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Seattle District



# **Grays Harbor Juvenile Detention Center Section 14 Stream bank Protection Project**

## **Appendix C**

November 2025

**COST APPENDIX**  
**FOR**  
**Grays Harbor Detention**  
**Shoreline Protection Project**  
**CAP Section 14**  
**Aberdeen, WA**

In support of:  
Draft Integrated Feasibility Report and Environmental  
Assessment

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## Introduction

The purpose of this appendix is to document and present the detailed cost estimate in support of emergency shoreline protection for public facilities in Grays Harbor, WA. The project intent is to armor the shoreline adjacent to Grays Harbor Juvenile Detention Center (JDC) and to mitigate the unavoidable environmental impacts of construction.

## Cost Development

The cost engineer prepared these estimates in accordance with ER 1110-2-1150 E&D Civil Works Projects, ER 1110-2-1302 E&D Civil Works Cost Engineering, and UFC 3-740-05 Construction Cost Estimating.

The cost engineer used conceptual design drawings and quantities prepared by the Project Delivery Team (PDT) as the basis of the cost estimate. The cost engineer verified the provided quantities were reasonable and calculated additional supporting quantities as needed. The cost engineer further incorporated additional information provided by the PDT via e-mails and in-person discussions into the estimate.

The cost engineer used Micro-Computer Aided Cost Estimating System II (MII) to prepare the estimates. The cost engineer developed the estimates at a Class 4 level in order to support selection of the TSP. Per ER 1110-2-1302, a Class 4 estimate is supported by a discussion of scope and uncertainties, with particular attention paid to large cost items. The cost engineer documented uncertainties in the Abbreviated Risk Analysis (ARA) risk register and developed risk-based contingencies using the tools included with the abbreviated risk analysis.

The local sponsor, Grays Harbor County, will be responsible for 35% of the project's cost. The estimated cost of the selected plan is considered fair and reasonable, provided the construction is done by a prudent and well-equipped contractor.

## Summary of Project Features

The cost engineer estimated three alternatives (Alternatives 2, 3, and 4). The cost engineer did not prepare a cost estimate for the no action alternative (Alternative 1) or Alternative 5 (which the PDT previously screened out).

**Alternative 2 – Riprap Along Eroded Shoreline:** This alternative replaces the eroded streambank with a single straight armored slope. Large woody material is at the toe of the armored slope. Because there is no flat bench on the shoreline to plant intertidal vegetation, it is assumed that this alternative will require off site mitigation.

**Alternative 3 – Terraced Riprap Berm:** This alternative replaces the eroded streambank with an armored slope that is interrupted by a flat terrace. The terrace is at an elevation around mean low water and is planted with intertidal marsh vegetation. Large woody material is at the toe of the armored slope. This alternative mitigates environmental impacts with these on-site measures.

**Alternative 4 – Laid Back Terraced Riprap Berm:** This alternative is similar to Alternative 3, except the armored slope is further inland. To maintain the required 15' visual clear zone, a

section of the perimeter fence needs to be relocated. Furthermore, this alternative reduces the yard space at the facility and requires temporarily moving portable classrooms during construction.

## Development of Cost by Feature

**01 Lands and Damages:** Sponsor owns land where project will take place. Real estate costs only apply to Alternative 2, which assumes off site mitigation. The cost engineer developed cost based on values of similar parcels of land in the area after discussion with PDT members.

**06 Fish & Wildlife Facilities:** This feature covers measures required to mitigate the environmental impact of construction. The main mitigation member is assumed to be anchored Large Woody Material (LWM) due to its effectiveness, cost, and constructability. The cost engineer calculated costs based on items of work required to assemble anchored LWM on a shoreline. The cost engineer developed these items of work through discussion with PDT members who have personal experience overseeing installation of anchored LWM.

**16: Bank Stabilization:** All three alternatives assumed shoreline armoring using riprap. The cost engineer calculated volumes based on plans created by PDT members and further discussion with the PDT members. The cost engineer used volumes of materials as a basis to calculate time required by heavy equipment. The estimate includes support equipment that a contractor would likely need to complete construction. The cost engineer developed these items of work through discussion with PDT members who have personal experience overseeing riprap armoring of shorelines.

## Major Assumptions

When necessary, the cost estimator made assumptions while developing the estimate. These are documented in the Basis of Estimate. Several key assumptions are:

- Dump trucks will be able to place rocks near the project site.
- Shoreline armoring will be performed by excavators.
- Front end loaders will move rocks from staging area to near where excavator is working.
- Placement of rocks will be staged in a way to maximum working area for the excavator.
- A lower productivity rate is assumed due to the excavator needing to frequently move.

## Contractor and Indirect Cost Considerations

The cost engineer assumed the prime contractor to be a management contractor, with most of the construction work being done by subcontractors. The prime contractor is expected to self-perform a minimum of 15% of the work.

### Prime Contractor

The prime contractor's job office overhead (JOOH) covers all direct supervision, temporary office facilities, and small tools costs. The cost engineer calculated a separate JOOH for each alternative to help determine cost differences between alternatives.

Home office overhead (HOOH) expenses are costs incurred by the contractor for business management and main office expenses. These main offices expenses include cost such as upper management, accounting, personnel, and legal.

The cost engineer calculated profit for the prime contractor using the profit weight guidelines method in UFC 3-740-05 and applied to the running construction cost. This range is usually between 3% - 12%. The cost engineer also added insurance and bond as a running cost. Additionally, Washington State levies a 0.484 percent business and occupation tax for Government Construction which the cost engineer applied as a running cost on top of all other expenses.

### Subcontractors

JOOH includes on-site management costs, costs for small tools, temporary facilities, and mobilization and demobilization of support equipment. HOOH for covers the subcontractors' permanent offices or home office expense. The cost engineer assumed JOOH, HOOH, and profit markups based on typical values.

### Planning, Engineering, and Design

The Planning, Engineering and Design (PED) costs are the design costs from authorization until project completion. This work includes detailed surveys, soil investigations, design work, preparation of the plans and specifications to guide the contractor to construct the project, and designer support during construction.

### Construction Management

Construction Management – sometimes called Supervision and Administration, or S&A – includes the cost of project managers, project engineers, and other field staff supervising the project construction.

### Risk-Based Contingency

Current regulations require analysis of schedule and cost risks. See the ARA Attachment for the Abbreviated Risk Analysis (ARA) documentation. The ARA calculated contingencies appropriate to capture cost risks and unknowns for the cost of Construction, PED, and S&A. To help in showing cost differences between alternatives, the cost engineer calculated separate contingencies for different alternatives and WBS.

The largest contingencies relate to scope uncertainty. Because the site is built on uncontrolled fill and the PDT has limited geotechnical information, USACE may need to change the design in light of new information. USACE may also need to change environmental mitigation design as the PDT learns more about these requirements. As a result, a high contingency is needed to cover these risks. Future testing and design work will allow reduction of contingencies.

## Price Level

The three categories of cost described in the Total Project Cost Summary (TPCS) are “Estimated Cost,” “Project First Cost,” and “Total Project Cost.” The estimated cost, which is the cost calculated in MCACES (MII), is based on a price level of October 2024. The Project First Cost, or in other words the value the project is actually authorized at, is set at October 2024. Lastly, the Total Project Cost is the fully funded cost of the project after taking into account predicted escalation.

Escalation rates are calculated using the Civil Works Construction Cost Index System, documented as EM 1110-2-1304 – the escalation is the percent change between the index at the current price point and the index at the time period when the midpoint of an expense is expected to occur. The midpoint of Real Estate acquisition is assumed to occur in FY27 Q4. Based on the estimator’s schedule, the midpoint of construction will be FY28 Q4, and the midpoint of design is assumed to be in FY27 Q3.

## Project Schedule

The cost engineer developed the construction schedule using durations calculated in MII. The cost engineer organized features of work based on the logical sequence of construction and assumed that most construction would occur in a sequential order.