



US Army Corps
of Engineers®
Seattle District



Skagit River Flood Risk Management General Investigation

Skagit County, Washington

Draft Feasibility Report and
Environmental Impact Statement

Appendix G – Cost Estimate

May 2014

Cost Estimating Appendix

COST ENGINEERING SUMMARY ATTACHMENTS

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DRAFT

COST ENGINEERING

Skagit GI Comprehensive Urban Levee Improvement Skagit County, WA

INTRODUCTION

The purpose of this appendix is to document and present the detailed cost estimate prepared in support of the Skagit GI Comprehensive Urban Levee Improvement as a Tentatively Selected Plan (TSP). It is designed to provide 100 year level protection and improve reliability of non-urban levees for existing protection levels. The project footprint is located in Skagit River Basin, in the State of Washington. The local sponsor for this project is Skagit County.

The basis of the cost estimates is conceptual design drawings and conceptual quantities prepared by the Project Delivery Team (PDT). Additional information developed by the PDT is incorporated into the estimate. This includes emails, phone calls, and in-person discussions. The MCACES estimate carefully documents the basis of information used in development of costs, down to the lowest reasonable level. Guidance for preparation was obtained from ER 1110-2-1150 Engineering and Design (E&D) for Civil Works Projects, ER 1110-1-1300 E&D Cost Engineering Policy and General Requirements, ER 1110-2-1302 Civil Works Cost Engineering, and ETL 1110-2-573 E&D Construction Cost Estimating Guide for Civil Works. The cost estimates were prepared using Micro-Computer Aided Cost Estimating System MII version 4, build 4. Supporting cost libraries or databases were MII 2012-b English Cost Book, 2011 Region VIII Equipment library (EP 1110-1-8) and the 2012 National Labor Library rates for Seattle, Washington.

The cost estimate was prepared at a Class 4 level with the intention that this estimate will be used for preliminary analysis to determine a National Economic Development (NED) plan. It is expected that further design effort will be done in order to prepare a cost estimate that will be used for authorization.

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. Uncertainties are documented in the Cost and Schedule Risk Analysis (CSRA) risk register and based on an abbreviated risk analysis suitable for this stage in the planning process.

Quantities used in the cost estimate came from two primary sources: they were developed by the applicable designer and delivered to the cost engineer, who then validated that they are reasonable. Additionally, they were developed from the conceptual design package with calculations performed in both MCACES itself and in a Microsoft Excel worksheet.

Lastly, this is a cost share project with Skagit County as the Local Sponsor. Federal costs are anticipated to be 65% of the Total Project Cost, with the balance to be Skagit County's share.

PRICE LEVEL

The three categories of cost contained 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 September 2013. The Project First Cost, or in other words the value the project is actually authorized at, is set at October 2015. Lastly, the date point of the Total Project Cost which is the cost the government will pay at the year of construction is October 2019.

Escalation is based on the March 2012 [Civil Works Construction Cost Index System \(CWCCIS\), EM 1110-2-1304](#).

It is assumed that the Seattle metropolitan area possesses a sufficiently large and diverse enough contractor, labor, equipment, and material base to support the project. The potential that this is not the case is considered within the risk analysis. Sources of cost information include MII 2012-b English Cost Book, 2011 Region VIII Equipment library (EP 1110-1-8) and the 2012 National Labor Library rates for Seattle, Washington. Additionally, vendor quotes for critical items were solicited and utilized for major components, or items that would otherwise be difficult to account for.

The cost of the selected plan is considered fair and reasonable, provided the construction is done by a prudent and well equipped contractor.

COST ESTIMATE STRUCTURE

The cost estimate for the selected plan was prepared by the Cost Engineering Section within Seattle District. The overall structure of the cost estimate is dictated by the Civil Works – Work Breakdown Structure. This structure is followed down to the sub-feature level (e.g. feature 11 Levees and Floodwalls, followed by sub-feature 1101 Levees.) The remainder of the estimate structure is based on the expected construction methodology and phasing techniques as determined by the PDT.

Project features in the total project cost summary (TPCS) are in accordance with the CWWBS:

01 Lands and Damages include the real estate acquisitions of project lands, easements and rights-of ways. Costs are real estate, non-Federal’s sponsors cost for land surveys, title preparation, legal opinions and Federal costs of reviewing the non-Federal sponsor’s documents for legal sufficiency.

02 Relocations includes costs to modify existing public infrastructure. This covers roads to allow for installation of new levees and raising existing levees. There will be demolition of existing roads, and reinstallation. Also included are costs to modify existing utilities to allow for placement of new levees and floodwalls. Work will include demolition and subsequent reinstallation.

06 Fish & Wildlife Facilities. Includes mitigation efforts for damages caused by other parts of the project. Primarily this includes purchase of wetland credits, installation of Large Woody Debris, and additional installation costs to bury a portion of the levee toe. These features are expected to change as refinements are made during the feasibility phase of the project.

11 Levee and Floodwalls. Includes costs for a installation of new levees, raising of existing levees owned by existing dike districts, and placing floodwalls at critical infrastructure.

30 Planning, Engineering and Design (PED). Provides the estimated engineering design costs based on a percentage of the construction cost features.

31 Construction Management (CM) provide the estimated CM or Supervision and Administration costs based on a percentage of the construction cost features.

Contingencies are added to the cost estimates in the TPCS based on the results of the cost and schedule risk analysis performed on September 24, 2013. Contingency values are variable and depend on the level of protection (75 year, 100 year, or 250 year flood protection). Contingency values range from 63 percent to 65%. Results of the cost risk study yielded a percent contingency which has been added to the construction costs of the project.

Escalation factors to the Effective Price Level Date and the Fully Funded Project Estimate Amount through the end of construction have also been included as part of the TPCS. The inflation was based on an assumed authorization date of October 1, 2015 and a mid-point of construction of October 1, 2019.

Key assumptions made while preparing construction costs levees, floodwalls, and supporting elements were:

- Disposal points for rock, fill, and construction debris are available within 10 miles.
- Sources of rock, fill, and general construction materials are available within 10 miles.
- Levee construction and modification will require entirely new fill.
- Existing roads and utilities will be replaced “in-kind” where demolished.
- Addition of new fill to existing levees can take place entirely on the landward side, requiring no in-water work.
- All property acquisitions and easements can be achieved, and no modifications of levee or floodwall footprints are required.
- There is sufficient workforce and equipment available to complete the project within the calculated timeframe.
- The protective floodwalls are at one constant height and will not vary.
- Staging areas are available close to the project elements.
- Existing riprap toe armor is not suitable or is not present and will be replaced.

Many of these assumptions were made by the PDT as a whole, but as they have significant cost impacts they are listed above.

DEVELOPMENT OF COSTS BY FEATURE

01 REAL ESTATE

Real estate costs along with internal administrative costs for land purchases and easements were provided to the Cost Engineer by Kevin Kane (NWS Real Estate). Please see the real estate appendix for further information.

02 RELOCATIONS

Information regarding where road rehabilitation and utility relocations would be done was provided to Cost Engineering by Glenn Kato from NWS Civil Design. Subsequently installation costs were developed based on RS Means production rates and vendor quotes for materials.

06 WILDLIFE FACILITIES & SANCTUARY

Quantities and rough scopes of what work will occur was provided by Hannah Hadley from NWS Environmental and Cultural Resources Branch. Features like the buried toe were coordinated with other technical disciplines to develop a rough design that would work for this project. Other features, such as the large woody debris, were based on designs from other projects. Costs for this feature come from vendor quotes, RS Means items, and, in the case of wetland credits, past pricing costs from other projects. Note that the purchase of wetland credits will be done by the Corps of Engineers or Local Sponsor. Additional costs for contractor management of this process are not included at this time.

11 LEVEES AND FLOODWALLS

Information for levee fill volumes was provided by Travis Macpherson (NWS Geotechnical) in coordination with Glenn Kato and Karl Eriksen (NWS Hydraulics). Fill material costs are based on vendor quotes (note that all fill is assumed to be purchased at this stage), and production rates and crew composition is based on RS Means items or calculated by the cost engineer. At this point it is assumed there are no interferences with existing structures or infrastructure, private or public. At the existing levees and new levees, the top few inches of organic material will be removed from the placement area, and the ground will be scarified to allow proper bonding of the new fill material. In certain areas, protective rip rap will be placed to armor the riverward slope.

Floodwall costs were based on a template wall design provided by Tracey Snyder (NWS Structures) that should be suitable for the proposed placements at the hospital and treatment plant. The floodwall costs include installation of a fifteen foot high protective floodwall to protect these facilities. After consultation with Ms Snyder it was decided that H-pile supports would not be necessary to support the structure, as ground conditions are expected to be suitable. Sheet piling is expected along the length of the floodwall to prevent seepage.

CONTRACTOR AND INDIRECT COST CONSIDERATIONS

The cost estimator assumed the work is done by a prime contractor which performs the rough earthwork, rough demolition, as well as project management functions. Specialty activities such as concrete placement, paving, and electrical/mechanical work are to be done by subcontractors hired by the prime contractor. Note that the sheet pile driving for the floodwalls is assumed to be done by a specialized contractor hired by the floodwall contractor. This arrangement makes for up to three levels of contracting and markup costs (job office overhead, home office overhead, profit, bond, and B&O tax). For most project functions, this is limited to two levels.

PRIME CONTRACTOR

The prime contractor's job office overhead (JOOH) was calculated based upon the typical number of supervisory people, temporary office, equipment, and office supplies and the construction time estimated for the project. Mobilization and demobilization are included within this percentage. The calculated JOOH was 3.7 percent, plus a 3 percent allowance (applied to direct labor) for small tools costs.

The home office overhead (HOOH) expenses are those cost incurred by the contractor for its overall business management of their main office expenses. These main offices expenses include cost such as upper management, accounting, personnel, and legal. This cost estimator set the HOOH at 6 percent of the construction cost. Typically, HOOH ranges from 5 percent to 10 percent of the construction cost.

It should be noted that at present, a single prime contractor is assumed for the whole project. Additionally, it's assumed that this contractor was selected through a full and open contract acquisition process. This is the primary reasons for the lower levels of overhead. These may change as the acquisition process is defined, particularly if this project will be split into multiple separate contracts.

The profit for the prime contractor was calculated to be 7.5 percent of the running construction cost, which includes direct cost, JOOH and HOOH markups, as determined utilizing the profit weighted guidelines method in ETL 1110-2-573.

Performance and payment bond premium of 0.19 percent of the running construction cost, including the direct cost, JOOH, HOOH, and profit, as determined by the MII embedded bond premium table for Class B work.

A one percent allowance was made for the contractor to purchase insurance and other protective measures for this construction.

Lastly, Washington State possesses a 0.484 percent B&O tax which is applied as a running cost on top of all other expenses.

SUBCONTRACTORS

JOOH rates for the subcontractors were assumed to be 9 percent on the job. This includes on-site management costs, costs for small tools, temporary facilities, and mobilization and demobilization of support equipment.

HOOH for the subcontractors is assumed to be 9 percent to cover the subcontractors' permanent offices or home office expense.

Profit for the subcontractors was set at 8 percent.

A one percent allowance was made for the contractor to purchase insurance and other protective measures for this construction.

Lastly, Washington State possesses a 0.484 percent B&O tax which is applied as a running cost on top of all other expenses.

PLANNING, ENGINEERING, AND DESIGN

The Planning, Engineering and Design (PED) costs are the costs from authorization until the first construction contract is awarded. This work includes detailed surveys, soil investigations and preparation of the plans and specifications to guide the contractor to construct the project. Discussions with Project Management yielded a PED cost of 26.7 percent of the estimated construction cost (based on the 1% ACE Baseline CWE). The Planner, in coordination with Cost Engineering selected a 15 percent contingency. Note that PED costs will be further developed during the Feasibility phase of the GI.

CONSTRUCTION MANAGEMENT

The Construction Management (CM) costs are determined as a percent of the estimated construction costs. For this feasibility level estimate, a percentage of 10 percent of the construction cost was used in consultation with Project Management. The Planner in coordination with Cost Engineering selected a 15 percent contingency. Note that CM costs will be further developed during the Feasibility phase of the GI.

CONTINGENCY

Current regulations require formal analyses of schedule and costs risks. See the C&SRA Attachment for the Abbreviated Cost Risk Analysis Study (C&SRA) documentation that was performed on September 24, 2013. The results of the cost risk study were that a 64 percent contingency (based on the 1% ACE Baseline CWE) was appropriate for construction costs. There was some minimal variation between levels of protection but range was under 1%. While an Abbreviated C&SRA was done at this point in project development, a full Monte Carlo risk analysis will need to be done in Feasibility in order to more accurately define the impacts of risk and uncertainty.

Contingency for 01 Real Estate costs was determined by Kevin Kane and Doris Cope in NWS Real Estate. This cost was determined to be 15 percent of the real estate total.

An output of the risk analysis is contingency, whose purpose is an added cost included in the cost estimate to cover unknowns. The largest driver of risk at this point is the raising of existing levees. This is the largest cost component and changes to this feature could have substantial effects on the project cost.

Unknowns across the project could include:

- The available information on existing roads is minimal and there is a large degree of uncertainty as to what the existing roads are like and what exact changes will need to be made to accommodate new and raised levees. This also applied to utilities, as information available was minimal at best.
- The PDT felt that it was highly likely that the levee raise designs and scope would change as the project was developed. Interferences with existing obstructions and other obstacles have not been evaluated. In order to accommodate interferences, it's possible that portions of the levee would need to be changed to floodwalls to avoid impacts to existing structures or site features that cannot be moved or modified. Additionally, due its size this feature is particularly vulnerable to variations in the hydraulic models, and the riprap armoring that may be required for protection.
- Flood gate designs were not available for estimating and as such it is not clear what even a preliminary design might require. Even the operations methodology for the gates is unclear, as it was not fully determined as to whether stop logs were wanted, or if a mechanical or manual slide gate was desired. Changes to this feature were considered highly likely.
- A contracting plan has not been established for this project. The project cost is currently calculated based on a single, large contractor administering all construction. Project costs should be expected to increase if a small business strategy is pursued or if a MATOC is used to restrict competition. This project has numerous elements that are easily separable and the PDT felt it was likely that many if not most of these might be split off as unique contracts. Doing this is likely to raise costs, but it may be easier to administer several smaller projects rather than one huge one.
- A consistent construction issue was the lack on known staging areas. Given the project footprint and complexity, multiple large staging areas will be required within the urban area. If these are not available or distant, prices will rise.
- The planned floodwalls will use sheet piles as a seepage barrier. However, this may raise concerns at the hospital due to noise and vibration. Additionally completely encircling the hospital and WWTP may require modification of a large number of unanticipated utilities.
- There may be difficulties in dealing with the large number of entities that will be affected by the project. State and federal highways, railroad mainlines, local utilities, and affected homeowner will all have concerns regarding project impacts to their property. This should not be viewed as a problem, as properly resolving stakeholder concerns is desirable. However, the scope and requirements of this is unknown, and may require extended time spent in the PED phase, or even changes to the project footprint to make reasonable accommodations.

PROJECT SCHEDULE

The project schedule for the Comprehensive Urban Levee Improvement was developed by the cost engineer based on MII calculated durations. Project length depends upon the level of protection that best fits the Nation Economic Plan (NED). However, projected durations are 22 months, 24 months, and 26 months for the 75, 100, and 250 year levels of flood protection, respectively.

Prior to construction start and after authorization, Planning, Engineering, and Design will occur. This is expected to take at least two years. Refinements will be made to the pre-construction schedule during the Feasibility phase.

OPERATIONS, MAINTENANCE, REPAIR, REHABILITATION, AND REPLACEMENT COSTS

A detailed OMRR&R cost estimate for this project will be prepared during Feasibility phase. NWS Economics has prepared a draft version of this, but a final version will be made by Cost Engineering following approval of a TSP.

FINAL FEASIBILITY ESTIMATE

The final feasibility cost estimate as presented in the following Total Project Cost Summary (TPCS) for is as follows:

Cost of Comprehensive Urban Levee Improvement
Skagit County, Washington
2014 Feasibility Report

75 Year Level of Protection
FY 2015 Price Level \$201,413,000
Fully Funded Amount \$217,855,000

100 Year Level of Protection
FY 2015 Price Level \$213,020,000
Fully Funded Amount \$230,699,000

250 Year Level of Protection
FY 2015 Price Level \$225,590,000
Fully Funded Amount \$243,922,000

ATTACHMENTS

TPCS
PROJECT SCHEDULE
MCACES REPORT
CSRA RISK REGISTER & FEATURE CONTINGENCIES

Skagit GI - CULI - 1/75 ACE

Title Page

Skagit River General Investigation

Flood Reduction Measure

Design Level: Conceptual // Level 4

PM: Lynn Wetzler

Planner: Margaret Chang

Technical Lead: Glenn Kato

Cost Engineer: Daniel Lowry

PROJECT SYNOPSIS: Raise levee heights in urban areas to provide a 1.33% exceedance level of protection. Additionally, there are various non-structural improvements (flood walls at critical infrastructure, gates, etc.) Also included are drainage gates, utility relocations, roadway relocations and modification to accommodate increased levee heights.

ESTIMATED PROJECT DURATION: 489 work days (678 calendar days)

Estimated by NWS Cost Engineering

Designed by NWS Design Branch

Prepared by Daniel Lowry & Quinn Ma

Preparation Date 9/9/2013

Effective Date of Pricing 9/9/2013

Estimated Construction Time 489 Days

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BASIS OF ESTIMATE: Estimate developed using MEANS Cost Data, MCASES MII Cost Data, vendor quotes where applicable, and actual quantity takeoff data where available.

Estimated by NWS Cost Engineering

Designed by NWS Design Branch

Prepared by Daniel Lowry & Quinn Ma

Preparation Date 9/9/2013

Effective Date of Pricing 9/9/2013

Estimated Construction Time 489 Days

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Skagit GI - CULI - 1/75 ACE

Library Properties Page i

Designed by
NWS Design Branch

Design Document Conceptual Designs
Document Date 9/2/2013

Estimated by
NWS Cost Engineering

District Seattle District
Contact Daniel Lowry 206.764.3702

Prepared by
Daniel Lowry & Quinn Ma

Budget Year 2016
UOM System Original

Direct Costs

LaborCost
EQCost
MatlCost
SubBidCost

Timeline/Currency

Preparation Date 9/9/2013
Escalation Date 9/9/2013
Eff. Pricing Date 9/9/2013
Estimated Duration 489 Day(s)

Currency US dollars
Exchange Rate 1.000000

Costbook CB12EB-b: MII English Cost Book 2012-b

Labor NLS2012: National Labor Library - Seattle 2012

Note: <http://www.wdol.gov> is the website for current Davis Bacon & Service Labor Rates. Fringes paid to the laborers are taxable. In a non-union job the whole fringes are taxable. In a union job, the vacation

Labor Rates

LaborCost1
Landscape
LaborCost3
LaborCost4

Skagit GI - CULI - 1/75 ACE

Equipment EP11R08: MII Equipment 2011 Region 08

08 NORTHWEST

Sales Tax 5.40
Working Hours per Year 1,540
Labor Adjustment Factor 1.05
Cost of Money 2.50
Cost of Money Discount 25.00
Tire Recap Cost Factor 1.50
Tire Recap Wear Factor 1.80
Tire Repair Factor 0.15
Equipment Cost Factor 1.00
Standby Depreciation Factor 0.50

Fuel

Electricity 0.072
Gas 3.670
Diesel Off-Road 3.450
Diesel On-Road 3.990

Shipping Rates

Over 0 CWT 28.32
Over 240 CWT 26.60
Over 300 CWT 24.23
Over 400 CWT 22.06
Over 500 CWT 11.26
Over 700 CWT 9.51
Over 800 CWT 6.48

Date Author Note

9/26/2013 LOWRY **PROJECT DESCRIPTION**

This estimate consists of costs to provide flood protection to urban areas in the Skagit River Basin. This work will include upgrading existing levees, building new levees, constructing floodwalls, and other more minor elements. This project is expected to take place over several years.

9/26/2013 LOWRY **BASES OF DESIGN**

This estimate is the drawings, figures, and quantities prepared for the combined Draft Feasibility Report/EIS, September, 2013.

9/30/2013 LOWRY **ACQUISITION PLAN**

The project will be acquired by a yet to be determined bidding process. While this project would be a very large contract on its own, it may be broken into smaller pieces.

It is not know if this work will be performed by a Contractor under the Small Business Administration 8a program, HUBZone, SDVOSB, Women Owned Small Business or through a combination of these and full and open bidding. Additionally, use of a MATOC is not assumed but potentially could be used.

Design-build construction is not anticipated, and a full set of plans and specs will be made available at solicitation.

Date Author Note

9/30/2013 LOWRY **SUB-CONTRACTING PLAN**

The following are expected subcontractors on this project:

Earthwork Subcontractor

Paving Subcontractor

Utilities Subcontractor

Flood Wall Subcontractor

Pile Driving 2nd Tier Subcontractor

Landscaping Subcontractor

It is assumed that the Prime Contractor will do the rest of the work.

9/30/2013 LOWRY **PROJECT CONSTRUCTION**

SITE ACCESS

The project site is located in Skagit County, Washington. Access has yet to be determined, but due to project footprint will be at multiple points.

BORROW AREAS

The borrow sources for has not been determined, but there are several nearby sources. Evaluation will need to be done at Feasibility Estimate to determine fill availability. Potential local borrow points have not been evaluated.

CONSTRUCTION METHODOLOGY

The construction methodology is contains standard elements, but some in-water work is expected. Flood wall construction, and gate installation may contain some unique elements.

Date Author Note

UNUSUAL CONDITION (Soil, Water, Weather)

Work must be coordinated with seasonal weather variations. No major issues related to in situ soil issues or water work is expected.

UNIQUE TECHNIQUES OF CONSTRUCTION

None expected

9/30/2013 LOWRY **CONSTRUCTION WINDOWS**

SCHEDULE

5 days a week, eight hours per day.

OVERTIME

This estimate does not contain overtime.

9/30/2013 LOWRY **EQUIPMENT AND LABOR AVAILABILITY & DISTANCE TRAVELED**

This estimate uses Davis Bacon labor rates for Seattle, Washington.

Equipment rates used are from EP 1110-1-8, Volume 11, August 2011.

9/30/2013 LOWRY **ENVIRONMENTAL CONCERNS**

- Potential damages to existing wetlands through levee placement and expansion.
- Damage to fish habitat through placement of levee armoring.

Date Author Note

9/30/2013 LOWRY **RISK**

Risks were evaluated using the Abbreviated Cost and Scheduled Risk Analysis. A contingency rate of 58.01% was generated from this analysis and is applied to this estimate.

9/30/2013 LOWRY Schedule Durations:

Unless noted otherwise, schedule calculations do not take into account haul times. It is assumed that these are never a limiting factor, and there are sufficient available trucks to haul material to the job site. Further refinements to this assumption will be made at the feasibility level estimate and schedule.

Direct Cost Markups

	Category			Method		
	Productivity	Overtime		Productivity	Overtime	
	<i>Days/Week</i>	<i>Hours/Shift</i>	<i>Shifts/Day</i>	<i>1st Shift</i>	<i>2nd Shift</i>	<i>3rd Shift</i>
Standard	5.00	8.00	1.00	8.00	0.00	0.00
Actual	5.00	8.00	1.00	8.00	0.00	0.00

<i>Day</i>	<i>OT Factor</i>	<i>Working</i>	<i>OT Percent</i>	<i>FCCM Percent</i>
Monday	1.50	Yes	0.00	0.00
Tuesday	1.50	Yes		
Wednesday	1.50	Yes		
Thursday	1.50	Yes		
Friday	1.50	Yes		
Saturday	1.50	No		
Sunday	2.00	No		

Sales Tax	TaxAdj	Running % on Selected Costs
MatlCost		

Contractor Markups

	Category	Method
JOOH Prime (Small Tools)	Allowance	% of Labor
JOOH Prime	JOOH	JOOH (Calculated)
JOOH Sub	JOOH	Running %
HOOH Prime	HOOH	Running %
HOOH Sub	Allowance	Running %
Profit	Profit	Profit Weighted Guidelines
<i>Guideline</i>	<i>Value</i>	<i>Weight</i>
<i>Risk</i>	0.100	20
<i>Difficulty</i>	0.060	15
		<i>Percentage</i>
		2.00
		0.90

Skagit GI - CULI - 1/75 ACE

<i>Size</i>	<i>0.030</i>	<i>15</i>	<i>0.45</i>
<i>Period</i>	<i>0.120</i>	<i>15</i>	<i>1.80</i>
<i>Invest (Contractor's)</i>	<i>0.065</i>	<i>5</i>	<i>0.33</i>
<i>Assist (Assistance by)</i>	<i>0.060</i>	<i>5</i>	<i>0.30</i>
<i>SubContracting</i>	<i>0.070</i>	<i>25</i>	<i>1.75</i>
<i>Total</i>		<i>100</i>	<i>7.52</i>

Profit Sub	Profit	Running %
Bond	Bond	Bond Table
<i>Class B, Tiered, 24 months, 1.00% Surcharge</i>		

<i>Contract Price</i>	<i>Bond Rate</i>
<i>500,000</i>	<i>15.84</i>
<i>2,000,000</i>	<i>9.57</i>
<i>2,500,000</i>	<i>7.59</i>
<i>2,500,000</i>	<i>6.93</i>
<i>7,500,000</i>	<i>6.34</i>

Insurance	Allowance	Running %
Excise Tax	Excise	Running %

Owner Markups	Category	Method			
Escalation	Escalation	Escalation			
	<i>StartDate</i>	<i>StartIndex</i>	<i>EndDate</i>	<i>EndIndex</i>	<i>Escalation</i>
	<i>4/11/2013</i>	<i>0.00</i>	<i>4/11/2013</i>	<i>0.00</i>	<i>0.00</i>

Contingency	Contingency	Running %
SIOH	SIOH	Running %

Skagit GI - CULI - 1/75 ACE

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Project Cost Summary			89,219,297	0	0	0	89,219,297
			<i>89,219,296.57</i>				<i>89,219,296.57</i>
Alternative 1 - Raise Urban Levee	1.00	EA	89,219,297	0	0	0	89,219,297
			<i>7,938,128.33</i>				<i>7,938,128.33</i>
Relocations	1.00	EA	7,938,128	0	0	0	7,938,128
			<i>5,702,016.12</i>				<i>5,702,016.12</i>
Roads, Construction Activities	1.00	EA	5,702,016	0	0	0	5,702,016
			<i>2,236,112.21</i>				<i>2,236,112.21</i>
Cemetery, Utilities, & Structure	1.00	EA	2,236,112	0	0	0	2,236,112
			<i>3,728,900.97</i>				<i>3,728,900.97</i>
Fish and Wildlife Facilities	1.00	EA	3,728,901	0	0	0	3,728,901
			<i>3,728,900.97</i>				<i>3,728,900.97</i>
Wildlife Facilities & Sanctuary	1.00	EA	3,728,901	0	0	0	3,728,901
			<i>77,552,267.27</i>				<i>77,552,267.27</i>
Levees and Floodwalls	1.00	EA	77,552,267	0	0	0	77,552,267
			<i>52,156,615.78</i>				<i>52,156,615.78</i>
Levees	1.00	EA	52,156,616	0	0	0	52,156,616
			<i>25,395,651.49</i>				<i>25,395,651.49</i>
Floodwalls	1.00	EA	25,395,651	0	0	0	25,395,651

Abbreviated Risk Analysis

Project (less than \$40M): **Skagit River General Investigation - 1/75 Exceedance**
 Project Development Stage: **Feasibility (Alternatives)**
 Risk Category: **High Risk: Complex Project or Life Safety**

Total Construction Contract Cost = \$ **89,219,297**

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate	\$ -	0.00%	\$ -	\$ -
1	06 03 WILDLIFE FACILITIES AND SANCTUARIES	Env Mitigation	\$ 3,728,901	16.21%	\$ 604,423	\$ 4,333,324.14
2	02 01 ROADS, Construction Activities	Roads & Levee Crossings	\$ 5,702,016	49.07%	\$ 2,797,742	\$ 8,499,757.66
3	11 01 LEVEES	Levee Raises	\$ 40,117,142	95.14%	\$ 38,167,843	\$ 78,284,984.80
4	11 01 LEVEES	New Levees	\$ 11,872,756	30.93%	\$ 3,671,921	\$ 15,544,676.87
5	11 02 FLOODWALLS	Floodwalls	\$ 19,900,734	36.36%	\$ 7,235,050	\$ 27,135,784.40
6	11 02 FLOODWALLS	Flood Gates	\$ 5,494,917	47.30%	\$ 2,598,852	\$ 8,093,769.37
7	02 03 CEMETERIES, UTILITIES, AND STRUCTURES, Construction Activities	Utility Lines & Service	\$ 2,236,112	37.32%	\$ 834,622	\$ 3,070,734.18
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12		Remaining Construction Items	\$ 166,718	0.2%	\$ 26,905	\$ 193,622.88
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ -	0.00%	\$ -	\$ -
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ -	0.00%	\$ -	\$ -

Totals						
		Real Estate	\$ -	0.00%	\$ -	\$ -
		Total Construction Estimate	\$ 89,219,297	62.70%	\$ 55,937,358	\$ 145,156,654
		Total Planning, Engineering & Design	\$ -	0.00%	\$ -	\$ -
		Total Construction Management	\$ -	0.00%	\$ -	\$ -
		Total	\$ 89,219,297		\$ 55,937,358	\$ 145,156,654

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: Skagit GI: Comprehensive Urban Levee Improvement - 75YR
PROJECT NO: TBD
LOCATION: Skagit River Basin, Washington

DISTRICT: Seattle
POC: CHIEF, COST ENGINEERING, John Dudgeon
PREPARED: 9/30/2013

This Estimate reflects the scope and schedule in report; DRAFT Feasibility Report and Conceptual Designs

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST (\$K) C	CNTG (\$K) D	CNTG (%) E	TOTAL (\$K) F	Program Year (Budget EC): 2016 Effective Price Level Date: 1 OCT 15				Spent Thru: 30-Sep-13 (\$K) K	L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
						ESC (%) G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J					
02	RELOCATIONS	\$7,938	\$4,976	63%	\$12,915	2.3%	\$8,122	\$5,092	\$13,214	\$0		\$8,757	\$5,490	\$14,247
06	FISH & WILDLIFE FACILITIES	\$3,729	\$2,338	63%	\$6,067	2.3%	\$3,815	\$2,392	\$6,207	\$0		\$4,114	\$2,579	\$6,693
11	LEVEES & FLOODWALLS	\$77,552	\$48,618	63%	\$126,170	2.3%	\$79,350	\$49,745	\$129,095	\$0		\$85,555	\$53,635	\$139,190
CONSTRUCTION ESTIMATE TOTALS:		\$89,219	\$55,932		\$145,151	2.3%	\$91,288	\$57,228	\$148,516	\$0		\$98,426	\$61,704	\$160,130
01	LANDS AND DAMAGES	\$10,066	\$1,510	15%	\$11,576	2.3%	\$10,300	\$1,545	\$11,845	\$0		\$10,746	\$1,612	\$12,358
30	PLANNING, ENGINEERING & DESIGN	\$25,500	\$3,825	15%	\$29,325	4.2%	\$26,564	\$3,985	\$30,548	\$0		\$29,602	\$4,440	\$34,042
31	CONSTRUCTION MANAGEMENT	\$8,922	\$1,338	15%	\$10,260	2.4%	\$9,134	\$1,370	\$10,504	\$0		\$9,848	\$1,477	\$11,326
PROJECT COST TOTALS:		\$133,708	\$62,605	47%	\$196,312		\$137,285	\$64,128	\$201,413	\$0		\$148,622	\$69,233	\$217,855

- _____ **Mandatory by Regulation** CHIEF, COST ENGINEERING, John Dudgeon
- _____ **Mandatory by Regulation** PROJECT MANAGER, Lynn Wetzler
- _____ **Mandatory by Regulation** CHIEF, REAL ESTATE, Christopher Borton
- _____ CHIEF, PLANNING, Valerie Ringold
- _____ CHIEF, ENGINEERING, JoAnn Walls
- _____ CHIEF, OPERATIONS, Elizabeth Coffey
- _____ CHIEF, CONSTRUCTION, Arill Berg
- _____ CHIEF, CONTRACTING, Patricia Blackwood
- _____ CHIEF, PM-PB, xxxx
- _____ CHIEF, PPMD & DDEPM, Olton Swanson

ESTIMATED FEDERAL COST: 65% \$141,606
ESTIMATED NON-FEDERAL COST: 35% \$76,249
ESTIMATED TOTAL PROJECT COST: \$217,855

**** TOTAL PROJECT COST SUMMARY ****

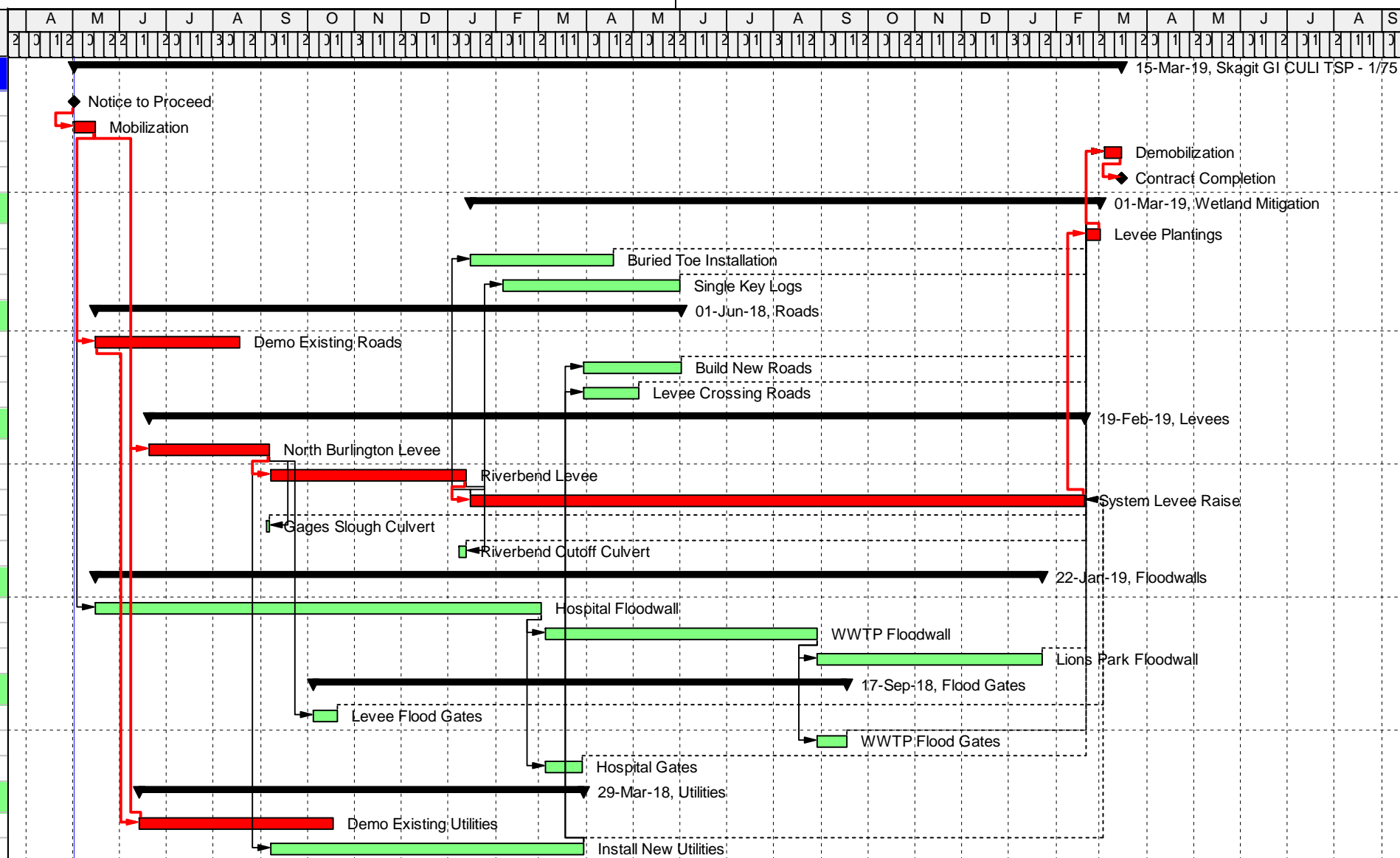
**** CONTRACT COST SUMMARY ****

PROJECT: Skagit GI: Comprehensive Urban Levee Improvement - 75YR
 LOCATION: Skagit River Basin, Washington
 This Estimate reflects the scope and schedule in report: DRAFT Feasibility Report and Conceptual Designs

DISTRICT: Seattle
 POC: CHIEF, COST ENGINEERING, John Dudgeon
 PREPARED: 9/30/2013

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 9/30/2013		Effective Price Level: 30-Sep-2013		Program Year (Budget EC): 2016		Effective Price Level Date: 1 OCT 15						
		RISK BASED												
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
PHASE 1 or CONTRACT 1														
02	RELOCATIONS	\$7,938	\$4,976	63%	\$12,915	2.3%	\$8,122	\$5,092	\$13,214	2019Q1	7.8%	\$8,757	\$5,490	\$14,247
06	FISH & WILDLIFE FACILITIES	\$3,729	\$2,338	63%	\$6,067	2.3%	\$3,815	\$2,392	\$6,207	2019Q1	7.8%	\$4,114	\$2,579	\$6,693
11	LEVEES & FLOODWALLS	\$77,552	\$48,618	63%	\$126,170	2.3%	\$79,350	\$49,745	\$129,095	2019Q1	7.8%	\$85,555	\$53,635	\$139,190
							\$0							
CONSTRUCTION ESTIMATE TOTALS:		\$89,219	\$50,955	57%	\$140,174		\$83,166	\$52,137	\$135,302			\$89,669	\$56,214	\$145,883
01	LANDS AND DAMAGES	\$10,066	\$1,510	15%	\$11,576	2.3%	\$10,300	\$1,545	\$11,845	2017Q2	4.3%	\$10,746	\$1,612	\$12,358
30	PLANNING, ENGINEERING & DESIGN													
2.8%	Project Management	\$2,500	\$375	15%	\$2,875	4.2%	\$2,604	\$391	\$2,995	2017Q2	9.8%	\$2,859	\$429	\$3,288
1.1%	Planning & Environmental Compliance	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
16.8%	Engineering & Design	\$15,000	\$2,250	15%	\$17,250	4.2%	\$15,626	\$2,344	\$17,970	2017Q2	9.8%	\$17,155	\$2,573	\$19,728
0.0%	Reviews, ATRs, IEPRs, VE	\$0	\$0	15%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
0.0%	Life Cycle Updates (cost, schedule, risks)	\$0	\$0	15%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
1.1%	Contracting & Reprographics	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
3.4%	Engineering During Construction	\$3,000	\$450	15%	\$3,450	4.2%	\$3,125	\$469	\$3,594	2019Q1	18.2%	\$3,694	\$554	\$4,248
2.2%	Planning During Construction	\$2,000	\$300	15%	\$2,300	4.2%	\$2,083	\$313	\$2,396	2019Q1	18.2%	\$2,463	\$369	\$2,832
1.1%	Project Operations	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
31	CONSTRUCTION MANAGEMENT													
8.0%	Construction Management	\$7,138	\$1,071	15%	\$8,209	2.4%	\$7,308	\$1,096	\$8,404	2019Q1	7.8%	\$7,879	\$1,182	\$9,061
1.0%	Project Operation:	\$892	\$134	15%	\$1,026	2.4%	\$913	\$137	\$1,050	2019Q1	7.8%	\$985	\$148	\$1,132
1.0%	Project Management	\$892	\$134	15%	\$1,026	2.4%	\$913	\$137	\$1,050	2019Q1	7.8%	\$985	\$148	\$1,132
CONTRACT COST TOTALS:		\$133,708	\$57,628		\$191,336		\$129,163	\$59,036	\$188,199			\$139,865	\$63,743	\$203,608

Activity ID	Activity Name	Original Duration	Start	Finish
Skagit GI CULI TSP - 1/75 Annual Chance				
A900	Notice to Proceed	0	02-May-17	15-Mar-19
A930	Mobilization	10	02-May-17	15-May-17
A940	Demobilization	10	04-Mar-19	15-Mar-19
A950	Contract Completion	0		15-Mar-19
Wetland Mitigation				
A1000	Levee Plantings	8	20-Feb-19	01-Mar-19
A1010	Buried Toe Installation	68	15-Jan-18	18-Apr-18
A1011	Single Key Logs	84	05-Feb-18	31-May-18
Roads				
A1020	Demo Existing Roads	68	16-May-17	17-Aug-17
A1030	Build New Roads	46	30-Mar-18	01-Jun-18
A1040	Levee Crossing Roads	26	30-Mar-18	04-May-18
Levees				
A1050	North Burlington Levee	57	20-Jun-17	06-Sep-17
A1060	Riverbend Levee	92	07-Sep-17	12-Jan-18
A1070	System Levee Raise	287	15-Jan-18	19-Feb-19
A1080	Gages Slough Culvert	3	04-Sep-17	06-Sep-17
A1090	Riverbend Cutoff Culvert	5	08-Jan-18	12-Jan-18
Floodwalls				
A1100	Hospital Floodwall	209	16-May-17	02-Mar-18
A1110	WWTP Floodwall	127	05-Mar-18	28-Aug-18
A1120	Lions Park Floodwall	105	29-Aug-18	22-Jan-19
Flood Gates				
A1130	Levee Flood Gates	12	05-Oct-17	20-Oct-17
A1140	WWTP Flood Gates	14	29-Aug-18	17-Sep-18
A1150	Hospital Gates	18	05-Mar-18	28-Mar-18
Utilities				
A1160	Demo Existing Utilities	91	13-Jun-17	17-Oct-17
A1170	Install New Utilities	146	07-Sep-17	29-Mar-18



█ Actual Work
 █ Critical Remaining Work
 Summary
 ◆ Milestone

Skagit GI - CULI - 1/100 ACE

Title Page

Skagit River General Investigation

Flood Reduction Measure

Design Level: Conceptual // Level 4

PM: Lynn Wetzler

Planner: Margaret Chang

Technical Lead: Glenn Kato

Cost Engineer: Daniel Lowry

PROJECT SYNOPSIS: Raise levee heights in urban areas to provide a 1% exceedance level of protection. Additionally, there are various non-structural improvements (flood walls at critical infrastructure, gates, etc.) Also included are drainage gates, utility relocations, roadway relocations and modification to accommodate increased levee heights.

ESTIMATED PROJECT DURATION: 626 work days (932 calendar days)

Estimated by NWS Cost Engineering

Designed by NWS Design Branch

Prepared by Daniel Lowry & Quinn Ma

Preparation Date 9/9/2013

Effective Date of Pricing 9/9/2013

Estimated Construction Time 541 Days

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BASIS OF ESTIMATE: Estimate developed using MEANS Cost Data, MCASES MII Cost Data, vendor quotes where applicable, and actual quantity takeoff data where available.

Estimated by NWS Cost Engineering

Designed by NWS Design Branch

Prepared by Daniel Lowry & Quinn Ma

Preparation Date 9/9/2013

Effective Date of Pricing 9/9/2013

Estimated Construction Time 541 Days

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Skagit GI - CULI - 1/100 ACE

Library Properties Page i

Designed by
NWS Design Branch

Design Document Conceptual Designs
Document Date 9/2/2013

Estimated by
NWS Cost Engineering

District Seattle District
Contact Daniel Lowry 206.764.3702

Prepared by
Daniel Lowry & Quinn Ma

Budget Year 2016
UOM System Original

Direct Costs

LaborCost
EQCost
MatlCost
SubBidCost

Timeline/Currency

Preparation Date 9/9/2013
Escalation Date 9/9/2013
Eff. Pricing Date 9/9/2013
Estimated Duration 541 Day(s)

Currency US dollars
Exchange Rate 1.000000

Costbook CB12EB-b: MII English Cost Book 2012-b

Labor NLS2012: National Labor Library - Seattle 2012

Note: <http://www.wdol.gov> is the website for current Davis Bacon & Service Labor Rates. Fringes paid to the laborers are taxable. In a non-union job the whole fringes are taxable. In a union job, the vacation

Labor Rates

LaborCost1
Landscape
LaborCost3
LaborCost4

Equipment EP11R08: MII Equipment 2011 Region 08

08 NORTHWEST

Sales Tax 5.40
Working Hours per Year 1,540
Labor Adjustment Factor 1.05
Cost of Money 2.50
Cost of Money Discount 25.00
Tire Recap Cost Factor 1.50
Tire Recap Wear Factor 1.80
Tire Repair Factor 0.15
Equipment Cost Factor 1.00
Standby Depreciation Factor 0.50

Fuel

Electricity 0.072
Gas 3.670
Diesel Off-Road 3.450
Diesel On-Road 3.990

Shipping Rates

Over 0 CWT 28.32
Over 240 CWT 26.60
Over 300 CWT 24.23
Over 400 CWT 22.06
Over 500 CWT 11.26
Over 700 CWT 9.51
Over 800 CWT 6.48

Date Author Note

9/26/2013 LOWRY **PROJECT DESCRIPTION**

This estimate consists of costs to provide flood protection to urban areas in the Skagit River Basin. This work will include upgrading existing levees, building new levees, constructing floodwalls, and other more minor elements. This project is expected to take place over several years.

9/26/2013 LOWRY **BASES OF DESIGN**

This estimate is the drawings, figures, and quantities prepared for the combined Draft Feasibility Report/EIS, September, 2013.

9/30/2013 LOWRY **ACQUISITION PLAN**

The project will be acquired by a yet to be determined bidding process. While this project would be a very large contract on its own, it may be broken into smaller pieces.

It is not known if this work will be performed by a Contractor under the Small Business Administration 8a program, HUBZone, SDVOSB, Women Owned Small Business or through a combination of these and full and open bidding. Additionally, use of a MATOC is not assumed but potentially could be used.

Design-build construction is not anticipated, and a full set of plans and specs will be made available at solicitation.

Date Author Note

9/30/2013 LOWRY **SUB-CONTRACTING PLAN**

The following are expected subcontractors on this project:

Earthwork Subcontractor

Paving Subcontractor

Utilities Subcontractor

Flood Wall Subcontractor

Pile Driving 2nd Tier Subcontractor

Landscaping Subcontractor

It is assumed that the Prime Contractor will do the rest of the work.

9/30/2013 LOWRY **PROJECT CONSTRUCTION**

SITE ACCESS

The project site is located in Skagit County, Washington. Access has yet to be determined, but due to project footprint will be at multiple points.

BORROW AREAS

The borrow sources for has not been determined, but there are several nearby sources. Evaluation will need to be done at Feasibility Estimate to determine fill availability. Potential local borrow points have not been evaluated.

CONSTRUCTION METHODOLOGY

The construction methodology is contains standard elements, but some in-water work is expected. Flood wall construction, and gate installation may contain some unique elements.

Date Author Note

UNUSUAL CONDITION (Soil, Water, Weather)

Work must be coordinated with seasonal weather variations. No major issues related to in situ soil issues or water work is expected.

UNIQUE TECHNIQUES OF CONSTRUCTION

None expected

9/30/2013 LOWRY **CONSTRUCTION WINDOWS**

SCHEDULE

5 days a week, eight hours per day.

OVERTIME

This estimate does not contain overtime.

9/30/2013 LOWRY **EQUIPMENT AND LABOR AVAILABILITY & DISTANCE TRAVELED**

This estimate uses Davis Bacon labor rates for Seattle, Washington.

Equipment rates used are from EP 1110-1-8, Volume 11, August 2011.

9/30/2013 LOWRY **ENVIRONMENTAL CONCERNS**

- Potential damages to existing wetlands through levee placement and expansion.
- Damage to fish habitat through placement of levee armoring.

Date Author Note

9/30/2013 LOWRY **RISK**

Risks were evaluated using the Abbreviated Cost and Scheduled Risk Analysis. A contingency rate of 58.01% was generated from this analysis and is applied to this estimate.

9/30/2013 LOWRY Schedule Durations:

Unless noted otherwise, schedule calculations do not take into account haul times. It is assumed that these are never a limiting factor, and there are sufficient available trucks to haul material to the job site. Further refinements to this assumption will be made at the feasibility level estimate and schedule.

Skagit GI - CULI - 1/100 ACE

Direct Cost Markups

	Category			Method		
Productivity	Productivity			Productivity		
Overtime	Overtime			Overtime		
	<i>Days/Week</i>	<i>Hours/Shift</i>	<i>Shifts/Day</i>	<i>1st Shift</i>	<i>2nd Shift</i>	<i>3rd Shift</i>
<i>Standard</i>	5.00	8.00	1.00	8.00	0.00	0.00
<i>Actual</i>	5.00	8.00	1.00	8.00	0.00	0.00

<i>Day</i>	<i>OT Factor</i>	<i>Working</i>	<i>OT Percent</i>	<i>FCCM Percent</i>
<i>Monday</i>	1.50	Yes	0.00	0.00
<i>Tuesday</i>	1.50	Yes		
<i>Wednesday</i>	1.50	Yes		
<i>Thursday</i>	1.50	Yes		
<i>Friday</i>	1.50	Yes		
<i>Saturday</i>	1.50	No		
<i>Sunday</i>	2.00	No		

Sales Tax	TaxAdj	Running % on Selected Costs
<i>MatlCost</i>		

Contractor Markups

	Category	Method
JOOH Prime (Small Tools)	Allowance	% of Labor
JOOH Prime	JOOH	JOOH (Calculated)
JOOH Sub	JOOH	Running %
HOOH Prime	HOOH	Running %
HOOH Sub	Allowance	Running %
Profit	Profit	Profit Weighted Guidelines
<i>Guideline</i>	<i>Value</i>	<i>Weight</i>
<i>Risk</i>	0.100	20
<i>Difficulty</i>	0.060	15
		<i>Percentage</i>
		2.00
		0.90

Skagit GI - CULI - 1/100 ACE

<i>Size</i>	<i>0.030</i>	<i>15</i>	<i>0.45</i>
<i>Period</i>	<i>0.120</i>	<i>15</i>	<i>1.80</i>
<i>Invest (Contractor's)</i>	<i>0.065</i>	<i>5</i>	<i>0.33</i>
<i>Assist (Assistance by)</i>	<i>0.060</i>	<i>5</i>	<i>0.30</i>
<i>SubContracting</i>	<i>0.070</i>	<i>25</i>	<i>1.75</i>
<i>Total</i>		<i>100</i>	<i>7.52</i>

Profit Sub	Profit	Running %
Bond	Bond	Bond Table
<i>Class B, Tiered, 24 months, 1.00% Surcharge</i>		

<i>Contract Price</i>	<i>Bond Rate</i>
<i>500,000</i>	<i>15.84</i>
<i>2,000,000</i>	<i>9.57</i>
<i>2,500,000</i>	<i>7.59</i>
<i>2,500,000</i>	<i>6.93</i>
<i>7,500,000</i>	<i>6.34</i>

Insurance	Allowance	Running %
Excise Tax	Excise	Running %

Owner Markups	Category	Method			
Escalation	Escalation	Escalation			
	<i>StartDate</i>	<i>StartIndex</i>	<i>EndDate</i>	<i>EndIndex</i>	<i>Escalation</i>
	<i>4/11/2013</i>	<i>0.00</i>	<i>4/11/2013</i>	<i>0.00</i>	<i>0.00</i>

Contingency	Contingency	Running %
SIOH	SIOH	Running %

Skagit GI - CULI - 1/100 ACE

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Project Cost Summary			95,443,328	0	0	0	95,443,328
			<i>95,443,327.53</i>				<i>95,443,327.53</i>
Alternative 1 - Raise Urban Levee	1.00	EA	95,443,328	0	0	0	95,443,328
			<i>8,070,624.51</i>				<i>8,070,624.51</i>
Relocations	1.00	EA	8,070,625	0	0	0	8,070,625
			<i>5,681,028.94</i>				<i>5,681,028.94</i>
Roads, Construction Activities	1.00	EA	5,681,029	0	0	0	5,681,029
			<i>2,389,595.57</i>				<i>2,389,595.57</i>
Cemetery, Utilities, & Structure	1.00	EA	2,389,596	0	0	0	2,389,596
			<i>3,723,512.76</i>				<i>3,723,512.76</i>
Fish and Wildlife Facilities	1.00	EA	3,723,513	0	0	0	3,723,513
			<i>3,723,512.76</i>				<i>3,723,512.76</i>
Wildlife Facilities & Sanctuary	1.00	EA	3,723,513	0	0	0	3,723,513
			<i>83,649,190.26</i>				<i>83,649,190.26</i>
Levees and Floodwalls	1.00	EA	83,649,190	0	0	0	83,649,190
			<i>58,222,503.42</i>				<i>58,222,503.42</i>
Levees	1.00	EA	58,222,503	0	0	0	58,222,503
			<i>25,426,686.83</i>				<i>25,426,686.83</i>
Floodwalls	1.00	EA	25,426,687	0	0	0	25,426,687

Abbreviated Risk Analysis

Project (less than \$40M): **Skagit River General Investigation - 1/100 Exceedance**
 Project Development Stage: **Feasibility (Alternatives)**
 Risk Category: **High Risk: Complex Project or Life Safety**

Total Construction Contract Cost = \$ **95,443,328**

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate	\$ -	0.00%	\$ -	\$ -
1	06 03 WILDLIFE FACILITIES AND SANCTUARIES	Env Mitigation	\$ 3,723,513	16.21%	\$ 603,550	\$ 4,327,062.54
2	02 01 ROADS, Construction Activities	Roads & Levee Crossings	\$ 5,681,029	49.07%	\$ 2,787,444	\$ 8,468,472.95
3	11 01 LEVEES	Levee Raises	\$ 44,418,621	95.14%	\$ 42,260,313	\$ 86,678,934.57
4	11 01 LEVEES	New Levees	\$ 13,636,960	30.93%	\$ 4,217,542	\$ 17,854,501.56
5	11 02 FLOODWALLS	Floodwalls	\$ 19,925,055	36.36%	\$ 7,243,892	\$ 27,168,946.76
6	11 02 FLOODWALLS	Flood Gates	\$ 5,501,632	47.30%	\$ 2,602,028	\$ 8,103,660.08
7	02 03 CEMETERIES, UTILITIES, AND STRUCTURES, Construction Activities	Utility Lines & Service	\$ 2,389,596	37.32%	\$ 891,909	\$ 3,281,504.73
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12		Remaining Construction Items	\$ 166,922	0.2%	\$ 26,937	\$ 193,859.48
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ -	0.00%	\$ -	\$ -
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ -	0.00%	\$ -	\$ -

Totals						
		Real Estate	\$ -	0.00%	\$ -	\$ -
		Total Construction Estimate	\$ 95,443,328	63.53%	\$ 60,633,615	\$ 156,076,943
		Total Planning, Engineering & Design	\$ -	0.00%	\$ -	\$ -
		Total Construction Management	\$ -	0.00%	\$ -	\$ -
		Total	\$ 95,443,328		\$ 60,633,615	\$ 156,076,943

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: Skagit GI: Comprehensive Urban Levee Improvement - 100YR
 PROJECT NO: TBD
 LOCATION: Skagit River Basin, Washington

DISTRICT: Seattle
 POC: CHIEF, COST ENGINEERING, John Dudgeon
 PREPARED: 9/30/2013

This Estimate reflects the scope and schedule in report; DRAFT Feasibility Report and Conceptual Designs

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST (\$K) C	CNTG (\$K) D	CNTG (%) E	TOTAL (\$K) F	ESC (%) G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J	Spent Thru: 30-Sep-13 (\$K) K	L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
02	RELOCATIONS	\$8,071	\$5,127	64%	\$13,198	0.0%	\$8,071	\$5,127	\$13,198	\$0		\$8,903	\$5,656	\$14,560
06	FISH & WILDLIFE FACILITIES	\$3,724	\$2,366	64%	\$6,089	2.3%	\$3,810	\$2,420	\$6,230	\$0		\$4,108	\$2,610	\$6,717
11	LEVEES & FLOODWALLS	\$83,649	\$53,142	64%	\$136,792	2.3%	\$85,589	\$54,374	\$139,963	\$0		\$92,282	\$58,627	\$150,908
CONSTRUCTION ESTIMATE TOTALS:		\$95,443	\$60,635		\$156,078	2.1%	\$97,469	\$61,922	\$159,391	\$0		\$105,293	\$66,892	\$172,185
01	LANDS AND DAMAGES	\$10,066	\$1,510	15%	\$11,576	2.3%	\$10,300	\$1,545	\$11,845	\$0		\$10,746	\$1,612	\$12,358
30	PLANNING, ENGINEERING & DESIGN	\$25,500	\$3,825	15%	\$29,325	4.2%	\$26,564	\$3,985	\$30,548	\$0		\$29,602	\$4,440	\$34,042
31	CONSTRUCTION MANAGEMENT	\$9,543	\$1,431	15%	\$10,974	2.4%	\$9,770	\$1,465	\$11,235	\$0		\$10,534	\$1,580	\$12,114
PROJECT COST TOTALS:		\$140,553	\$67,402	48%	\$207,954		\$144,102	\$68,917	\$213,020	\$0		\$156,174	\$74,525	\$230,699

- Mandatory by Regulation CHIEF, COST ENGINEERING, John Dudgeon
- Mandatory by Regulation PROJECT MANAGER, Lynn Wetzler
- Mandatory by Regulation CHIEF, REAL ESTATE, Christopher Borton
- CHIEF, PLANNING, Valerie Ringold
- CHIEF, ENGINEERING, Mark Ohlstrom
- CHIEF, OPERATIONS, Elizabeth Coffey
- CHIEF, CONSTRUCTION, Arill Berg
- CHIEF, CONTRACTING, Patricia Blackwood
- CHIEF, PM-PB, xxxx
- CHIEF, PPMD & DDEPM, Olton Swanson

ESTIMATED FEDERAL COST: 65% \$149,954
 ESTIMATED NON-FEDERAL COST: 35% \$80,745
ESTIMATED TOTAL PROJECT COST: \$230,699

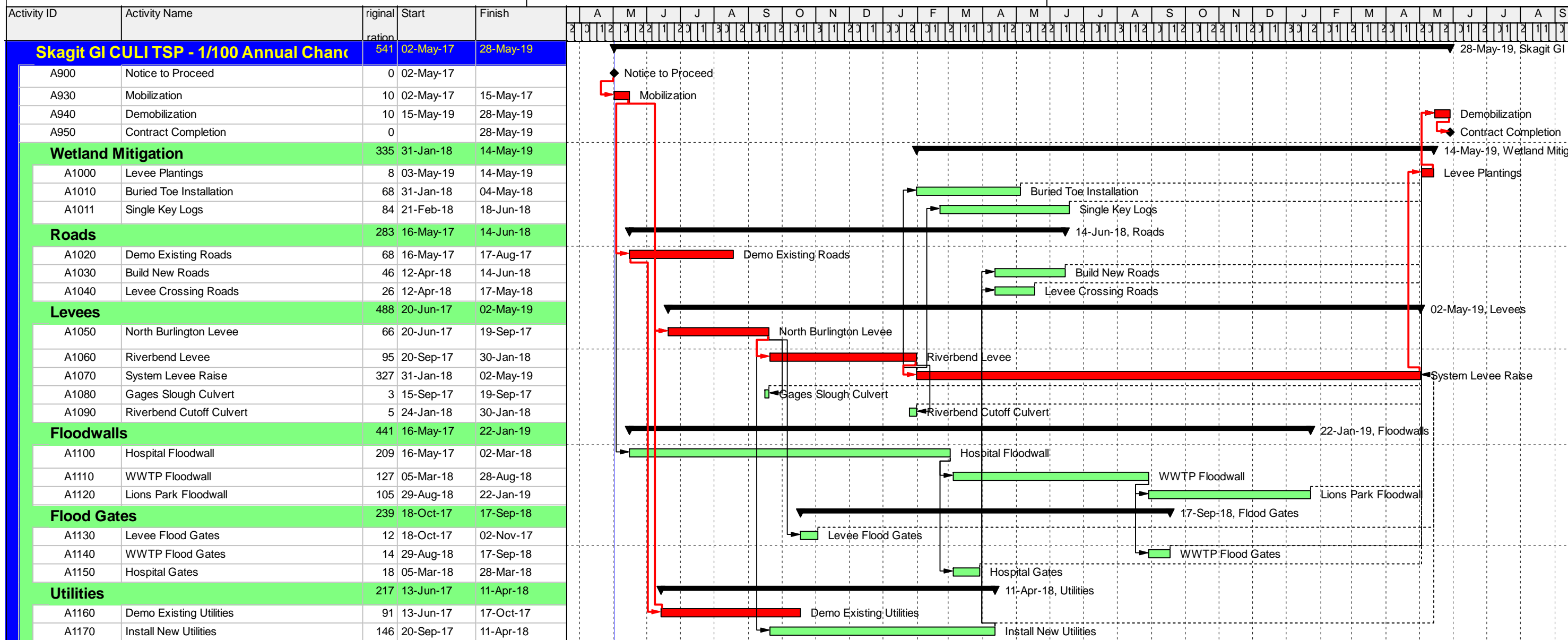
**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Skagit GI: Comprehensive Urban Levee Improvement - 100YR
 LOCATION: Skagit River Basin, Washington
 This Estimate reflects the scope and schedule in report: DRAFT Feasibility Report and Conceptual Designs

DISTRICT: Seattle
 POC: CHIEF, COST ENGINEERING, John Dudgeon
 PREPARED: 9/30/2013

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 9/30/2013		Program Year (Budget EC): 2016		Effective Price Level: 30-Sep-2013		Effective Price Level Date: 1 OCT 15						
		RISK BASED												
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
PHASE 1 or CONTRACT 1														
02	RELOCATIONS	\$8,071	\$5,127	64%	\$13,198	0.0%	\$8,071	\$5,127	\$13,198	2019Q1	10.3%	\$8,903	\$5,656	\$14,560
06	FISH & WILDLIFE FACILITIES	\$3,724	\$2,366	64%	\$6,089	2.3%	\$3,810	\$2,420	\$6,230	2019Q1	7.8%	\$4,108	\$2,610	\$6,717
11	LEVEES & FLOODWALLS	\$83,649	\$53,142	64%	\$136,792	2.3%	\$85,589	\$54,374	\$139,963	2019Q1	7.8%	\$92,282	\$58,627	\$150,908
							\$0							
CONSTRUCTION ESTIMATE TOTALS:		\$95,443	\$55,508	58%	\$150,951		\$89,399	\$56,795	\$146,193			\$96,389	\$61,236	\$157,625
01	LANDS AND DAMAGES	\$10,066	\$1,510	15%	\$11,576	2.3%	\$10,300	\$1,545	\$11,845	2017Q2	4.3%	\$10,746	\$1,612	\$12,358
30	PLANNING, ENGINEERING & DESIGN													
2.6%	Project Management	\$2,500	\$375	15%	\$2,875	4.2%	\$2,604	\$391	\$2,995	2017Q2	9.8%	\$2,859	\$429	\$3,288
1.0%	Planning & Environmental Compliance	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
15.7%	Engineering & Design	\$15,000	\$2,250	15%	\$17,250	4.2%	\$15,626	\$2,344	\$17,970	2017Q2	9.8%	\$17,155	\$2,573	\$19,728
0.0%	Reviews, ATRs, IEPRs, VE	\$0	\$0	15%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
0.0%	Life Cycle Updates (cost, schedule, risks)	\$0	\$0	15%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
1.0%	Contracting & Reprographics	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
3.1%	Engineering During Construction	\$3,000	\$450	15%	\$3,450	4.2%	\$3,125	\$469	\$3,594	2019Q1	18.2%	\$3,694	\$554	\$4,248
2.1%	Planning During Construction	\$2,000	\$300	15%	\$2,300	4.2%	\$2,083	\$313	\$2,396	2019Q1	18.2%	\$2,463	\$369	\$2,832
1.0%	Project Operations	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
31	CONSTRUCTION MANAGEMENT													
8.0%	Construction Management	\$7,635	\$1,145	15%	\$8,780	2.4%	\$7,817	\$1,172	\$8,989	2019Q1	7.8%	\$8,428	\$1,264	\$9,692
1.0%	Project Operation:	\$954	\$143	15%	\$1,097	2.4%	\$977	\$147	\$1,123	2019Q1	7.8%	\$1,053	\$158	\$1,211
1.0%	Project Management	\$954	\$143	15%	\$1,097	2.4%	\$977	\$147	\$1,123	2019Q1	7.8%	\$1,053	\$158	\$1,211
CONTRACT COST TOTALS:		\$140,553	\$62,274		\$202,827		\$136,032	\$63,790	\$199,822			\$147,271	\$68,868	\$216,139



█ Actual Work
 █ Critical Remaining Work
 ▬ Summary
 █ Remaining Work
 ◆ Milestone

Skagit GI - CULI - 1/250 ACE

Title Page

Skagit River General Investigation

Flood Reduction Measure

Design Level: Conceptual // Level 4

PM: Lynn Wetzler

Planner: Margaret Chang

Technical Lead: Glenn Kato

Cost Engineer: Daniel Lowry

PROJECT SYNOPSIS: Raise levee heights in urban areas to provide a 0.04% exceedance level of protection. Additionally, there are various non-structural improvements (flood walls at critical infrastructure, gates, etc.) Also included are drainage gates, utility relocations, roadway relocations and modification to accommodate increased levee heights.

ESTIMATED PROJECT DURATION: 578 work days (801 calendar days)

Estimated by NWS Cost Engineering

Designed by NWS Design Branch

Prepared by Daniel Lowry & Quinn Ma

Preparation Date 9/9/2013

Effective Date of Pricing 9/9/2013

Estimated Construction Time 578 Days

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BASIS OF ESTIMATE: Estimate developed using MEANS Cost Data, MCASES MII Cost Data, vendor quotes where applicable, and actual quantity takeoff data where available. This estimate is a variation on the 100 year baseline cost estimate.

Estimated by NWS Cost Engineering

Designed by NWS Design Branch

Prepared by Daniel Lowry & Quinn Ma

Preparation Date 9/9/2013

Effective Date of Pricing 9/9/2013

Estimated Construction Time 578 Days

This report is not copyrighted, but the information contained herein is For Official Use Only.

Skagit GI - CULI - 1/250 ACE

Library Properties Page i

Designed by
NWS Design Branch

Design Document Conceptual Designs
Document Date 9/2/2013

Estimated by
NWS Cost Engineering

District Seattle District
Contact Daniel Lowry 206.764.3702

Prepared by
Daniel Lowry & Quinn Ma

Budget Year 2016
UOM System Original

Direct Costs

LaborCost
EQCost
MatlCost
SubBidCost

Timeline/Currency

Preparation Date 9/9/2013
Escalation Date 9/9/2013
Eff. Pricing Date 9/9/2013
Estimated Duration 578 Day(s)

Currency US dollars
Exchange Rate 1.000000

Costbook CB12EB-b: MII English Cost Book 2012-b

Labor NLS2012: National Labor Library - Seattle 2012

Note: <http://www.wdol.gov> is the website for current Davis Bacon & Service Labor Rates. Fringes paid to the laborers are taxable. In a non-union job the whole fringes are taxable. In a union job, the vacation

Labor Rates

LaborCost1
Landscape
LaborCost3
LaborCost4

Equipment EP11R08: MII Equipment 2011 Region 08

08 NORTHWEST

Sales Tax 5.40
Working Hours per Year 1,540
Labor Adjustment Factor 1.05
Cost of Money 2.50
Cost of Money Discount 25.00
Tire Recap Cost Factor 1.50
Tire Recap Wear Factor 1.80
Tire Repair Factor 0.15
Equipment Cost Factor 1.00
Standby Depreciation Factor 0.50

Fuel

Electricity 0.072
Gas 3.670
Diesel Off-Road 3.450
Diesel On-Road 3.990

Shipping Rates

Over 0 CWT 28.32
Over 240 CWT 26.60
Over 300 CWT 24.23
Over 400 CWT 22.06
Over 500 CWT 11.26
Over 700 CWT 9.51
Over 800 CWT 6.48

Date Author Note

9/26/2013 LOWRY **PROJECT DESCRIPTION**

This estimate consists of costs to provide flood protection to urban areas in the Skagit River Basin. This work will include upgrading existing levees, building new levees, constructing floodwalls, and other more minor elements. This project is expected to take place over several years.

9/26/2013 LOWRY **BASES OF DESIGN**

This estimate is the drawings, figures, and quantities prepared for the combined Draft Feasibility Report/EIS, September, 2013.

9/30/2013 LOWRY **ACQUISITION PLAN**

The project will be acquired by a yet to be determined bidding process. While this project would be a very large contract on its own, it may be broken into smaller pieces.

It is not know if this work will be performed by a Contractor under the Small Business Administration 8a program, HUBZone, SDVOSB, Women Owned Small Business or through a combination of these and full and open bidding. Additionally, use of a MATOC is not assumed but potentially could be used.

Design-build construction is not anticipated, and a full set of plans and specs will be made available at solicitation.

Date Author Note

9/30/2013 LOWRY **SUB-CONTRACTING PLAN**

The following are expected subcontractors on this project:

Earthwork Subcontractor

Paving Subcontractor

Utilities Subcontractor

Flood Wall Subcontractor

Pile Driving 2nd Tier Subcontractor

Landscaping Subcontractor

It is assumed that the Prime Contractor will do the rest of the work.

9/30/2013 LOWRY **PROJECT CONSTRUCTION**

SITE ACCESS

The project site is located in Skagit County, Washington. Access has yet to be determined, but due to project footprint will be at multiple points.

BORROW AREAS

The borrow sources for has not been determined, but there are several nearby sources. Evaluation will need to be done at Feasibility Estimate to determine fill availability. Potential local borrow points have not been evaluated.

CONSTRUCTION METHODOLOGY

The construction methodology is contains standard elements, but some in-water work is expected. Flood wall construction, and gate installation may contain some unique elements.

Date Author Note

UNUSUAL CONDITION (Soil, Water, Weather)

Work must be coordinated with seasonal weather variations. No major issues related to in situ soil issues or water work is expected.

UNIQUE TECHNIQUES OF CONSTRUCTION

None expected

9/30/2013 LOWRY **CONSTRUCTION WINDOWS**

SCHEDULE

5 days a week, eight hours per day.

OVERTIME

This estimate does not contain overtime.

9/30/2013 LOWRY **EQUIPMENT AND LABOR AVAILABILITY & DISTANCE TRAVELED**

This estimate uses Davis Bacon labor rates for Seattle, Washington.

Equipment rates used are from EP 1110-1-8, Volume 11, August 2011.

9/30/2013 LOWRY **ENVIRONMENTAL CONCERNS**

- Potential damages to existing wetlands through levee placement and expansion.
- Damage to fish habitat through placement of levee armoring.

Date Author Note

9/30/2013 LOWRY **RISK**

Risks were evaluated using the Abbreviated Cost and Scheduled Risk Analysis. A contingency rate of 58.01% was generated from this analysis and is applied to this estimate.

9/30/2013 LOWRY Schedule Durations:

Unless noted otherwise, schedule calculations do not take into account haul times. It is assumed that these are never a limiting factor, and there are sufficient available trucks to haul material to the job site. Further refinements to this assumption will be made at the feasibility level estimate and schedule.

Skagit GI - CULI - 1/250 ACE

Direct Cost Markups

	Category			Method		
	<i>Days/Week</i>	<i>Hours/Shift</i>	<i>Shifts/Day</i>	<i>1st Shift</i>	<i>2nd Shift</i>	<i>3rd Shift</i>
Productivity						
Overtime						
<i>Standard</i>	5.00	8.00	1.00	8.00	0.00	0.00
<i>Actual</i>	5.00	8.00	1.00	8.00	0.00	0.00

<i>Day</i>	<i>OT Factor</i>	<i>Working</i>	<i>OT Percent</i>	<i>FCCM Percent</i>
<i>Monday</i>	1.50	Yes	0.00	0.00
<i>Tuesday</i>	1.50	Yes		
<i>Wednesday</i>	1.50	Yes		
<i>Thursday</i>	1.50	Yes		
<i>Friday</i>	1.50	Yes		
<i>Saturday</i>	1.50	No		
<i>Sunday</i>	2.00	No		

Sales Tax	TaxAdj	Running % on Selected Costs
<i>MatlCost</i>		

Contractor Markups

	Category	Method
JOOH Prime (Small Tools)	Allowance	% of Labor
JOOH Prime	JOOH	JOOH (Calculated)
JOOH Sub	JOOH	Running %
HOOH Prime	HOOH	Running %
HOOH Sub	Allowance	Running %
Profit	Profit	Profit Weighted Guidelines
<i>Guideline</i>	<i>Value</i>	<i>Weight</i>
<i>Risk</i>	0.100	20
<i>Difficulty</i>	0.060	15
		<i>Percentage</i>
		2.00
		0.90

Skagit GI - CULI - 1/250 ACE

<i>Size</i>	<i>0.030</i>	<i>15</i>	<i>0.45</i>
<i>Period</i>	<i>0.120</i>	<i>15</i>	<i>1.80</i>
<i>Invest (Contractor's)</i>	<i>0.065</i>	<i>5</i>	<i>0.33</i>
<i>Assist (Assistance by)</i>	<i>0.060</i>	<i>5</i>	<i>0.30</i>
<i>SubContracting</i>	<i>0.070</i>	<i>25</i>	<i>1.75</i>
<i>Total</i>		<i>100</i>	<i>7.52</i>

Profit Sub	Profit	Running %
Bond	Bond	Bond Table
<i>Class B, Tiered, 24 months, 1.00% Surcharge</i>		

<i>Contract Price</i>	<i>Bond Rate</i>
<i>500,000</i>	<i>15.84</i>
<i>2,000,000</i>	<i>9.57</i>
<i>2,500,000</i>	<i>7.59</i>
<i>2,500,000</i>	<i>6.93</i>
<i>7,500,000</i>	<i>6.34</i>

Insurance	Allowance	Running %
Excise Tax	Excise	Running %

Owner Markups	Category	Method			
Escalation	Escalation	Escalation			
	<i>StartDate</i>	<i>StartIndex</i>	<i>EndDate</i>	<i>EndIndex</i>	<i>Escalation</i>
	<i>4/11/2013</i>	<i>0.00</i>	<i>4/11/2013</i>	<i>0.00</i>	<i>0.00</i>

Contingency	Contingency	Running %
SIOH	SIOH	Running %

Skagit GI - CULI - 1/250 ACE

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Project Cost Summary			101,444,399	0	0	0	101,444,399
			<i>101,444,399.25</i>				<i>101,444,399.25</i>
Alternative 1 - Raise Urban Levee	1.00	EA	101,444,399	0	0	0	101,444,399
			<i>8,068,524.82</i>				<i>8,068,524.82</i>
Relocations	1.00	EA	8,068,525	0	0	0	8,068,525
			<i>5,679,552.46</i>				<i>5,679,552.46</i>
Roads, Construction Activities	1.00	EA	5,679,552	0	0	0	5,679,552
			<i>2,388,972.37</i>				<i>2,388,972.37</i>
Cemetery, Utilities, & Structure	1.00	EA	2,388,972	0	0	0	2,388,972
			<i>3,722,750.86</i>				<i>3,722,750.86</i>
Fish and Wildlife Facilities	1.00	EA	3,722,751	0	0	0	3,722,751
			<i>3,722,750.86</i>				<i>3,722,750.86</i>
Wildlife Facilities & Sanctuary	1.00	EA	3,722,751	0	0	0	3,722,751
			<i>89,653,123.57</i>				<i>89,653,123.57</i>
Levees and Floodwalls	1.00	EA	89,653,124	0	0	0	89,653,124
			<i>64,233,046.57</i>				<i>64,233,046.57</i>
Levees	1.00	EA	64,233,047	0	0	0	64,233,047
			<i>25,420,077.00</i>				<i>25,420,077.00</i>
Floodwalls	1.00	EA	25,420,077	0	0	0	25,420,077

Abbreviated Risk Analysis

Project (less than \$40M): **Skagit River General Investigation - 1/250 Exceedance**
 Project Development Stage: **Feasibility (Alternatives)**
 Risk Category: **High Risk: Complex Project or Life Safety**

Total Construction Contract Cost = \$ **101,444,399**

	<u>CWWBS</u>	<u>Feature of Work</u>	<u>Contract Cost</u>	<u>% Contingency</u>	<u>\$ Contingency</u>	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate	\$ -	0.00%	\$ -	\$ -
1	06 03 WILDLIFE FACILITIES AND SANCTUARIES	Env Mitigation	\$ 3,722,751	16.21%	\$ 603,426	\$ 4,326,177.15
2	02 01 ROADS, Construction Activities	Roads & Levee Crossings	\$ 5,679,552	49.07%	\$ 2,786,720	\$ 8,466,272.02
3	11 01 LEVEES	Levee Raises	\$ 49,772,467	95.14%	\$ 47,354,014	\$ 97,126,480.70
4	11 01 LEVEES	New Levees	\$ 14,293,701	30.93%	\$ 4,420,654	\$ 18,714,355.18
5	11 02 FLOODWALLS	Floodwalls	\$ 19,919,875	36.36%	\$ 7,242,009	\$ 27,161,883.58
6	11 02 FLOODWALLS	Flood Gates	\$ 5,500,202	47.30%	\$ 2,601,352	\$ 8,101,553.96
7	02 03 CEMETERIES, UTILITIES, AND STRUCTURES, Construction Activities	Utility Lines & Service	\$ 2,388,972	37.32%	\$ 891,677	\$ 3,280,648.92
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12		Remaining Construction Items	\$ 166,879	0.2%	\$ 26,930	\$ 193,809.08
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ -	0.00%	\$ -	\$ -
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ -	0.00%	\$ -	\$ -

Totals						
		Real Estate	\$ -	0.00%	\$ -	\$ -
		Total Construction Estimate	\$ 101,444,399	64.99%	\$ 65,926,781	\$ 167,371,181
		Total Planning, Engineering & Design	\$ -	0.00%	\$ -	\$ -
		Total Construction Management	\$ -	0.00%	\$ -	\$ -
		Total	\$ 101,444,399		\$ 65,926,781	\$ 167,371,181

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: Skagit GI: Comprehensive Urban Levee Improvement - 250YR
PROJECT NO: TBD
LOCATION: Skagit River Basin, Washington

DISTRICT: Seattle
POC: CHIEF, COST ENGINEERING, John Dudgeon
PREPARED: 9/30/2013

This Estimate reflects the scope and schedule in report; DRAFT Feasibility Report and Conceptual Designs

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST (\$K) C	CNTG (\$K) D	CNTG (%) E	TOTAL (\$K) F	Program Year (Budget EC): 2016 Effective Price Level Date: 1 OCT 15				Spent Thru: 30-Sep-13 (\$K) K	L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
						ESC (%) G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J					
02	RELOCATIONS	\$8,069	\$5,244	65%	\$13,312	2.3%	\$8,256	\$5,365	\$13,621	\$0		\$8,901	\$5,785	\$14,686
06	FISH & WILDLIFE FACILITIES	\$3,723	\$2,419	65%	\$6,142	2.3%	\$3,809	\$2,476	\$6,285	\$0		\$4,107	\$2,669	\$6,776
11	LEVEES & FLOODWALLS	\$89,653	\$58,266	65%	\$147,919	2.3%	\$91,732	\$59,617	\$151,348	\$0		\$98,905	\$64,278	\$163,184
CONSTRUCTION ESTIMATE TOTALS:		\$101,444	\$65,929		\$167,373	2.3%	\$103,796	\$67,457	\$171,254	\$0		\$111,913	\$72,732	\$184,645
01	LANDS AND DAMAGES	\$10,066	\$1,510	15%	\$11,576	2.3%	\$10,300	\$1,545	\$11,845	\$0		\$10,746	\$1,612	\$12,358
30	PLANNING, ENGINEERING & DESIGN	\$25,500	\$3,825	15%	\$29,325	4.2%	\$26,564	\$3,985	\$30,548	\$0		\$29,602	\$4,440	\$34,042
31	CONSTRUCTION MANAGEMENT	\$10,144	\$1,522	15%	\$11,666	2.4%	\$10,385	\$1,558	\$11,943	\$0		\$11,197	\$1,680	\$12,877
PROJECT COST TOTALS:		\$147,155	\$72,785	49%	\$219,940		\$151,045	\$74,545	\$225,590	\$0		\$163,458	\$80,464	\$243,922

- Mandatory by Regulation CHIEF, COST ENGINEERING, John Dudgeon
- Mandatory by Regulation PROJECT MANAGER, Lynn Wetzler
- Mandatory by Regulation CHIEF, REAL ESTATE, Christopher Borton
- CHIEF, PLANNING, Valerie Ringold
- CHIEF, ENGINEERING, Mark Ohlstrom
- CHIEF, OPERATIONS, Elizabeth Coffey
- CHIEF, CONSTRUCTION, Arill Berg
- CHIEF, CONTRACTING, Patricia Blackwood
- CHIEF, PM-PB, xxxx
- CHIEF, PPMD & DDEPM, Olton Swanson

ESTIMATED FEDERAL COST: 65% \$158,549
ESTIMATED NON-FEDERAL COST: 35% \$85,373
ESTIMATED TOTAL PROJECT COST: \$243,922

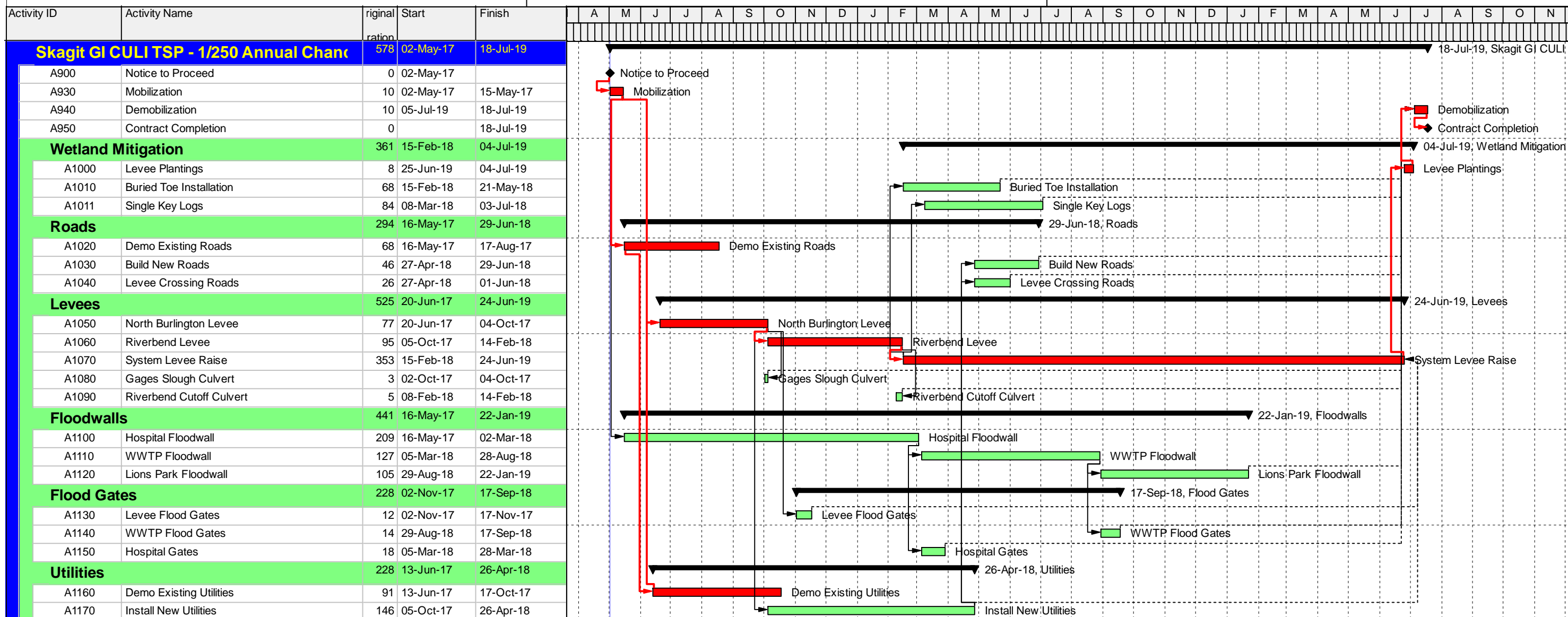
**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Skagit GI: Comprehensive Urban Levee Improvement - 250YR
 LOCATION: Skagit River Basin, Washington
 This Estimate reflects the scope and schedule in report; DRAFT Feasibility Report and Conceptual Designs

DISTRICT: Seattle
 PREPARED: 9/30/2013
 POC: CHIEF, COST ENGINEERING, John Dudgeon

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 9/30/2013		Program Year (Budget EC): 2016		Effective Price Level: 30-Sep-2013		Effective Price Level Date: 1 OCT 15						
		RISK BASED												
WBS	Civil Works	COST	CNTG	CNTG	TOTAL	ESC	COST	CNTG	TOTAL	Mid-Point	INFLATED	COST	CNTG	FULL
NUMBER	Feature & Sub-Feature Description	(\$K)	(\$K)	(%)	(\$K)	(%)	(\$K)	(\$K)	(\$K)	Date	(%)	(\$K)	(\$K)	(\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
PHASE 1 or CONTRACT 1														
02	RELOCATIONS	\$8,069	\$5,244	65%	\$13,312	2.3%	\$8,256	\$5,365	\$13,621	2019Q1	7.8%	\$8,901	\$5,785	\$14,686
06	FISH & WILDLIFE FACILITIES	\$3,723	\$2,419	65%	\$6,142	2.3%	\$3,809	\$2,476	\$6,285	2019Q1	7.8%	\$4,107	\$2,669	\$6,776
11	LEVEES & FLOODWALLS	\$89,653	\$58,266	65%	\$147,919	2.3%	\$91,732	\$59,617	\$151,348	2019Q1	7.8%	\$98,905	\$64,278	\$163,184
							\$0							
CONSTRUCTION ESTIMATE TOTALS:		\$101,444	\$60,685	60%	\$162,129		\$95,541	\$62,092	\$157,633			\$103,012	\$66,948	\$169,960
01	LANDS AND DAMAGES	\$10,066	\$1,510	15%	\$11,576	2.3%	\$10,300	\$1,545	\$11,845	2017Q2	4.3%	\$10,746	\$1,612	\$12,358
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	\$2,500	\$375	15%	\$2,875	4.2%	\$2,604	\$391	\$2,995	2017Q2	9.8%	\$2,859	\$429	\$3,288
1.0%	Planning & Environmental Compliance	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
14.8%	Engineering & Design	\$15,000	\$2,250	15%	\$17,250	4.2%	\$15,626	\$2,344	\$17,970	2017Q2	9.8%	\$17,155	\$2,573	\$19,728
0.0%	Reviews, ATRs, IEPRs, VE	\$0	\$0	15%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
0.0%	Life Cycle Updates (cost, schedule, risks)	\$0	\$0	15%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
1.0%	Contracting & Reprographics	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
3.0%	Engineering During Construction	\$3,000	\$450	15%	\$3,450	4.2%	\$3,125	\$469	\$3,594	2019Q1	18.2%	\$3,694	\$554	\$4,248
2.0%	Planning During Construction	\$2,000	\$300	15%	\$2,300	4.2%	\$2,083	\$313	\$2,396	2019Q1	18.2%	\$2,463	\$369	\$2,832
1.0%	Project Operations	\$1,000	\$150	15%	\$1,150	4.2%	\$1,042	\$156	\$1,198	2017Q2	9.8%	\$1,144	\$172	\$1,315
31	CONSTRUCTION MANAGEMENT													
8.0%	Construction Management	\$8,116	\$1,217	15%	\$9,333	2.4%	\$8,309	\$1,246	\$9,555	2019Q1	7.8%	\$8,959	\$1,344	\$10,302
1.0%	Project Operation:	\$1,014	\$152	15%	\$1,166	2.4%	\$1,038	\$156	\$1,194	2019Q1	7.8%	\$1,119	\$168	\$1,287
1.0%	Project Management	\$1,014	\$152	15%	\$1,166	2.4%	\$1,038	\$156	\$1,194	2019Q1	7.8%	\$1,119	\$168	\$1,287
CONTRACT COST TOTALS:		\$147,155	\$67,542		\$214,696		\$142,789	\$69,179	\$211,969			\$154,557	\$74,679	\$229,236



█ Actual Work
 █ Critical Remaining Work
 ▬ Summary
 █ Remaining Work
 ◆ Milestone

Skagit River General Investigation - 1/75 Exceedance

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 24-Sep-13

Risk Level

Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level	
Project Scope Growth							Max Potential Cost Growth	200%
PS-1	Env Mitigation	• Potential for scope growth, added features and quantities?	Currently wetland credits are assumed as mitigation, and these are assumed to be sufficient. Do we have accurate understanding of what will be required for mitigation? Could this be increased following increased design or consultation?	We're proposing a very conservative approach at this point in the project, low potential for additional increase. Arrangements of the features may change, but unlikely that Agencies will request more. Vulnerable to scope increases if overall project scope increases.	Possible	Negligible	0	
PS-2	Roads & Levee Crossings	• Design confidence?	Location and placement of roads and levee crossings is highly conceptual and based off limited effort and a GIS model that could have limited data. Could additional effort be required in road construction that was not previously anticipated?	Yes, the locations and type of roads will likely change in numerous places. North end off 99 and I-5 is especially uncertain. Large amounts of potential variability. Cost for this feature represents 5-6% of total project cost, and an increase in 50% (of this feature) would be significant	Likely	Significant	3	
PS-3	Levee Raises	• Potential for scope growth, added features and quantities?	While a hydraulic model was done, it cannot fully account for all the features that may be required to support levee construction. Could some levee extend to far on to property owner land and require replament with flood walls? Could increased soil be required? Could additional monitoring be needed?	Unlikely to require monitoring of any sort. Two feet of freeboard was added to accommodate potential variability in model issues. Potential for localized levee height increases due to hydraulic complexities and debris blockages. There is a potential that levees may have to be swapped for floodwalls. Potential for riprap design to change as well, more may required. Limited knowledge of existing conditions. This project component is the largest cost driver in the project cost, and changes to it will create large impacts (positive and negative). Certain considerations, such as using 100% purchased fill material will need to be evaluated at Feasibility, as changes to this could substantially lower project cost.	Very LIKELY	Significant	4	
PS-4	New Levees	• Potential for scope growth, added features and quantities?	While a hydraulic model was done, it cannot fully account for all the features that may be required to support levee construction, and less may be known about new levee areas than the raises. Could some levee extend to far on to property owner land and require replament with flood walls? Could increased soil be required? Could additional monitoring be needed?	Risks are less significant but the basic risks are the same as PS-3. The new levees are also more likely to have their alignments changed. The alingment may need to be adjusted in order to accomadate existing homes and property.	Likely	Marginal	2	
PS-5	Floodwalls	• Design confidence?	Floodwall design was based off a template design and not modified for different areas. Could modifications be required?	The design itself is probably reasonable, but the height may be variable. As currently estimated the walls are calculated at a constant height due to lack of information, and this height was a conservative value. Height is equally likely to increase as to decrease. Additionally, it is possible piles may be required (unlikely), but would substantially increase cost. Low potential for overall variability, but there is some.	Possible	Significant	2	
PS-6	Flood Gates	• Investigations sufficient to support design assumptions?	PDT did not examine flood gates or their requirements due to time and funding constraints. Requirements are very uncertain and costs are based largely on vendors opinions of what might be required.	Very likely to see changes due to the lack of overall investigation. Cost changes could be severe in either direction as discussions with vendor were based on conservative system design.	Very LIKELY	Marginal	3	
PS-7	Utility Lines & Service	• Design confidence?	Limited information was available in determing types and quantities that will require relocation. Additionally, could there be utilities that had not been previously known about entirely?	Likely that there will be some changes, and changes could be quite substantial. No electrical data is currently available, so this is completely unaccounted for. The overall cost of the utility lines is approximately 2%, so even a doubling of potential costs would not be show stopper for the project.	Very LIKELY	Marginal	3	
PS-8	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0	

PS-9	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-10	0	• Investigations sufficient to support design assumptions?			Unlikely	Negligible	0
PS-11	0	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-12	Remaining Construction Items	• Potential for scope growth, added features and quantities?	There could be a substantial number of "unknown-unknowns" at this stage in the design process.	Small scale of remaining items limits their overall impact on the project.	Likely	Negligible	1
PS-13	Planning, Engineering, & Design	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0
PS-14	Construction Management	• Potential for scope growth, added features and quantities?			Unlikely	Negligible	0

Acquisition Strategy

							Max Potential Cost Growth	30%
AS-1	Env Mitigation	• Contracting plan firmly established?	A contracting plan has not been developed. Given the scale of the project full and open contracting is expected. This assumption may be invalid depending on potential Contracting directives and requirements.	The contract could be split into various smaller pieces, thus making it more likely for a restricted bidding process. Bidding could be conceivably done through a variety of small business, HUBZone, 8A, as well as large contractor solicitations. Additionally, MATOCs might be used, which in some situations may raise proposal prices. Assume prices for this component may increase by 5%.	Likely	Negligible	1	
AS-2	Roads & Levee Crossings	• Contracting plan firmly established?	A contracting plan has not been developed. Given the scale of the project full and open contracting is expected. This assumption may be invalid depending on potential Contracting directives and requirements.	The contract could be split into various smaller pieces, thus making it more likely for a restricted bidding process. Bidding could be conceivably done through a variety of small business, HUBZone, 8A, as well as large contractor solicitations. Additionally, MATOCs might be used, which in some situations may raise proposal prices. Assume prices for this component may increase by 5%.	Likely	Negligible	1	
AS-3	Levee Raises	• Contracting plan firmly established?	A contracting plan has not been developed. Given the scale of the project full and open contracting is expected. This assumption may be invalid depending on potential Contracting directives and requirements.	The contract could be split into various smaller pieces, thus making it more likely for a restricted bidding process. Bidding could be conceivably done through a variety of small business, HUBZone, 8A, as well as large contractor solicitations. Additionally, MATOCs might be used, which in some situations may raise proposal prices. Assume prices for this component may increase by 15%, given that this item contains the some of the greatest prevalence of Prime work. Given that this feature is above \$20M in cost it is less likely to be issued as a MATOC or SB contract.	Possible	Critical	3	
AS-4	New Levees	• Contracting plan firmly established?	A contracting plan has not been developed. Given the scale of the project full and open contracting is expected. This assumption may be invalid depending on potential Contracting directives and requirements.	The contract could be split into various smaller pieces, thus making it more likely for a restricted bidding process. Bidding could be conceivably done through a variety of small business, HUBZone, 8A, as well as large contractor solicitations. Additionally, MATOCs might be used, which in some situations may raise proposal prices. Assume prices for this component may increase by 15%, given that this item contains the some of the greatest prevalence of Prime work. Given that this feature is about \$20M in cost it is less likely to be issued as a MATOC or SB contract.	Possible	Significant	2	

AS-5	Floodwalls	• Contracting plan firmly established?	A contracting plan has not been developed. Given the scale of the project full and open contracting is expected. This assumption may be invalid depending on potential Contracting directives and requirements.	The contract could be split into various smaller pieces, thus making it more likely for a restricted bidding process. Bidding could be conceivably done through a variety of small business, HUBZone, 8A, as well as large contractor solicitations. Additionally, MATOCs might be used, which in some situations may raise proposal prices. Given that this feature is above \$20M in cost it is less likely to be issued as a MATOC or SB contract.	Possible	Significant	2
AS-6	Flood Gates	• Contracting plan firmly established?	A contracting plan has not been developed. Given the scale of the project full and open contracting is expected. This assumption may be invalid depending on potential Contracting directives and requirements.	The contract could be split into various smaller pieces, thus making it more likely for a restricted bidding process. Bidding could be conceivably done through a variety of small business, HUBZone, 8A, as well as large contractor solicitations. Additionally, MATOCs might be used, which in some situations may raise proposal prices. Assume prices for this component may increase by 5%.	Likely	Negligible	1
AS-7	Utility Lines & Service	• Contracting plan firmly established?	A contracting plan has not been developed. Given the scale of the project full and open contracting is expected. This assumption may be invalid depending on potential Contracting directives and requirements.	The contract could be split into various smaller pieces, thus making it more likely for a restricted bidding process. Bidding could be conceivably done through a variety of small business, HUBZone, 8A, as well as large contractor solicitations. Additionally, MATOCs might be used, which in some situations may raise proposal prices. Assume prices for this component may increase by 5%.	Likely	Negligible	1
AS-8	0	• Contracting plan firmly established?			Unlikely	Negligible	0
AS-9	0	• Contracting plan firmly established?			Unlikely	Negligible	0
AS-10	0	• Contracting plan firmly established?			Unlikely	Negligible	0
AS-11	0	• Contracting plan firmly established?			Unlikely	Negligible	0
AS-12	Remaining Construction Items	• Contracting plan firmly established?	A contracting plan has not been developed. Given the scale of the project full and open contracting is expected. This assumption may be invalid depending on potential Contracting directives and requirements.	The contract could be split into various smaller pieces, thus making it more likely for a restricted bidding process. Bidding could be conceivably done through a variety of small business, HUBZone, 8A, as well as large contractor solicitations. Additionally, MATOCs might be used, which in some situations may raise proposal prices.	Likely	Negligible	1
AS-13	Planning, Engineering, & Design	• Contracting plan firmly established?			Unlikely	Negligible	0

AS-14	Construction Management	• Contracting plan firmly established?			Unlikely	Negligible	0	
Construction Elements								
							Max Potential Cost Growth	50%
CE-1	Env Mitigation	• Unique construction methods?	Currently wetland credits, buried riprap protection, and large woody debris are the proposed ways to mitigate for damaged wetlands. This could change to other methods.	PDT does not expect unusual methods or issues to be raised at this point. Potentially vulnerable to weather conditions. Areas where the buried toes are being constructed, pumps may be required to remove excess water.	Possible	Negligible	0	
CE-2	Roads & Levee Crossings	• Accelerated schedule or harsh weather schedule?	Paving schedules can be negatively impacted due to rain and harsh winter weather. Staging areas have not been defined for the project. Distant staging areas will increase costs.	Staging areas may be an issue, as we are in an urban environment. They may potentially be a long ways from the actual construction. Neighborhoods may have their own constraints in terms of work restriction and staging limitations. Traffic control may be an issue during construction. Overall impacts are likely to be fairly minor.	Likely	Marginal	2	
CE-3	Levee Raises	• Water care and diversion plan?	A care and diversion of water plan has not been developed for this project. In-water work is expected for the raises, storm water management may be more involved than silt fences and storm drain covers. Additionally, staging areas have not been defined for the project. Distant staging areas will increase costs.	Staging areas may be an issue, as we are in an urban environment. They may potentially be a long ways from the actual construction. Neighborhoods may have their own constraints in terms of work restriction and staging limitations. Work beyond silt fences is not expected. Gages slough may require a more in depth storm water system.	Possible	Marginal	1	
CE-4	New Levees	• High risk or complex construction elements, site access, in-water?	New levees have uncertain foundations, and have a high degree of unknowns as far as existing site conditions go. Additionally, staging areas have not been defined for the project. Distant staging areas will increase costs.	A certain amount of settlement is possible, however we have some information from existing logs. We may find localized locations where we need to overexcavate or overbuild but this will be very fairly limited.	Possible	Marginal	1	
CE-5	Floodwalls	• High risk or complex construction elements, site access, in-water?	Floodwalls are complicated structures and are being constructed in areas that may have a variety of presently unknown construction restrictions (WWTP and Hospital). For example the hospital may not allow work during certain hours, or may restrict work in certain areas due to ongoing usage that cannot be shifted (helipad potentially). Additionally, staging areas have not been defined for the project. Distant staging areas will increase costs.	Pile drivers may be quite loud if required, they are also tall and inconvenient to position in a constricted work environment. Work may be restricted for the general wall construction as well. Staging areas may be a problem. Utility conflicts are likely and work may be needed to relocate. Dealing with utilities at the hospital and WWTP may be problematic.	Very LIKELY	Marginal	3	
CE-6	Flood Gates	• Special equipment or subcontractors needed?	Installation process is somewhat uncertain, and it's uncertain how much the fabrication contractor would need to be involved through the install process.	Lots of uncertainty regarding installatio and equipment that will be required to operate and maintain. Gate designs may need to change to facilitate local O&M requirements.	Very LIKELY	Negligible	2	
CE-7	Utility Lines & Service	• High risk or complex construction elements, site access, in-water?	Could utility work require specialized contractors, or parts that may have limited availability?	Might be some minimum horizontal boring. Same staging area issues as the remainder of the project.	Likely	Negligible	1	
CE-8	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0	
CE-9	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0	

CE-10	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-11	0	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-12	Remaining Construction Items	• Potential for construction modification and claims?	Since these elements are more uncertain they could be more prone to claims and mods.	Small scale of remaining items limits their overall impact on the project.	Likely	Negligible	1
CE-13	Planning, Engineering, & Design	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0
CE-14	Construction Management	• Accelerated schedule or harsh weather schedule?			Unlikely	Negligible	0

Quantities for Current Scope

							Max Potential Cost Growth	40%
Q-1	Env Mitigation	• Quality control check applied?	• Sufficient investigations to develop quantities? • Quality control check applied?	DQC has not been done for any portion of the project. Assumed maximum level of impact for possible wetland mitigation, and used average "going rate" for mitigation. Used a mitigation tool for a different project to develop impacts for fisheries. Tool is not an approved model, only an approximation. Wetlands are unlikely to increase and fisheries mitigation is likely to increase to some, but not substantially.	Likely	Negligible	1	
Q-2	Roads & Levee Crossings	• Quality control check applied?	• Sufficient investigations to develop quantities? • Quality control check applied?	Have done a partial QC on quantities proposed. Estimates are concept level and should be considered very rough. Increases may be significant for these reasons.	Likely	Significant	3	
Q-3	Levee Raises	• Quality control check applied?	• Sufficient investigations to develop quantities? • Quality control check applied?	AE work on the model used for hydraulics was well reviewed. Civil and Geotech spent some time discussing levee quantities. A conservative approach was taken during quantity development.	Possible	Marginal	1	
Q-4	New Levees	• Quality control check applied?	• Sufficient investigations to develop quantities? • Appropriate methods applied to calculate quantities? • Quality control check applied?	AE work on the model used for hydraulics was well reviewed. Civil and Geotech spent some time discussing levee quantities. A conservative approach was taken during quantity development, however the potential for settlement has not been accounted for. Additional analysis is needed to determine any requirement.	Likely	Marginal	2	
Q-5	Floodwalls	• Quality control check applied?	• Level of confidence based on design and assumptions? • Quality control check applied?	Have done a partial QC on quantities proposed. Estimates are concept level and should be considered very rough. Increases would be fairly minor.	Likely	Negligible	1	
Q-6	Flood Gates	• Quality control check applied?	• Sufficient investigations to develop quantities? • Quality control check applied?	Extremely limited investigation, but these are a limited cost driver in the overall estimate.	Likely	Marginal	2	

Q-7	Utility Lines & Service	• Quality control check applied?	• Sufficient investigations to develop quantities? • Quality control check applied?	Have done a partial QC on quantities proposed. Estimates are concept level and should be considered very rough. Very likely to change.	Unlikely	Negligible	0	
Q-8	0	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0	
Q-9	0	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0	
Q-10	0	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0	
Q-11	0	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0	
Q-12	Remaining Construction Items	• Quality control check applied?	• Level of confidence based on design and assumptions? • Sufficient investigations to develop quantities? • Quality control check applied?	Small scale of remaining items limits their overall impact on the project.	Likely	Negligible	1	
Q-13	Planning, Engineering, & Design	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0	
Q-14	Construction Management	• Level of confidence based on design and assumptions?			Unlikely	Negligible	0	
Specialty Fabrication or Equipment								
							Max Potential Cost Growth	75%
FE-1	Env Mitigation	• Unusual parts, material or equipment manufactured or installed?	N/A		Unlikely	Negligible	0	
FE-2	Roads & Levee Crossings	• Unusual parts, material or equipment manufactured or installed?	N/A		Unlikely	Negligible	0	
FE-3	Levee Raises	• Unusual parts, material or equipment manufactured or installed?	N/A		Unlikely	Negligible	0	
FE-4	New Levees	• Unusual parts, material or equipment manufactured or installed?	N/A		Unlikely	Negligible	0	
FE-5	Floodwalls	• Unusual parts, material or equipment manufactured or installed?	N/A		Unlikely	Negligible	0	

FE-6	Flood Gates	<ul style="list-style-type: none"> Unusual parts, material or equipment manufactured or installed? 	<p>These items are highly specialized and require may require a specialized contractor to install. Additionally, some of these are quire large and may be difficult or expensive to transport.</p>	<p>Unlikely to substantially impact cost as we've accounted for a conservative design. Transportation was considered by the vendor and has been narrowed to a reasonable range.</p>	Unlikely	Negligible	0	
FE-7	Utility Lines & Service	<ul style="list-style-type: none"> Risk of specialty equipment functioning first time? Test? 	<ul style="list-style-type: none"> Risk of specialty equipment functioning first time? Test? 	<p>Unlikely to encounter larger components of infrastructure, which would require more complicated fabrication. Unusual elements are unlikely as utility design and operation is well understood.</p>	Unlikely	Negligible	0	
FE-8	0	<ul style="list-style-type: none"> Unusual parts, material or equipment manufactured or installed? 			Unlikely	Negligible	0	
FE-9	0	<ul style="list-style-type: none"> Unusual parts, material or equipment manufactured or installed? 			Unlikely	Negligible	0	
FE-10	0	<ul style="list-style-type: none"> Unusual parts, material or equipment manufactured or installed? 			Unlikely	Negligible	0	
FE-11	0	<ul style="list-style-type: none"> Unusual parts, material or equipment manufactured or installed? 			Unlikely	Negligible	0	
FE-12	Remaining Construction Items	<ul style="list-style-type: none"> Unusual parts, material or equipment manufactured or installed? 	N/A		Unlikely	Negligible	0	
FE-13	Planning, Engineering, & Design	<ul style="list-style-type: none"> Unusual parts, material or equipment manufactured or installed? 			Unlikely	Negligible	0	
FE-14	Construction Management	<ul style="list-style-type: none"> Unusual parts, material or equipment manufactured or installed? 			Unlikely	Negligible	0	
Cost Estimate Assumptions								
							Max Potential Cost Growth	45%
CT-1	Env Mitigation	<ul style="list-style-type: none"> Reliability and number of key quotes? 	Limited availability in data?	<p>Quotes were obtained for cost items, however multiple quotes to validate costs were not always available. These quotes have been used on other NWS estimates and have been reliable.</p>	Unlikely	Negligible	0	
CT-2	Roads & Levee Crossings	<ul style="list-style-type: none"> Assumptions regarding crew, productivity, overtime? 	<ul style="list-style-type: none"> Assumptions regarding crew, productivity, overtime? The cost estimate is conservative in it's assumptions, but does not assume 24/7 work, night shifts, or account for limited skilled labor availability. 	<p>A shift to night work could increase costs, same thing for weekend work. The cost increase for labor overtime is somewhat mitigated by reduced FOOH and equipment FCCM costs.</p>	Possible	Marginal	1	
CT-3	Levee Raises	<ul style="list-style-type: none"> Reliability and number of key quotes? 	<p>Sources of material have not been carefully evaluated, and suitable fill may not be readily available within a reasonable distance. Additionally forecasted prices may be inaccurate and material inflation may proceed faster than CWICCS tables predict. Site constrictions and restraints have not been evaluated. A levee system with limited access to trucks may have substantially increased costs.</p>	<p>These concerns could create significant headaches as design and the cost estimate develops. Consequences could include a long time period project (5+ years) that would mitigate for workforce and equipment constraints.</p>	Possible	Significant	2	

CT-4	New Levees	• Reliability and number of key quotes?	Sources of material have not been carefully evaluated, and suitable fill may not be readily available within a reasonable distance. Additionally forecasted prices may be inaccurate and material inflation may proceed faster than CWICCS tables predict. Site constrictions and restraints have not been evaluated. A levee system with limited access to trucks may have substantially increased costs.	These concerns could create significant headaches as design and the cost estimate develops. Consequences could include a long time period project (5+ years) that would mitigate for workforce and equipment constraints. Note that this risk is identical to CT-3, and should only be applied once.	Unlikely	Negligible	0
CT-5	Floodwalls	• Reliability and number of key quotes?	The specialized nature of this feature may mean predicted markups for the subcontractor are inaccurate and may be low. Crew production rates might be off as well due to limited estimator/designer experience with this feature.	It's likely that some level of inaccuracy is present in the estimate, however the direction and scope of that is uncertain due to the lack of other floodwall production info. In general the wall was estimate conservatively, so impacts should be minimized.	Likely	Marginal	2
CT-6	Flood Gates	• Reliability and number of key quotes?	There was limited availability for quotes on this feature. The specialized nature of this feature may mean predicted markups for the subcontractor are inaccurate and may be low. Crew production rates might be off as well due to limited estimator/designer experience with this feature.	This concern is minimized due to consultation with a competent vendor who provided costs for installation. Certainly these costs change based on a more detailed appraisal of the working environment, but it's unlikely that they were completely off the mark.	Possible	Negligible	0
CT-7	Utility Lines & Service	• Site accessibility, transport delays, congestion?	Utility are typically located near roads and other areas with a high number of potential site constraints. Sites may have limited availability. Primary power, sewer force mains, fiber optic comm, and DI water pipe are expensive and quotes could not be obtained on all of these components. Prices may be different and higher than those calculated in the MII cost book.	The portion of the estimate that utilities account for is small, and a variation in material pricing or production should not cause a substantial overall price increase.	Likely	Negligible	1
CT-8	0	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-9	0	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-10	0	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-11	0	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-12	Remaining Construction Items	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-13	Planning, Engineering, & Design	• Reliability and number of key quotes?			Unlikely	Negligible	0
CT-14	Construction Management	• Reliability and number of key quotes?			Unlikely	Negligible	0

External Project Risks							Max Potential Cost Growth	60%
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EX-1	Env Mitigation	<ul style="list-style-type: none"> Potential for market volatility impacting competition, pricing? 	<ul style="list-style-type: none"> Political influences, lack of support, obstacles? Potential for market volatility impacting competition, pricing? 	<p>Political influences from tribes and services may come into play. It has been difficult to gauge what will be desired from outside entities. HQ may have concerns and questions regarding our methods for calculating mitigation. There could be substantial increases to PED time to deal with concerns from outside entities, which may push the project out and increase costs if materials escalate at a rate above inflation.</p>	Likely	Marginal	2
EX-2	Roads & Levee Crossings	<ul style="list-style-type: none"> Potential for severe adverse weather? 	<ul style="list-style-type: none"> Unanticipated inflations in fuel, key materials? Could asphalt/concrete increase in price? Potential for severe adverse weather? 	<p>Minimal risks for political or external influences, except perhaps at WA-99. Could see some cost increases if we aren't able to modify this point. We are considering bridge abutments to not be an issue as we are not setting back levees at these locations.</p>	Possible	Negligible	0
EX-3	Levee Raises	<ul style="list-style-type: none"> Potential for market volatility impacting competition, pricing? 	<ul style="list-style-type: none"> Potential for severe adverse weather? Political influences, lack of support, obstacles? Lack of local support may inhibit construction progress. Potential for market volatility impacting competition, pricing? 	<p>Could be heavily influenced by seasonal weather concerns. There could be schedule delays due to this, as major material placement couldn't continue. Don't expect to be doing any levee rebuilds, geotech has a solid understanding of the area. Discussed levee foundation concerns elsewhere. If county wanted certified levees in a situation where were not planning for it, that would create an LPP, which wouldn't increase federal costs.</p>	Possible	Marginal	1
EX-4	New Levees	<ul style="list-style-type: none"> Potential for severe adverse weather? 	<ul style="list-style-type: none"> Potential for severe adverse weather? Political influences, lack of support, obstacles? Lack of local support may inhibit construction progress. Potential for market volatility impacting competition, pricing? 	<p>Could be heavily influenced by seasonal weather concerns. There could be schedule delays due to this, as major material placement couldn't continue. Discussed levee foundation concerns elsewhere. If county wanted certified levees in a situation where were not planning for it, that would create an LPP, which wouldn't increase federal costs. There may be some drainage features in the project footprint that require fish friendly passage, but these are likely to be extremely minor. Creation of a new diking district would be exclusively a O&M cost.</p>	Likely	Marginal	2
EX-5	Floodwalls	<ul style="list-style-type: none"> Potential for market volatility impacting competition, pricing? 	<ul style="list-style-type: none"> Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? 	<p>Hospital may have specific requirements regarding access issues. This would largely be an issue of the contractor performing proper phasing. No impact.</p>	Unlikely	Negligible	0
EX-6	Flood Gates	<ul style="list-style-type: none"> Potential for market volatility impacting competition, pricing? 	<ul style="list-style-type: none"> Potential for severe adverse weather? Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? 	<p>Railroads may not wish to cooperate regarding gate placement creating difficulties in PED. WA-20 is a state highway, and WSDOT may have concerns. Working with WSDOT would require more coordination and guidelines, but not likely to be a deal breaker. Real estate costs would increase in order to avoid the railroad, not easily feasible and may be deal breaker.</p>	Likely	Marginal	2
EX-7	Utility Lines & Service	<ul style="list-style-type: none"> Potential for market volatility impacting competition, pricing? 	<ul style="list-style-type: none"> Political influences, lack of support, obstacles? Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? 	<p>Only issue might be dealing with the various public and private entities that own the various lines. Not likely to be a construction cost, but will require ongoing coordination during PED. There may issues with local entities where we construct new levees over existing utilities. We may have to replace utilities at these points.</p>	Unlikely	Marginal	0
EX-8	0	<ul style="list-style-type: none"> Potential for severe adverse weather? 			Unlikely	Negligible	0
EX-9	0	<ul style="list-style-type: none"> Potential for severe adverse weather? 			Unlikely	Negligible	0
EX-10	0	<ul style="list-style-type: none"> Potential for severe adverse weather? 			Unlikely	Negligible	0
EX-11	0	<ul style="list-style-type: none"> Potential for severe adverse weather? 			Unlikely	Negligible	0
EX-12	Remaining Construction Items	<ul style="list-style-type: none"> Potential for severe adverse weather? 	N/A		Unlikely	Negligible	0
EX-13	Planning, Engineering, & Design	<ul style="list-style-type: none"> Potential for severe adverse weather? 			Unlikely	Negligible	0
EX-14	Construction Management	<ul style="list-style-type: none"> Potential for severe adverse weather? 			Unlikely	Negligible	0