedness (Organizational development – administrative procedures, training, contracting, organizational development, pre-position suppliers, agreements, etc.)
- ii Implementation
- 1) Implementation Approach (4 pages)
 - a) Priorities
 - b) Key Assumptions
 - c) Leadership, Roles & Responsibilities
 - 2) Summary Table of Recovery Strategies (3 pages)
 - 3) Budget Considerations and Insights (2 pages)
 - 4) Implementation Schedule with Key Milestones (1 page)
- b Prepare and submit Draft Plan.
 - c Conduct two-hour review meeting with County to adjudicate review comments and finalize key strategies and approaches. Consultant PM and Emergency Response Lead (by telephone) shall participate in meeting.
 - d Prepare and submit Final Plan
3. Subtask 500.03 – Outbriefing Development Assistance

Assist the County in developing and presenting an out-briefing on the System-Wide Preparedness Recovery Plan for County Leadership and stakeholders such as MWPAAC representatives. Assume 12 hours of Consultant services.
 4. Subtask 500.04 – Consultant Team Meetings

Conduct up to three, two-hour duration, monthly Consultant team meetings to monitor progress, coordinate task activities and discuss technical topics. Consultant team meetings shall be attended by the Consultant's Project Manager and the Task Leads as appropriate to the work being conducted.

ASSUMPTIONS

1. The County will provide a list of up to five relevant County-produced emergency response planning documents.
2. This task excludes development or updating of site-specific recovery plans, standard operating procedures, Continuity of Operation Plans, Emergency Response Plans and/or

detailed guidance for each location or facility. These programmatic, site and facility specific plans may be addressed in the future.

DELIVERABLES

1. Workshop and meeting notes.
2. Draft and Final System Wide Recovery Plan (approximately 40 pages in length, excluding appendices).
3. PowerPoint slides to supplement County presentation if required.

TASK 600 - FINAL RESILIENCY PLAN AND RECOMMENDATIONS

The purpose of this task is to develop a Resiliency Plan including summaries of each of the task elements with appendices covering the detailed assessment. The Resiliency Plan shall identify recommended seismic resiliency actions the County should undertake, considering Equity and Social Justice, financial, and overall reasonableness of solutions. Task 300, Digester Concrete Condition Assessment shall be included by a brief reference, as it shall be a separate deliverable in Task 300.

The Consultant shall provide the following services:

1. Subtask 600.01 – Summarize, Provide Recommendations and Prepare Draft Plan
 - a Summarize methodologies and results for Tasks 200, 400, and 500. The detailed results of the tasks shall be included as appendices as follows.
 - i Task 200 – Risk-Based Prioritized list of Facilities and Sewers
 - ii Task 400 – Detailed List of Preventive Recommendations and Cost Estimates
 - iii Task 500 – Recovery Plan
 - b Provide Resiliency Plan recommendations, including the following.
 - i Task 400 Preventative Recommendations
 - 1) List and brief description
 - 2) Probable planning level cost estimates
 - 3) Proposed schedule for implementation
 - ii Task 500 System-Wide Recovery Plan Recommendations
 - 1) Action items
 - 2) Planning elements
 - 3) Resources required as identified
 - c Provide a brief description of the expected overall regional post-event damage and functionality for a Cascadia Subduction and Seattle Fault scenario.
 - d Provide recommendations to address future programmatic needs for seismic resiliency in WTD's systems, considering Equity and Social Justice, financial, and overall reasonableness of solutions. Identify and provide a brief description of Resiliency Planning elements, such as the development of seismic design standards, not implemented in this project but identified as important to comprehensive resiliency planning efforts.
 - e Prepare Draft Resiliency Plan

2. Subtask 600.02 – Mid-Point Briefing Development Assistance

Assist the County in developing a mid-point briefing on the Resiliency Plan for County leadership and stakeholders such as MWPAAC representatives, to include support in preparing PowerPoint slides.

3. Subtask 600.03 - Final Resiliency Plan

4. Subtask 600.04 – Consultant Team Meetings

Conduct up to two, two-hour duration, monthly Consultant team meetings to monitor progress, coordinate task activities and discuss technical topics. Consultant team meetings shall be attended by the Consultant's Project Manager and the Task Leads as appropriate to the work being conducted.

5. Subtask 600.05 – Task 600 GIS Support

Provide Task 600 GIS support by summarizing Task 200 GIS analyses.

DELIVERABLES

1. Draft and Final Resiliency Plan (approximately 40 pages in length, excluding appendices).
2. Up to 20 PowerPoint slides to supplement County presentation if required.

TASK 700 - ADDITIONAL UNANTICIPATED, URGENT OR SPECIAL SERVICES

The Consultant shall provide services which are unplanned, urgent and/or critical to maintaining the project schedule and progress of the work. The work of this task must be specifically scoped, agreed to, and authorized in writing by the County prior to performing the work. Work areas may include but not be limited to:

1. Provide master planning services.
2. Provide GIS support.
3. Provide ASCE 41-13 Chapter 4 Tier 1 Screening (or other appropriate detailed assessment) of facilities identified as warranting more in-depth review.
4. Provide additional assessment services for Brightwater Treatment Plant.
5. Provide facility inspection.
Provide engineering design and estimating services for digester repair concepts.
6. Attendance at public or County leadership meetings.
7. Prepare draft responses to anticipated questions from the public or County leadership.

ASSUMPTIONS

1. The Consultant may plan for the following to address this Task – Up to 40 hours of Project Management services, 120 hours of Engineering services, 15 hours of Project Control services, and 15 hours of Administrative services.

DELIVERABLES

Reports, estimates, drawings, special inspections, field services, documentation, as appropriate.