

Whiteman Cove Restoration Architecture and Engineering Design

Washington Department of Natural Resources

1. Project Understanding

Washington Department of Natural Resources (DNR) has requested that Anchor QEA, LLC, provide analysis, design, permitting, and outreach support for the Whiteman Cove Restoration Architecture and Engineering Design Project (Project) to re-establish fish passage with Whiteman Cove estuary to Case Inlet.

Whiteman Cove is a historical barrier estuary, separated from Case Inlet by a natural spit formed by net littoral drift to the north and feeder bluffs to the south. The historical opening to the cove, located at the northern end of the spit, was closed in the late 1950s to create a perched brackish water lagoon that was intended for the rearing of juvenile salmon. Water levels in the cove are currently regulated by two gated culverts that are not operating as originally designed, but are currently meeting design intent of maintaining current water surface elevation in the lagoon. Minimal exchange occurs between the perched lagoon and Case Inlet. Freshwater input to the cove comes primarily from a small intermittent stream (Whiteman Creek) at the eastern end of the cove that drains the approximately 1.7-square-mile upland watershed. Properties adjacent to the cove include Joemma Beach State Park to the northwest, and private properties inland along the cove's south shoreline and the northeast portion of the cove. Whiteman Cove itself includes DNR property along the northwest portion and YMCA Camp Colman south of the DNR parcel. The roadway berm, which separates Whiteman Cove from Case Inlet (part of south Puget Sound), is owned by DNR at the north segment of Bay Road KP South and by Camp Colman along the southern segment of the access road, which leads to Camp Colman to the west.

Options to restore tidal hydrology and fish passage have been previously studied. Earlier feasibility studies, performed by Anchor QEA in 2010 and 2014, evaluated several alternatives for restoring fish passage and natural tidal inundation to the site, including open channels, weirs, box culverts, and small single-span bridges. In addition to fish passage, other objectives of the previously proposed restoration actions evaluated by Anchor QEA in 2014 included designing a self-sustaining tidal inlet, maintaining vehicle access to Camp Colman, and minimizing impacts to Camp Coleman operations and property owners in the eastern (back) end of the cove.

DNR has identified the following objectives for this Project:

- Collect data to inform DNR of viable alternative(s) that will be evaluated for the analysis and design to reestablish the tidal estuary and fish passage.
- Assess potential impacts to adjacent upland properties within the Cove from proposed alternatives.

- Assess potential sedimentation and other potential impacts to Case Inlet and an adjacent commercial geoduck aquaculture farm and eelgrass restoration site from proposed alternatives.
- Provide viable options for the YMCA to have continued vehicle access to Camp Coleman.
- Assess immediate and projected physical changes to the estuary and adjacent Case Inlet tidelands based on proposed alternatives.
- Complete State Environmental Policy Act requirements for the final design.

The Project will occur in three phases; Phase 1/1B work is ongoing and will be completed by December 2019.

- **Phase 1 and 1B** will include a literature review, storyboard development, support at scheduled meetings on July 24 and September 19, and water quality data collection work (in progress).
- **Phase 2** will include a feasibility study, coastal evaluation, private property impacts assessment, conceptual design/cost estimating, and outreach support.
- **Phase 3** will include a 30% through final design/cost estimating, permitting assistance (including environmental impact statement, although this effort could be started in Phase 2), and outreach support.

This scope of work is for Phase 2 tasks only, which will occur between January 2020 and June 2020. Contracting Phase 3 work will occur through a future scope amendment, with this phase anticipated to begin in early spring 2020.

2. Scope of Services and Deliverables

The Phase 2 scope of work includes time and budget to develop options to meet project objectives described in above, evaluate the proposed options, and select a preferred option to move forward into 30% design (Phase 3 work). Reasonable options developed and provided to DNR by YMCA, homeowners, and other stakeholders within the timeline of this phase of the project will be considered along with other options. Tasks 1 through 4 were scoped as part of Phase 1/1B work; therefore Phase 2 work begins with Task 5. Specific work, deliverables, and assumptions for Phase 2 are outlined in the following sections.

Task 5: Phase 2 Project Management and Meetings

Subtask 5.1: Project Management

This subtask includes the following Project management tasks for a Project duration of 8 months: (November 2019 through June 2020):

- Communicating with DNR and the consultant team during the approximately 8-month period when this scope is underway and ensuring that communication on Project status and progress is communicated both ways (i.e., to DNR and to the consultant team)
- Maintaining and updating the Project schedule
- Tracking and managing the Project budget and providing monthly invoices

Subtask 5.2: Project Meetings

This subtask includes the following:

- Phase 2 kickoff conference call with DNR staff
- Two conference calls to review deliverables and prepare for meetings
- Pre-application meeting with available representatives of Regulatory Agencies
- One open meeting focused on review of conceptual alternatives and planning study results (to occur after completion of Task 8). Representative staff from BCE and KPFF will attend the open meeting.

Deliverables

- Project schedule, provided in PDF format
- Monthly invoices with budget status
- Meeting summary, provided in Microsoft (MS) Word file format

Task 6: Data Review and Collection

This task will include additional data review and synthesis of work previously conducted in support of this project, documents provided by DNR, and other publicly available sources to support the Feasibility Work (Phase 2). This work will build on information gathered as part of Task 2 (Phase 1) work. The background information gathering was also be informed by input obtained in previous open meetings (conducted as part of Phase 1 and 1B work).

Subtask 6.1: Compilation and Review of Existing Data

This subtask includes the following:

- Reviewing and synthesizing previous work conducted by the Project team and others at the Project site, developing a project basemap.
- Compiling and reviewing available site information relevant to the new work outlined in this scope (i.e., transportation study).

- Reviewing existing as-built plans and other site analysis documents provided by DNR, including utilities, critical areas, and property information including parcel lines, ownership information, easements, etc.
- Identifying and reviewing, if any, historical geotechnical borings near the Project site.

Data compilation and review conducted as part of this task will be targeted to support new work not previously scoped as part of the feasibility study (i.e. Phase 1 and 1b work); data collected will be used to develop and analyze conceptual alternatives, planning-level studies and investigations, and the choice and refinement of a preferred alternative. Site data to be collected is outlined in Subtask 6.2.

Deliverables

- Documentation of compiled data will be included in the draft feasibility report (Task 10)

Subtask 6.2: Targeted Data Collection

This subtask includes targeted data collection and analysis of high priority information identified in the "baseline data needs list," developed by DNR with input from the consultant team (see Attachment 1). This list was developed in coordination with homeowners and representatives for the YMCA.

This budget allocated for this task is based on assumptions of what data is required for the feasibility study work based on the list provided in Attachment 1 and our understanding of the Project at the time this scope of work was developed. Additional data collection and associated budget may be required based on the results of Subtask 7.1 or DNR request.

Data to be collected as part of this task includes:

- Targeted site survey to determine unknown elevations of the existing tide gate systems (i.e., pipe inverts, location/elevation of wing walls), center line elevation of spit/roadway, and topography of adjacent nearshore area down to a lower tide elevation.
- Additional water quality data sampling to build upon the sampling program outlined and conducted under Phase 1B work. Water samples will be collected during one additional time period and water quality measurements will be collected during two additional time periods. Timing of data collection will be selected in coordination with DNR. Sampling locations will be the same as Phase 1B work.
- Sediment grab samples from inside the lagoon and the nearshore area adjacent to the lagoon will be collected and analyzed in a lab to determine grain size distribution. Two locations within the lagoon, two locations within the old tidal channel, and two locations in the nearshore area will be sampled (six total samples).
- Habitat Survey: A reconnaissance-level habitat survey will be conducted to document existing habitat conditions within Whiteman Cove and adjacent areas within a potential construction

footprint. This survey would include documentation and mapping of dominant vegetation (including non-native species); aquatic habitat conditions such as depth, substrate, and aquatic vegetation; and estimated areas of wetlands. A wetland delineation will not be conducted. Any fish or wildlife species observed will be documented and a general description of the types of fish and wildlife species that would utilize the site will be included.

Deliverables

- Topographic survey data in AutoCAD format and PDF
- Data files from instrumentation, field forms, and laboratory results
- Results of the data collection effort will be documented in the feasibility report scoped in Task 10.

Task 7: Develop Evaluation Criteria and Project Alternatives

This task will include development of evaluation criteria and Project alternatives.

Subtask 7.1: Evaluation Criteria Development

This subtask includes the following:

- Coordination with DNR, regulatory agencies, and others (as needed) to develop evaluation criteria specific to stated objectives for the project in Section 1 of this scope of work and other regulatory considerations
- Development of Preliminary Evaluation Criteria for discussion with DNR at a conference call meeting and revision based on DNR's input
- Preparation of materials outlining evaluation criteria to be published on DNR's Project website to solicit public and stakeholder input on the proposed evaluation criteria.
- Finalization of the evaluation criteria based on provided input

Subtask 7.2: Preliminary Concepts

This subtask includes the following:

- In coordination with DNR, identify a range of preliminary concepts (up to five anticipated) that will meet (to the extent practical) evaluation criteria developed in Subtask 7.1. Reasonable options developed and provided to DNR by YMCA, homeowners, and other stakeholders will be considered along with other options. These concepts may include potential structural solutions to provide fish passage to Whiteman Cove. This task will leverage work previously conducted by Anchor QEA, and others, at the site.
- Range of concepts will be discussed at the pre-application meeting with Regulatory Agencies (see Subtasks 5.2 and 8.6) to solicit their input on permitting constraints for each concept. Input obtained during this meeting may eliminate the number of preliminary concepts included in this screening level evaluation.

- Conduct a screening-level feasibility review on each of the preliminary concepts using existing data and previously completed studies (including information collected/compiled as part of Phase 1, 1B, and Task 6 of this phase of work (Phase 2).
- Develop a matrix that outlines high-level opportunities and constraints for each of the preliminary concepts and narrative and illustrative figures (plan view only) for each preliminary conceptual alternative. These materials will be published on DNR's Project website to solicit input.

Subtask 7.3: Select Draft Conceptual Alternatives

This subtask includes the following:

- In coordination with DNR and using input obtained from regulatory agencies, project stakeholders and the public through the Project website, select two of the preliminary concepts (Subtask 7.2) to move forward in the in-depth studies (Task 8).
- Develop narrative outlining rationale for selection of the preferred alternative for inclusion in the feasibility report (Task 10).

Deliverables

- Draft and Final Matrix of Preliminary Evaluation Criteria, provided in PDF format
- Draft and Final Matrix of Final Evaluation Criteria, provided in PDF format
- Draft and Final Matrix of Opportunities and Constraints for each preliminary concept, provided in PDF format

Task 8: Planning-Level Studies and Investigations

Anchor QEA will evaluate two conceptual alternatives (Task 3) at a screening/planning level, based on developed evaluation criteria, as needed to get to a preferred alternative. Specific studies that will be conducted are described in the subtasks below.

Subtask 8.1: Hydraulic Assessment (Led by Anchor QEA)

This subtask includes the updating of an earlier hydraulic modeling assessment, using an unsteady state (tidal) one-dimensional (1D) model (HEC-RAS) of the system to evaluate fish passage, flooding risk, sediment transport impacts, and impacts to existing recreational uses of Whiteman Cove due to proposed conceptual alternatives. This subtask also includes evaluating other concerns through analytical and GIS-based evaluations.

Updates to the existing 1D model will include, at a minimum, the following:

- The 1D model will be changed to a 2D model within HEC-RAS to provide increased resolution in Whiteman Cove for predictions of water surface elevation and depth-averaged velocities and salinities

- Updates to elevation information, if needed, from the topography data collected as part of Task 6
- Updates to the freshwater input to Whiteman Cove used in the model using GIS hydrology tools, updated rainfall information, and updated elevations (as needed)
- Salinity modeling will be enabled

Conditions that will be modeled for each proposed alternative will include the following:

- Tidal conditions only representing a typical 2-week tidal signal, including king-tides
- Tidal conditions (as defined above) with one low and one high flow from tributaries
- Tidal conditions (as defined above) with mid-range estimates for sea level rise

The output of the model for each proposed alternative will include the following:

- Depth-averaged velocities in the tidal connection (based on proposed alternatives) between the lagoon and the Sound over typical tidal cycles
- Water surface elevations and depth-averaged salinities in the lagoon due to tides, freshwater inflows, and the proposed tidal connection between the lagoon and the Sound

The results of the model will be used to evaluate the conceptual alternatives in terms of fish passage into the lagoon, potential for flooding of adjacent properties along the lagoon shoreline, potential for low water elevations (draining) of the lagoon at certain tidal elevations, potential impacts to existing recreational uses of Whiteman Cove and sediment transport along the nearshore and estuary that could impact adjacent commercial shellfish beds and an eelgrass restoration site. A GIS-based analysis will be used to evaluate the impacts of high and low water levels (predicted by the modeling) on the lagoon.

In addition to the hydraulic modeling, wave conditions in the lagoon will be evaluated for open channel-based alternatives. An open channel connection with the Sound will allow some wave energy to propagate into the lagoon during storm events. Wave conditions that can impact the site (from the Sound) will be estimated using standard wave-hindcast methods (using long-term wind data) as outlined in the U.S. Army Corps of Engineers (USACE) Coastal Engineering Manual (USACE 2006). Potential for wave impacts and shoreline erosion inside the lagoon due to open channel/bridge alternatives will be estimated using standard calculations (spreadsheet models) for wave propagation, transformation, and breaking, as described in the USACE Coastal Engineering Manual (USACE 2006).

The results of the hydraulic modeling and wave evaluation will be used to evaluate potential changes to physical and geological coastal processes in the nearshore region of the Project site. Potential changes to physical and geological coastal processes at the site due to mid-range estimates of sea level rise will be discussed in terms of sustainability of the restored system. Anchor QEA will review

predicted sea level rise estimates for the Project area as outlined in a report developed by the University of Washington Climate Impacts Group (CIG).¹ Anchor QEA will also review the recent (July 2018) CIG and Washington Sea Grant (in partnership with many others) that provides the most up-to-date sea level rise estimates for the Puget Sound Region. Anchor QEA will work with DNR to select the most appropriate sea level rise estimates and will provide input on the conceptual alternatives but will not conduct a full sea level rise analysis during predesign.

Subtask 8.2: Coastal Sediment Transport Study (Led by Blue Coast)

This subtask includes a combined analysis of geology and hydraulics to determine the existing geomorphology and sediment dynamics and to evaluate the potential impacts to these processes as a result of construction of the two proposed alternatives. Analysis will address the ability for a tidal channel to be self-sustaining under coastal processes at the site as well as the potential impacts to nearshore habitats updrift from the Project site. The specific methods to conduct this analysis include the following:

- Conduct a review of data available for the site including aerial photographs, oblique aerial photographs, and topographic data. Publicly available data will be used to document the erosion and accretion potential at the site and dominant direction of littoral drift as well as other geomorphic indicators.
- The modeling outputs will be used to calculate tidal prism (volume of water flowing into the system at high tide) for the proposed alternatives. Potential marsh area will also be calculated for each alternative. This information will be used to size the dimensions for an open channel for tidal estuary alternatives based on regression models being developed as part of ESRP Tidal Channel Learning Grant.
- The modeling outputs of velocity will be used to calculate shear stress at the channel outlet for each alternative. Shear stress estimates will be compared to critical shear stress for several mean diameter grain sizes within the tidal channel to estimate potential for sediment mobilization and scour.
- Wind-wave estimates will be used to calculate alongshore sediment transport at the site under existing conditions and for both alternatives. The Project alternatives will be evaluated based on the changes in geomorphology as a result of the Project and how the new geomorphology will affect longshore drift at the Project site as well as updrift of the Project site.
- Reference sites that have similar wave conditions and geomorphology to the historic condition at Whiteman Cove and to the alternatives developed will be identified to assist in characterizing potential for changes to existing conditions and provide an understanding of evolution of the site after Project construction.

¹ University of Washington Climate Impacts Group, 2017. Prepared in partnership with Washington State Parks and Recreation Commission. June 2017.

- A conceptual (diagrammatic) model of sediment transport will be developed for the Project site under existing conditions and after Project construction to compare the relative sediment sources and sinks and evaluate site geomorphology. The model will be qualitative (conceptual) for all elements and quantitative for sediment sources and sinks where sufficient information exist to calculate net transport rates.
- The conceptual sediment transport model will also be used to estimate the potential for impacts from changes to sediment transport patterns to eelgrass and shellfish resources near the site. The presence of mapped eelgrass and shellfish beds are in and of themselves excellent indicators of the existing conditions that dominate at the site and their delineation will be used to help define the extents of sediment transport conceptual model.

Subtask 8.3: Transportation Study (Led by KPFF)

This subtask includes the following to inform the conceptual alternatives in terms of access to YMCA Camp Coleman by evaluating two transportation options for vehicle access to the camp.

- Evaluate alternative accesses to YMCA from Whiteman Cove Road and from 48th Street SW, including preliminary evaluation of:
 - Property impacts
 - Constructability and cost
- Evaluate a fish-passable bridge or other structural option along the existing sand spit for conformance with American Association of State Highway and Transportation Officials and Federal Highway Administration standards, including preliminary evaluation of:
 - Approximate span length based to support the minimum hydraulic opening
 - Foundation stability
 - Minimum clearance to mean higher high water
 - Structural depth
 - Constructability and cost

Subtask 8.4: Cultural Resources Review (Led by Anchor QEA)

This subtask includes the following:

- Additional desktop analysis of potential impacts to cultural resources, building on the planning level assessment prepared in 2015. This analysis will be specific to the two alternatives under consideration and will provide sufficient detail to compare the two alternatives based on their potential impacts.
- For each alternative, the analysis will include a recommended Area of Potential Effects (APE), an inventory of recorded resources within the APE, and a description of potential impacts. Effects to any recorded sites or structures will be evaluated to the extent possible with existing information.

Subtask 8.5: Fisheries and Habitat Assessment (Led by Anchor QEA)

This subtask includes the following:

- Compiling existing information, supplemented with site observations, on the biological communities and habitat within the Project area, including priority habitats and species, wetlands, trees, and other available information.
- Identifying and evaluating potential impacts and benefits from the conceptual alternatives on fish and wildlife species and habitats (including specific elements such as trees and wetlands) by quantifying areas of existing versus proposed habitats and the habitat suitability for representative species (based on accessibility, depth, water quality parameters, vegetation, etc.).

Subtask 8.6: Permitting Strategy (Led by Anchor QEA)

This subtask includes the following:

- Attending a multi-agency site visit (i.e. pre-application meeting) to orient regulatory staff with the Project area and obtain feedback on the anticipated permitting strategy. Budget for this meeting is scoped in Sub-Task 5.2 (Meetings).
- Reviewing local codes and ordinances that may apply to the Project (e.g., Shoreline Master Program, Critical Areas Ordinance).
- Preparing a recommended permitting strategy that summarizes anticipated environmental permits and approvals, timing, and documentation necessary to support the environmental review of the Project.

Subtask 8.7: Developing Benefits and Concept-Level Costs

This subtask includes the following:

- Developing a matrix of benefits (based on final evaluation criteria) and concept-level opinions of construction cost for each of the two conceptual alternatives. These costs may be provided as a range due to uncertainties and data gaps at the conceptual level of design.

Deliverables

- Draft and Final Technical Memorandum for each study (Hydraulics, Coastal Sediment Transport, Transportation, Cultural Resources, Fisheries/Habitat, Permitting), provided in PDF and MS Word format
- Draft and Final Area of Potential Effect maps for each alternative, provided in PDF format
- Draft and Final Concept-level opinion of construction cost and Benefits Matrix, provided in PDF format

Task 9: Select Preferred Alternative

This task includes selection of the preferred alternative based on input from the open meeting (Task 5.2), which is expected to occur after completion of studies scoped in Task 8, and discussions with DNR. This task includes the following:

- Selection of preferred alternative
- Develop a narrative of rationale for selection of the preferred alternative for inclusion in the feasibility report (Task 10).

Deliverables

- None

Task 10: Feasibility Report

This task includes development of a feasibility report to summarize work conducted in Tasks 1 through 8 on the Project. The main body text of the report will provide a summary of the work and previous deliverables will be included as appendices to the report. Appendices will include, at a minimum, water quality reports and technical memoranda developed for each of the technical studies conducted as part of Task 8.

Deliverables

- Draft and final feasibility report provided in PDF and MS Word format

3. Assumptions

Meetings (Task 5):

- DNR will be responsible for open meeting logistics, including determining who is invited, publicizing open meetings, distributing invites, securing location(s), and providing audio visual equipment and ensuring its functionality.
- Anchor QEA will provide DNR with slides and handouts to be included at the open meeting. DNR will complete reproduction tasks for handouts at the open meeting.
- DNR will lead facilitation of the open meeting; Anchor QEA will lead facilitation of regulatory agency site visit.
- Up to three consultant staff will attend the open meeting; duration is assumed to be 2 hours, not including travel time. DNR staff will develop a summary of input from each meeting.
- Kickoff and progress meetings with DNR are assumed to be 1.5 hours in duration and will be conference calls. One consultant team member will attend one of the progress meetings in person (in Olympia).
- Travel time and mileage will be billed to DNR. Travel time from Seattle to Whiteman Cove and Seattle to Olympia is estimated at 3 hours round trip.

Data Review and Collection (Task 6):

- A comprehensive site survey, including a topographical and bathymetric survey, has not been completed and will not be completed until Phase 3 of the Project after a preferred alternative is selected.
- Existing historical records, survey, LiDAR data, geology, utility information, and other GIS data will be adequate for development and evaluation of the conceptual alternatives.
- Geotechnical test pits and/or borings, or other invasive exploration, will NOT be required as part of the feasibility evaluation.
- A fish survey will not be conducted as part of this scope of services.
- Data gaps evaluation is not included in this scope of services, because it was previously completed as part of Phase 1B work (see Attachment 1).

Evaluation Criteria and Conceptual Alternatives (Task 7):

- Following pre-application meeting with Regulatory Agencies, up to five concepts will be summarized for discussion with DNR and for publication on the Project website. These concepts will be described by a narrative and an illustrative figure for this purpose. No engineering plan views or section views will be developed for concepts. Work conducted by others will be leveraged as much as practical to develop and describe concepts.
- Two concepts will be selected based on input from the open meeting and discussions with DNR to move forward in the feasibility analysis.
- Only one bridge concept will be included in the conceptual alternatives. Multiple bridge structures will not be evaluated.

Planning-Level Studies (Task 8):

- Level of effort proposed for studies is based on current understanding of the Project and potential concepts. The level of effort and budget for the studies may increase or decrease based on results of Tasks 5, 6, and 7 from what is included in this scope of work.
- Proposed work does not include chemical analysis of soils or sediments.
- No permitting applications or formal agency correspondence will be prepared under this scope of work.
- DNR will provide on-site cultural resource investigation and communicate findings to Anchor QEA.
- No fieldwork will be required for completion of the cultural resources analysis. Fieldwork may be recommended for future phases of environmental compliance.
- Sediment transport modeling is not included in this scope of work, sediment transport will be evaluated using results of hydrodynamic modeling and empirical calculations.
- This task includes budget for one round of review by DNR. Comments will be addressed to develop final technical memoranda as part of Task 8.

- A single response matrix for substantive comments on technical memoranda will be compiled.

Select Preferred Alternative (Task 9):

- Input from DNR, the open meeting, and regulatory agency site visit will be used to select a preferred alternative.
- Refinement of the preferred alternative based on regulatory agency comments, open meeting input, or other information is not included in this scope of work and will be conducted as part of 30% design. A narrative of proposed refinements will be included in the feasibility report (Task 10).

Feasibility Report (Task 10):

- The feasibility report will be developed as a succinct summary of work completed to date on the Project including conclusions and recommendations for the preferred alternative for the site.
- This report will include previous deliverables (including technical memoranda developed as part of Task 8) as appendices. The consultant team will address one round of review comments from DNR on the report to develop a final report. Additional review/revision of previous deliverables included as appendices is not included in this work.
- The single response matrix for substantive DNR comments on draft technical memoranda developed as part of Task 8 will be expanded to include substantive DNR comments on the draft feasibility report.

4. Timeframe

The following table summarizes the proposed timeline for completion by task.

Task	Timeline
Task 5 Project Management and Meetings	January 2020–June 2020
Task 6 Data Review and Collection	January 2020–February 2020, additional water quality sampling in May 2020
Task 7 Develop Evaluation Criteria and Project Alternatives	February 2020
Task 8 Planning-Level Studies and Investigations	May 2020
Task 9 Select Preferred Alternative	May 2020
Task 10 Feasibility Report	June 2020

Note:

Tasks 1 through 4 are part of Phase 1 and 1B work for this Project.