

# Scope of Work

May 4, 2023

## Water System Consolidation Feasibility Study

### Sun Vista/Sunlight Beach Homeowners Association

## 1. Project Understanding

Anchor QEA appreciates the opportunity to submit this detailed scope of work to assist the Sun Vista/Sunlight Beach Homeowners Association (HOA) in completing a water system consolidation feasibility study. The Washington State Department of Health (DOH) initiated the Drinking Water State Revolving Fund (DWSRF) Consolidation Feasibility Grant program to promote consolidation of small Group A water systems into larger entities to improve the management of the water systems and the safety of the drinking water they distribute to the public. We understand that the Sun Vista/Sunlight Beach HOA has secured a \$50,000 grant from the program and has entered into an agreement with DOH (Contract CBO27656) for grant funding to complete a feasibility study that will evaluate the potential for consolidating the Sun Vista/Sunlight Beach HOA Water System (DOH Water System ID 85160) with the Sunlight Beach Water System (DOH Water System ID 85270).

The Sun Vista/Sunlight Beach HOA Water System and the Sunlight Beach Water System currently serve a combined population of over 400 people in overlapping service areas. The two systems have an intertie for emergencies. The wells that supply the two systems are about 100 feet apart and possibly subject to tidal flooding from Puget Sound. Physical space severely limits treatment capabilities. Those who manage the systems have discussed the potential for working together to evaluate the feasibility of consolidating the two systems to efficiently address long-term vulnerabilities and operational issues. They have identified the following priorities for the water system consolidation feasibility study:

- Assessment of facility improvements required over the next 20 years, based on the different consolidation and non-consolidation alternatives considered and the need to replace aging infrastructure
  - This assessment needs to include an evaluation of associated capital and long-term operations and maintenance (O&M) costs.
- Assessment of the potential for groundwater supply contamination with nitrates and microbials from near-term development and future septic systems within the 5-year wellhead protection area (WPA) defined in the Sun Vista/Sunlight Beach HOA Wellhead Protection Area Report (Golder Associates 2013)
- Assessment of the potential for other contaminants to impact groundwater supply, such as arsenic, saltwater intrusion, and contaminants from secondary residential roads within the 100-foot sanitary radius around the wells

- Assessment of availability, feasible alternative sites for new groundwater wells and other key facilities that may be needed to replace existing facilities, based on the different consolidation and non-consolidation alternatives considered

Further analysis of these priorities is needed as part of the consolidation feasibility study. To meet DOH requirements, the study will also need to include an evaluation of water demands; conceptual design of infrastructure improvements needed for consolidation; a cost analysis of the work required to consolidate the systems or continue with separate systems, including an evaluation of both capital costs for improvements associated with consolidation and long-term O&M costs; and a comparison between potential consolidation and the cost of the systems remaining separate and independent. The consolidation feasibility study is intended to provide the water system owners with the information needed to make decisions about consolidation and to document that process for DOH review. The consolidation feasibility study will not include a field verification of the availability and adequacy of water supplies or provide a full basis for the siting and design of new water system facilities. Additional work will be required once a decision has been made about consolidation following the completion of the feasibility study to confirm the capacity and quality of new groundwater supplies, determine the appropriate treatment needed, and collect information needed to support the design of new water system facilities.

## **2. Scope of Services and Deliverables**

Based on the information included in our proposal for the project and additional conversations with the water system owners, Anchor QEA proposes to perform the following tasks to complete the water system consolidation feasibility study.

### **Task 1: Evaluation of Existing Systems**

This task will evaluate each existing water system. The evaluation completed for this task will assume that the two water systems would remain separate and be managed as separate water systems into the future. Each water system would require improvements and upgrades to meet the future needs of that system. The objective of this task would be to assess the existing condition of both water systems and evaluate their ability to operate in their existing condition into the future.

#### **Subtask 1.1: Collect and Review Background Information**

Anchor QEA will collect and review pertinent background information on the water systems. Information will include the current water system facilities' inventory reports on file with DOH, mapping, and information included in each water system's small water system management plan (SWSMP). Anchor QEA will use the information in the SWSMP as a basis for the consolidation feasibility study. If additional information is needed to complete the consolidation feasibility study, Anchor QEA will prepare a written request for additional information.

### **Subtask 1.2: Schedule and Participate in a Kick-off Meeting and Site Visit**

As an initial step toward evaluating the existing water systems, Anchor QEA will schedule a virtual kick-off meeting with the key members of the consultant team and the Planning Team, composed of representatives from each water system. The primary purpose of this virtual kick-off meeting will be to introduce the key members of the consultant team to the Planning Team, review the scope of work, and confirm roles and responsibilities. Following the virtual kick-off meeting, Anchor QEA's Project Manager will schedule and attend an in-person kick-off meeting near the site on Whidbey Island with the Planning Team to discuss the scope of work and schedule in more detail, identify key areas of concern or existing system deficiencies to be addressed through the consolidation feasibility study, and discuss the alternatives to be considered by the study. Following the meeting, Anchor QEA's Project Manager will then tour each water system with the Planning Team and visually document the existing condition of the key facilities with photographs and field notes.

### **Subtask 1.3: Inventory and Map Existing Water System Facilities**

Anchor QEA has reviewed existing water system mapping that includes the following:

- PDF copies of scanned service area maps for both Water Systems
- As-built drawings from the 1995 Sunlight Beach Road Distribution Main Replacement Project (Schaefer and Bratton Engineers 1995)

As part of this task, Anchor QEA will collect the latest mapping information available, review mapping with representatives from both water systems, and compile electronic maps and a water system inventory database using ArcGIS. This will include the following:

- Generate ArcGIS format maps of each water system showing water mains, wells, storage facilities, and other key facilities identified through consultation with water system representatives.
- Compile water system inventory information for each water system.

The GIS database will be set up to include the following water system inventory information:

- **Wells:** Size, depth, capacity, date of installation, and reported condition
- **Storage Tanks:** Dimensions, capacity, materials, date of installation, and reported condition
- **Distribution Pipe and Related Appurtenances:** Size, material, length, year of installation, and reported condition

Anchor QEA will rely on information provided by the water systems and photographs taken during the site visit to compile the GIS inventory of water system facilities. To the extent the data is available, the water system inventory effort will include collection of the data recommended by the DOH *Asset Management for Small Water Systems* fact sheet and will be compiled in a format that is

acceptable to DOH. Anchor QEA will not make measurements, perform field surveys, or do other work to verify the age, configuration, or condition of water system facilities.

#### **Subtask 1.4: Forecast Water Demands**

Anchor QEA will work with water system representatives to summarize historical water use and develop water demand forecasts. To complete this task, we will need a list of water system members or customers and meter readings from the wells and customer meter reading records, each compiled in a single spreadsheet or other electronic file that can be easily used to evaluate water use.

Anchor QEA will use this data to forecast water demands, as follows:

- Tabulate and evaluate information on historical water production (as measured at the groundwater wells) and water use (from customer meter data).
- Summarize existing land use, population served, and service connections.
- Identify parcels within each water system's service area not currently served.
- Project future growth and development of vacant parcels based on consultation with water system representatives, existing land use, and zoning. Estimate growth in terms of equivalent residential units.
- Estimate existing water demands, peaking, unaccounted-for water, and demand per equivalent residential unit.
- Forecast water demand for the 6-year (through 2029) and 20-year (through 2043) planning horizons.

The Planning Team has indicated that the water service areas for both systems are largely developed and that additional areas of potential development are limited to a few vacant lots that do not currently receive water service. The effort allocated to this task reflects the feedback from the Project Team that potential for growth is limited and the number of future potential connections can be quickly estimated with input from the Planning Team. If more effort is required to accurately forecast demands, Anchor QEA will provide that effort under an amendment to this scope of work.

#### **Subtask 1.5: Evaluate Existing Water Systems**

Anchor QEA will analyze the current capacity of each water system to identify deficiencies, and identify improvements needed to accommodate future growth, assuming that the existing systems would remain separate, and each will continue in its current configuration with existing water supply and storage facilities at their present locations, as follows:

- Evaluate system capacity, including well source and storage capacity, according to the guidelines provided in the DOH Water System Design Manual.
- Perform a hydraulic analysis of each existing system to evaluate the system's performance under the following conditions:

- Existing average daily demand (ADD), maximum daily demand with fire flow (MDD+FF), and peak hourly demand (PHD) conditions
- Projected 6-year (2029) ADD, MDD+FF, and PHD conditions
- Projected 20-year (2043) ADD, MDD+FF, and PHD conditions
- Identify water system deficiencies revealed by the hydraulic analysis of the system.
- Review water quality test results from the last 6 years and provide an updated summary of the results. Identify any water quality issues revealed by the water quality data for each system.
- Perform an independent assessment of the analysis outlined in the Sun Vista/Sunlight Beach HOA Wellhead Protection Area Report (Golder Associates 2013). Golder Associates used an analytical model based on uniform groundwater flow equations to delineate the WPA. The WPA will be reviewed to determine whether the method and delineation prepared by Golder Associates is appropriate for the existing wells. No modeling or detailed analysis will be performed. If review of the WPA analysis indicates that additional modeling or detailed analysis is warranted to verify the results of the WPA, Anchor QEA will complete this analysis under an amendment to this scope of work.
- Use information from WPA and other sources to assess contamination risks from nitrates/microbials from upgrade septic systems and sea water intrusion.
- Review information available for the on-site septic systems proposed on the upslope Kohwles development site, which includes hydrogeologic information and nitrate transport calculations using the DOH Level 1 nitrate balance spreadsheet model. Parameters used in the model will be reviewed and the sensitivity of the nitrate contamination analysis to a range of possible parameters will be described. A summary of nitrate/microbial contamination risks from the development will be prepared.
- Contact the County hydrogeologist to discuss the potential sources of contamination and water quality concerns, including nitrates/microbials from upgrade septic systems, sea water intrusion from groundwater, sea water contamination from tidal flooding, iron, manganese, and arsenic. Collect any additional data that might be available on groundwater quality and quantity to support analysis of groundwater supplies.
- Based on this independent assessment, assess changes in treatment that may be required in the future to continue to provide water of adequate quality from existing groundwater wells.

### **Subtask 1.6: Complete a Cost Analysis**

Anchor QEA will develop a planning-level (order of magnitude) opinion of probable capital cost and long-term O&M costs associated with improvements that would be needed to maintain each water system in its current configuration with existing water supply and storage facilities at their present locations. The opinion of costs will be based on planning-level information regarding the size, approximate length, and type of general equipment or materials needed. Planning-level unit costs will be used. Detailed quantity estimates or breakdowns of materials will not be completed as part of

this study. The costs will be prioritized according to when they will be needed to address existing or projected system deficiencies. These costs will primarily be used as a basis of comparison to the alternatives considered as part of Tasks 2 and 3.

### **Subtask 1.7: Summarize the Task 1 Findings in a Memorandum**

Anchor QEA will summarize the results of the Task 1 work in a memorandum for each water system. The memoranda will be prepared such that they can be incorporated directly into the overall consolidation feasibility study report (Task 5). A draft PDF of each memorandum will be submitted to water system owners for review and comment. It is assumed that the water system owners will provide one consolidated set of comments, which will be incorporated into a final memorandum for this task. The final memorandum will then be incorporated directly into the overall consolidation feasibility study report. Anchor QEA will present the results during a virtual meeting (via WebEx) to representatives of each water system.

### **Task 1 Deliverables**

- Written Request for Additional Information (email format)
- Kick-off Meeting Notes and Photographs (PDF format)
- Water System Mapping and GIS System Inventory (PDF and ArcGIS format)
- Draft and Final Task 1 Summary Memorandum (PDF format)

## **Task 2: Evaluation of Separate Water Systems with New Facilities**

The evaluation completed for this task will assume that the two water systems would remain separate and be managed as separate water systems into the future. The evaluation will also assume that new water supply facilities may be required for each water system. The objective of this task would be to evaluate options for maintaining two separate water systems with new water supply facilities and identify other improvements needed to ensure successful operation into the future with associated time frames and costs.

### **Subtask 2.1: Complete Screening Analysis of Water Supply Alternatives**

As an initial step towards evaluating and identifying potential improvements that would be required to maintain successful operation of two separate water systems, Anchor QEA will complete a screening analysis of potential water supply alternatives. It is our understanding that the Planning Team is looking at potential locations for future groundwater wells. Anchor QEA will review two or three locations, including the location on the Kohlwes property, and at least one other location identified by the Planning Team. Anchor QEA will then evaluate these potential water supply locations based on the following criteria:

- Potential for sea water contamination via tidal flooding
- Potential for nitrate and microbial/bacterial contamination

- Potential for sea water intrusion and other water quality concerns
- Hydrogeologic concerns
- Property owner concerns
- Distance from existing water systems
- Other regulated contaminants

Anchor QEA will develop a matrix to rate the potential groundwater supply locations according to these criteria. These criteria will be characterized for each water supply alternative, and a rating will be developed to represent the level of concern (low, medium, or high level of concern). The matrix will be developed such that the water system owners can use it to evaluate and compare other potential groundwater well locations if there are more that are identified beyond the three evaluated as part of this task.

### **Subtask 2.2: Develop Improvement Plans**

Anchor QEA will develop a plan to address the deficiencies identified as part of Task 1 for each existing system. The plan will include recommended improvements needed for each existing system to provide adequate source and storage capacity, deliver adequate flow rates and pressures, address water quality deficiencies, and replace infrastructure when it reaches the end of its useful design life. Two or three improvement alternatives will be developed, one corresponding to each water supply alternative evaluated as part of Subtask 2.1. Anchor QEA will complete additional hydraulic analysis to understand which improvements are needed to address system deficiencies. Anchor QEA will then develop a prioritized list of improvements and a map showing the proposed improvements for each system improvement alternative. These improvements may include the following:

- New wells and control/treatment facilities for each water system at the locations identified as part of Subtask 2.1.
- New storage tanks at locations that correspond with potential well locations.
- Distribution pipe improvements and upgrades needed to deliver water from groundwater wells and storage facilities to water system customers.

In order to complete this analysis within the budget available, this analysis will evaluate no more than three alternatives and assumes that the alternatives will be similar, except that the location of water supply wells, storage facilities, and pipelines that connect those facilities to the distribution system will vary between the alternatives. The alternatives for this task will be reviewed and approved by the water system owners prior to completing the other analyses.

### **Subtask 2.3: Complete a Cost Analysis**

Anchor QEA will develop a planning-level (order-of-magnitude) opinion of probable capital costs and long-term O&M costs associated with each of the alternative improvement plans developed as part of this task. The opinion of costs will be based on planning-level information regarding the size,

approximate length, and type of general equipment or materials needed. Planning-level unit costs will be used. Detailed quantity estimates or breakdowns of materials will not be completed as part of this study. The costs will be prioritized according to when they will be needed to address existing or projected system deficiencies.

### **Subtask 2.4: Summarize the Task 2 Findings in a Memorandum**

Anchor QEA will summarize the results of the Task 2 work in a short memorandum for each water system. The memoranda will be prepared such that they can be incorporated directly into the overall consolidation feasibility study report (Task 5). A draft PDF of each memorandum will be submitted to water system owners for review and comment. It is assumed that the water system owners will provide one consolidated set of comments, which will be incorporated into a final memorandum for this task. The final memorandum will then be incorporated directly into the overall consolidation feasibility study report. Anchor QEA will present the results during a virtual meeting (via WebEx) to representatives of each water system.

### **Task 2 Deliverables**

- Screening Matrix for Well Locations (PDF and Microsoft Excel format)
- Draft and Final Task 2 Summary Memorandum (PDF format)

## **Task 3: Evaluation of One Consolidated Water System**

The evaluation completed for this task will assume that the two water systems would consolidate and operate as a single water system into the future. The objective of this task will be to evaluate options for consolidating the two water systems into one water system with new water supply facilities or other improvements needed to consolidate the systems and ensure successful operation into the future.

### **Subtask 3.1: Develop Consolidation Plan**

Anchor QEA will develop a plan to address the deficiencies identified as part of Task 1 for each existing system through consolidation of the two systems. The plan will include recommended improvements needed to merge the two systems into one distribution system and provide necessary source and storage capacity, deliver adequate flow rates and pressures, address water quality deficiencies, and replace infrastructure when it reaches the end of its useful design life. Two or three alternative improvement plans will be developed, one corresponding to each water supply alternative evaluated as part of Subtask 2.1. This task also assumes that the screening of potential water supply locations, completed as part of Subtask 2.1, will be applied to the evaluation of this task and that the same potential groundwater well locations will be considered for this task.

Anchor QEA will complete additional hydraulic analysis of potential improvements to understand which improvements are needed to address system deficiencies. Anchor QEA will then develop a



prioritized list of improvements and a map showing the proposed consolidation. These improvements may include the following:

- New wells and control/treatment facilities for each water system at the locations identified as part of Subtask 2.1
- New storage tanks at locations that correspond with potential well locations
- Distribution pipe improvements and upgrades needed to deliver water from groundwater wells and storage facilities to water system customers
- Permanent connections between the two distribution systems
- Consolidated distribution pipelines and other facilities

In order to complete this analysis within the budget available, this analysis will evaluate no more than three alternatives and assumes that the alternatives will be similar, except that the location of water supply wells, storage facilities, and pipelines that connect those facilities to the distribution system will vary between the alternatives. The alternatives for this task will be reviewed and approved by the water system owners prior to completing the other analyses.

The analysis will also include a very general discussion about the impact of consolidation on rates, water rights, and other regulatory requirements. A detailed rate evaluation or detailed review of water rights and permitting requirements will not be completed as part of this study. This discussion will be included in the memorandum for this task (Subtask 3.3).

### **Subtask 3.2: Complete a Cost Analysis**

Anchor QEA will develop a planning-level (order-of-magnitude) opinion of probable capital costs and long-term O&M costs associated with each of the alternative improvement plans developed as part of this task. The opinion of costs will be based on planning-level information regarding the size, approximate length, and type of general equipment or materials needed. Planning-level unit costs will be used. Detailed quantity estimates or breakdowns of materials will not be completed as part of this study. The costs will be prioritized according to when they will be needed to address existing or projected system deficiencies.

### **Subtask 3.3: Summarize the Task 3 Findings in a Memorandum**

Anchor QEA will summarize the results of the Task 3 work in a short memorandum. The memorandum will be prepared such that it can be incorporated directly into the overall consolidation feasibility study report (Task 5). A draft PDF of each memorandum will be submitted to water system owners for review and comment. It is assumed that the water system owners will provide one consolidated set of comments, which will be incorporated into a final memorandum for this task. The final memorandum will then be incorporated directly in the overall consolidation feasibility study report. Anchor QEA will present the results during a virtual meeting (via WebEx) to representatives of each water system.

### **Task 3 Deliverables**

- Draft and Final Task 3 Summary Memorandum (PDF format)

### **Task 4: Public Outreach**

The objective of this task will be to support the water system owners in communicating the results of the work to the members of each water system and present information at annual and special member meetings.

Anchor QEA will coordinate the work closely with the Planning Team and will support each water system in implementing their member and involvement strategies for the study. Anchor QEA will prepare information to support those communications and will present the findings of the consolidation feasibility study at up to two meetings of the water system members. It is assumed that the water system management will schedule and facilitate these public meetings. Anchor QEA will prepare and present information as directed by the water system owners. This task also includes up to 4 hours of additional time to answer member or customer questions and coordinate the work with the public. It is our understanding that member meetings usually occur in July and August of each year. Anchor QEA's Project Manager will attend either in person or virtually and present interim information in the summer or fall of 2023. The final consolidation feasibility study will be presented in summer or fall 2024, or when scheduled by the water system owners. It is anticipated that participants in the final member meetings will include the boards of directors of the two water systems and interested members.

### **Task 4 Deliverables**

- Presentation Materials for Member Meetings (PDF and Microsoft PowerPoint format)

### **Task 5: Preparation of the Consolidation Feasibility Study Report**

The objective of this task will be to summarize the findings of the consolidation study in a final report with recommendations for next steps. The final consolidation feasibility study report is required by DOH and will be reviewed by DOH Office of Drinking Water representatives to ensure that it meets the requirements of the grant and provides enough information to support the water systems' decision about future consolidation.

Anchor QEA will prepare a draft and final consolidation feasibility study report. We anticipate that the report will incorporate the information included in the summary memoranda prepared for Tasks 1 through 3 and will include additional background and detail needed to meet DOH requirements. The level of detail will be similar to the example consolidation that Anchor QEA provided to the Planning Team during the consultant selection process. Comments provided on the content of those reports will be addressed, and revisions will be reflected in the draft consolidation feasibility study report. The draft report will be submitted to the water system owners and DOH Office of Drinking

Water representatives for review. Comments provided on the draft report will be addressed, and revisions will be incorporated into a final report.

### **Task 5 Deliverables**

- Draft and Final Consolidation Feasibility Study Report (PDF format)

### **Task 6: Project Administration**

The objective of this task will be to manage the consultant team's work on the project and support the Sun Vista/Sunlight Beach HOA in managing the grant with DOH. As part of this task, Anchor QEA will manage the consultant team's work on the project. Anchor QEA's Project Manager will communicate progress regularly with the Sun Vista/Sunlight Beach HOA Contract Representative and will coordinate the work with key representatives of each water system. Anchor QEA will submit monthly invoices to the Contract Representative. Each invoice will be sent with a summary of work completed during the invoice period. Anchor QEA will also assist the Sun Vista/Sunlight Beach HOA with completing deliverables needed to comply with grant funding, including submitting a short quarterly progress report to the Contract Representative needed to help DOH understand the relative progress on the project since the last reporting period.

### **Task 6 Deliverables**

- Monthly Invoices (PDF format)
- Progress Summaries (PDF format)

## **3. Assumptions**

- Only work specifically outlined as part of this scope of work will be completed as part of this project. If additional work is needed to support the water systems' efforts to determine whether they will consolidate or not, that additional work will be provided under an amendment to this scope of work.
- Representatives of the water system will provide information on the systems, including available mapping, water production records, customer meter records, identified deficiencies, water quality data, reports, and other pertinent information needed to complete the consolidation feasibility study.
- In-person meetings will include a project kick-off meeting and up to two member meetings. All other coordination meetings will be conducted virtually through WebEx or another online meeting platform.
- No electronic mapping exists for existing water system facilities in CAD or GIS format. Anchor QEA will develop a GIS database based on available PDF maps and input from the water system representatives. Maps will only be as accurate as the information provided by the water system representatives.

- No topographic survey or detailed survey of water system facilities will be completed.
- Water demand forecasting will be completed in accordance with the DOH Water System Design Manual.
- Publicly available parcel data, topography, and other base mapping information will be used to develop water system mapping and demand forecasts.
- Anchor QEA's principal engineer and hydrogeologist will review the existing Wellhead Protection Area and calculations made to establish the WPA in the Sun Vista/Sunlight Beach HOA Wellhead Protection Area Report (Golder Associates 2013). However, no hydrogeologic modeling or detailed analysis will be completed.
- Two or three potential locations for water supply wells will be considered and evaluated through a screening-level analysis as part of Subtask 2.1.
- Two or three improvement alternative plans, one corresponding to each water supply well location evaluated at the screening-level as part of Subtask 2.1, will be considered for the evaluation of the scenario in which the two systems remain separate.
- Two or three improvement alternative plans, one corresponding to each water supply well location evaluated at the screening-level as part of Subtask 2.1, will be considered for the evaluation of the scenario in which the two systems consolidate to become one system.
- Planning-level cost analyses will be completed based on lengths of new pipe and sizes or capacities of new well source and storage facilities. Detailed quantity estimates or breakdowns of equipment and material will not be included.
- Any comments provided on the draft memoranda prepared as part of Phases 1 through 4 will be addressed, and revisions made as a result of those comments will be incorporated into the Consolidation Feasibility Study Report.
- One set of consolidated review comments will be provided by the water systems to Anchor QEA following review of the deliverables listed.