APPENDIX 4:

PLANNING LEVEL COST ESTIMATE BACK-UP DETAIL

Construction Cost Estimation

Reference Project	Total project cost	Bridge Area (SF)	Cost/SF	Notes
Flood control	$ 107,505,708.00	80,757.00	$ 1,331.22	This project has no water work. The bridge is over dry land so easy construction.
Johnson	$ 79,668,536.00	50,869.00	$ 1,566.15	
Robertson	$ 333,241,000.00	86,000.00	$ 3,874.90	This is an engineers estimate and a bit of an outlier. This bridge is really big and in a difficult to construct area.
Gerstle	$ 199,254,909.00	81,055.00	$ 2,458.27	This bridge doesn't have a huge amount of water work.
339 old 2014 Estimate	$ 63,642,094.00	49,175.00	$ 1,294.20	
Elmer Email from 2022	$ 90,000,000.00	49,175.00	$ 1,830.20	The bridge length at this time was assumed to be 1400'.
		Average	$ 2,059.16	
New Estimate	$ 153,672,500.00	61,469.00	$ 2,500.00	Based on current imagery the gap needed to cover appears to be more like 1750' so I have adjusted the bridge area. While the bridge is not very large in overall size I would not consider this an average build. The season is super short, everything has to be flown or barged in, and the water flow is substantial. This cost includes all work for the project such as road embankment, rirprap armoring, etc.

General Notes

The numbers above are total project costs which inlcudes work not directly tied to bridges depending on the scope. It also includes all ICAP and CENG required. It is assumed that the bridge will be 35' wide and 1750' long. The 2 existing bridges will be removed completely. The detailed design is assumed to fall more in line with the email from Elmer who used to work in the bridge design section. The current PEL document references a report from 2014 prepared by the National Constructors' Group out of Napa California which I believe to be underengineered and far too old for relevance as far as cost goes. It is important to understand that currently our project costs are substantially higher than what they have been in even the past 5 years. A bonus for this project is that there really should be no traffic control since there is nothing connected on the other side.

Design Cost

Design Costs can be broken down to a percent of total construction costs and generally range from 3-10%. A substantial amount of money will be in getting bathemetry and doing a robust hydro analysis of the drainage basin. There will also be a substantial drilling effort for the pier foundations. Assuming there will be consultant involvement for portions of the design.

Percentage	Construction $	Design Cost
7%	$ 153,672,500.00	10,757,075.00

Total Project Cost

$ 164,429,575.00	Rounded	$ 164,500,000.00
Contengency	10%	180,950,000.00

STATE OF ALASKA DOT/PF
COMPUTATIONS

DATE 9/25/2013
BRIDGE No. 339
CALC. BY EEM

Copper Delta Bridge Replacement
Concept 5 - 1405' x 35' ten span w/ drilled shafts
ESTIMATE OF QUANTITIES & COST

Item No.	PAY ITEM	UNIT	UNIT PRICE	QUANTITY	AMOUNT
202(13)	Removal of Existing Bridge Number 339	LS-SF	$50	11,228	$561,400
205(1)	Excavation for Structures	CY	$35	5,000	$175,000
205(3)	Structural Fill	CY	$50	1,500	$75,000
501(1)	Class A Concrete	LS-CY	$2,000	1,500.0	$3,000,000
501(4)	Class DS Concrete (8' diameter shaft/column)	LS-LF	$2,000	2,200.0	$4,400,000
501(7)	Precast Concrete Member (137' Girders)	EACH	$97,500	60	$5,850,000
503(1)	Reinforcing Steel	LS-LBS	$2.25	800,000	$1,800,000
503(2)	Epoxy-Coated Reinforcing Steel	LS-LBS	$2.50	400,000	$1,000,000
507(1)	Steel Bridge Railing	LF	$250	2,890.0	$722,500
515(1)	Drilled Shaft	LS	$2,500,000	1	$2,500,000
515(2)	Unclassified Excavation (8' diameter)	FT	$2,500	1,925.0	$4,812,500
515(3)	Shaft Casing (8' diameter)	FT	$1,250	2,200.0	$2,750,000
515(4)	Shaft Instrumentation and Data Collection	LS	$75,000	1	$75,000
606(12)	Guardrail / Bridge Rail Connection	EACH	$3,000	4	$12,000
611(1)	Riprap, Class II	CY	$150	40,000	$6,000,000
611(X)	Guide Bank Fill	CY	$50	50,000	$2,500,000
512(X)	Temporary Work Trestle (1100' x 34')	LS-SF	$100	37,400	$3,740,000
	SUBTOTAL				**$39,973,400**
640(1)	Mobilization & Demobilization	LS	11%		$4,441,489
	SUBTOTAL				**$44,414,889**
	Contingency	LS	25%		$11,103,722
	SUBTOTAL				**$55,518,611**
	Construction Engineering	LS	15%		$5,996,010
	SUBTOTAL				**$61,514,621**
	ICAP	LS	4.79%		$2,127,473
	TOTAL				**$63,642,094**

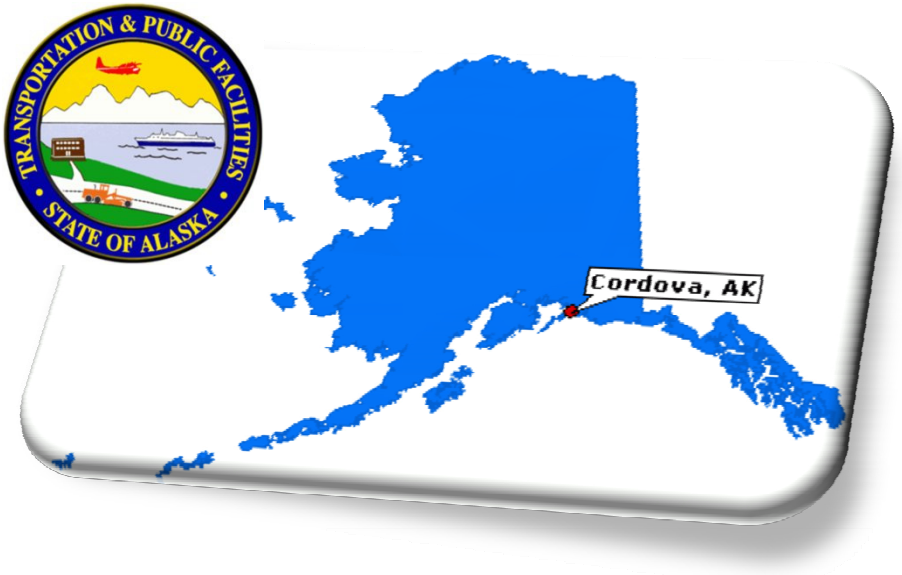
CONSTRUCTABILITY ANALYSIS REPORT

Copper River Highway Bridge #339
Cordova, Alaska
AKSAS Project # 60555
Final Report

February 11, 2014

Prepared for:

The Alaska Department of Transportation & Public Facilities



Prepared by:

The National Constructors' Group
635 Chaparral Circle
Napa, CA 94558
707.257.8994

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    - Example of Drilled Shaft Contractor Prequalification Request
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- Dolos Concrete Block Information

Appendix

Documents Received and Reviewed by NCG:

1. June 18, 2013 – Update
2. April 10, 2013 – Update
3. August 30, 2012 – Update
4. July 17 , 2012 – Update
5. Press Release
6. Cordova Local Contract
7. Bridge Design Current Proposal
8. Material Source
9. August 14, 2012 – DOT Trip Report
10. Survey Control
11. Cordova Highway Log
12. DOT Pile Specifications
13. 1972 Foundation Repair
14. 1977 Construction Completion Report
15. 1972 Load Test Borings
16. 1977 As-Built Plans
17. October 21, 2011 – DOT Scour Report
18. August 2010 – River Cross-Sections
19. USGS – 2010 Discharge Measurement
20. USGS – Water Modeling Bridge #339
21. USGS – Geomorphology of Copper River
22. USGS – Stream Flow – Scour 2010 at Bridge #339
23. Alaska Department of Labor Rates 4/1/2013
24. AGC Craft Labor Agreements
25. Material Sites Material Sites
26. Cordova Tide Charts
27. AGC Craft Labor Contracts
28. Alaska Marine Highway System – Rates and Schedules

Investigative and Quantitative Contacts Made by NCG:

- Cement – *Alaska Basic Industrial*
- Reinforcing Steel – *Diamond Fabrication*
- Reinforcing Steel – *JD Steel*
- Casing, Pipe, Structural Sections – *Skyline Steel*
- Precast Concrete Girders – *Concrete Tech, Tacoma*
- Trestle Timber Deck Mats – *Northland Wood Products*
- Trestle Timber Deck Mats – *Spartan Mat*
- Camp Facilities – Operation – *Global Services, Inc.*
- Camp Facilities – Operation – *Greenstone*
- Fuel – Shoreline Petroleum – *Cordova Terminal*
- Barge Transportation – *Samson Tug and Barge, Cordova and Seattle*
- Trucking – *Carlisle Transportation Service*
- Trucking – *Lyden Transportation Service*
- Cordova Helicopter Service
- Construction Equipment:
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    - Hoisting Equipment – *Lampson International*
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    - Vibratory Pile Hammers – *Hydraulic Power System*
    - Hydraulic Pile Hammers – *Conmaco*
    - Diesel Pile Hammers – *Conmaco*
    - Loaders/Generator – *NC Machinery*
    - Travel Lifts – *Mi-Jack Products*
- Cordova Port Director
- Cordova Hospital
- Cordova Air Boat Tours – *Jack Stephenson*

Section 1 –

INTRODUCTION

Introduction

Bridge #339 located at milepost 36 on the Copper River Highway in Cordova, Alaska has structurally failed and has been closed indefinitely since August 2011. The Alaska Department of Transportation & Public Facilities (Department) is currently working on the design to replace the bridge.

Review and evaluation of the preliminary design during the 2012/2013 winter raised important questions relating to constructability and compatibility of the proposed bridge with site-specific challenges. These questions introduce unacceptable risks to the project.

The Department determined the project would benefit with assistance from a specialized Bridge/Engineer/Construction Consultant. During the summer of 2013, the Department procured a consultant contract with the National Constructors' Group to assist it with a constructability analysis for the proposed bridge replacement.

The contract was structured as a series of tasks as follows:

Task 1 – Start-up

Task 2 – Site Visit

Task 3 – Evaluation

Task 4 – Design Recommendation

Task 5 – Construction Phasing

Task 6 – Construction Estimate

Task 7 – Constructability Report

Location

The site of Copper River Bridge #339 is located at milepost 36 on the Copper River Highway. The 50 mile Highway begins in Cordova is paved to milepost 13 and ends at the Million Dollar Bridge. It is frequently used by hunters, recreationists, and tourists.

Traffic Volume

During the winter, the road beyond milepost 16 is not maintained and closed to vehicle traffic (typically November thru mid April).

The 2010 summer Average Daily Traffic Volume (ADT) in this area is 65.

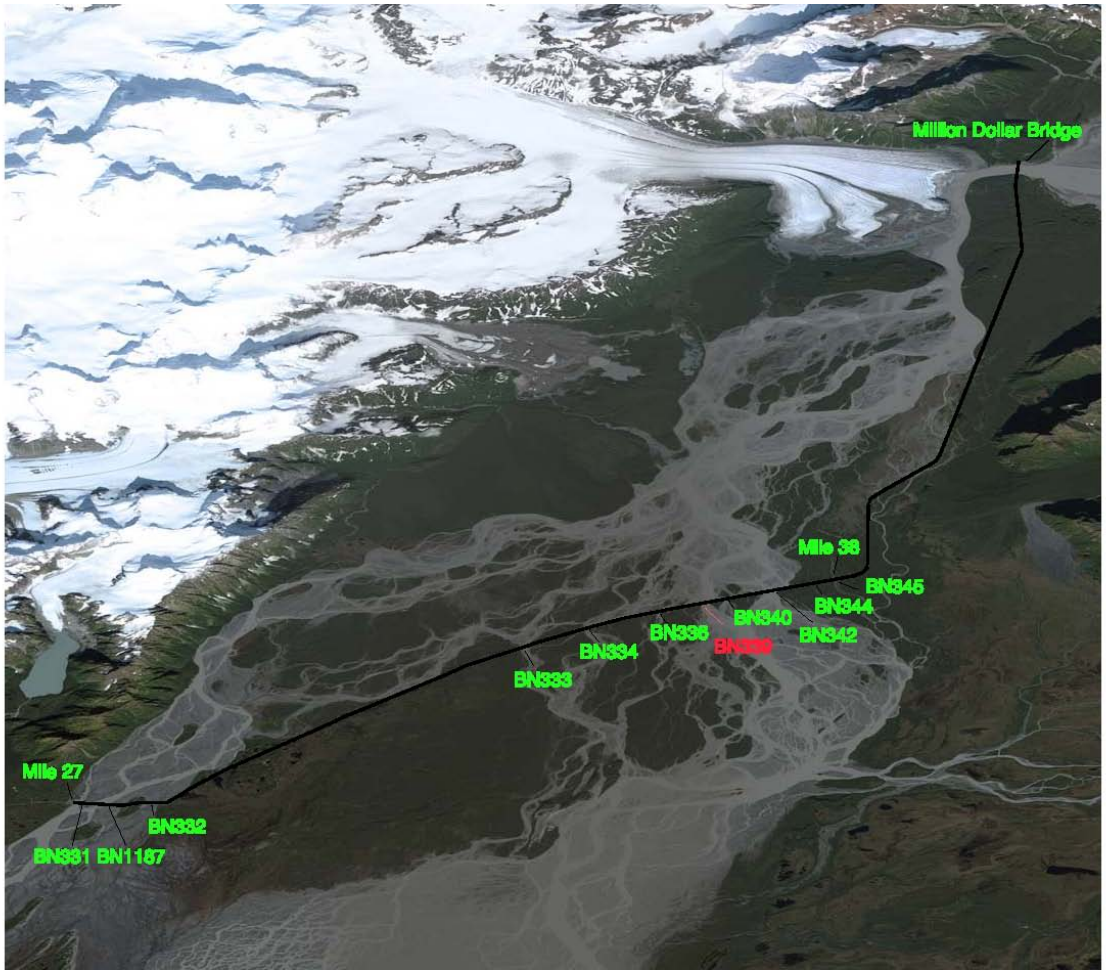

Figure 1 – Copper River Delta

Background

The Copper River drains an area of approximately 24,000 square miles north of the Million Dollar Bridge and is the sixth largest drainage basin in Alaska. Just downstream from the Million Dollar Bridge, the Copper River flows past the face of Childs Glacier before it enters a large, 9-mile wide alluvial braided flood plain (See Figure 1).

Bridge #339 is one of 11 bridges crossing the Copper River Delta. The bridge was constructed in 1977.

This complex flood plain consists of highly erodible material, across which the river is constantly migrating. Multiple channels continually scour, fill, and move from one location to another. Naturally occurring changes in flow between river channels across the braided Copper River delta have led to a dramatic increase in the amount of water flowing under Bridge #339. During the summer of 2011, the flow was measured at 89,000 cubic feet per second (cfs) (665,800 gallons per second).

During the summer of 2006, a large flood initiated a major channel shift (and flow) toward Bridge #339. The increase in flow caused severe erosion to the west road embankment and bridge abutments, prompting emergency repairs. During 2009, it was noticed things were changing again and more flow

was being directed toward Bridge #339. In 2010, AK DOT&PF along with the U.S. Geological Survey (USGS) began a comprehensive monitoring program at Bridge #339. By June of 2010 excessive flow at the bridge caused severe erosion to the west road embankment and both bridge abutments, once again prompting emergency placement of riprap on the embankment and abutments. During the summer of 2011, the river channel started migrating east and began scouring the east bridge piers and abutment. By August 2011 the scour was so severe it was determined the bridge has lost its structural capacity and was closed for safety. By the summer of 2012, the river channel breached the east road approach creating a 100-foot gap.

Current Site Conditions

The Copper River current, debris transport, and ever-changing bathymetry are primary risks relative to design, construction methods, cost, and the duration of construction for the replacement of Bridge #339. To put it in perspective, the flows in the Copper River are approximately four times that of an ebb tide at the Golden Gate Bridge, and two times that at the Tacoma Narrows Bridge.

The original bridge design used a 100-year flood flow of 21,300 cfs. On July 25, 2013, the flow at Bridge #339 was measured to be 92,600 cfs, which equates to 43.5% of the flow through the Million Dollar Bridge.

The main river channel continues its eastward migration. In October 2012, the road breach was approximately 185 feet. On May 30, 2013, a camera mounted on the bridge captured more than 50-feet of road erosion in a 24-hour period. Road breach in June 2013 was approaching 800-feet; road breach in July 2013 was roughly 864-feet; road breach in August 2013 was around 972-feet; and road breach in September 2013 was approximately 1,055-feet (and is 54-feet away from the east abutment of Bridge #340). Beginning August 15, 2013 a portion of the river's flow shifted to the west abutment, and exposed sand bars in the river are continually migrating around the bridge site.

Due to the extremely complex and dynamic conditions at the site of Bridge #339, a construction approach has been developed that takes into account all of the possible river configurations, including currents, sand bars, scour holes, and the possibility lengthening Bridge #339 during construction.

Access to the east side of the river at Bridge #339 is available by airboat, but the route crossing the river is continually migrating.

Construction Strategy

The nature of the river (swift currents with deep channel(s) at the bridge site combined with shallow braided channels throughout the delta) makes it extremely difficult to transport construction equipment and materials to the east side of the river. To access the east side of the river utilizing a portable shallow draft tugboat and Flexifloat type barges loaded with construction equipment is problematic at best.

The severe winter weather on the delta (100 mph winds that can last for weeks, up to 40-foot tall snowdrifts, and unreliable ice thicknesses) coupled with the 23 miles of access road that is not maintained during the winter months leads to a construction work window of four months. Those work

months are May through August, with April and September used for mobilization and demobilization each year.

Therefore, an option is to build a construction trestle across the entire river or develop a plan of constructing the bridge with minimal temporary trestle "over the top" and utilize the new bridge as a roadway is being pursued. Differing span lengths require variables to the construction methods. NCG has analyzed the various options for reliability, cost, and minimization of risk.

Site Visit/Team Workshop

The design team conducted a site visit Tuesday and Wednesday, August 20-21, 2013. During the site visit, the team viewed the Copper River Delta, its alluvial system, river currents, access, potential material sources, and logistics. The team also interviewed several local agencies and transportation and service companies.

A site visit trip report was provided to the Department in September 2013 (see attachments).

Following the site visit, a team workshop was conducted at the Department's Fairbanks District Office on Tuesday and Wednesday, October 22-23, 2013 (see attachments for agenda). The purpose of the workshop was to decide which bridge types, bridge foundations, and hydraulic design elements were to be carried forward for further development.

Preferred Design

Design Options

For the permanent structure, the Department/NCG Team elected to move forward with two separate and distinct permanent structure design options. Each option has independent construction solutions.

Option #1 – Department Design

The Department design option consists of spans of 140-feet found upon a single 8'-0" diameter drilled shaft 170 feet in length with hammer head substructure and a superstructure consisting of 66 precast concrete "bulb tee" girders, each 5'-5" in depth (plans, elevations, and cross sections are included with the attachments).

This option's construction solution consists of a downstream construction access trestle approximately 1,400 lf in length, with reusable oscillator and oscillator crane platforms.

Option #2 – Department/NCG Joint Design

The Department/NCG joint design option consists of spans of 100 feet founded upon two 4'-0" diameter driven pipe pile 150' in length with a precast concrete pile cap and a superstructure consisting of 10 each precast concrete box girders 3'-6" by 5'-0" deep. This option is designed to account for construction equipment loading and critical handling at Port of Cordova (plans, elevation, and cross-section are included herein).

This option's construction solution consists of an over-the-top construction access trestle, which is recycled four times utilizing the complete bridge in each cycle as the access roadway.

Comparison of the Options

Construction Cost

- Option #1 – Total estimated construction cost based upon current dollars is $49,000,000.
    - Cost does not include abutment slope protection, soils investigation, or design and construction inspection.
- Option #2 – Total estimated construction cost based upon current dollars is $36,000,000.
    - Cost does not include abutment slope protection, soils investigation, or design and construction inspection.

Abutment Slope Options

- Option #1 – Double ARBED Sheet Pile Wall – $8,065,770
- Option #2 – Riprap – $2,433,390
- Option #3 – Concrete Dolos[1]- $4,800,000

Maintenance Cost

- Option #1 – Structural requires standard practice inspection. For the bridge girders, a snooper truck will be required to inspect the girders. The spans for this option are 60' longer than the existing bridge spans, resulting in less debris obstructions to either the existing bridge or the option #2 bridge. The bridge deck and railings are the same for either option. Both options have the same maintenance problem of protecting the abutment slopes. These slope options have been investigated.
- Option #2 – The structure will require standard practice inspection. The girders for this option have been designed for construction loads and are therefore stiffer. However, an inspection will be required that requires access hatches. The span is 20' longer than the existing structure, providing less area for obstructions in the river.

Durability – Life Cycle Cost

- Option #1 – The proposed pile foundations for both options have been significantly lengthened by approximately 100' from the original structure to account for the extensive scour observed at the site. Additionally, the exposed surface of the pile casing has been galvanized and thickened to provide added protection to the steel casing from abrasion.
- Option #2 – The option #2 superstructure, being 40' shorter than the spans of Option #1 and designed for construction loads, could be a marginal improvement to durability.

Seismic

- Option #1 – Designed for maximum local seismic event and to all current seismic codes.
- Option #2 – Designed for maximum local seismic event and to all current seismic codes.

[1] See attached literature in Appendix

Associated General Contractor/Craft Labor Agreement Requirements

First Aid, Sanitation, and Accident Prevention

First Aid Requirements

In case of accidents, the following requirements for first aid are agreed to:

a) The Employer will keep and maintain fully equipped standard First Aid Kits (as prescribed by the National Safety Council) where equipment for isolated crews are working in remote areas or in areas where First Aid Kits are not immediately available; such kits shall be provided and be accessible on each machine and/or for each crew.

b) The Union will cooperate with the Employer in order to have at least one person in each 20 employed who is a trained first aid person. No person shall be employed as a foreman who does not have a valid, up-to-date First Aid Card.

c) Blankets and stretchers shall be maintained for the use of Employees who may be injured.

d) Persons whose injuries require the use of a stretcher or ambulance shall be accompanied to the hospital by an attendant other than the driver.

e) Immediate transportation must be provided for seriously injured persons, and such transportation must have precedence over all other transportation under the control of the firm or party upon whose operation the accident occurs.

Camp Requirements

All camps, regardless of size and location, shall provide adequate laundry, drying and bathing facilities for Employees. Showers are preferable and shall be provided in ratio of at least four showerheads for each fifty Employees. The Employer or subcontractor shall furnish towels, washcloths and hand soap to all Employees.

Each person shall be allowed housing of approximately sixty (60) square feet of floor area and shall be furnished bedding and weekly change of linen. Shelterwells and similar structures shall require approximately ninety (90) square feet of floor area per worker. Adequate closet or locker space shall be provided each person, and where more than two (2) persons are housed in a single room, a locker and keys or lockable closet shall be provided each person. There shall be no more than four (4) persons housed in a standard 16 x 24 shelterwell. Room attendants shall be required to sweep floors and tidy rooms daily, excluding Sundays and holidays, and one day each week shall give each room a general cleaning, including an antiseptic treatment of floors. The Employers shall furnish an adequate number of washers and dryers, both in camp and in facilities arranged for through a third party. However, Employees covered by this Agreement shall be entitled to as favorable camp conditions as other Employees covered by AGC Agreement.[2]

[2] Alberta or equal quality trailer camps are acceptable providing the patented or similar covered walkways are installed.

Equipment Requirements

It shall not be considered a violation of this Agreement where persons refuse to work with or ride in unsafe equipment or where adequate safeguards are not provided, or when the facilities and services are not being maintained in a reasonably sanitary condition. The Employers agree that all equipment shall be properly cabbed and screened.

Shelter Requirements

Warm and adequate shelter shall be provided for the Employees by the Employer in which to dry their clothes and eat their lunches.

Drinking Water

Cool and clean drinking water in sanitary containers and disposable cups will be provided in adequate supply in close proximity to Employees at all times.

Toilets and Urinals

On all projects covered by this Agreement, there shall be provided by the Employer, at all times during construction, sanitary facilities consisting of a reasonable number of toilets and urinals. Toilets shall be protected from weather and falling objects.

Drug-Free and Alcohol-Free Workplace

Labor & Management are committed to providing Employees with a drug-free and alcohol-free workplace. It is the goal to protect the health and safety of Employees and to promote a productive workplace, and protect the reputation of Labor and Management and the Employees. Consistent with those goals, the Employer prohibits the use, possession, distribution, or sale at its employment sites, of drugs, drug paraphernalia, or alcohol. The Union recognizes the Employer's right to develop and implement a drug-screening program. The Employer agrees to pay the cost for such drug screening. The Employer will designate the facility to conduct the drug/alcohol screening. Within the limits permitted by applicable Federal or State laws and/or owner regulations, the Employer has the prerogative to test Employees for drug/alcohol usage, and to refuse employment or terminate those who test positive.

Background Check

The Employer maintains the right to conduct a criminal background check for felony convictions and/or driving convictions on new Employees prior to hiring. If required by the Employers contract or insurance carrier requirements. Workers required by the Employer to submit to a Background Check will not be on the payroll of the Employer during the background check. If the Employee is put to work while they are awaiting the results, they will be paid for time worked. The Employer will pay for the Background Check.

Personnel Living Facilities

The construction period for this project coincides with Cordova's tourist and fishing season, thus making local accommodations extremely limited. That restriction, coupled with the thirty-five mile distance to the jobsite, requires that a camp be established for the project personnel. The planned location is on Department property near the airport (at mile 13.5). Transportation to the job site will be provided via

bus. Catering, janitorial, and sanitary services for the camp will be provided by Cordova businesses. Power will be provided by generators, sanitary provided by septic tank, and cell phones for personal use.

On-Site Facilities

Due the large quantity of construction and permanent material to be handled, on-site facilities must be provided to provide for welding both construction and permanent materials, reinforcing steel fabrication and assembly, concrete plant operation, material storage, and superintendent/engineer's office.

An on-site facility is planned utilizing the Departments 100-foot right-of-way, placing embankment material and base rock. The facility will be, as a minimum, 500-feet-long (see plan of site facilities for each option).

Handling Material at the Site Facility

The primary material handling equipment at the site facility is estimated to be two 50-ton travel lifts, supplemented with a 40-ton hydraulic rough terrain crane and a combined fork lift/loader. This equipment has the hoisting capability of handling all permanent and temporary materials to be incorporated into the work.

Local Contractors

Local contractors are contemplated to perform the following functions:

- Hauling pipe/structural steel (for constructing trestles) containers, etc., from the Cordova port to the jobsite
- Provide embankment, roadway rock, and riprap as required
- Fuel will be provided by the Cordova distributor
- Processing and hauling of concrete aggregate
- Providing water to the site for construction
- Asphalt wearing surface, if required
- Janitorial, sanitary, and food preparation services

Construction Phasing

Approach to the Replacement of Copper River Highway Bridge #339

The following are activities that are the same for either Option #1–140' Spans or Option #2–100' spans.

Construction Approach for Controlling the River's Current While Placing Temporary and Permanent Pile

Accurately placement of piles and other foundation elements in deep fast-flowing water is difficult. Maintaining pile tolerance is a significant risk, therefore a diversion element has been developed for current diversion (See attachment "Current Deflection Diversion Methods"). It is anticipated that sand bars will continually be moving transversely across the river. The approach utilizing a floating barge only needs to be utilized where the current would affect tolerance. The approach was developed from various diversion methods that have been utilized for bridge construction on the Mississippi River.

Demolition of Existing Bridges #339 and #340

Bridge #339

Bridge #339 consists of five (5) spans of 80-feet/each for an overall bridge length of 400-feet and six (6) bents consisting of a cap and two piles each. It is assumed that environmental restraints will not allow demolition methods for removal of the bridges, nor allow dropping of significant portions into the river.

Option #1 – 140' Spans – Temporary Trestle Downstream of the Alignment

- Construct access trestle
- Remove Span #1 as follows:
    - Saw cut the joint between the girders and lift girders. Remove the girders and saw cut girders into sections to use for slope protection.
    - Place scaffold on cap. Saw and wedge cap from two piles and lift off.
    - Vibrate a 48" pipe around the existing 30" pile, breaking the friction and pulling both the 48" pipe and the 30" existing pile.
    - Repeat procedure for each span as trestle progresses (see construction schedule for sequence of the work).

Option #2 – 100' Spans – Temporary Trestle – Rail on Outside – Cap Beam below Existing Deck

- Remove Span #1 from land and construct the first and second trestle bent
- Remove Span #2 as follows:
    - Saw cut the joint between the girders and lift girders. Remove the girders and saw cut girders into sections to use for slope protection.
    - Place scaffold on cap. Saw and wedge cap from two piles and lift off.
    - Vibrate a 48" pipe around the existing 30" pile, breaking the friction and pulling both the 48" pipe and the 30" existing pile.
    - See construction schedule for sequence of the work.

Bridge #340

Bridge #340 exists of three spans and the overall bridge length is 241'.

- Saw cut the joint between the girders and lift girders. Remove the girders and saw cut girders into sections to use for slope protection.
- Place scaffold on cap. Saw and wedge cap from two piles and lift off.
- Vibrate a 48" pipe around the existing 30" pile, breaking the friction and pulling both the 48" pipe and the 30" existing pile.
- Repeat procedure for each span as trestle progresses (see construction schedule for sequence of the work).

Mobilization of Construction and Permanent Materials

Construction Materials

- The estimate is based upon trestle pipe pile and structural steel members being barge delivered from Longview, Washington, to Cordova. If allowed, this material may be provided to the construction contractor from foreign sources.
- Timber crane mats for the trestle deck will be provided either by Alaska or Washington sources and barged to Cordova.

Permanent Materials

- The estimate is based upon drilled shaft casing or pipe pile will be delivered by barge to Cordova from Longview, Washington. The procurement of the permanent material must meet five USA requirements for FHWA funded projects.
- Epoxy coated reinforcing steel will be barged from Seattle, Washington to Cordova.
- Concrete "bulb tee" or concrete box girders will be barged from Concrete Tech in Tacoma, Washington to Cordova.
- Cement will be trucked from Anchorage via the Alaska Marine Highway System (AMHS).
- Concrete aggregates, riprap, roadway base materials, and embankment will be processed locally.

Mobilization of Construction Equipment

- See detailed listing of source of construction equipment, which identifies items to be trucked from Anchorage via the AMHS. Construction equipment not available in Alaska will be barged from Seattle, Washington to Cordova.

Specialty Mobilization

- Hoisting equipment required for unloading and handling concrete girders at the Cordova harbor barge dock.
    - For Option #1, crawler crane employed at the site will be moved to the harbor to unload the decked "bulb tee" girders
- Trucks, trailers, and steering dollies will be required for transporting the concrete girders from the Cordova harbor to the jobsite.

- Unloading, transportation, and assembly of 225-ton crawler crane, and, for Option #2, the assembly of the crane onto the crane car.
    - For Option #1, the crawler crane employed at the site will be moved to the harbor to unload the decked “bulb tee” girders.
    - For Option #2, during the first season delivery 2 ea. RTC 70-ton machine will be utilized to unload and handle the box girders
    - For the second season, the crawler crane employed at the site will be moved to the harbor to unload the box girders.

Craft Labor Work Hour Shift Analysis

Alternative A – Single Shift

- Option A-1 – Single Shift
    - Six days per week
    - 10 hours per day
    - 60 work hours per week
    - Pay

        60 hours – Straight time pay
        10 hours – Premium time pay
        70 hours – Total Pay
    - Construction duration – 17 weeks
    - (Total work hours) (construction duration) (60 hrs. x 17 wks.) = 1,020 hours

- Option A-2 – Single Shift
    - Six days per week
    - 12 hours per day
    - 72 work hours per week
    - Pay

        72 hours – Straight time pay
        16 hours – Premium time pay
        88 hours – Total Pay
    - Construction duration – 17 weeks
    - (Total work hours) (construction duration) (72 hrs. x 17 wks.) = 1,224 hours

Alternative B – Double Shift

- Double Shift
    - Six days per week
    - 10 hours per day
    - First Shift – 60 work hours per week
    - Second Shift – 60 work hours per week
    - First Shift Pay

        60 hours – Straight time pay
        10 hours – Premium time pay
        70 hours – Total Pay
    - Second Shift Pay

        60 hours – Straight time pay
        10 hours – Premium time pay
        6 hours – Shift time pay
        76 hours – Total Pay
    - Construction duration – 17 weeks
    - (Total work hours) (construction duration) (120 hrs. x 17 wks.) = 2,040 hours

Alternative C – Rolling 48 Hours – Two (2) Groups

(Work four days, off four days)

- Single Shift (2 groups) – 12 hours
  - Four days per shift
  - 12 hours per day
  - Total of 96 work hours per week
  - First Group Pay

    48 hours – Straight time pay
    8 hours – Premium time pay
    56 hours – Total Pay
  - Second Group Pay

    48 hours – Straight time pay
    8 hours – Premium time pay
    56 hours – Total Pay
  - Construction duration – 17 weeks
  - (Total work hours) (construction duration) (96 hrs. x 17 wks.) = 1,632 hours

Alternative D – 14 days on/14 days off (12 hours per shift)

(This alternative is similar to current Alaska remote operations)

- (Total work hours) (construction duration) (84 hrs. x 17 wks.) = 1,428 hours

Summary of Hours per Alternative

Alternative A-1 – 1,020 hours (Single shift – 6 days, 10 hrs/day)

Alternative A-2 – 1,224 total work hours (Single shift – 6 days, 12 hrs/day)

Alternative B – 2,040 hours (Double shift – 6 days, 10 hrs/day)

Alternative C – 1,632 hours (Rolling 48 – 4 days, 12 hrs/day – 2 groups)

Alternative D – 1,428 hours (14 days on/14 days off – 12 hours/shift)

Discussion

- Alternative B/C requires double camp facilities
- Alternative A-1 and A-2 utilize daylight hours
- Alternative B requires lighting
- Alternative B requires duplicate supervision/engineering
- Alternative A-1 requires 17% fewer hours than A-2
- Alternative C requires duplicate supervision/engineering
- Alternative C requires cost to leave for four days
- Alternative D requires duplicate supervision/engineering
- Alternative D requires the cost to leave for 14 days

The estimate will be based upon Alternative A-2, which contains the following:

- Single shift
- 6 days per week
- 12 hour work days
- 1,224 total work hours

Craft Labor Hourly Rate Schedule

Labor Rates

LINE	DESCRIPTION		ELECTRICIAN	LABOR FOREMAN	LABORER	IRON WORK	PILE BUTT	PILE BUTT WELD	OPERATING ENGINEER _____	OPERATING ENGINEER ___	OPERATING ENGINEER
1	Base Wages		$46.64	$32.65	$30.96	$34.56	$37.28	$38.31	$41.24	$31.47	$37.89
2	Planned Premium Time (22%)	22%	$10.26	$7.18	$6.81	$7.60	$8.20	$8.43	$9.07	$6.92	$8.34
3	Incidental Premium Time (3%)	3%	$1.90	$0.97	$0.90	$1.04	$1.12	$1.15	$1.24	$0.94	$1.14
4	Shift Differential		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5	Travel Pay		$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50
6	**Subtotal Lines 1-5**		**$59.30**	**$41.30**	**$39.17**	**$43.70**	**$47.10**	**$48.39**	**$52.05**	**$39.84**	**$47.86**
7	Health/Wellness		$10.85	$7.12	$7.12	$7.43	$9.56	$9.56	$9.37	$9.37	$9.37
8	Pension		$14.95	$13.55	$13.55	$16.48	$1.63	$11.63	$10.04	$10.04	$10.04
9	Training		$0.88	$1.24	$1.24	$0.95	$0.72	$0.72	$1.03	$1.03	$1.03
10	Management		$0.21	$0.21	$0.21	$0.44	$0.11	$0.11	$0.11	$0.11	$0.11
11	Legal		$0.16	$0.16	$0.16	$0.11	$0.16	$0.16			
12	**Subtotal Lines 7-11**		**$27.05**	**$22.28**	**$22.28**	**$25.41**	**$12.18**	**$22.18**	**$20.55**	**$20.55**	**$20.55**
12a	**Subtotal Lines 1-11**		**$86.35**	**$63.58**	**$61.45**	**$69.11**	**$59.28**	**$70.57**	**$72.60**	**$60.39**	**$68.41**
13	FICA (SS)	6.20%	$3.68	$2.56	$2.43	$2.71	$2.92	$3.00	$3.23	$2.47	$2.97
14	FICA (Med)	2.35%	$1.39	$0.97	$0.92	$1.03	$1.11	$1.14	$1.22	$0.94	$1.12
15	FUTA	0.60%	$0.36	$0.25	$0.24	$0.26	$0.28	$0.29	$0.31	$0.24	$0.29
16	Alaska Unemployment	4.18%	$2.48	$1.73	$1.64	$1.83	$1.97	$2.02	$2.18	$1.67	$2.00
17	**Total Tax**	**13.33%**	**$7.90**	**$5.51**	**$5.22**	**$5.83**	**$6.28**	**$6.45**	**$6.94**	**$5.31**	**$6.38**
18	Workers Compensation	15%	$7.00	$4.90	$4.64	$5.18	$5.59	$5.75	$6.19	$4.72	$5.68
19	Risk, Liability, & Property Damage	2%	$0.93	$0.65	$0.62	$0.69	$0.75	$0.77	$0.82	$0.63	$0.76
20	Workers Comp Jones Act										
21	Workers Comp Longshoreman										
22	**Subtotal**		**$7.93**	**$5.55**	**$5.26**	**$5.88**	**$6.34**	**$6.51**	**$7.01**	**$5.35**	**$6.44**
23	Small Tools and Supplies		$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00
24	Misc outside Rentals		$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00
25	Safety supplies		$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00
26	**Subtotal**		**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**
27	**Total Lines**		**$114.18**	**$86.64**	**$83.94**	**$92.81**	**$83.90**	**$95.53**	**$98.55**	**$83.05**	**$93.23**
28	**Escalation**										
29	**Total Cost per Man-hour**										

Note: Rates based upon 6 days per week, 12 hours per day

Craft Labor Cost Per Shift

Crew	Craft Labor	No. in Crew	Hourly Rate	Hours per Shift	Total Cost per Shift	Total Man-hours per Shift
Trestle Crew	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	4	$83.90	12	4,027	48
	Laborer	2	$83.94	12	2,015	24
	Operating Engineer	3	$93.23	12	3,356	36
		10		**48**	**10,453**	**120**
Material Handling	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	3	$83.90	12	3,020	36
	Laborer	2	$83.94	12	2,015	24
	Operating Engineer	3	$83.05	12	2,990	36
		9		**48**	**9,080**	**108**
Welding	PD Foreman	1	$102.00	12	1,224	12
	Pile Driver	4	$95.53	12	4,585	48
	Laborer	2	$83.04	12	1,993	24
	Operating Engineer	1	$83.05	12	997	12
		8		**48**	**8,799**	**96**
Rebar	Rebar F	1	$110.00	12	2,227	12
	Rebar	2	$92.81	24	3,547	24
		3		**36**	**5,774**	**36**
Shaft	PD Foreman	1	$87.90	12	1,055	12
	Operations Foreman	1	$110.00	12	1,320	12
	Operating Engineer	5	$93.23	12	5,594	60
	PB	3	$83.96	12	3,023	36
	Labor	2	$83.04	12	1,993	24
		12		**60**	**12,984**	**144**
Abutment Slope Protection Sheet Pile Crew	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	5	$83.90	12	5,034	60
	Laborer	2	$83.94	12	2,015	24
	Operating Engineer	4	$88.94	12	4,269	48
		12		**48**	**12,372**	**144**
Rock/Riprap Placing Crew	PD Foreman	1	$90.00	12	1,080	12
	Pile Driver	2	$83.94	12	2,015	24
	Laborer	3	$93.23	12	3,356	36
		6		**36**	**6,451**	**72**
Caps	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	2	$83.90	12	2,014	24
	Laborer	1	$83.04	12	1,018	12
	Operating Engineer	2	$93.20	12	2,237	24
		6		**48**	**6,323**	**72**
Grade	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	6	$83.40	12	6,041	72
	Operating Engineer	4	$93.23	12	4,474	48
		11		**36**	**11,570**	**132**

Construction Equipment Rate Schedule

Description - Construction Equipment	Monthly Ownership	Monthly Standby	Hourly Operating Expense
Flexifloat – Pontoons	$2,500.00	$1,250.00	$6.00
Anchor Winches	$6,000.00	$3,000.00	$5.00
Light Towers	$1,400.00		$5.00
Generators - 15 kw	$1,100.00		$30.00
Generators - 250 kw	$3,000.00		$100.00
Generators - 500 kw	$6,000.00		$185.00
Welding Machine - 250 Amp	$300.00		$10.00
Welding Machine - 350 Amp	$900.00		$15.00
Air Compressor - 185 CFM	$800.00		$15.00
Air Compressor - 325 CFM	$3,000.00		$50.00
Air Compressor - 600 CFM	$6,000.00		$55.00
Loader/Forklift – 966	$9,000.00		$50.00
Rough Terrain Crane - 70 Ton	$14,000.00	$7,000.00	$95.00
Crawler Crane – 2250	$30,000.00	$15,000.00	$110.00
Crane Carrier Car	$12,500.00		$40.00
Travel Lift	$15,000.00		$50.00
Boat LCM	$4,000.00		$28.00
Air Boat	$1,500.00		$25.00
Concrete Plant/Turbine Mixer	$19,000.00	$9,500.00	$30.00
Vibratory Hammer HPS 1600	$20,000.00	$10,000.00	$100.00
Vibratory Hammer Power Pak	$20,000.00	$10,000.00	$175.00
Hydraulic Impact Hammer (200,000-300,000)	$50,000.00		$150.00
Personnel Van	$3,000.00		$20.00
Pickups	$1,200.00		$10.00
Mechanic Truck	$20.00		$20.00
Fuel Trailer	$10.00		$5.00
Water Tank Trailer	$10.00		$4.00
Shaft Equipment			
Liebherr 885 Crawler 150-ton	$25,000.00	$12,500.00	$80.00
Leffer Oscillator - 8'-0"	$15,000.00	$7,500.00	$100.00
Leffer Power Pack	$6,000.00	$3,000.00	$60.00
Concrete Pump	$10,000.00	$5,000.00	$80.00
Misc. Shaft Equipment (Bucket, Tremie, etc.)	$2,500.00	$5,000.00	$50.00

Construction Equipment Operating Expense per Shift

Option #1 - 140' Spans / Option #2 100' Spans

	Construction Equipment Description	EOE Operating Rate/Hr	Hours Worked per Shift	EOE per Shift
Trestle Operation	Crawler Crane	$110.00	12	$1,320.00
	Crane Carrier	$40.00	12	$480.00
	Vibratory Hammer	$100.00	5	$500.00
	Vibratory Power Pak	$175.00	5	$875.00
	Hydraulic Hammer	$250.00	5	$1,250.00
	Welding Machine	$10.00	12	$120.00
	Air Compressor	$15.00	12	$180.00
	Flexifloat	$6.00	12	$72.00
	Anchor Weights	$5.00	12	$60.00
	Generator - 250 kw	$100.00	12	$1,200.00
	TOTAL	**$811.00**	**99**	**$6,057.00**
Material Handling	Travel Lift	$50.00	12	$600.00
	Travel Lift	$50.00	8	$400.00
	RTG - 70-Ton	$95.00	10	$950.00
	966 Lift	$50.00	10	$500.00
	Air Compressor - 600 cfm	$55.00	10	$550.00
	TOTAL	**$300.00**		**$3,000.00**
Welding	350 Amp	$15.00	10	$150.00
	350 Amp	$15.00	10	$150.00
	250 Amp	$10.00	10	$100.00
	250 Amp	$10.00	10	$100.00
	Generator - 250 kw	$100.00	12	$1,200.00
	Air Compressor - 325 CFM	$50.00	12	$600.00
	TOTAL	**$200.00**		**$2,300.00**
Drill Shaft	Crawler	$80.00	12	$960.00
	Oscillator	$100.00	8	$800.00
	Power Pak	$60.00	8	$480.00
	Miscellaneous	$30.00	12	$360.00
	Air Compressor - 185 CFM	$15.00	12	$180.00
	Welder - 250 Amp	$10.00	6	$60.00
	Cone Pump	$80.00	1	$80.00
	TOTAL	**$375.00**		**$2,920.00**
Other	Boat LCM	$28.00	1	$28.00
	Air Boat	$25.00	2	$50.00
	Personal Van	$20.00	4	$80.00
	Pickup Trucks	$10.00	36	$360.00
	Mechanics Truck	$20.00	12	$240.00
	Generator - 15 kw	$10.00	12	$120.00
	Tanks	$10.00	20	$200.00
	TOTAL	**$123.00**		**$1,078.00**
	Grand Total			**$15,355.00**

Construction Material Rate Schedule

Description	Unit of Measure	Unit Price	Freight Included	
			Yes	No
Trestle – Pile	ton	$1,500.00		
Trestle – Structural Steel Section	ton	$1,300.00		✓
Trestle – P.T. Strand/Anchors	lb	$10.00		
Trestle – Timber Deck Mats (12”x5’x40)	ea	$2,960.00	✓	
Trestle – Miscellaneous	lb	$5.00		
Concrete Forms	sf	$45.00		

Permanent Material Rate Schedule

Description	Unit of Measure	Unit Price	Freight Included	
			Yes	No
Cement	ton	$136.00		✓
Concrete – Admixtures	gal	$30.00	✓	
Concrete – Aggregate	ton	$15.00	✓	
Concrete – Sand	ton	$20.00	✓	
Pile/Shaft Casing	ton	$1,500.00		✓
Reinforcing Steel	lb	$0.75		✓
Reinforcing Steel – Epoxy	lb	$0.92		✓
Elastomeric Bearing Part	ea	$900.00	✓	
Precast Concrete “Bulb Tee” Girder	lf	$250.00		✓
Precast Concrete Box Beam Girder	lf	$320.00		✓
ARBED Steel Shaft Pile	ton	$1,600.00		✓
Bridge Rail	lf	$100.00	✓	
Roadway Rail	lf	$80.00	✓	
Roadway Embankment	cy	$15.00	✓	
Riprap Class I	cy		✓	
Riprap Class II	cy		✓	
Riprap Class III	cy		✓	
Riprap Class IV	cy		✓	
Membrane Waterproofing	sf	$10.00	✓	
Pile Galvanized – 48’	lbs	$0.25	✓	✓
Pile Galvanized – 96’	sf	$10.00	✓	✓

Section 2 –

OPTION #1 – 140’ Spans

Option #1 – 140' Spans

Construction Schedule/Sequence

A construction trestle approximately 1,400 feet long will be constructed for construction access on the downstream side of the replaced bridge. At each pier, a platform will be constructed for drilled shaft construction utilizing an oscillator. The material for two oscillator platforms is included in the estimate. For the oscillator service crane, a platform is provided between two piers. The material for two crane platforms is estimated. The need for the platform adjacent to the access trestle is due to the short construction season and the need to construct the access trestle concurrently with the drilled shaft. Further, the access trestle is placed off-line to provide access for erecting the bridge superstructure. The superstructure erection will commence from the east abutment proceeding to the west. This will provide concurrency with trestle removal (see detailed cross-section plan and elevation details).

Construction Schedule

The estimate is based upon two construction seasons as follows:

- Notice to proceed
- Submittals approval, reinforcing steel, box girders
- Procure – fabricate – "trestle" caps, girders, pile template, and timber deck
- Procure – fabricate – superstructure decked "bulb tee" girders
- Procure – fabricate – trestle pipe pile
- Procure – fabricate – permanent pipe pile
- Procure – reinforcing steel for pile, column, caps
- Procure subcontractors
    - Site/camp development
    - Concrete aggregate production
    - Craft employee camp services
- Establish camp site at mile 15 (ferry delivery – winter)
- Mobilize construction equipment at Seattle
- Load/ship/unload to jobsite – trestle pipe pile
- Load/ship/unload to jobsite – caps, girder, template
- Load/ship/unload to jobsite – construction equipment
- Mobilize construction equipment at Anchorage

<u>Season #1</u>

- Access trestle is constructed for the entire ± 1,400 lf
- All 11 ea 8'-0" diameter drilled shaft 170' long are completed
- All 11 ea pier hammer head caps are complete
- Temporary platforms are removed
- Trestle timber deck is removed for winter (strand X-bracing and deck beams shall remain in place for lateral stability)

- Site facilities are removed and the area will be utilized during Season #2 for storage of “bulb tee” concrete girders
- During the winter, all construction equipment and facilities will be moved to winter storage. Construction equipment and material no longer required will be barged to Seattle, as weather allows.

Season #2

- Superstructure is erected from the east to the west
- Trestle is removed
- See attachments for detailed sequence of work (including estimated production) and detailed schedule of work

Work Breakdown Structures – Summary

Option #1 – 140' Spans

Season #1	**Shifts**
Original Mobilization	18.0
Demolition	11.5
Trestle	166.0
Shaft Operation (Concurrent)	143.0
Cap Operation (Concurrent)	110.0
Winter Shutdown	12.0
Total (Excludes *concurrent operations*)	**207.5**

34 weeks = 7 months (including mobilization/demobilization)
29 weeks = 6 months (mobilization/demobilization)

Season #2	**Shifts**
Remobilization	18.0
Girder Erection/Handling	48.0
Trestle Removal	20.0
Place Deck Wearing Surface (Concurrent)	12.0
Place Guardrail (Concurrent)	8.0
Demobilize Site	12.0
Total (Excludes *concurrent operations*)	**98.0**

16.3 weeks = 3.8 months

	Shifts
Mobilization/Demobilization	60.0
Demolition	11.5
Trestle	186.0
Shafts	143.0
Cap	110.0
Girders	48.0
Deck	12.0
Guardrail	8.0
Total	**578.5**

Construction Sequence – Option #1 – 140' Spans

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
Season 1				
T	Set Template – Bent 0	1	0.5	
T	Drive Pile – Bent 0 – 4 ea – 24"	1	1.5	
T	Set Template – Bent 1	1	0.5	
T	Drive Pile – Bent 1 – 4 ea – 24"	1	1.5	
T	Set Caps, Girder, Deck, Span 0-1	1	1.0	
T	Set Template – Bent 2	1	0.5	
T	Drive Pile – Bent 2 – 4 ea – 24"	1	1.5	T = 14
T	Set Caps, Girders, Deck – Span 1-2	1	1.0	
T	Set Template – Bent 3	1	0.5	
T	Drive Pile – Bent 3 – 4 ea – 24"	1	1.5	
T	Set Caps, Girders, Deck – Span 2-3	1	1.0	
T	Set Template – Bent 4	1	0.5	
T	Drive Pile – Bent 4 – 4 ea – 24"	1	1.5	
T	Set Caps, Girders, Deck – Span 3-4	1	1.0	
Demo	Saw Cut Girder Lines		SUB	
Demo	Remove Spans EB #1		0.5	D = 1.5
Demo	Remove Cap A		0.5	
Demo	Remove Pile A – 2 ea – 30"		0.5	
Shaft	Drill Shaft Pier 1 (Abutment) from Land – (Excavate, Rebar, Concrete)	Shaft	11.0	S = 11
T	Set Template – Bent 5		0.5	
T	Drive Pile – Bent 5 – 4 ea – 24"		1.5	T = 3
T	Set Caps, Girders, Deck – Span 4-5		1.0	
Demo	Remove Spans EB #2		0.5	
Demo	Remove Cap B		0.5	D = 1.5
Demo	Remove Pile B – 2 ea – 30"		0.5	
T	Set O1 Platform Jacket		1.0	
T	Drive Pile – O1 Platform – 8 ea – 24"		2.0	
T	Set O1 Platform Girders, Deck		1.0	T = 7
T	Set Template – Bent 6		0.5	
T	Drive Pile – Bent 6 – 4 ea – 24"		1.5	
T	Set Caps, Girders, Deck – Span 5-6		1.0	
Demo	Remove Spans EB #3		0.5	
Demo	Remove Cap C		0.5	D = 1.5
Demo	Remove Pile C – 2 ea – 30"		0.5	
T	Drive Pile – OC1 Platform – 8 ea – 24"		2.0	T = 3
T	Set Girders, Deck – OC1 Platform		1.0	
Shaft	Drill Shaft Pier #2 (Excavate, Rebar, Concrete)		11.0	S = 11
T	Set Template – Bent 7		0.5	
T	Drive Pile – Bent 7 – 4 ea – 24"		1.5	T = 3
T	Set Caps, Girders, Deck – Span 6-7		1.0	
Demo	Remove Spans EB #4		0.5	
Demo	Remove Cap D		0.5	D = 1.5
Demo	Remove Pile D – 2 ea – 30"		0.5	
Cap	Pier Cap #1 - Form, Rebar, Concrete, Cure		10.0	C = 10

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
T	Set O2 Platform Jacket		1.0	
T	Drive Pile O2 Platform – 8 ea – 24”		2.0	T = 4
T	Set 02 Platform Girders, Deck		1.0	
Shaft	Drill Shaft Pier #3 (Excavate, Rebar, Concrete)		11.0	S = 11
Cap	Pier Cap #2 - Form, Rebar, Concrete, Cure		10.0	C = 10
Demo	Remove Spans EB #5		0.5	
Demo	Remove Caps E-F		0.5	D = 1.5
Demo	Remove Pile E-F – 4 ea – 30”		0.5	
T	Set Template – Bent 8		0.5	
T	Drive Pile – Bent 8 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 7-8		1.0	
T	Set Template – Bent 9		0.5	
T	Drive Pile – Bent 9 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 8-9		1.0	
T	Move Platform O1 to Platform O3		1.0	
T	Set O3 Platform Jacket		1.0	
T	Drive Pile – O3 Platform – 8 ea – 24”		2.0	
T	Set 03 Platform Girders, Deck		1.0	T = 21
T	Set Template – Bent 10		0.5	
T	Drive Pile – Bent 10 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 9-10		1.0	
T	Set Template – Bent 11		0.5	
T	Drive Pile – Bent 11 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 10-11		1.0	
T	Move Platform OC1 to Platform OC2		1.0	
T	Drive Pile – OC2 Platform – 8 ea – 24”		2.0	
T	Set OC2 Platform Girders, Deck		1.0	
Shaft	Drill Shaft Pier #4 (Excavate, Rebar, Concrete)		11.0	S = 11
Cap	Move Cap from 01 to 03 – Form, Rebar, Concrete, Cure		10.0	C = 10
T	Set Template – Bent 12		0.5	
T	Drive Pile – Bent 12 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 11-12		1.0	
T	Move Platform 02 to Platform 04		1.0	
T	Set 04 Platform Jacket		1.0	
T	Drive Pile – O4 Platform – 8 ea – 24”		2.0	
T	Set 04 Platform Girders, Deck		1.0	
T	Set Template – Bent 13		0.5	T = 17
T	Drive Pile – Bent 13 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 12-13		1.0	
T	Set Template – Bent 14		0.5	
T	Drive Pile – Bent 14 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 13-14		1.0	
T	Drive Pile – OC2A Platform – 8 ea – 24”		2.0	
T	Set OC2A Platform Girders, Deck		1.0	
Shaft	Drill Shaft Pier #5 (Excavate, Rebar, Concrete)		11.0	S = 11
Cap	Move Cap from 02 to 04 – Form, Rebar, Concrete, Cure		10.0	C = 10

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
T	Set Template – Bent 15		0.5	
T	Drive Pile – Bent 15 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 14-15		1.0	
T	Set Template – Bent 16		0.5	
T	Drive Pile – Bent 16 – 4 ea – 24”		1.5	T = 11
T	Set Caps, Girders, Deck – Span 15-16		1.0	
T	Move Platform 03 to Platform 05		1.0	
T	Set 05 Platform Jacket		1.0	
T	Drive Pile – O5 Platform – 8 ea – 24”		2.0	
T	Set 05 Platform Girders, Deck		1.0	
Shaft	Drill Shaft Pier #6 (Excavate, Rebar, Concrete)		11.0	S = 11
T	Set Template – Bent 17		0.5	
T	Drive Pile – Bent 17 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 16-17		1.0	T = 7
T	Move Platform OC2 to Platform OC3		1.0	
T	Drive Pile – OC3 Platform – 8 ea – 24”		2.0	
T	Set OC3 Platform Girders, Deck		1.0	
Cap	Move Cap from Pier 3 to Pier 5		10.0	C = 10
T	Set Template – Bent 18		0.5	
T	Drive Pile – Bent 18 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 17-18		1.0	
T	Set Template – Bent 19		0.5	
T	Drive Pile – Bent 19 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 18-19		1.0	
T	Move Platform O4 to Platform O6 (Bent #7)		1.0	
T	Drive Pile – O4 Platform – 8 ea – 24”		2.0	T = 17
T	Set O4 Platform Girders, Deck		1.0	
T	Move Platform OC2A to Platform OC3A		1.0	
T	Drive Pile - OC3A Platform – 8 ea – 24”		2.0	
T	Set OC3A Platform Girders, Deck		1.0	
T	Set Template – Bent 20		0.5	
T	Drive Pile – Bent 20 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 19-20		1.0	
Shaft	Drill Shaft Pier #7 (Excavate, Rebar, Concrete)		11.0	S = 22
Cap	Move Cap from Pier 4 to Pier 6		10.0	C = 10
T	Set Template – Bent 21		0.5	
T	Drive Pile – Bent 21 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 20-21		1.0	
T	Set Template – Bent 22		0.5	T = 7
T	Drive Pile – Bent 22 – 4 ea – 24”		1.5	
T	Set Caps, Girders, Deck – Span 21-22		1.0	
T	Move Platform 05 to Platform 07		1.0	
Shaft	Drill Shaft Pier #8 (Excavate, Rebar, Concrete)		11.0	S = 22
Cap	Move Cap from Pier 5 to Pier 7		10.0	C = 10

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
T	Move Platform OC-3 to Platform OC4		1.0	
T	Drive Pile – OC3 Platform– 8 ea – 24"		2.0	
T	Set OC3 Platform Girders, Deck		1.0	
T	Set Template – Bent 23		0.5	
T	Drive Pile – Bent 23 – 4 ea – 24"		1.5	
T	Set Caps, Girders, Deck – Span 22-23		1.0	
T	Set Template – Bent 24		0.5	
T	Drive Pile – Bent 24 – 4 ea – 24"		1.5	T = 17
T	Set Caps, Girders, Deck – Span 23-24		1.0	
T	Move Platform 06 to Platform 08		1.0	
T	Drive Pile – 08 Platform – 8 ea – 24"		2.0	
T	Set 08 Platform Girders, Deck		1.0	
T	Set Template – Bent 25		0.5	
T	Drive Pile – Bent 25 – 4 ea – 24"		1.5	
T	Set Caps, Girders, Deck – Span 24-25		1.0	
Shaft	Drill Shaft Pier #9 (Excavate, Rebar, Concrete)		11.0	S = 11
Cap	Move Cap from Pier 6 to Pier 8		10.0	C = 10
T	Move Platform OC3A to Platform OC4A		1.0	
T	Drive Pile – OC4A Platform – 8 ea – 24"		2.0	
T	Set OC4A Platform Girders, Deck		1.0	
T	Set Template – Bent 26		0.5	
T	Drive Pile – Bent 26 – 4 ea – 24"		1.5	
T	Set Caps, Girders, Deck – Span 25-26		1.0	
T	Set Template – Bent 27		0.5	
T	Drive Pile – Bent 27 – 4 ea – 24"		1.5	
T	Set Caps, Girders, Deck – Span 26-27		1.0	
T	Set Template – Bent 28		0.5	
T	Drive Pile – Bent 28 – 4 ea – 24"		1.5	T = 23
T	Set Caps, Girders, Deck – Span 27-28		1.0	
T	Move Platform 07 to Platform 09		1.0	
T	Drive Pile – O9 Platform – 8 ea – 24"		2.0	
T	Set 09 Platform Girders, Deck		1.0	
T	Set Template – Bent 29		0.5	
T	Drive Pile – Bent 29 – 4 ea – 24"		1.5	
T	Set Caps, Girders, Deck – Span 28-29		1.0	
T	Set Template – Bent 30		0.5	
T	Drive Pile – Bent 30 – 4 ea – 24"		1.5	
T	Set Caps, Girders, Deck – Span 29-30		1.0	
Shaft	Drill Shaft Pier #10 (Excavate, Rebar, Concrete)		11.0	S = 11
Cap	Move Cap from Pier 7 to Pier 9		10.0	C = 10
T	Move Platform 08 to Platform 10		1.0	
T	Drive Pile – 10 Platform – 8 ea – 24"		2.0	T = 4
T	Set 10 Platform Girders, Deck		1.0	
Shaft	Drill Shaft Pier #11 (Excavate, Rebar, Concrete)		11.0	S = 11
Cap	Move Cap from Pier 8 to Pier 10		10.0	C = 10

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
T	Move Platform 09 to Platform 11		1.0	
T	Drive Pile – 11 Platform – 8 ea – 24"		2.0	T = 4
T	Set 11 Platform Girders, Deck		1.0	
Cap	Move Cap from Pier 9 to Pier 11		10.0	C = 10
T	Move Platform 10 to Platform 12		1.0	
T	Drive Pile – 12 Platform – 8 ea – 24"		2.0	T = 4
T	Set 12 Platform Girders, Deck		1.0	
	Summary Season 1			
	Demo			**11.5**
	Trestle			**166.0**
	Separate Operation			
	Shaft			**143.0**
	Cap – Separate Operation			**110.0**
	Total (21 weeks = 5 months)			

Note 1: Work trestle on downstream side of new bridge
Note 2: Placement of abutment scour protection is a concurrent operation

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
Season 2				
	• Unload/Handle 80-ton precast concrete "bulb tee" girders; 2250 Crawler Crane; Unload Barge; Stockpile 66 ea girders at Cordova Harbor; two (2) trucks with steering dollies; three (3) trips/shifts unloaded at site with two (2) travel lifts. Six (4) girders per shift – 11 shifts		16	
	• Concurrently RTC with travel lifts handling timber deck mats to the RTC. 280 ea deck trestle at 24/shift – 11 concurrent shifts		11	
	• Demobilize 2250 crawler crane at the port, transfer to the job site, and reassemble. 10 shifts total		10	
	• Commencing at the east of project pier abutment #11, erect precast concrete "bulb tee" girders 6 ea/shift – 11 shifts		11	
	• Remove access trestle pier (abutment) #11 to pier (abutment) #1. Haul materials to Cordova harbor for next destination. 20 shifts total (Concurrent)		20	
	• Place deck wearing surface (Concurrent)		12	
	• Place guardrail (Concurrent)		8	

Note 1: Erection begins at east end of bridge to enable concurrent removal of temporary trestle
Note 2: Transportation of "bulb tee" girders out of the harbor has an issue with turning radius and movement through the town of Cordova.

Quantity Take-Offs

Construction Material

Option #1 – 140' Spans

- No. of temporary bents (main trestle) – 31 ea ..... 1,400 lf trestle
- No. of oscillation platforms – 2 ea ..... 4 uses
- No. of shaft crane platforms – 2 ea ..... 2 ½ uses
- Length of trestle pile ..... 150 lf
- Length of oscillator pile ..... 150 lf
- Length of crane platform pile ..... 150 lf
- No. of trestle pile (4) (31) ..... 124 ea
- No. of oscillator pile (2) (8) ..... 16 ea
- No. of crane platforms (2) (12) ..... 24 ea
- **Total pile required ..... 164 ea**
- Weight per lf 24" – 3/4" wall ..... 280 #/lf
- Total length pile required (164) (145) ..... 23,780 lf
- Total weight pile (280#/lf) (23,780 lf) ..... 6,658,400 #/lf = 3,330 tons
- Pile tip 5'-0" x 164 ea ..... 820 lf
- Lifting Weight (280#/lf) (145 lf) ..... 20.3 tons
- Lifting Weight (820#/lf) (6 lf) ..... 2 tons
- Lifting Weight Subtotal ..... 22.3 tons
- Pile tip weight (465#/lf) (820 lf) ..... 381,300 #/lf = 191 tons
- **Total trestle pile tonnage ..... 3,521 tons**
- Cap beam (35' length) – 31 ea ..... 1,085 lf
    - Girder (2 ea) (245#/lf) ..... 490 #/lf
    - Stiffeners, pile guide ..... 150 #/ea
    - Total cap beam weight per lf ..... 640 #/lf
    - Total cap beam weight (1,085 lf) (640#/lf) ..... 694,400 # = 347 ton
    - Lifting weight 35' cap ..... 640 #/lf (35 ft) = 11.2 tons
- Track girder (2 ea) (1,400 lf) ..... 2,800 lf
    - Girder weight per lf (2 ea) (245#) ..... 490 #/lf
    - Stiffeners, plate top/bottom ..... 150 #/lf
    - Total girder weight ..... 640 #/lf
    - Total girder weight (2,800 lf) (640#/lf) ..... 1,792,000 #/lf = 896 ton
    - Lifting weight 50' girder – (640#/lf) (50 ft) ..... 32,000 #/ea = 16 tons

- Timber crane mats – 6'-0" x 40' ..... 235 ea
  - Timber crane mats ..... 672,000 board feet
  - 12 bf/sq (56,000) .....
  - Curb – 12 x 12 (2,800) ..... (33,600) board feet
  - Rail ..... 2,800 lf
  - Pile template/spud pile/rollers/hardware, etc.
  - Post-tensioned strand and anchors for diagonal bracing ..... 12,000 lf – strand plus hardware

Oscillation Platform

Material for two platforms:

- Oscillation platform pile ..... 16 ea
- Oscillation platform pile jacket ..... 2 ea
- Oscillation platform girders 1 set ..... 64 lf
- Oscillation platform concrete deck 20 x 20 ..... 1 ea
  - 2'-0" thick ..... ± 25 cy of concrete
  - Rebar 300#/cy ..... 7,500 #
  - P.T. 80#/cy ..... 2,000 #
- Platform pile – 16 ea. @ 150' ..... 2,400 lf
  - 2,400 lf @ 280#/lf – 672,000# ..... 336 tons
- WT platform jacket – (400#/lf) (160 lf) – 64,000# ..... 32 tons
- Platform girders (640#/lf) (69 lf) – 80,960# ..... 21 tons

  Total Steel for Oscillation Platform ..... 389 tons

Oscillator Crane Platform

Note: Material crane platform is the same as trestle. Can use trestle material until last required platform – crane platform 50'

Material for one crane platform:

- Pile 24 ea (150') 3,600 lf (280#/lf) – 1,008,000# ..... 504 tons
- Cap beam (2 ea) (640#/lf) (35 feet) – 44,800# ..... 25 tons
- Girders (2 ea) (50'0" ft) (640#/lf) – 64,000# ..... 32 tons
- Total ..... 561 tons
- Timber crane mats (6'-0" x 40') (8 ea) ..... 23,040 board feet

Construction Material Summary

- Pipe Pile
  - Trestle – 124 ea..... 2,681 tons
  - Oscillation Platform – 16 ea..... 336 tons
  - Oscillation crane platform – 24 ea..... 504 tons

    Total..... 3,521 tons

- Cap Girder
  - Trestle – 31 ea..... 347 tons
  - Oscillation Platform ..... 21 tons
  - Crane platform..... 25 tons

    Total..... 393 tons
- Trestle girder
  - Trestle ..... 896 tons
  - Crane Platform..... 36 tons
  - Oscillation platform jacket – 2 ea ..... 32 tons

    Total..... 964 tons

    Total Steel ..... 4,878 tons
- Special
  - Timber Deck..... 1,079 MBF
  - Oscillation platform concrete deck..... 25 cy

Permanent Materials - Foundations

Shaft Casing Details

Option #1 – 140' Spans

- Number of shafts ..... 11 ea.
- Shaft diameter ..... 8'-0"
- Casing wall thickness ..... 1½"
- Shaft length ..... 170 feet
    - Water depth – ± 30 (galvanized) 1½" ..... 330 feet
    - Scour – ± 50 (galvanized) 1½" ..... 550 feet
    - Embedded – ± 85 (galvanized) 1½" ..... 935 feet
    - Tip Section 2½" – ±5 (galvanized) 2½" ..... 55 feet

      Total ..... 1,870 lf
- Weight/foot galvanized – (1,576#/lf) (330 lf) = 520,080 lf ..... 260 tons
- Weight/foot 1½" wall – (1,526#/lf) (1,485 lf) = 2,266,110 lf .... 1,133 tons
- Weight/foot 2½" wall – (2,542#/lf) (55 lf) = 139,870 lf ..... 70 tons

  Total Casing Weight 1,463 tons

- Weight/Individual Casing ..... 133 tons

Shaft Concrete Details

- Concrete per lineal foot of shaft ..... 1.9 cy/lf
- Concrete "tremie" seal – 55' deep ..... 105 cy/ea shaft

  Total "Tremie" concrete (605 lf) (1.9 cf) ..... 1,150 cy

- Concrete upper 115 lf (1.9 cf/lf) ..... 218 cy/ea
    - Total upper concrete ..... 2,398 cy
    - Total shaft concrete ..... 3,548 cy
    - Concrete required each pile ..... 323 cy

Shaft Reinforcing Steel (Rebar) Details

- Reinforcing Steel (Rebar) ..... 325 #/cy
- Total Reinforcing Steel (325#/cy)(3,548 cy)=1,153,000#/cy ..... 577 tons

Shaft Excavation Detail

- Excavation ±150 lf/ea @ 1.9 cy/lf ..... 285 cy

  Total excavation (285 ea) (11) ..... 3,135 cy

Permanent Material – Substructure

Cap Cast-In-Place Concrete Detail

Option #1 – 140' Spans

- No. of CIP concrete caps ..... 11 ea
- Cap dimensions – L – 33', W – 8', D – 3'-6" ..... 34 cy
  L – 20'6", W – 8', D – 3'-6"..... 21 cy
- Concrete per cap..... 55 cy
  Total cap concrete (55 ea) 11 ea..... 605 cy

Cap Reinforcing Steel Detail

- Rebar..... 275 #/cy
- Rebar per cap (275 cy) (55 cy) = 15,125#/cy ..... 7.6 tons/ea
  Total cap rebar (15,125#/cy) (11) = 166,375#/cy ..... 84 tons

Summary

Summary – Foundation Permanent Materials

- Shaft Casing..... 1,463 tons
- Shaft Rebar..... 577 tons
- Shaft Concrete ..... 3,548 cy
- Shaft Excavation..... 3,135 cy

Summary – Substructure Permanent Material

- Cap Concrete..... 605 cy
- Cap rebar..... 84 tons

Superstructure – Precast Concrete "Bulb Tee" Girder

- No. of spans ..... 11 ea
- No. of girders per span ..... 6 ea
- Total girders ..... 66 ea
- Approximate weight of girders ..... 80 tons
- Total girder weight..... 5,280 tons
- Deck waterproof membrane ..... 45,000 sf
- Deck overlay 4" – 45,000 sf..... 560 cy
- Steel bridge rail ..... 2,800 lf
- Roadway Rail..... 200 lf

Summary – Steel Required for Project

Option #1 – 140' Spans

Permanent Material

- Shaft Pipe – 8'0" – 1 ½"
  - Galvanized – 330 lf – 520,000# ..... 260 tons
  - Galvanized – 1,485 lf – 2,266,110# ..... 1,133 tons
  - Pile Tip 2 ½" – 55 lf – 139,870# ..... 70 tons

    Total ..... 1,463 tons

Construction Material

- Trestle Pile – 24" – 3/4" – 23,780 lf – 6,658,400# ..... 3,330 tons
- Pile Tip – 2 ½" – 820 lf – 381,300# ..... 191 tons

  Total ..... 3,521 tons
- Trestle Cap Beams
  - 36 WF – 2,170 lf ..... 347 tons
- Trestle Girders
  - 36 WF 245 – 5,600 lf ..... 896 tons

    Total ..... 6,227 tons

Craft Labor Cost Per Shift

Crew	Craft Labor	No. in Crew	Hourly Rate	Hours per Shift	Total Cost per Shift	Total Man-hours per Shift
Trestle Crew	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	4	$83.90	12	4,027	48
	Laborer	2	$83.94	12	2,015	24
	Operating Engineer	3	$93.23	12	3,356	36
		10		**48**	**10,453**	**120**
Material Handling	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	3	$83.90	12	3,020	36
	Laborer	2	$83.94	12	2,015	24
	Operating Engineer	3	$83.05	12	2,990	36
		9		**48**	**9,080**	**108**
Welding	PD Foreman	1	$102.00	12	1,224	12
	Pile Driver	4	$95.53	12	4,585	48
	Laborer	2	$83.04	12	1,993	24
	Operating Engineer	1	$83.05	12	997	12
		8		**48**	**8,799**	**96**
Rebar	Rebar F	1	$110.00	12	2,227	12
	Rebar	2	$92.81	24	3,547	24
		3		**36**	**5,774**	**36**
Shaft	PD Foreman	1	$87.90	12	1,055	12
	Operations Foreman	1	$110.00	12	1,320	12
	Operating Engineer	5	$93.23	12	5,594	60
	PB	3	$83.96	12	3,023	36
	Labor	2	$83.04	12	1,993	24
		12		**60**	**12,984**	**144**
Abutment Slope Protection Sheet Pile Crew	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	5	$83.90	12	5,034	60
	Laborer	2	$83.94	12	2,015	24
	Operating Engineer	4	$88.94	12	4,269	48
		12		**48**	**12,372**	**144**
Rock/Riprap Placing Crew	PD Foreman	1	$90.00	12	1,080	12
	Pile Driver	2	$83.94	12	2,015	24
	Laborer	3	$93.23	12	3,356	36
		6		**36**	**6,451**	**72**
Caps	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	2	$83.90	12	2,014	24
	Laborer	1	$83.04	12	1,018	12
	Operating Engineer	2	$93.20	12	2,237	24
		6		**48**	**6,323**	**72**
Grade	PD Foreman	1	$87.90	12	1,055	12
	Pile Driver	6	$83.40	12	6,041	72
	Operating Engineer	4	$93.23	12	4,474	48
		11		**36**	**11,570**	**132**

Option #1 – 140' Spans - Craft Labor – Cost Analysis

(1) Mobilization / Demobilization – Season #1 and Season #2

Season #1 – Mobilization (Including unloading/handling/facilities development)

Season #1 – Mobilization ..... 18 Shifts
Season #1 – Demobilization ..... 12 Shifts
Season #2 – Mobilization ..... 12 Shifts
Season #2 – Demobilization ..... 12 Shifts
Total Shifts ..... 54 Shifts

Material Handling Crew
(54 Shifts)($9,080/shift) $490,320

(2) Material Handling Crew
Season #1 – 177.5 shifts
Season #2 – 68 shifts
Total Shifts – (245.5)($9,080) $2,229,140

(3) Demolition – Trestle Crew
Season #1 – (11.5 Shifts)($10,433/shift) $119,980

(4) Trestle in and out – Trestle Crew
Season #1 – 166 shifts
Season #2 – 20 shifts
Total Shifts – (186)($10,433) $1,940,538

(5) Shaft Operation – Shaft Crew
Season #1 – (110 Shifts)($12,984/shift) $1,428,240

(6) Cap Operator – Cap Crew
Season #1 – (88 Shifts)($6,324/shift) $556.512

(7) Welding Operation – Welding Crew
Season #1 – (140 Shifts)($8,794/shift) $1,231,160

(8) Reinforcing Steel Fabrication/Placing – Reinforcing Crew
Season #1 – (120 Shifts)($3,547/shift) $425,640

(9) Girder Unload/Erection Operation – Erection Crew
Season #2 – (22 Shifts)($11,570/shift) $254,540

(10) Wearing Surface
(6 Shifts)($6,090/shift) $36,540

(11) Guard Rail
(4 Shifts)($6,090/shift) $24,360

Option #1 Total Craft Labor $8,736,970

Construction Equipment Ownership Cost Analysis

Option #1 – 140' Spans

Construction Equipment Description	Const. Period	Monthly Ownership Rate	No. of Operating Months	Total Cost per Operation Period	Monthly Stand-by Rate	Number of Stand-by Months	Total Cost of Stand-by Period
Flexifloat – Pontoons	2	$2,500.00	7	$17,500.00			
Anchor Winches	2	$6,000.00	7	$42,000.00			
Light Towers	4	$1,400.00	12	$16,800.00			
Generators - 15 kw	2	$1,100.00	24	$26,400.00			
Generators - 250 kw	1	$3,000.00	11	$33,000.00			
Generators - 500 kw	1	$6,000.00	11	$66,000.00			
Welding Machine - 250 Amp	3	$300.00	18	$5,400.00			
Welding Machine - 350 Amp	2	$900.00	12	$10,800.00			
Air Compressor - 185 CFM	2	$800.00	20	$16,000.00			
Air Compressor - 325 CFM	1	$3,000.00	7	$21,000.00			
Air Compressor - 600 CFM	1	$6,000.00	7	$42,000.00			
Loader/Forklift – 966	1	$9,000.00	9	$81,000.00			
Rough Terrain Crane - 70 Ton	1	$14,000.00	11	$154,000.00	$7,000.00	5	$35,000.00
Crawler Crane – 2250	1	$30,000.00	11	$330,000.00	$15,000.00	7	$105,000.00
Crane Carrier Car	0	$12,500.00					
Travel Lift	2	$15,000.00	20	$300,000.00	$7,500.00	10	$75,000.00
Boat LCM	1	$4,000.00	11	$44,000.00			
Air Boat	1	$1,500.00	11	$16,500.00			
Concrete Plant/Turbine Mixer	1	$19,000.00	7	$133,000.00	$9,500.00	3	$28,500.00
Vibratory Hammer HPS 1600		$20,000.00	12	$240,000.00	$10,000.00	1	$10,000.00
Vibratory Hammer Power Pak		$20,000.00	12	$240,000.00	$10,000.00	1	$10,000.00
Hydraulic Impact Hammer (200,000-300,000)		$50,000.00	6	$300,000.00			
Personnel Van	1	$3,000.00	11	$33,000.00			
Pickups	3	$1,200.00	33	$39,600.00	$600.00	21	$12,600.00
Mechanic Truck	1	$2,500.00	11	$27,500.00	$1,250.00	8	$10,000.00
Fuel Trailer	1	$100.00	11	$1,100.00			
Water Tank Trailer	1	$100.00	11	$1,100.00			
Shaft Equipment							
Liebherr 885 Crawler 150-ton	1	$25,000.00	4	$100,000.00	$12,500.00	3	$37,500.00
Leffer Oscillator - 8'-0"	1	$15,000.00	4	$60,000.00	$7,500.00	3	$22,500.00

Construction Equipment Description	Const. Period	Monthly Ownership Rate	No. of Operating Months	Total Cost per Operation Period	Monthly Stand-by Rate	Number of Stand-by Months	Total Cost of Stand-by Period
Leffer Power Pack	1	$6,000.00	4	$24,000.00	$3,000.00	3	$9,000.00
Concrete Pump	1	$10,000.00	4	$40,000.00	$5,000.00	3	$15,000.00
Misc. Shaft Equipment (Bucket, Tremie, etc.)	1	$2,500.00	4	$10,000.00	$1,250.00	3	$3,750.00
Subtotal				**$2,471,700.00**	**$90,100.00**		**$373,850.00**
Total Stand-by Cost				**$373,850.00**			
GRAND TOTAL				**$2,845,550.00**			

Construction Equipment Operating Expense per Shift

Option #1 - 140' Spans

	Construction Equipment Description	EOE Operating Rate/Hr	Hours Worked per Shift	EOE per Shift
Trestle Operation	Crawler Crane	$110.00	12	$1,320.00
	Crane Carrier	$40.00	12	$480.00
	Vibratory Hammer	$100.00	5	$500.00
	Vibratory Power Pak	$175.00	5	$875.00
	Hydraulic Hammer	$250.00	5	$1,250.00
	Welding Machine	$10.00	12	$120.00
	Air Compressor	$15.00	12	$180.00
	Flexifloat	$6.00	12	$72.00
	Anchor Weights	$5.00	12	$60.00
	Generator - 250 kw	$100.00	12	$1,200.00
	TOTAL	**$811.00**	**99**	**$6,057.00**
Material Handling	Travel Lift	$50.00	12	$600.00
	Travel Lift	$50.00	8	$400.00
	RTG - 70-Ton	$95.00	10	$950.00
	966 Lift	$50.00	10	$500.00
	Air Compressor - 600 cfm	$55.00	10	$550.00
	TOTAL	**$300.00**		**$3,000.00**
Welding	350 Amp	$15.00	10	$150.00
	350 Amp	$15.00	10	$150.00
	250 Amp	$10.00	10	$100.00
	250 Amp	$10.00	10	$100.00
	Generator - 250 kw	$100.00	12	$1,200.00
	Air Compressor - 325 CFM	$50.00	12	$600.00
	TOTAL	**$200.00**		**$2,300.00**
Drill Shaft	Crawler	$80.00	12	$960.00
	Oscillator	$100.00	8	$800.00
	Power Pak	$60.00	8	$480.00
	Miscellaneous	$30.00	12	$360.00
	Air Compressor - 185 CFM	$15.00	12	$180.00
	Welder - 250 Amp	$10.00	6	$60.00
	Cone Pump	$80.00	1	$80.00
	TOTAL	**$375.00**		**$2,920.00**
Other	Boat LCM	$28.00	1	$28.00
	Air Boat	$25.00	2	$50.00
	Personal Van	$20.00	4	$80.00
	Pickup Trucks	$10.00	36	$360.00
	Mechanics Truck	$20.00	12	$240.00
	Generator - 15 kw	$10.00	12	$120.00
	Tanks	$10.00	20	$200.00
	TOTAL	**$123.00**		**$1,078.00**
	Grand Total			**$15,355.00**

Construction Equipment Operating Expense Analysis

Option #1 – 140' Spans

Construction Equipment Description	Const. Period	Hourly Operating Expense	Number of Operating Hours	Total Operating Expense
Flexifloat – Pontoons	2	$6.00	2,100	$12,600
Anchor Winches	2	$5.00	2,100	$10,500
Light Towers	2	$5.00	700	$3,500
Generators - 15 kw	2	$10.00	3,500	$35,000
Generators - 250 kw	1	$100.00	900	$90,000
Generators - 500 kw	1	$185.00	900	$166,500
Welding Machine - 250 Amp	3	$10.00	4,000	$40,000
Welding Machine - 350 Amp	2	$15.00	2,500	$37,500
Air Compressor - 185 CFM	2	$15.00	4,000	$60,000
Air Compressor - 325 CFM	1	$50.00	1,500	$75,000
Air Compressor - 600 CFM	1	$55.00	1,000	$55,000
Loader/Forklift – 966	1	$50.00	1,750	$87,500
Rough Terrain Crane - 70 Ton	1	$95.00	2,000	$190,000
Crawler Crane – 2250	1	$110.00	3,000	$330,000
Travel Lift	2	$50.00	4,500	$225,000
Boat LCM	1	$28.00	1,000	$28,000
Air Boat	1	$25.00	500	$12,500
Concrete Plant/Turbine Mixer	1	$30.00	100	$3,000
Vibratory Hammer HPS 1600	1	$100.00	660	$66,000
Vibratory Hammer Power Pak	1	$175.00	660	$115,500
Hydraulic Impact Hammer (200,000-300,000)	1	$150.00	500	$75,000
Personnel Van	1	$20.00	1,000	$20,000
Pickups	3	$10.00	10,000	$100,000
Mechanic Truck	1	$20.00	3,300	$66,000
Fuel Trailer	1	$5.00	1,000	$5,000
Water Tank Trailer	1	$4.00	1,000	$4,000
Shaft Equipment				
Liebherr 885 Crawler 150-ton	1	$80.00	1,700	$136,000
Leffer Oscillator - 8'-0"	1	$100.00	500	$50,000
Leffer Power Pack	1	$60.00	500	$30,000
Concrete Pump	1	$80.00	100	$8,000
Misc. Shaft Equipment (Bucket, Tremie, etc.)		$50.00	1,700	$85,000
Total Operating Expense				**$2,222,100**

Construction Material Estimate

Option #1 – 140' Spans

Material Description	Qty.	Unit of Measure	Unit Price	Total
Trestle Pile				
Main Trestle	2,490	ton	$1,500.00	$3,735,000
Oscillator Platform	336	ton	$1,500.00	$504,000
Crane Platform	504	ton	$1,500.00	$756,000
Subtotal - Trestle	**3,330**			**$4,995,000**
Trestle Cap Beams				
Main Trestle	347	ton	$1,300.00	$451,100
Oscillator Jacket	32	ton	$1,300.00	$41,600
Crane Platform	25	ton	$1,300.00	$32,500
Subtotal - Trestle	**404**			**$525,200**
Trestle Track Girders				
Main Trestle	896	ton	$1,300.00	$1,164,800
Oscillator	21	ton	$1,300.00	$27,300
Crane Platform	36	ton	$1,300.00	$46,800
Subtotal - Trestle	**953**			**$1,238,900**
Timber Crane Mats (12' x 5'0" x 40')	300	ea	$2,960.00	$888,000
Miscellaneous Material				
Oscillator Deck - Concrete	50	cy	$300.00	$15,000
Oscillator Deck - Rebar	15,000	lb	$0.80	$12,000
Oscillator Deck - PT	4,000	lb	$3.00	$12,000
Trestle Curb	35	mbf	$600.00	$21,000
Trestle Rail	2,800	lf	$5.00	$14,000
Trestle - Pile Template	25	ton	$1,300.00	$32,500
Trestle - Pile Template Spuds	22	ton	$1,500.00	$33,000
Trestle Miscellaneous Bolts, etc.	60,000	lb	$5.00	$300,000
Diagonal Bracing PT	12,000	lbs	$3.00	$36,000
Cap Forms	2,100	ea	$45.00	$94,500
Subtotal Miscellaneous				**$570,000**
Total Construction Materials				**$8,217,100**

Permanent Material Estimate

Option #1 – 140' Spans

Material Description	Qty.	Unit of Measure	Unit Price	Total
Shaft Casing - 8'-0"	1,463	ton	$1,500.00	$2,194,500
Shaft Galvanizing	16,500	sf	$100.00	$1,650,000
Shaft Tremie Concrete	1,150	cy	$170.00	$195,500
Shaft Concrete	2,398	cy	$155.00	$371,690
Shaft Reinforcing Steel	1,153,000	cy	$0.92	$1,060,760
Subtotal - Shaft				**$5,472,450**
Cap Concrete	605	cy	$155.00	$93,775
Cap Reinforcing Steel	166,375	lb	$0.92	$153,065
"Bulb Tee" Girder	9,240	lf	$250.00	$2,310,000
Elastomeric Bearing Pads	112	ea	$900.00	$100,800
Membrane Waterproofing	45,000	sf	$10.00	$450,000
Bridge Rail	2,800	lf	$100.00	$280,000
Roadway Rail	400	lf	$80.00	$32,000
Subtotal				**$3,419,640**
Total Permanent Materials				**$8,892,090**

Option #1 – 140' Spans – Transportation Analysis

Note: Options #1 and #2 have differing construction equipment requirements, especially regarding requirements for construction during Season #1 and Season #2. The requirements for Option #2 are the same for both Season #1 and #2, whereas the requirement for Option #1 differs.

Option #1 – Anchorage Source – Delivery via Truck/Ferry

- Ferry fees/trip
  - Driver $89.00
  - Truck to 21 feet.....$157.00
  - To 60' (39' x $8.30) $324.00

    Total one-way $570.00

Construction Equipment Description	Load Required
1. Flexifloats (2 ea) with anchors/deck	1
2. Light towers (3 ea)	1/3
3. Generators	1
4. Material bores – Excavated material	½
5. Welding machines and special for 8'-0" casing	1/3
6. Air compressor	1/3
7. Fuel storage tank	½
8. Water pull trailer	1
9. Porta Camp (barge from Anchorage)	barge
10. Conex material boxes – 20' – 6 ea.	3
11. Office trailer off-site (barge)	barge
12. 966 loader/forklift	1
13. Material trailer/platform for concrete buckets – 4 cy	
14. 40-ton rough terrain crane	1
15. Small tools/safety/concrete lab equipment	
16. Personal van	drive
17. Pickups	drive

Option #1 – 140' Spans – Seattle Source – Barge Delivery

SEASON #1

Construction Equipment

Crawler crane – 2,250 – 280-ton – 200' boom
Liebherr 885 crawler crane – 150 ton[3]
Leffer oscillator – 50 ton[1]
Leffer power pack[1]
Shaft miscellaneous equipment – buckets, jet pump[1]
Concrete pump[1]
Travel lifts – 2 ea
LCM/air boat
Anchors and hoists
Concrete plant with 4 cy turbine mixer

Option #1 – 140' Spans – Seattle Source – Barge Delivery

Construction Materials

- Reinforcing Steel – 664 tons
- Crane Mats 5x40 – 290 ea

Option #1 – 140' Spans – Tacoma Source – Barge Delivery

- Precast concrete decked "bulb tee" girders – 140' long – 80 ton/ea – 66 ea

Option #1 – 140' Spans – Longview, Washington Source – Barge Delivery

- Pipe and rolled steel girders
    - Steel – Longview, Washington (fabricated weight)
        - Pipe 8'-0" diameter – 1,870 lf.....1,463 tons
        - Pipe 2'-0" diameter – 24,600 lf.....3,521 tons
        - Cap 36 WF 245 – 2,170 lf.....347 tons
        - Girder 36 WF 245 – 5,600 lf.....896 tons

          6,227 tons

[3] This equipment returned to Seattle after Season #1

Mobilization/Demobilization Cost (Transportation Analysis)

Construction Equipment – Option #1 – 140' Spans

Season #1 – Mobilization – Construction Equipment – Barge

1. Crawler Crane 2250
    - Load 10 trucks at Lampson (200 hrs)($160/hr) . $32,000
    - Haul 10 trucks to Seattle (160 hrs)($400/hr)..... $64,000
    - Unload/Load/Load (incl. barge rates)..... $0
    - Assemble at Site (160 hrs)($100/hr)..... $16,000
    - TOTAL..... $112,000
2. Rough Terrain Crane
    - Load at Lampson (4 hrs)($60/hr) $240
    - Haul to Seattle (16 hrs)($250/hr)..... $4,000
3. Travel Lifts - 2 each (144 hrs)($100/hr) $14,400
4. Concrete Placing $14,400
5. Hammers..... $14,400
6. Flexifloats/Anchors (12 hrs)($100/hr) $1,200
7. Shaft Equipment (40 hrs)($100/hr)..... $4,000
8. Barge Ship Load (5 days)($10,000/day) $50,000
   Barge Ship Unload (5 days) ($10,000/day) $50,000
9. Port Charges Seattle/Cordova (10 days)($2,500/day).... $25,000
10. Barge Travel – 1,700 miles/8 mph = 212 hours or
    9 days($2,000/hr)..... $424,000
    Total (#1-10)..... $713,640

Season #1 – Demobilization – Construction Equipment – Barge

1. Off-Site (Cordova) – Site demobilization is included in direct costs
2. Shaft Equipment – Return to Seattle
   25% Barge Travel (424,000 + 100,000 x 25%)..... $131,000

Season #2 – Mobilization – Site Mob Team

Season #2 – Return to Seattle

3. Same as Mobilization – Less Shaft Equipment demobilization $709,640

Total Option #1 Construction Equipment

Mobilization/Demobilization/Barge..... $1,554,280

Option #1 – Season #1 – Mobilization – Construction Equipment – Anchorage

1. Light Towers (2 ea).....Truck #1
2. Generator 15 kw (2 ea).....Truck #2
3. Generator 25 kw (1 ea).....Truck #2
4. Generator 500 kw (1 ea).....Truck #2
5. Welding Machines 250 Amp (3 ea).....Truck #1
6. Welding Machines 350 Amp (2 ea).....Truck #1
7. Air Compressor 185 CFS (2 ea).....Truck #1
8. Air Compressor 325 CFS (1 ea).....Truck #3
9. Air Compressor 600 CFS (1 ea).....Truck #3
10. Loader/Forklift .....Truck #4
11. Pedestrian Van ..... Driver
12. Concrete Pumps ..... Driver
13. Pickups (3 ea) ..... Driver

Truck Trips – Time

- Travel .....3 hours
- Ferry.....7 hours
- Travel .....2 hours
- Travel .....2 hours
- Wait.....10 hours
- Ferry.....7 hours
- Travel .....3 hours

  Subtotal.....34 hours ($150/hr)..... $5,100
  Ferry – Two tolls (2) ($570)..... $1,140
  Subtotal..... $6,240 /trip

  4 Trips (4 ea) ($6,240/trip)..... $24,960
  Miscellaneous (1 ea) ($6,240)..... $6,240
  4 Pickups, etc. (4 tolls) ($250)..... $1,000
  Total $32,200

Option #1 – Season #1 Demobilization / Season #2 Mobilization / Season #2 Demobilization

(3 ea)($32,200)..... $96,600

Miscellaneous – Anchorage Trips (Containers, etc.)

(40 ea)($6,240)..... $96,600

Total Option #1 – Anchorage $378,400

Total Option #1 Mobilization/Demobilization Equip $1,932,680

Season #1 – Mobilization – Construction/Permanent Materials/Barge Delivery

Seattle

Deck Timber (12" x 5'-0" x 40')	300	ea
Rebar	660	tons
Formwork		a
Containers (small tools/parts, etc) 8 ea	3,325	tons
Total	3,800	tons

Longview

Pipe Pile	1,302	tons
Trestle Pile	687	tons
Trestle Cap Steel	130	tons
Trestle Girder Steel	240	tons
Sheet Pile	3,240	tons
Total	5,599	tons

Season #2 – Tacoma

Decked "Bulb Tee" Girders 50% – 60 ea	3,325	tons
Barge Trips (3 ea) ($549,000)	$1,647,000	

Craft Labor Camp Development/Operation

Assumptions

- Camp will be located on Department Property near the airport
- A 40-bed camp is planned
- The contractor shall provide the following:
  - A level site for the camp
  - Well water (camp facilities, including treatment)
  - Septic sanitary system
  - Hoisting equipment for erection/demolition
  - Fuel for generator/incinerator and heating
  - Telephone/internet and television services
- Camp configuration will consist of:
  - 1 ea – 16x60 Kitchen/Dining Unit
  - 1 ea – 16x30 Men Shower/Wash Unit
  - 1 ea – 16x20 Women's Shower/Wash Unit
  - 1 ea – 16x20 Recreation Room with TV
  - 1 ea – 16x20 Field Office
  - 1 ea – 16x20 Generator unit with 70 KW gen set
  - 1 ea – 16x20 4 bed sleepers
  - 1 ea – 20' Water storage/treatment Connex
  - 1 ea Waste Incinerator
- Mobilization / One-Winter / Demobilization
  - Mobilization of Facilities $10,000
  - Demolition $5,000
  - On-Site Setup (10 days)($1,445/day)..... $14,450
  - Winterization (8 days)($1,445/day)..... $11,560
  - Sparing Strategy (10 days)($1,445/day) $14,450
  - Detours (8 days)($1,445/day) $11,560
  - TOTAL..... $67,020
- Camp Lease
  - In Operation (330 days)($1,440/day) $475,200
  - Stand-by (220 days)($75/day) $16,500
  - TOTAL..... $491,700
- Camp Personnel
  - Manager/Cook (330 days)($747.90/day)..... $246,807
  - Baker/Cook (330 days)($735.70/day)..... $242,781
  - Helper (330 days)($688.75/day)..... $227,288
  - Maintenance (330 days)($1,045.10/day) $344,883
  - TOTAL..... $1,061,759

2. Food Supplies, etc. = $45.85/man day
    - Assume average (7 days/wk)((30 men/day)
      (300 days)(35 men) = 10,500 days..... $481,425
3. Summary – Construction Camp Cost
    - Mobilization/Demobilization $67,020
    - Camp Lease $491,700
    - Camp Personnel $1,061,765
    - Food and Supplies $481,425
    - Site Grading..... $35,000
    - Develop Well..... $7,500
    - Develop Septic System..... $15,000
    - Hoisting Equipment Mob./Demob..... $30,000
    - Fuel Cost for Generator (330 days)($800/day)... $264,000
    - Telephone (11 mo.)($2,000/mo.) $22,000
      TOTAL CAMP COST..... $2,475,410

Section 3 –

OPTION #2 – 100’ Spans

Option #2 – 100' Spans

Construction Schedule/Sequence

A construction trestle in the same alignment of the replaced bridge will be built for construction access. The primary hoisting equipment is a 225-ton crawler crane with the car body placed upon a hydraulically driven fabricated car that travels on rails outside of the complete permanent structure. The estimate provided for four (4) spans of temporary trestle, which is recycled four times. The permanent bridge superstructure is placed as the work progresses, providing the access road for all material handling (see detailed cross section/plan and elevation, as well as photographs).

Construction Schedule

The estimate is based upon two construction seasons as follows:

Season #1

- Seven spans of the replaced structure will be complete
- Two spans of the temporary trestle will remain in place
- Primary hoisting equipment will be dismantled and moved to the harbor for unloading girders; the remaining equipment will be removed from the site to winter storage, as well as all other construction materials and equipment
- Any box girders not planned to be incorporated during Season #1 will be stored on Department property near the airport.

Season #2

- Complete the remaining seven spans, completing the structure
- Remove remaining trestle
- Complete deck wearing surface, barrier rail, slope protection, and roadway
- Load out trestle materials on barge to Anchorage
- Construction equipment load-out for return to either Anchorage or Seattle

Construction Sequence

- Notice to proceed
- Submittals approval, reinforcing steel, box girders
- Procure – fabricate – "trestle" caps, girders, pile template, and timber deck
- Procure – fabricate – superstructure box girders
- Procure – fabricate – trestle pipe pile
- Procure – fabricate – permanent pipe pile
- Procure – reinforcing steel for pile, column, caps
- Procure subcontractors
    - Site/camp development
    - Concrete aggregate production
    - Craft employee camp services
- Establish camp site @ mile 15 (ferry delivery – winter)

- Mobilize construction equipment at Seattle
- Mobilize construction equipment at Anchorage
- Load/ship/unload to jobsite – trestle pipe pile
- Load/ship/unload to jobsite – caps, girder, template
- Load/ship/unload to jobsite – construction equipment
- Mobilize construction equipment at Anchorage

Construction (Season #1)

- Establish camp utilities – power, sanitary, water
- Develop site facilities
- Construct first trestle span from land – TB #1 and #2
- Assemble crane carrier car and crane (Manitowoc 2250)
- Begin constructing pre-cast concrete pile caps
- Erect rolling pile template on trestle
- Assemble Flexifloat/current deflector (utilize if current flowing on west side of river)
- Construct trestle bents #3 and #4
- Drive permanent pile pier #1 and #2

Work Breakdown Structures – Summary

Option #2 – 100' Spans

Season #1	**Shifts**
Original Mobilization	18.0
Demolition	11.5
Trestle	70.5
Pier/Superstructure	40.5
Winter Shutdown	12.0
Total	**152.5**

25.4 weeks = 6 months – Total including Mobilization
20.4 weeks = 4.8 months (Mobilization/Demobilization)

Season #2	**Shifts**
Remobilization	18.0
Trestle	55.0
Pier/Superstructure	32.5
Place Deck Wearing Surface (Concurrent)	12.0
Place Guardrail (Concurrent)	8.0
Demobilize Site (6 shifts concurrent/12 non-concurrent)	12.0
Total (*Excludes guardrail placement*)	**129.5**

21.6 weeks = 5 months
16.5 weeks = 4 months (Mobilization/Demobilization)

	Shifts
Mobilization/Demobilization	60.0
Demolition	11.5
Trestle	125.5
Pier/Superstructure	73.0
Deck	12.0
Guardrail	8.0
Total	**290.0**

Construction Sequence – Option #2 – 100' Spans

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
Season 1				
Demo	Saw Cut Girder Lines on Existing Bridge	Sub		D=2
Demo	Remove Girders – Span EB #1	1	0.5	
Demo	Saw Cut Cap A from Pile	1	0.5	
Demo	Remove Cap A	1	0.5	
Demo	Remove Cap A pile – 2 ea 30"	1	0.5	
T	Drive Pile – Bent 0 and 1 – 24"	1	3.0	T=10
T	Set Cap 1 – Girder Span 0-1	1	1.0	
T	Assemble Crawler Crane on Trestle Girder – Set Flow – Diverter	1	3.0	
T	Move Template to Bent 2	1	0.5	
T	Drive Pile – Bent 2 – 4 ea – 24"	1	1.5	
T	Set Cap 2 – Girder Span 1-2	1	1.0	
Pier	Set Template Across Trestle Girders	1	0.25	P = 3.75
Pier	Drive Pile – Pier 1 (Abutment) – 2 ea – 48" pile (Excavation/Concrete)	1	3.0	
Pier	Set Pier 1 (Abutment) – Precast Cap	1	0.5	
Demo	Remove Girders – Span EB #2	1	0.5	D = 2
Demo	Saw Cut/Wedge Cap B	1	0.5	
Demo	Remove Cap B	1	0.5	
Demo	Remove Pile – Bent 3 – 2 ea – 30”	1	0.5	
T	Move Template to Bent 3	1	0.5	T = 3
T	Drive Pile – Bent 3 – 4 ea – 24"	1	1.5	
T	Set Cap 3 – Girder Span 2-3	1	1.0	
Pier	Set Template for Pier 2 on Trestle	1	0.25	P = 3.75
Pier	Drive Pile – Pier 2– 2 ea – 48” (Excavation/Concrete)	1	3.0	
Pier	Set Pier 2 Cap	1	0.5	
Demo	Remove Girders – Span EB #3	1	0.5	D = 2
Demo	Saw Cut/Wedge Cap C	1	0.5	
Demo	Remove Cap C	1	0.5	
Demo	Remove Pile – Bent D – 2 ea – 30”	1	0.5	
T	Move Template to Bent 4	1	0.5	T = 6
T	Drive Pile – Bent 4 – 4 ea – 24"	1	1.5	
T	Set Cap 4 – Girder Span 3-4	1	1.0	
T	Move Template to Bent 5	1	0.5	
T	Drive Pile – Bent 5 – 4 ea – 24"	1	1.5	
T	Set Cap 5 – Girder Span 4-5	1	1.0	
Pier	Set Template for Pier 3 on Trestle	1	0.25	P = 5.75
Pier	Drive Pile – Pier 3 – 2 ea – 48” (Excavation/Concrete)	1	3.0	
Pier	Set Pier 3 Cap	1	0.5	
Pier	Erect Girders – Span 1 and 2	1	2.0	
Demo	Remove Span EB #4	1	0.5	D = 2
Demo	Saw Cut/Wedge Cap D	1	0.5	
Demo	Remove Cap D	1	0.5	
Demo	Remove Pile – Bent D – 2 ea – 30”	1	0.5	

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
T	Move Template to Bent 6	1	0.25	T = 2.75
T	Drive Pile – Bent 6 – 4 ea – 24”	1	1.5	
T	Set Cap 6 – Girder Span 5-6	1	1.0	
Demo	Remove Girders – Span EB #5	1	0.5	D = 2
Demo	Saw Cut/Wedge Cap E	1	0.5	
Demo	Remove Cap E	1	0.5	
Demo	Remove Pile – Bent E – 2 ea - 30"	1	0.5	
T	Move Template to Bent 7	1	0.25	T = 5.5
T	Drive Pile – Bent 7 – 4 ea – 24”	1	1.5	
T	Set Cap 7 – Girder Span 6-7	1	1.0	
T	Move Template to Bent 8	1	0.25	
T	Drive Pile – Bent 8 – 4 ea – 24”	1	1.5	
T	Set Cap 8 – Girder Span 7-8	1	1.0	
Demo	Saw Cut/Wedge Cap F	1	0.5	D = 1.5
Demo	Remove Cap F	1	0.5	
Demo	Remove Pile – Bent F – 2 ea – 30"	1	0.5	
T	Move Template to Bent 9	1	0.25	T = 2.75
T	Drive Pile – Bent 9 – 4 ea – 24”	1	1.5	
T	Set Cap 9 – Girder Span 8-9	1	1.0	
Pier	Set Template for Pier 4 and 5 on Trestle	1	0.50	P = 10.5
Pier	Drive Pile – Piers 4 and 5 – 4 ea – 48” (Excavation/Concrete)	1	6.0	
Pier	Set Piers 4 and 5 – Cap	1	2.0	
Pier	Set Girders Span 3 and 4	1	2.0	
T	Remove Temporary Trestle – Bent 0, 1, 2, 3, 4, 5, 6 – 7 ea – 28 Pile – 28 Caps	1	14.0	T = 19.5
T	Move Template to Bent 10	1	0.25	
T	Drive Pile – Bent 10 – 4 ea – 24”	1	1.5	
T	Set Cap 10 – Girders Span 9-10	1	1.0	
T	Move Template to Bent 11	1	0.25	
T	Drive Pile – Bent 11 – 4 ea – 24”	1	1.5	
T	Set Cap 11 – Girders Span 10-11	1	1.0	
Pier	Set Template for Pier 6 on Trestle	1	0.25	P = 4.25
Pier	Drive Pile – Pier 6 – 2 ea – 48” (Excavation/Concrete)	1	3.0	
Pier	Set Cap Pier 6	1	1.0	
T	Move Template to Bent 12	1	0.25	T = 19
T	Drive Pile – Bent 12 – 4 ea – 24”	1	1.5	
T	Set Cap 12 – Girder Span 11-12	1	1.0	
T	Set Girders Span 5	1	1.0	
T	Remove Temporary Trestle Bents 7, 8, 9, and 10	1	7.0	
T	Move Template to Bent 13	1	0.25	
T	Drive Pile – Bent 13 – 4 ea – 24”	1	1.5	
T	Set Cap 13 – Girder Span 12-13	1	1.0	
T	Move Template to Bent 14	1	0.25	
T	Drive Pile – Bent 14 – 4 ea – 24”	1	1.5	
T	Set Cap 14 – Girder Span 13-14	1	1.0	

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
T	Move Template to Bent 15	1	0.25	
T	Drive Pile – Bent 15 – 4 ea – 24”	1	1.5	
T	Set Cap 15 – Girder Span 14-15	1	1.0	
Pier	Set Template for Pier 7 and 8 on Trestle	1	0.50	
Pier	Drive Pile – Piers 7 and 8 – 4 ea – 48” (Excavation/Concrete)	1	6.0	P = 10.5
Pier	Place Cap Pier 7-8	1	2.0	
Pier	Set Girders Span 7-8	1	2.0	
T	Remove Trestle Bents 11-12	1	2.0	T = 2
Pier	Place Girders on Spans 13-14 and 14-15	1	2.0	P = 2
T	Bents 13, 14, 15 – Remain in-place through Winter	1		
	Summary Season 1			
	Demo			**11.5**
	Trestle			**70.5**
	Pier / Superstructure			**40.5**
	Total (21 weeks = 5 months)			**122.5**

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
Season 2				
M	Reassemble Hoisting Equipment Onto Trestle	1	6.0	M = 18.0
M	Remobilize Site Facilities from Storage	2	12.0	
T	Set Template Bent 16	1	0.25	
T	Drive Pile – Bent 16 – 4 ea – 24"	1	1.5	
T	Set Cap 16 – Girder Span 15-16	1	1.0	
T	Move Template to Bent 17	1	0.25	
T	Drive Pile – Bent 17 – 4 ea – 24"	1	1.5	
T	Set Cap 17 – Girder Span 16-17	1	1.0	T = 11.0
T	Move Template to Bent 18	1	0.25	
T	Drive Pile – Bent 18 – 4 ea – 24"	1	1.5	
T	Set Cap 18 – Girder Span 17-18	1	1.0	
T	Move Template to Bent 19	1	0.25	
T	Drive Pile – Bent 19 – 4 ea – 24"	1	1.5	
T	Set Cap 19 – Girder Span 18-19	1	1.0	
Pier	Set Template for Pier 9 on Trestle	1	0.25	
Pier	Drive Pile – Pier 9 – 2 ea – 48" (Excavation/Concrete)	1	3.0	
Pier	Set Precast Concrete Cap Pier 9	1	1.0	
Pier	Set Template for Pier 10 on Trestle	1	0.25	P = 9.5
Pier	Drive Pile – Pier 10 – 2 ea – 48" (Excavation/Concrete)	1	3.0	
Pier	Set Precast Concrete Cap Pier 10	1	1.0	
Pier	Set Girders – Spans 8 and 9	1	1.0	

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
T	Move Template to Bent 20	1	0.25	
T	Drive Pile – Bent 20 – 4 ea – 24"	1	1.5	
T	Set Cap 20 – Girder Span 19-20	1	1.0	
T	Move Template to Bent 21	1	0.25	
T	Drive Pile – Bent 21 – 4 ea – 24”	1	1.5	
T	Set Cap 21 – Girders Span 20-21	1	1.0	
T	Move Template to Bent 22	1	0.25	
T	Drive Pile – Bent 22 – 4 ea – 24”	1	1.5	T = 17.75
T	Set Cap 22 – Girder Span 21-22	1	1.0	
T	Remove Girders, Caps, Pile – Bents 15, 16, 17, 18	1	4.0	
T	Move Template to Bent 23	1	0.25	
T	Drive Pile – Bent 23 – 4 ea – 24”	1	1.5	
T	Set Cap 23 – Girder Span 22-23	1	1.0	
T	Move Template to Bent 24	1	0.25	
T	Drive Pile – Bent 24 – 4 ea – 24”	1	1.5	
T	Set Cap 24 – Girder Span 23-24	1	1.0	
Pier	Set Template for Pier 11 on Trestle	1	0.25	
Pier	Drive Pile – Pier 11 – 2 ea – 48" (Excavation/Concrete)	1	3.0	
Pier	Set Cap Pier 11	1	1.0	
Pier	Set Template for Pier 12 on Trestle	1	0.25	P = 9.5
Pier	Drive Pile – Pier 12 – 2 ea – 48" (Excavation/Concrete)	1	3.0	
Pier	Set Cap Pier 12	1	1.0	
Pier	Set Girders Span 10-11	1	1.0	
T	Remove Girders, Caps, Pile – Bents 19, 20, 21	1	3.0	
T	Move Template to Bent 25	1	0.25	
T	Drive Pile – Bent 25 – 4 ea – 24”	1	1.5	
T	Set Cap 25 – Girder Span 24-25	1	1.0	T = 8.5
T	Move Template to Bent 26	1	0.25	
T	Drive Pile – Bent 26 – 4 ea – 24”	1	1.5	
T	Set Cap 26 – Girder Span 25-26	1	1.0	
Pier	Drive Pile – Pier 13 – 2 ea – 48" (Excavation/Concrete)	1	1.5	
Pier	Set Template for Pier 13 on Trestle	1	0.25	P = 3.75
Pier	Set Cap – Pier 13	1	1.0	
Pier	Set Girder – Span 12	1	1.0	
T	Move Template to Bent 27	1	0.25	
T	Drive Pile – Bent 27 – 4 ea – 24”	1	1.5	
T	Set Cap 27 – Girder Span 27-28	1	1.0	T = 5.75
T	Move Template to Bent 28	1	0.5	
T	Drive Pile – Bent 28 – 4 ea – 24”	1	1.5	
T	Set Cap 28 – Girder 28	1	1.0	

Activity	Activity Description	Crew No.	No. Shifts for Activity	Total Shifts Per Function
Pier	Set Template for Pier 14 on Trestle	1	0.25	
Pier	Drive Pile – Pier 14 – 2 ea – 48" (Excavation/Concrete)	1	3.0	
Pier	Set Cap Pier 14	1	1.0	
Pier	Set Template for Pier 15 on Trestle	1	0.25	P = 9.5
Pier	Drive Pile – Pier 15 – 2 ea – 48" (Excavation/Concrete)	1	3.0	
Pier	Set Cap	1	1.0	
Pier	Set Girders – Spans 13-14	1	1.0	
T	Remove Girders, Caps, Pull Pile – 22, 23, 24, 25, 26, 27, 28	1	7.0	T = 12.0
T	Demobilize Hoisting Equipment	1	5.0	
	Place Wearing Surface on Bridge (Concurrent)		12.0	
	Place Guard Rail (Concurrent)		8.0	
	Demobilize Material and Equipment (Concurrent)		18.0	
	Summary Season 2			
	Mobilization			**18**
	Trestle			**55**
	Pier / Superstructure			**32.25**
	Total (17 weeks = 4 months)			

Quantity Take-Offs

Construction Material

Option #2 – 100' Spans

- No. of temporary bents – 8 ea ..... 375 lf trestles
- No. of trestle pile ..... 32 ea
- Length of pile ..... 145 feet
- Weight per lf 24"-3/4" ..... 280 #/lf
- Total weight pile – 1,299,200#..... 650 tons
- Pile tip – (5'-0")(32) = 160 lf x 465#/lf = 74,400#..... 37 tons
- Weight per pile ..... 22 tons

  Total ..... 687 tons

- Cap beam (50 lf)..... 8 ea
- Cap beam – 2 ea. (w 36 x 245)..... 490 #/lf
  - Stiffeners/sleeves et. al – 160 lf..... 650 #/lf
- Total weight per cap beam (50') (650#/lf) = 32,500# ..... 16.25 ton
- Pile pins – 5" dia. – strong pipe – 30" long (2 ea/bent) ..... 56 ea
- Track girder 2 ea (375' long) ..... 750 lf
- Track girder (2 ea) (245)..... 490 #/lf
  - Stiffeners/bottom/top/plate ..... 150 #/lf
  - Total girder weight..... 640 lf
  - Total girder weight (640#/lf) (750 lf) = 480,000#/lf ..... 240 tons
  - Lifting weight – 50' girder ..... 16 tons/ea
- Track rail..... 750 lf heavy duty rail
- Miscellaneous – Bolts, etc.
  - Guard Rail..... 750 lf
  - Walkway grading..... 5,250 sf
- Pile template/spud pile/rollers/hardware, etc.
  - Post-tensioned strand and anchors for diagonal bracing..... 12,000 lf – strand plus hardware

Construction Material – Summary

- Pipe Pile
  - Trestle – ea..... 790 tons
- Cap Girder
  - Trestle – ea..... 130 tons
- Trestle girder
  - Trestle ..... 240 tons
  - Crane Platform..... 36 tons

  Total Steel ..... 1,115 tons
- Special
  - Timber Deck..... 1,079 MBF

Permanent Materials – Foundations

Pile Casing Details

Option #2 – 100' Spans

- Number of pile ..... 30 ea
- Pile diameter.....48"
- Pile wall .....1"
- Pile length – 150 feet
  - Water depth – ± 30' (galvanized)..... 900 feet
  - Scour – ±50' ..... 1,500 feet
  - 1" Embedded – ±65' ..... 1,950 feet
  - 2" Drilled Shaft – ±5' ..... 150 feet[4]

  Total..... 4,500 feet
- Cast steel driving tip..... 30 ea
- Weight/foot galvanized – (600#/lf)(900 lf) = 540,000#/lf ..... 270 tons
- Weight/foot 1" wall – (550#/lf)(3,450 lf) = 1,897,500#/lf ..... 950 tons
- Weight/foot 2" wall – (1,100#/lf)(150 lf) = 165,000#/lf ..... 82 tons

  Total Pipe Weight ..... 1,302 tons
- Weight per individual pile casing..... 43.5 tons

Pile Concrete Details

- Depth of concrete in pile ..... 100 feet
- Concrete per lineal foot of pile ..... 0.50 cy
- Total lineal feet of concrete..... 3,000 lf

  Total concrete required ..... 1,500 cy
- Concrete required each pile ..... 50 CY

[4] The heavier pile tip is added to improve driving resistance

Reinforcing Steel Details

- Rebar per cubic yard of concrete..... 325 lbs
- Total rebar (325#)(1,500 cy) = 487,500 ..... 245 tons

Pile Excavation

- Excavation (3,000 lf) (0.50 cy)..... 1,500 cy

Permanent Material – Substructure

Column Concrete

Option #2 – 100' Spans

- No. of columns ..... 30 ea
- Column diameter ..... 4 feet
- Column length..... 10 feet
- Concrete per lf ..... 0.5 cy
- Total concrete column ..... 150 cy
- Rebar – 325#/cy – 48,750# ..... 25 tons

Precast Cap Concrete

- No. of caps ..... 15 ea
- Cap dimensions – L=32', W=4', D=5'
- Concrete per cap – 24 cy..... 48 tons
- Total cap concrete ..... 360 cy
- Rebar per cubic yard of concrete..... 275 #
- Total rebar (275#)(360 cy) = 99,000# = 49.5 tons..... 3.3 tons/ea
- Bearing pads – 16 ea pier..... 448 ea.
- Cap formwork
    - Soffit – (15 ea) (160 sf)..... 2,400 sf
    - Wall sides – (15 ea) (2) (192 sf)..... 5,760 sf
    - Wall end – (15 ea) (2) (30) ..... 900 sf

Superstructure – Precast Concrete Box Girder

- No. of spans ..... 14 ea
- No. of girders per span ..... 10 ea
- Total girders ..... 140 ea
- Approximate weight of girders .....(45-50) tons
- Total Girder Weight ..... 6,650 tons
- Quantities/box girder
    - Concrete..... 25 cy
    - Reinforcing steel – 6,085# ..... 244 #/cy
    - P.T. longitudinal – 2,355# ..... 93 #/cy
    - P.T. transverse – 75#..... 3 #/cy

- Grout ..... 10 cy
- Tie rods ..... 4 ea

- Deck waterproof membrane ..... 45,000 sf
- Deck overlay 4" – 45,000 sf..... 560 cy
- Steel bridge rail ..... 2,800 lf
- Roadway Rail..... 200 lf

Permanent Material – Superstructure

Total Superstructure Concrete Box Girder Quantities

Option #2 – 100' Spans

- Concrete..... 3,500 cy
- Rebar..... 857,000 #
- P.T. longitudinal ..... 325,500 #
- P.T. transverse ..... 10,500 #
- Grout..... 1,400 cy
- Tie rod ..... 560 ea

Summary of Steel Required for Project

Option #2 – 100' Spans

Permanent Material

- Shaft Pipe – 4'0" – 1"
  - Galvanized 1" Pipe – (90 lf)(600#) = 540,000#/lf..... 270 tons
  - Non-galvanized 1" Pipe – (3,450 lf)(550#) = 1,897,500#/lf ... 950 tons
  - Non-galvanized 2" Pipe – (150 lf)(1,100#) = 165,000#/lf ..... 82 tons
  - Total ..... 1,302 tons

Construction Material

- Trestle Pile – 24" – 3/4" – 4,800 lf = 1,344,000#/lf..... 672 tons
- Pile Tip – 24" – 2 ½" (tip) – 160 lf = 74,000#/lf ..... 37 tons
  Total ..... 709 tons
- Trestle Cap Beams
  - 36 WF – 124 lf – 800 lf = 260,000#/lf..... 130 tons
- Trestle Girders
  - 36 WF 245 – 1,500 lf = 480,000#/lf ..... 240 tons
    Total ..... 1,079 tons
- Heavy Rail..... 750 lf

Craft Labor Hourly Rate Schedule

Labor Rates

LINE	DESCRIPTION		ELECTRICIAN	LABOR FOREMAN	LABORER	IRON WORK	PILE BUTT	PILE BUTT WELD	OPERATING ENGINEER _____	OPERATING ENGINEER ___	OPERATING ENGINEER
1	Base Wages		$46.64	$32.65	$30.96	$34.56	$37.28	$38.31	$41.24	$31.47	$37.89
2	Planned Premium Time (22%)	22%	$10.26	$7.18	$6.81	$7.60	$8.20	$8.43	$9.07	$6.92	$8.34
3	Incidental Premium Time (3%)	3%	$1.90	$0.97	$0.90	$1.04	$1.12	$1.15	$1.24	$0.94	$1.14
4	Shift Differential		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5	Travel Pay		$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50
6	**Subtotal Lines 1-5**		**$59.30**	**$41.30**	**$39.17**	**$43.70**	**$47.10**	**$48.39**	**$52.05**	**$39.84**	**$47.86**
7	Health/Wellness		$10.85	$7.12	$7.12	$7.43	$9.56	$9.56	$9.37	$9.37	$9.37
8	Pension		$14.95	$13.55	$13.55	$16.48	$1.63	$11.63	$10.04	$10.04	$10.04
9	Training		$0.88	$1.24	$1.24	$0.95	$0.72	$0.72	$1.03	$1.03	$1.03
10	Management		$0.21	$0.21	$0.21	$0.44	$0.11	$0.11	$0.11	$0.11	$0.11
11	Legal		$0.16	$0.16	$0.16	$0.11	$0.16	$0.16			
12	**Subtotal Lines 7-11**		**$27.05**	**$22.28**	**$22.28**	**$25.41**	**$12.18**	**$22.18**	**$20.55**	**$20.55**	**$20.55**
12a	**Subtotal Lines 1-11**		**$86.35**	**$63.58**	**$61.45**	**$69.11**	**$59.28**	**$70.57**	**$72.60**	**$60.39**	**$68.41**
13	FICA (SS)	6.20%	$3.68	$2.56	$2.43	$2.71	$2.92	$3.00	$3.23	$2.47	$2.97
14	FICA (Med)	2.35%	$1.39	$0.97	$0.92	$1.03	$1.11	$1.14	$1.22	$0.94	$1.12
15	FUTA	0.60%	$0.36	$0.25	$0.24	$0.26	$0.28	$0.29	$0.31	$0.24	$0.29
16	Alaska Unemployment	4.18%	$2.48	$1.73	$1.64	$1.83	$1.97	$2.02	$2.18	$1.67	$2.00
17	**Total Tax**	**13.33%**	**$7.90**	**$5.51**	**$5.22**	**$5.83**	**$6.28**	**$6.45**	**$6.94**	**$5.31**	**$6.38**
18	Workers Compensation	15%	$7.00	$4.90	$4.64	$5.18	$5.59	$5.75	$6.19	$4.72	$5.68
19	Risk, Liability, & Property Damage	2%	$0.93	$0.65	$0.62	$0.69	$0.75	$0.77	$0.82	$0.63	$0.76
20	Workers Comp Jones Act										
21	Workers Comp Longshoreman										
22	**Subtotal**		**$7.93**	**$5.55**	**$5.26**	**$5.88**	**$6.34**	**$6.51**	**$7.01**	**$5.35**	**$6.44**
23	Small Tools and Supplies		$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00
24	Misc outside Rentals		$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00
25	Safety supplies		$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00
26	**Subtotal**		**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**	**$12.00**
27	**Total Lines**		**$114.18**	**$86.64**	**$83.94**	**$92.81**	**$83.90**	**$95.53**	**$98.55**	**$83.05**	**$93.23**
28	**Escalation**										
29	**Total Cost per Mani_____**										

Note: Rates based upon 6 days per week, 12 hours per day

Option #2 – 100' Spans - Craft Labor – Cost Analysis

(1) Mobilization / Demobilization – Season #1 and Season #2

Season #1 – Mobilization (Including unloading/handling/facilities development)

Season #1 – Mobilization ..... 18 Shifts
Season #1 – Demobilization ..... 12 Shifts
Season #2 – Mobilization ..... 18 Shifts
Season #2 – Demobilization ..... 12 Shifts
Total Shifts ..... 60 Shifts

Material Handling Crew
(60 Shifts)($9,080/shift) $544,800

(2) Construction Material Handling

Season #1 – 122.5 Shifts
Season #2 – 82.5 Shifts
Total Shifts – (205 Shifts) ($9,080/shift) $1,861,400

(3) Demolition – Trestle Crew

Season #1 – (11.5 Shifts)($10,433/shift) $119,980

(4) Trestle in and out – Trestle Crew

Season #1 – 70.5 shifts
Season #2 – 55.0 shifts
Total Shifts – (125.5 Shifts)($10,433/shift) $1,309,342

(5) Permanent Pier (Column/Cap) Superstructure

Season #1 – 70.5 shifts
Season #2 – 32.5 shifts
Total Shifts – (73 Shifts)($10,433/shift) $761,609

(6) Welding (Pipe Pile)

(120 Shifts)($8,799/shift) $1,055,880

(7) Reinforcing Steel Fabrication/Placing – Reinforcing Crew

(40 Shifts)($3,547/shift) $141, 880

(8) Wearing Surface

(6 Shifts)($6,090/shift) $36,540

(9) Guard Rail

(4 Shifts)($6,090/shift) $24,360

Option #2 Total Craft Labor.....$5,855,791

Construction Equipment Ownership Cost Analysis

Option #2 – 100' Spans

Construction Equipment Description	Const. Period	Monthly Ownership Rate	No. of Operating Months	Total Cost per Operation Period	Monthly Stand-by Rate	Number of Stand-by Months	Total Cost of Stand-by Period
Flexifloat – Pontoons	2	$2,500.00	9	$22,500.00	$1,250.00	10	$12,500.00
Anchor Winches	2	$6,000.00	9	$54,000.00	$3,000.00	10	$30,000.00
Light Towers	1	$1,400.00	9	$12,600.00			
Generators - 15 kw	2	$1,100.00	22	$24,200.00			
Generators - 250 kw	1	$3,000.00	9	$27,000.00			
Generators - 500 kw	1	$6,000.00	9	$54,000.00			
Welding Machine - 250 Amp	3	$300.00	27	$8,100.00			
Welding Machine - 350 Amp	2	$900.00	18	$16,200.00			
Air Compressor - 185 CFM	2	$800.00	22	$17,600.00			
Air Compressor - 325 CFM	1	$3,000.00	9	$27,000.00			
Air Compressor - 600 CFM	1	$6,000.00	9	$54,000.00			
Loader/Forklift – 966	1	$9,000.00	11	$99,000.00			
Rough Terrain Crane - 70 Ton	1	$14,000.00	11	$154,000.00	$7,000.00	7	$49,000.00
Crawler Crane – 2250	1	$30,000.00	11	$330,000.00	$15,000.00	7	$105,000.00
Crane Carrier Car	1	$12,500.00	9	$112,500.00	$6,250.00	7	$43,750.00
Travel Lift	2	$15,000.00	20	$300,000.00	$7,500.00	14	$105,000.00
Boat LCM	1	$4,000.00	11	$44,000.00			
Air Boat	1	$1,500.00	11	$16,500.00			
Concrete Plant/Turbine Mixer	1	$19,000.00	7	$133,000.00	$9,500.00	10	$95,000.00
Vibratory Hammer HPS 1600	1	$20,000.00	9	$180,000.00			
Vibratory Hammer Power Pak	1	$20,000.00	9	$180,000.00			
Hydraulic Impact Hammer (200,000-300,000)	1	$50,000.00	9	$450,000.00			
Personnel Van	1	$3,000.00	11	$33,000.00			
Pickups	3	$1,200.00	33	$39,600.00	$600.00	21	$12,600.00
Mechanic Truck	1	$2,500.00	11	$27,500.00	$1,250.00	8	$10,000.00
Fuel Trailer	1	$100.00	11	$1,100.00			
Water Tank Trailer	1	$100.00	11	$1,100.00			
Subtotal				**$2,418,500.00**	**$51,350.00**		**$462,850.00**
Total Stand-by Cost				**$462,850.00**			
GRAND TOTAL				**$2,881,350.00**			

Construction Equipment Operating Expense per Shift

Option #2 - 100' Spans

	Construction Equipment Description	EOE Operating Rate/Hr	Hours Worked per Shift	EOE per Shift
Trestle Operation	Crawler Crane	$110.00	12	$1,320.00
	Crane Carrier	$40.00	12	$480.00
	Vibratory Hammer	$100.00	5	$500.00
	Vibratory Power Pak	$175.00	5	$875.00
	Hydraulic Hammer	$250.00	5	$1,250.00
	Welding Machine	$10.00	12	$120.00
	Air Compressor	$15.00	12	$180.00
	Flexifloat	$6.00	12	$72.00
	Anchor Weights	$5.00	12	$60.00
	Generator - 250 kw	$100.00	12	$1,200.00
	TOTAL	**$811.00**	**99**	**$6,057.00**
Material Handling	Travel Lift	$50.00	12	$600.00
	Travel Lift	$50.00	8	$400.00
	RTG - 70-Ton	$95.00	10	$950.00
	966 Lift	$50.00	10	$500.00
	Air Compressor - 600 cfm	$55.00	10	$550.00
	TOTAL	**$300.00**		**$3,000.00**
Welding	350 Amp	$15.00	10	$150.00
	350 Amp	$15.00	10	$150.00
	250 Amp	$10.00	10	$100.00
	250 Amp	$10.00	10	$100.00
	Generator - 250 kw	$100.00	12	$1,200.00
	Air Compressor - 325 cfm	$50.00	12	$600.00
	TOTAL	**$200.00**		**$2,300.00**
Other	Boat LCM	$28.00	1	$28.00
	Air Boat	$25.00	2	$50.00
	Personal Van	$20.00	4	$80.00
	Pickup Trucks	$10.00	36	$360.00
	Mechanics Truck	$20.00	12	$240.00
	Generator - 15 kw	$10.00	12	$120.00
	Tanks	$10.00	20	$200.00
	TOTAL	**$123.00**		**$1,078.00**
Drill Shaft	Boat LCM	$80.00	12	$960.00
	Oscillator	$100.00	8	$800.00
	Power Pak	$60.00	8	$480.00
	Miscellaneous	$30.00	12	$360.00
	Air Compressor - 185 CFM	$15.00	12	$180.00
	Welder - 250 Amp	$10.00	6	$60.00
	Cone Pump	$80.00	1	$80.00
	TOTAL	**$375.00**		**$2,920.00**
	Grand Total			**$15,355.00**

Construction Equipment Operating Expense Analysis
Option #2 – 100' Spans

Construction Equipment Description	Const. Period	Hourly Operating Expense	Number of Operating Hours	Total Operating Expense
Flexifloat – Pontoons	2	$6.00	5,000	$30,000
Anchor Winches	2	$5.00	5,000	$25,000
Light Towers	1	$5.00	240	$1,200
Generators - 15 kw	2	$10.00	5,000	$50,000
Generators - 250 kw	1	$100.00	1,000	$100,000
Generators - 500 kw	1	$185.00	1,000	$185,000
Welding Machine - 250 Amp	3	$10.00	6,000	$60,000
Welding Machine - 350 Amp	2	$15.00	4,000	$60,000
Air Compressor - 185 CFM	2	$15.00	5,000	$75,000
Air Compressor - 325 CFM	1	$50.00	2,000	$100,000
Air Compressor - 600 CFM	1	$55.00	1,500	$82,500
Loader/Forklift – 966	1	$50.00	2,000	$100,000
Rough Terrain Crane - 70 Ton	1	$95.00	2,200	$209,000
Crawler Crane – 2250	1	$110.00	3,000	$330,000
Crane Carrier Car	1	$40.00	3,000	$120,000
Travel Lift	2	$50.00	4,500	$225,000
Boat LCM	1	$28.00	1,000	$28,000
Air Boat	1	$25.00	500	$12,500
Concrete Plant/Turbine Mixer	1	$30.00	150	$4,500
Vibratory Hammer HPS 1600	1	$100.00	660	$66,000
Vibratory Hammer Power Pak	1	$175.00	660	$115,500
Hydraulic Impact Hammer (200,000-300,000)	1	$150.00	900	$135,000
Personnel Van	1	$20.00	1,000	$20,000
Pickups	3	$10.00	10,000	$100,000
Mechanic Truck	1	$20.00	3,500	$70,000
Fuel Trailer	1	$5.00	1,000	$5,000
Water Tank Trailer	1	$4.00	1,000	$4,000
Total Operating Expense				**$2,313,200**

Construction Material Estimate

Option #2 – 100' Spans

Material Description	Qty.	Unit of Measure	Unit Price	Total
Trestle Pile	687	ton	$1,500.00	$1,030,500
Trestle Cap Beam	130	ton	$1,300.00	$169,000
Trestle Track Girder	240	ton	$1,300.00	$312,000
Subtotal - Trestle				**$1,511,500**
Miscellaneous Material				
Track Rail	750	lf	$30.00	$22,500
trestle Walkway Grading	5,250	sf	$25.00	$131,250
Trestle Pile template	25	ton	$1,300.00	$32,500
Trestle Pile template Spud	22	ton	$1,500.00	$33,000
Diagonal Bracing PT	12,000	lbs	$3.00	$36,000
Trestle Miscellaneous Bolts, etc.	750	lf	$20.00	$15,000
Guard Rail	540	sf	$45.00	$24,300
Cap Forms	20,000	lbs	$5.00	$100,000
Subtotal Miscellaneous				**$394,550**
Total Construction Materials				**$1,906,050**

Permanent Material Estimate

Option #2 – 100' Spans

Material Description	Qty.	Unit of Measure	Unit Price	Total
Pile Casing -- 8'-0"	1,302	ton	$1,500.00	$1,953,000
Pile Galvanizing	540,000	lb	$0.25	$135,000
Pile Concrete	1,500	cy	$155.00	$232,500
Pile Reinforcing Steel	487,500	lb	$0.92	$448,500
Subtotal - Shaft				**$2,769,000**
Column Concrete	150	cy	$155.00	$23,250
Column Rebar	48,750	lb	$0.92	$44,850
Cap Concrete	360	cy	$155.00	$55,800
Cap Rebar	99,000	lb	$0.92	$91,080
Elastomeric Bearing Pads	300	ea	$900.00	$270,000
Precast Concrete Box Girders	14,000	ea	$320.00	$4,480,000
Membrane Waterproofing	45,000	sf	$10.00	$450,000
Bridge Rail	2,800	lf	$100.00	$280,000
Roadway Rail	400	lf	$80.00	$32,000
Subtotal				**$5,726,980**
Total Permanent Materials				**$8,495,980**

Option #2 – 100' Spans – Transportation Construction Equipment

Note: Options #1 and #2 have differing construction equipment requirements, especially regarding requirements for construction during Season #1 and Season #2. The requirements for Option #2 are the same for both Season #1 and #2, whereas the requirement for Option #1 differs.

Option #2 – 100' Spans – Anchorage Source – Delivery via Truck/Ferry

- Ferry fees/trip
  - Driver $89.00
  - Truck to 21' $157.00
  - To 60' – (39') ($8.30).....$324.00

    Total One-Way $570.00

Construction Equipment Description	Load Required
Crane carrier "manufactured" – Anchorage	1
Flexifloats (2 ea)	1
Light towers (3 ea)	1/3
Generators	1
a. Excavated material box (2 ea)	
Welding machines	1/3
Air compressor	½
Fuel storage tank	1
Water pull trailer	1
Porta Camp (barge from Anchorage)	
Conex material boxes – 20' – 6 ea.	3
Office trailer off-site	2
966 loader/forklift	1
Material trailer/platform for concrete buckets – 4 cy	
40-ton rough terrain crane	1
Small tools/safety/concrete lab equipment	
Personal van	drive
Pickups	drive

Option #2 – 100' Spans – Seattle Source – Barge Delivery

Crawler crane – 2,250 – 280 ton L=30'-9", W=27'-0", 120' boom
Vibrating hammer HPS 1600 – 82,000# – 3 power 700 kw generator – 4 truckloads
Impact hammer – 300,000 to 400,000 ft/lbs – delivery weight 80,000 lbs
Travel lifts – 2 ea
LCM/air boat
Anchors and hoists
Concrete plant – turbine mixer
48" Leffer bucket
Reinforcing steel – 370 ton

Option #2 – 100' Spans – Tacoma Source – Barge Delivery

- Precast concrete box girders – (140 ea)(±47.5 ton/ea) = 6,650 tons
    - Season #1 – 3,325 tons
    - Season #2 – 3,325 tons

Option #2 – 100' Spans – Longview, Washington Source – Barge Delivery

- Pipe and rolled steel girders
    - Steel – Longview, Washington (fabricated weight)
        - Pipe 4'-0" diameter – 4,500 lf..... 1,302 tons
        - Pipe 2'-0" diameter – 4,960 lf..... 709 tons
        - Cap 36 WF 245 – 800 lf ..... 130 tons
        - Girder 36 WF 245 – 1,500 lf..... 240 tons

          2,381 tons

Construction Equipment – Option #2 – 100' Spans

Season #1 – Mobilization – Construction Equipment – Barge

1. Crawler Crane 2250
    - Load 10 trucks at Lampson (200 hrs)($160/hr) . $32,000
    - Haul 10 trucks to Seattle (160 hrs)($400/hr)..... $64,000
    - Unload/Load/Load (incl. barge rates)..... $0
    - Assemble at Site (160 hrs)($100/hr)..... $16,000
    - TOTAL..... $112,000
2. Rough Terrain Crane
    - Load at Lampson (4 hrs)($60/hr) $240
    - Haul to Seattle (16 hrs)($250/hr)..... $4,000
3. Travel Lifts from _____ (2 ea)(144 hrs)($100/hr) $14,400
4. Concrete Placing $14,400
5. Hammers..... $14,400
6. Flexifloats/Anchors (12 hrs)($100/hr) $1,200
7. Barge Ship Load (5 days)($10,000/day) $50,000
   Barge Ship Unload (5 days) ($10,000/day) $50,000
8. Port Charges Seattle/Cordova (10 days)($2,500/day).... $25,000
9. Barge Travel – 1,700 miles/8 mph = 212 hours or
   9 days($2,000/hr)..... $424,000
   Total (#1-10) $709,640

Season #1 – Demobilization – Construction Equipment – Barge

1. Off-Site (Cordova) – Site Demobilization Crew Analysis

Season #2 – Mobilization – Construction Equipment

1. Off-Site (Cordova) – Site Mobilization Crew Analysis

Season #2 – Demobilization $709,640

Total Option #2 Construction Equipment
Mobilization/Demobilization/Barge.....$1,419,280

Anchorage Mobilization – Demobilization – Mobilization

1. Light Towers (2 ea).....Truck #1
2. Generator 15 kw (2 ea) .....Truck #2
3. Generator 25 kw (1 ea) .....Truck #2
4. Generator 500 kw (1 ea) .....Truck #2
5. Welding Machines 250 Amp (3 ea).....Truck #1
6. Welding Machines 350 Amp (2 ea).....Truck #1
7. Air Compressor 185 CFS (2 ea).....Truck #1
8. Air Compressor 325 CFS (1 ea).....Truck #3
9. Air Compressor 600 CFS (1 ea).....Truck #3
10. Loader/Forklift .....Truck #4

11. Pedestrian Van ..... Driver
12. Concrete Pumps ..... Driver
13. Pickups (3 ea) ..... Driver

Truck Trips – Time

- Travel ..... 3 hours
- Ferry ..... 7 hours
- Travel ..... 2 hours
- Travel ..... 2 hours
- Wait ..... 10 hours
- Ferry ..... 7 hours
- Travel ..... 3 hours

Subtotal ..... 34 hours ($150/hr) $5,100
Ferry – Two tolls (2) ($570) $1,140
Subtotal ..... $6,240 /trip

4 Trips (4 ea) ($6,240/trip) $24,960
C_____ (1 ea) ($6,240) $6,240
4 Pickups, etc. (4 tolls) ($250) $1,000
Total $32,200

Season #1 Demobilization / Season #2 Mobilization / Season #2 Demobilization

(3 ea)($32,200) $96,600

Miscellaneous – Anchorage Trips (Containers, etc.)

(40 ea)($6,240) $96,600

Total Option #2 – Anchorage $378,400

Total Option #2 Mobilization/Demobilization Equip $1,797,680

Option #2 – Season #1 – Mobilization – Construction/Permanent Materials/Barge Delivery

Tacoma

Rebar ..... 315 tons
Formwork A.....
Containers – 8 ea ..... 160 tons
Box Girders – 70 ea ..... 3,325 tons
Total ..... 3,800 tons

Longview

Pipe Pile	1,302	tons
Trestle Pile	687	tons
Trestle Cap Steel	130	tons
Trestle Girder Steel	240	tons
Sheet Pile	3,240	tons
Total	5,599	tons

Season #2 – Tacoma

"Bulb Tee" Girders – 66 ea	5,280	tons

3 Barge Trips

Barge Load	$50,000	ea
Barge Unload	$50,000	ea
Port Fee	$25,000	ea
Travel	$424,000	ea
Subtotal	$549,000	ea
Total ($549,000) (3.5)	**$1,921,500**	

Craft Labor Camp Development/Operation

Assumptions

- Camp will be located on Department Property near the airport
- A 40-bed camp is planned
- The contractor shall provide the following:
  - A level site for the camp
  - Well water (camp facilities, including treatment)
  - Septic sanitary system
  - Hoisting equipment for erection/demolition
  - Fuel for generator/incinerator and heating
  - Telephone/internet and television services
- Camp configuration will consist of:
  - 1 ea – 16x60 Kitchen/Dining Unit
  - 1 ea – 16x30 Men Shower/Wash Unit
  - 1 ea – 16x20 Women's Shower/Wash Unit
  - 1 ea – 16x20 Recreation Room with TV
  - 1 ea – 16x20 Field Office
  - 1 ea – 16x20 Generator unit with 70 KW gen set
  - 1 ea – 16x20 4 bed sleepers
  - 1 ea – 20' Water storage/treatment Connex
  - 1 ea Waste Incinerator
- Mobilization / One-Winter / Demobilization
  - Mobilization of Facilities $10,000
  - Demolition $5,000
  - On-Site Setup (10 days)($1,445/day)..... $14,450
  - Winterization (8 days)($1,445/day)..... $11,560
  - Sparing Strategy (10 days)($1,445/day) $14,450
  - Detours (8 days)($1,445/day) $11,560
  - TOTAL..... $67,020
- Camp Lease
  - In Operation (330 days)($1,440/day) $475,200
  - Stand-by (220 days)($75/day) $16,500
  - TOTAL..... $491,700
- Camp Personnel
  - Manager/Cook (330 days)($747.90/day)..... $246,807
  - Baker/Cook (330 days)($735.70/day)..... $242,781
  - Helper (330 days)($688.75/day) $227,288
  - Maintenance (330 days)($1,045.10/day) $344,883
  - TOTAL..... $1,061,759

4. Food Supplies, etc. = $45.85/man day
    - Assume average (7 days/wk)((30 men/day)
      (300 days)(35 men) = 10,500 days $481,425
5. Summary – Construction Camp Cost
    - Mobilization/Demobilization $67,020
    - Camp Lease $491,700
    - Camp Personnel $1,061,765
    - Food and Supplies $481,425
    - Site Grading $35,000
    - Develop Well $7,500
    - Develop Septic System $15,000
    - Hoisting Equipment Mob./Demob. $30,000
    - Fuel Cost for Generator (330 days)($800/day) ... $264,000
    - Telephone (11 mo.)($2,000/mo.) $22,000
      TOTAL CAMP COST $2,475,410

Section 4 –

ABUTMENT SLOPE PROTECTION OPTIONS

Abutment Slope Protection (Options)

- Option #1 – Double ARBED Sheet Pile Wall
- Option #2 – Riprap
- Option #3 – Concrete Dolos[5]

See Drawing Number (___) for an optional plan for protection of the abutment slopes. The optional plan is to provide a double ARBED sheet pile wall filed with rock. The two walls are tied together with rods. The sheet pile wall is estimated to be 90' deep. The outside of the crib wall would be protected with a design rock and riprap slope protection.

- Abutment slope protection approximate quantity length of wall ±300 lf, total of 1,200 lf, the ARBED sheet pile wall is planned to be 90' in depth for a total of 108,000 sf at 68#/sf, or 3,240 tons.
- Tie rods would be placed approximately 10' apart, requiring 60 ea tie rods and tie rock
- Fill for the walls, assuming it to be 30' deep and 25' wide, amounts to approximately 18,000 cy
- Slope protection core rock – 36,000 cy
- Slope riprap – 12,000 cy

Permanent Material Cost

- Sheet Pile (3,240 ton)($1,500/ton) $4,860,000
- Tie Rods/Anchor (60 ea)($500/ea) $30,000
- Rock Fill (18,000 cy)($25/cy) $450,000
- Slope Protection Core Rock (36,000 cy)($30/cy) $1,080,000
- Slope Riprap (12,000 cy)($40/cy) $480,000

  Total $6,900,000

Craft Labor

- Sheet Pile (60 shifts)($12,373/shift) $742,380
- Rock Placement (66 shifts)($6,415/ton) $423,390

  Total $1,165,770

  Total Sheet Pile/Rock Option $8,065,770

Option #2 – Abutment Slope Protection – Rock Option

- Permanent Material – Rock $2,010,000
- Labor $423,390

  Total Rock Option $2,433,390

[5] See attached literature in Appendix

Option #3 – Dolos or Tetrapod Concrete Slope Protection[2]

Quantity estimate:
32 ea every five feet. Each abutment = 300' (50x32x2) = 3,840 ea

- (3,840 ea)(5 cy/ea) = (19,200 cy)($220.00).....$4,224,000
- Handle, Haul, & Place (3,840 ea)($150).....$576,000

  Total Dolos Option $4,800,000

Section 5 –

COMPARISON OF OPTIONS

Construction Material Comparison of Option #1 (140' spans) to Option #2 (100' Spans)

Item	Option #1	Option #2
Pipe pile	3,521 tons	687 tons
Cap girder	404 tons	130 tons
Track girder trestles	953 ton	240 ton
Total	**4,878 tons**	**1,057 tons**

Permanent Materials Comparison of Option #1 (140' spans) to Option #2 (100' Spans)

Item	Option #1	Option #2
Shaft/pile casing	1,463 tons	1,302 tons
Concrete	3,538 cy	1,500 cy
Reinforcing steel	577 tons	245 tons
Excavation	3,135 cy	1,500 cy
Cap concrete	605 cy	360 cy
Cap rebar	84 tons	49.5 tons

Total Cost Summary Comparison

Option #1 – 140' Spans / Option #2 - 100' spans

Option #1-140' Spans	Cost Category	Option #2-100' Spans
	Direct Cost	
$8,892,090	Permanent Material	$8,496,705
$9,317,800[6]	Construction Material	$2,128,055[7]
$2,341,600[8]	Construction Equipment Ownership	$2,433,200[6]
$2,845,550	Construction Equipment Operating Expense	$2,881,350
$8,736,970	Craft Labor	$5,855,791
$32,134,010	**Subtotal Direct Cost**	**$21,795,101**
	Indirect Cost	
$1,932,680	Mobilization/Demobilization - Construction Equipment	$1,797,680
$1,921,500	Mobilization - Construction/Permanent Materials	$1,647,000
$2,475,416	Camp Mobilization/Demobilization - Operation	$2,475,416
$2,457,900[9]	Time Related Indirect Cost	$2,522,900[7]
$1,601,300	Non-Time Related Indirect Cost	$1,601,300
$10,388,796	**Subtotal Indirect Cost**	**$10,044,296**
	Total	
$42,522,806	**Total - Construction Cost**	**$31,839,397**
$6,115,879	**Contractors Margin (70% of Craft Labor)**	**$4,099,054**
$48,638,685	**Total As-Bid Cost**	**$35,938,451**

[6] Trestles steel fabrication – (1,357 ton)($600/ton) = +$814,200

[7] Trestles steel fabrication – (370 ton)($600/ton) = +$222,000

[8] ~~Added ownership cost for the 2250 for both options = +$120,000~~. Abutment bank protection is not included in either solution. The monetary amount will be the same for whichever option is selected.

[9] Staff labor fringes = $545,600 for both options

Section 6 –

TIME RELATED AND NON-TIME RELATED COST ESTIMATE DETAIL

Time Related Indirect Cost – Option #1 – 140' Spans

The National Constructors' Group
Option #1 – 140' Spans
Time Related Indirect Costs
Activity Unit Price Summary

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
101		**Supervision**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Project Manager	24.00	MO			365,000	0	0	0	0	365,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		15,200					15,200
B		General Superintendent	10.00	MO			130,000	0	0	0	0	130,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		13,000					13,000
C		Carpenter Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Erection Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Concrete Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
F		Rebar Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		P.T. Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Shift Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		General Foreman		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
J		Building Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
K		Deputy General Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		General Foreman		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					495,000	**0**	**0**	**0**	**0**	**495,000**

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
102		**Engineering**					Takeoff:	Takeoff:	Takeoff:	Takeoff:	Takeoff:	
A		Project Engineer	18.00	MO			216,000	0	0	0	0	216,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		12,000					12,000
B		Deputy Project Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Office Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Cost Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Lead Schedule Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
F		Schedule Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Form Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Draftsman		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Shift Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
J		Engineer Tunnel Alignment		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
K		Survey Party Chief		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		Instrument Man		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
M		Survey Associate		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**216,000**	**0**	**0**	**0**	**0**	**216,000**
103		**Quality Control**					Takeoff:	Takeoff:	Takeoff:	Takeoff:	Takeoff:	
A		Chief Quality Control Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Quality Control Civil Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Quality Control Lab Technician		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
104		**Administration**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Office Manager	18.00	MO			162,000	0	0	0	0	162,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		9,000					9,000
B		Personnel Recruiter		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Joint Venture Accountant		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Accounting/Accounts Payable		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Timekeeper/Payroll	10.00	MO			50,000	0	0	0	0	50,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		5,000					5,000
F		Secretary/Receptionist		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Purchasing Agent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Expediting Clerk		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Warehouse Supervisor		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**212,000**	**0**	**0**	**0**	**0**	**212,000**
105		**Safety/First Aid/Security**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Safety Supervisor	10.00	MO			80,000	0	0	0	0	80,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		8,000					8,000
B		Nurse		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Security Guard		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**80,000**	**0**	**0**	**0**	**0**	**80,000**
106		**Supervisory Transportation**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		4 X 4 Pickups		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Expense*						0
B		Boats		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Expense*						0

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
C		Buses		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		*Included with Construction Equipment Ownership and Operating Expense*					0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
107		**Office Furniture/Equipment**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Office Equipment	1.00	LS			0	2,000	0	0	0	2,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			2,000				2,000
B		Engineering Equipment	1.00	LS			0	5,000	0	0	0	5,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			5,000				5,000
C		Surveying Equipment	1.00	LS			0	10,000	0	0	0	10,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			10,000				10,000
D		Quality Control Equipment	1.00	LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Clerical Supplies	12.00	MO			0	6,000	0	0	0	6,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			500				500
F		Postage	12.00	MO			0	12,000	0	0	0	12,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			1,000				1,000
G		Misc Freight Demurrage		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		*Included in Mobilization Estimate*					0
H		Engineering/Surveying Supplies		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Quality Control Supplies		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
J		Plans & Specifications		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
K		Reproduction	12.00	MO			0	7,200	0	0	0	7,200
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			600				600
L		Office Copier	12.00	MO			0	12,000	0	0	0	12,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			1,000				1,000
M		Job Photographs	12.00	MO			0	3,600	0	0	0	3,600
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			300				300
N		Telephones (Cell Phones - 6 ea)	90.00	MO			0	45,000	0	0	0	45,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			500				500
O		Electric Power - Office Only		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		*Included with Construction Equipment*					0
P		Gas/Fuel/Oil - Office Only		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
Q		Water - Office Only	12.00	MO			0	6,000	0	0	0	6,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			500				500
R		Janitorial Services & Supplies		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Camp Service*						0
S		Initiate CPM Schedule		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Project Engineering*						0
T		Computer CPM Schedule		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Project Engineering*						0
U		Loss on Warehouse Stock		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
V		Dues/Associations		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
W		On-Site Computers	4.00	LS			0	32,000	0	0	0	32,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			8,000				8,000
		Bid Item Total					**0**	**140,800**	**0**	**0**	**0**	**140,800**
108		**Service & Supplies**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Drinking Water Supplies	43.00	WK			0	0	4,300	0	0	4,300
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				100			100
B		Ice Machine Rent/Ice Purchases		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Drinking Water Delivery	43.00	WK			0	0	6,450	0	0	6,450
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				150			150
D		Sanitary Facilities		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Non-Time Indirect with Labor Rates*						0
E		First Aid Equipment & Supplies		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
F		Employee Qualification Tests - Welding	1.00	LS			0	0	10,000	0	0	10,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				10,000			10,000
G		Security Clearances		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Ladders/Scaffolds		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Fire Extinguishers		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Small Tools for Construction Equipment*						0
J		Winter Protection/Excessive Rain	1.00	LS			0	0	75,000	0	0	75,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				75,000			75,000

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
K		Fire Protection		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		Interim Job Clean-up		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Labor Rates*						0
M		Trash Haul & Disposal	43.00	WK			0	0	10,750	0	0	10,750
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				250			250
N		Safety Awards - Programs (*Important!*)	1.00	LS			0	0	20,000	0	0	20,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				20,000			20,000
		Bid Item Total					**0**	**0**	**126,500**	**0**	**0**	**126,500**
109		**Temp Facilities & Yard Area Maintenance**					Takeoff:	Takeoff:	Takeoff:	Takeoff:	Takeoff:	
A		Lease Plant Area		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Office for Owner/Agent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Project Office		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Warehouse Space		EA			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Craft Change-House		EA			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
F		Maintain Project Building		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Maintain Roads & Yard Area		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Dust Control		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Snow Removal		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
110		**Operation Utility Systems**					Takeoff:	Takeoff:	Takeoff:	Takeoff:	Takeoff:	
A		Cell Phones		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Office Furniture/Equipment*						0
B		Electric Energy	12.00	MO			0	0	60,000	0	0	60,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				5,000			5,000

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
C		Maintain Electric Power & Light		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Camp Maintenance*						0
D		Water Supply System		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Sub Contract*						0
E		Air Compressor		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
F		Welding Machine		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
G		Temporary Heat		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Camp Facility*						0
H		Sanitary Facility		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Camp Facility*						0
I		Pollution Facility		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**60,000**	**0**	**0**	**60,000**
111		**General Material Handling**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Loader/Forklift		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
B		Rigging Crew		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
C		Flat Rack		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Flatbed Truck w/Boom		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Tractor Trailer Transport		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
F		Operation Man Hoist (2 ea.)		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Forklift		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Hydraulic Crane		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
I		Truck or Crawler Crane		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
J		Bridge Crane Operator		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
K		Warehouse Supplies		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		Dunnage/Sling/Spreaders		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Small Tool Labor Rate*						0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
112		**Service & Repair Operations**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Master Mechanic	18.00	MO			234,000	0	0	0	0	234,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		13,000					13,000
B		Preventive Maintenance Supervisor		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Shop Foreman		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Shop Mechanic		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Field Mechanic w/Mechanic Truck		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
F		Tire Man w/Tire Truck		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Grease Man w/Lube Truck		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Operating Expense*						0
H		Fuel Man w/Fuel Truck		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Operating Expense*						0
I		Hydraulic Crane		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
J		Welding Machine		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
K		Shop Supplies		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		Boiler Wash		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**234,000**	**0**	**0**	**0**	**0**	**234,000**

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
113		**Escalation**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Hourly Craft Personnel		Hrs			0	0		0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Salaried Personnel		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Construction Equipment Operating Expense		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Permanent Material		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Expendable Material		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
114		**Premium Pay**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Shift Differential		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Incidental Premium		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Schedule Premium		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
115		**Non-Allocated Labor**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Stand By		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Show Up					0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Apprentices					0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Equal Employment Opportunity					0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Training		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Material/ Exp	Const. Equipment	Subcontract	Total
201		Salaried Personnel Expense					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Relocation Expense - Moving		EA			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
B		Relocation Expense - Allotment		EA			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
C		Living Allowance/Subsistence	58.00	MO			348,000	0	0	0	0	348,000
Mh:		Shifts:			Hrs/Shift:		6,000					6,000
		Bid Item Total					**348,000.00**	**0.00**	**0.00**	**0.00**	**0.00**	**348,000.00**
		SUBTOTAL of TIME RELATED INDIRECT COSTS					**$1,585,000**	**$140,800**	**$186,500**	**$0**	**$0**	**$1,912,300**

Time Related Indirect Cost – Option #2 – 100' Spans

The National Constructors' Group
Option #2 – 100' Spans
Time Related Indirect Costs
Activity Unit Price Summary

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
101		**Supervision**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Project Manager	24.00	MO			365,000	0	0	0	0	365,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		15,200					15,200
B		General Superintendent	11.00	MO			143,000	0	0	0	0	143,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		13,000					13,000
C		Carpenter Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Erection Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Concrete Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
F		Rebar Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		P.T. Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Shift Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		General Foreman		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
J		Building Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
K		Deputy General Superintendent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		General Foreman		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					508,000	**0**	**0**	**0**	**0**	**508,000**

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
102		**Engineering**					Takeoff:	Takeoff:	Takeoff:	Takeoff:	Takeoff:	
A		Project Engineer	18.00	MO			216,000	0	0	0	0	216,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		12,000					12,000
B		Deputy Project Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Office Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Cost Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Lead Schedule Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
F		Schedule Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Form Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Draftsman		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Shift Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
J		Engineer Tunnel Alignment		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
K		Survey Party Chief		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		Instrument Man		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
M		Survey Associate		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**216,000**	**0**	**0**	**0**	**0**	**216,000**
103		**Quality Control**					Takeoff:	Takeoff:	Takeoff:	Takeoff:	Takeoff:	
A		Chief Quality Control Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Quality Control Civil Engineer		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
C		Quality Control Lab Technician		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
104		**Administration**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Office Manager	18.00	MO			162,000	0	0	0	0	162,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		9,000					9,000
B		Personnel Recruiter		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Joint Venture Accountant		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Accounting/Accounts Payable		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Timekeeper/Payroll	11.00	MO			55,000	0	0	0	0	55,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		5,000					5,000
F		Secretary/Receptionist		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Purchasing Agent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Expediting Clerk		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Warehouse Supervisor		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**217,000**	**0**	**0**	**0**	**0**	**217,000**
105		**Safety/First Aid/Security**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Safety Supervisor	11.00	MO			88,000	0	0	0	0	88,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		8,000					8,000
B		Nurse		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Security Guard		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**88,000**	**0**	**0**	**0**	**0**	**88,000**

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
106		**Supervisory Transportation**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		4 X 4 Pickups		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Expense*						0
B		Boats		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Expense*						0
C		Buses		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Expense*						0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
107		**Office Furniture/Equipment***					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Office Equipment	2.00	LS			0	4,000	0	0	0	4,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			2,000				2,000
B		Engineering Equipment	2.00	LS			0	10,000	0	0	0	10,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			5,000				5,000
C		Surveying Equipment	1.00	LS			0	10,000	0	0	0	10,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			10,000				10,000
D		Quality Control Equipment	1.00	LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Clerical Supplies	13.00	MO			0	6,500	0	0	0	6,500
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			500				500
F		Postage	13.00	MO			0	13,000	0	0	0	13,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			1,000				1,000
G		Misc Freight Demurrage		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included in Mobilization Estimate*						0
H		Engineering/Surveying Supplies		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Quality Control Supplies		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
J		Plans & Specifications		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
K		Reproduction	13.00	MO			0	7,800	0	0	0	7,800
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			600				600
L		Office Copier	13.00	MO			0	13,000	0	0	0	13,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			1,000				1,000
M		Job Photographs	13.00	MO			0	3,900	0	0	0	3,900
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			300				300

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
N		Telephones (Cell Phones - 6 ea)	91.00	MO			0	45,500	0	0	0	45,500
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			500				500
O		Electric Power - Office Only		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
P		Gas/Fuel/Oil - Office Only		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
Q		Water - Office Only	13.00	MO			0	6,500	0	0	0	6,500
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			500				500
R		Janitorial Services & Supplies		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Camp Service*						0
S		Initiate CPM Schedule		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Project Engineering*						0
T		Computer CPM Schedule		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Project Engineering*						0
U		Loss on Warehouse Stock		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
V		Dues/Associations		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
W		On-Site Computers	4.00	LS			0	32,000	0	0	0	32,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:			8,000				8,000
		Bid Item Total					**0**	**152,200**	**0**	**0**	**0**	**152,200**
108		**Service & Supplies***					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Drinking Water Supplies	47.00	WK			0	0	4,700	0	0	4,700
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				100			100
B		Ice Machine Rent/Ice Purchases		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Drinking Water Delivery	47.00	WK			0	0	7,050	0	0	7,050
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				150			150
D		Sanitary Facilities		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Non-Time Indirect with Labor Rates*						0
E		First Aid Equipment & Supplies		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
F		Employee Qualification Tests - Welding	2.00	LS			0	0	20,000	0	0	20,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				10,000			10,000
G		Security Clearances		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
H		Ladders/Scaffolds		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Fire Extinguishers		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Small Tools for Construction Equipment*						0
J		Winter Protection/Excessive Rain	1.00	LS			0	0	75,000	0	0	75,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				75,000			75,000
K		Fire Protection		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		Interim Job Clean-up		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Labor Rates*						0
M		Trash Haul & Disposal	47.00	WK			0	0	11,750	0	0	11,750
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				250			250
N		Safety Awards - Programs (*Important!*)	1.00	LS			0	0	20,000	0	0	20,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:				20,000			20,000
		Bid Item Total					**0**	**0**	**138,500**	**0**	**0**	**138,500**
109		**Temp Facilities & Yard Area Maintenance**					Takeoff:	Takeoff:	Takeoff:	Takeoff:	Takeoff:	
A		Lease Plant Area		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Office for Owner/Agent		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Project Office		MO			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Warehouse Space		EA			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Craft Change-House		EA			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
F		Maintain Project Building		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Maintain Roads & Yard Area		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
H		Dust Control		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
I		Snow Removal		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**

Activity	Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
110	**Operation Utility Systems**					Takeoff:	Takeoff:	Takeoff:	Takeoff:	Takeoff:	
A	Cell Phones		MO			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Included with Office Furniture/Equipment*						0
B	Electric Energy	13.00	MO			0	0	65,000	0	0	65,000
Mh:	Shifts:	Mh/Un:		Hrs/Shft:				5,000			5,000
C	Maintain Electric Power & Light		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Included with Camp Maintenance*						0
D	Water Supply System		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Sub Contract*						0
E	Air Compressor		MO			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
F	Welding Machine		MO			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
G	Temporary Heat		LS			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Camp Facility*						0
H	Sanitary Facility		LS			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Camp Facility*						0
I	Pollution Facility		LS			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:							0
	Bid Item Total					**0**	**0**	**65,000**	**0**	**0**	**65,000**
111	**General Material Handling**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A	Loader/Forklift		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
B	Rigging Crew		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
C	Flat Rack		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:							0
D	Flatbed Truck w/Boom		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:							0
E	Tractor Trailer Transport		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
F	Operation Man Hoist (2 ea.)		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:							0
G	Forklift		Hrs			0	0	0	0	0	0
Mh:	Shifts:	Mh/Un:		Hrs/Shft:							0

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
H		Hydraulic Crane		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
I		Truck or Crawler Crane		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Ownership and Operating Cost*						0
J		Bridge Crane Operator		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
K		Warehouse Supplies		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
L		Dunnage/Sling/Spreaders		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Small Tool Labor Rate*						0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
112		**Service & Repair Operations**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Master Mechanic	19.00	MO			247,000	0	0	0	0	247,000
Mh:		Shifts:	Mh/Un:		Hrs/Shft:		13,000					13,000
B		Preventive Maintenance Supervisor		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Shop Foreman		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Shop Mechanic		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Field Mechanic w/Mechanic Truck		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
F		Tire Man w/Tire Truck		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
G		Grease Man w/Lube Truck		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Operating Expense*						0
H		Fuel Man w/Fuel Truck		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment Operating Expense*						0
I		Hydraulic Crane		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
J		Welding Machine		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:	*Included with Construction Equipment*						0
K		Shop Supplies		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
L		Boiler Wash		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**247,000**	**0**	**0**	**0**	**0**	**247,000**
113		**Escalation**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Hourly Craft Personnel		Hrs			0	0		0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Salaried Personnel		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Construction Equipment Operating Expense		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Permanent Material		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
E		Expendable Material		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
114		**Premium Pay**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Shift Differential		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Incidental Premium		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Schedule Premium		LS			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
115		**Non-Allocated Labor**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Stand By		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
B		Show Up					0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
C		Apprentices					0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
D		Equal Employment Opportunity					0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0

Activity		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Const. Material/Exp	Const. Equipment	Subcontract	Total
E		Training		Hrs			0	0	0	0	0	0
Mh:		Shifts:	Mh/Un:		Hrs/Shft:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
201		**Salaried Personnel Expense**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Relocation Expense - Moving		EA			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shif:							0
B		Relocation Expense - Allotment		EA			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shif:							0
C		Living Allowance/Subsistence	59.00	MO			354,000	0	0	0	0	354,000
Mh:		Shifts:			Hrs/Shif:		6,000					6,000
		Bid Item Total					**354,000.00**	**0.00**	**0.00**	**0.00**	**0.00**	**354,000.00**
		SUBTOTAL of TIME RELATED INDIRECT COSTS					**$1,630,000**	**$152,200**	**$203,500**	**$0**	**$0**	**$1,985,700**

Non-Time Related Indirect Cost

The National Constructors' Group

Non-Time Related Indirect Costs

Activity Unit Price Summary

Activity Resource		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
201		**Salaried Personnel Expense**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Expense/Travel Accounts	1.00	LS			0	0	25,000	0	0	25,000
Mh:		Shifts:			Hrs/Shift:				25,000			25,000
B		Entertainment		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
C		Recruiting Expense	1.00	LS			0	0	15,000	0	0	15,000
Mh:		Shifts:			Hrs/Shift:				15,000			15,000
D		Key Employee Training		Hrs			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
		Bid Item Total					**0.00**	**0.00**	**40,000.00**	**0.00**	**0.00**	**40,000.00**
202		**Outside Services**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Legal		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
B		Audit		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
C		Public Relations		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
D		Security Guard Service		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
E		Outside Surveyor		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
F		Doctor's Retainer		EA			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
G		Main Office Ser/Home Office OH	1.00	LS			0	0	0	0	350,000	350,000
Mh:		Shifts:			Hrs/Shift:	*(1% of $35,000,000)*					350,000	350,000
H		Mobilization Team		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**350,000**	**350,000**

Activity Resource		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
203		**Professional Engineers**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Design/Consulting - Trestle	1.00	LS			0	0	0	0	75,000	75,000
Mh:		Shifts:			Hrs/Shift:						75,000	75,000
B		Mix Design	1.00	LS			0	0	0	0	2,500	2,500
Mh:		Shifts:			Hrs/Shift:						2,500	2,500
C		Crane Certification	1.00	EA			0	0	0	0	7,500	7,500
Mh:		Shifts:			Hrs/Shift:						7,500	7,500
D		Form Lift Drawing		Hrs			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
E		Plant Design		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**85,000**	**85,000**
204		**Equipment Mobilization**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Export/Import Freight		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
B		Freight In on Equipment		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
C		Unload & Assemble Equipment		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
D		Interim In & Out		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
E		Plant Design		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
205		**Site Development**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Clear and Grub Area	1.00	LS			0	0	0	0	7,500	7,500
Mh:		Shifts:			Hrs/Shift:						7,500	7,500
B		Bridge Structure		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
C		Storm Drain		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0

Activity Resource		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
D		Grade Plant Area & Access Road	1.00	LS			0	0	0	0	100,000	100,000
Mh:		Shifts:			Hrs/Shift:						100,000	100,000
E		Gravel Plant Area & Access Road	1.00	LS			0	0	0	0	50,000	50,000
Mh:		Shifts:			Hrs/Shift:						50,000	50,000
F		Develop Parking Area 150' X 200'		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
G		Railroad Siding		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**157,500**	**157,500**
206		**Install Office & Shops**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Office for Owner/Agency		LS		✓	0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
B		Project Office		LS		✓	0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
C		Quality Control Lab		LS		✓	0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
D		Tool Trailers		LS		✓	0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
E		Shelving Bins/Racks		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
F		Equipment Shop		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
G		Tire Repair Shop		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
H		Fuel Storage		LS		✓	0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
I		Carpenter Shop & Layout Plan		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
J		Riggers Loft		LS		✓	0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
K		Pipe Shop		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
L		Tool Shed		LS		✓	0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
M		Craft Change - House		LS		✓	0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0

Activity Resource	Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
N	Electric Shop		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
O	Iron Worker Shop		LS		✓	0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
P	Drill Steel Shop		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
Q	Guard House		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
R	First Aid Station		LS		✓	0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
S	Ice House		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
T	Powder Magazine/Cap House		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
U	Compressor House		LS		✓	0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
V	Oxygen/Acetylene Storage		LS		✓	0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
W	Gang Boxes		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
X	Construction Materials for Installation	1.00	LS		✓	0	0	125,000	0	0	125,000
Mh:	Shifts:			Hrs/Shift:				125,000			125,000
	Bid Item Total					**0**	**0**	**125,000**	**0**	**0**	**125,000**
207	**Install Temporary Utilities & Services**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A	Telephone/Public Address		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:	*Included with Camp Estimate*						0
B	Two Way Radio		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
C	Electric Facilities		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:	*Included with Camp Estimate*						0
D	Electric Distribution		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:	*Included with Camp Estimate*						0
E	Electric Drops		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
F	Plant & Job Area Lighting		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:	*Included with Construction Equipment Estimate*						0

Activity Resource	Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
G	Railroad Siding		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
H	Develop Water Supply		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:	*Included with Camp Estimate*						0
I	Water Distribution		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
J	Sanitary	47.00	Wks			0	0	0	0	18,800	18,800
Mh:	Shifts:			Hrs/Shift:	*Included with Camp Estimate for site*					400	400
K	Install Dewatering System		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
L	Air Compressing Station Equipment		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
M	Air Distribution system		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
N	Temporary Heat		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
	Bid Item Total					**0**	**0**	**0**	**0**	**18,800**	**18,800**
208	**Erect Fixed Plants**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A	Crushing/Screening Plant		LS			0	0	0	0		0
Mh:	Shifts:			Hrs/Shift:						*Subcontract*	0
B	Aggregate Handling		LS			0	0	0	0		0
Mh:	Shifts:			Hrs/Shift:						*Subcontract*	0
C	Concrete Batch & Mix Plant		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
D	Refrigeration		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
E	Precast/Prestress Plant		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
F	Asphalt Batch Plant		LS			0	0	0	0		0
Mh:	Shifts:			Hrs/Shift:						*Subcontract if required*	0
G	Pug Mill		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
H	Weight Station		LS			0	0	0	0	0	0
Mh:	Shifts:			Hrs/Shift:							0
I	Work Trestle/Platform		LS			0	0	0	0		0
Mh:	Shifts:			Hrs/Shift:				*Separate detailed estimate as a direct cost*			0

Activity Resource		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
J		Whirly Track		LS			0	0	0	0		0
Mh:		Shifts:			Hrs/Shift:				*Separate detailed estimate as a direct cost*			0
K		Electric/Tower Crane		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
L		Raise Tower Crane		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
M		Pollution Facilities		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
N		Cableway/Highline		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
O		Erect Man/Material Hoist		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
P		Raise Man/Material Hoist		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
Q		Rubbish Chutes		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
R		Camp Facilities		LS			0	0	0	0		0
Mh:		Shifts:			Hrs/Shift:				*Separate detailed estimate as a direct cost*			0
S		Project Railway		LS			0	0	0	0	0	0
Mh:		Shifts:			Hrs/Shift:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
209		**Install Signs & Protection**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Project Signs		LS			0	0		0	0	0
					Hrs/Shift							0
B		Safety & Air Signs/Billboards	1.00	LS			0	0		0	5,000	5,000
					Hrs/Shift						5,000	5,000
C		Barricades		LS			0	0	0	0	0	0
					Hrs/Shift							0
D		Stairways & Ramp for General Access		LS			0	0	0	0	0	0
					Hrs/Shift							0
E		Fencing		LS			0	0		0	0	0
					Hrs/Shift							0
		Bid Item Total					**0**	**0**	**0**	**0**	**5,000**	**5,000**

Activity Resource		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
210		**Demobilization**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Dismantle & Load Out Equipment		LS			0	0	0	0		0
		Shifts:			Hrs/Shift:		*Separate detailed estimate for demo craft labor/construction equipment transportation*					0
B		Freight Out		LS			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
C		Remove Railway Siding		LS			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
D		Remove Dock Facility		LS			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
E		Remove Office, Shops, Etc.		Hrs			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
F		Remove Electrical		Hrs			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
G		Remove Water Supply System		Hrs			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
H		Remove Compressed Air System		Hrs			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
I		Remove Material Processing Plant		LS			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
J		Remove Material Handling Plant		LS			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
K		Remove Dewatering System		LS			0	0	0	0	0	0
		Shifts:			Hrs/Shift:							0
L		Remove Camp Facilities		LS			0	0	0	0		0
		Shifts:			Hrs/Shift:					*Separate camp estimate*		0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
211		**Project & Direction Traffic**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Temporary Detours		LS			0	0	0	0	0	0
					Hrs/Shift:							0
B		Patching Streets & Sidewalks		LS			0	0	0	0	0	0
					Hrs/Shift:							0
C		Cones, Barrels & Barricades		LS			0	0	0	0	0	0
					Hrs/Shift:							0
D		Temporary Guardrails		LS			0	0	0	0	0	0
					Hrs/Shift:							0

Activity Resource		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
E		Temporary Concrete Median Barrier		LS			0	0	0	0	0	0
					Hrs/Shift:							0
F		Barrier Lighting		LS			0	0	0	0	0	0
					Hrs/Shift:							0
G		Temporary Traffic Signals		LS			0	0	0	0	0	0
					Hrs/Shift:							0
H		Set Out & Maintain Bar's, Cones		LS			0	0	0	0	0	0
					Hrs/Shift:							0
I		Traffic Flagging		LS			0	0		0	0	0
					Hrs/Shift:							0
J		Navigational Flagging		LS			0	0		0	0	0
					Hrs/Shift:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
212		**Project Close-Out**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Final Project Cleanup		LS				0		0	0	0
					Hrs/Shift:							0
B		Punch List Work Supervision		LS			0	0	0	0	0	0
					Hrs/Shift:							0
C		Repair Damaged Facility		LS				0		0	0	0
					Hrs/Shift:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
213		**Small Tools & Supplies**					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		For Earthwork		LS			0	0	0	0	0	0
					Hrs/Shift:							0
B		For Utility Work		LS			0	0	0	0	0	0
					Hrs/Shift:							0
C		For Concrete Work		LS			0	0	0	0	0	0
					Hrs/Shift:							0
D		For Structural Steel Work		LS			0	0	0	0	0	0
					Hrs/Shift:							0
E		For Architectural Work		LS			0	0	0	0	0	0
					Hrs/Shift:							0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**

Activity Resource		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
214		Insurance-Bonds-Taxes-Fees					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Builders Risk	1.00	LS			0	0	200,000	0	0	200,000
					Hrs/Shift:				200,000			200,000
B		Auto Insurance		LS			0	0	0	0	0	0
					Hrs/Shift:	*With Ownership rate*						0
C		Equipment Insurance - Special	1.00	LS			0	0	450,000	0	0	450,000
		- Ocean Transport			Hrs/Shift:				450,000			450,000
D		Railroad Protective		LS			0	0	0	0	0	0
					Hrs/Shift:							0
E		General Liability	1.00	LS			0	0	0	0	0	0
					Hrs/Shift:	*Included with labor rate*						0
F		Excess PL & PD		LS			0	0	0	0	0	0
					Hrs/Shift:	*Included with labor rate*						0
G		Performance & Payment Bond	1.00	LS			0	0	140,000	0	0	140,000
					Hrs/Shift:	*Assume $35,000,000 contract x .004*			140,000			140,000
H		Subs & Vendors Bonds		LS			0	0	0	0	0	0
					Hrs/Shift:	*Minimal subcontractor _____*						0
I		Sales or Use Tax		LS			0	0	0	0	0	0
					Hrs/Shift:	*Not included*						0
J		Gross Receipts Tax		LS			0	0	0	0	0	0
					Hrs/Shift:	*Not included*						0
K		Personal Property Tax		LS			0	0	0	0	0	0
					Hrs/Shift:	*Not included*						0
L		License Fees & Permit		LS			0	0	0	0	0	0
					Hrs/Shift:	*Not included*						0
M		Building Permit		LS			0	0	0	0	0	0
					Hrs/Shift:	*Not included*						0
N		Non-Recoverable Insurance Comp.		LS			0	0	0	0	0	0
					Hrs/Shift:	*Minimal -- Included in margin*						0
P		Environmental Insurance	1.00	LS			0	0	30,000	0	0	30,000
					Hrs/Shift:				30,000			30,000
Q		Liquidated Damages		LS			0	0	0	0	0	0
					Hrs/Shift:	*Not included*						0
R		Interest Charges		LS			0	0	0	0	0	0
					Hrs/Shift:	*Assume mobilization trestle material paid as on-hand*						0
		Bid Item Total					**0**	**0**	**820,000**	**0**	**0**	**820,000**

Activity Resource		Description	Quantity	Unit	WC	Hrs/ Shift	Labor	Perm Material	Construction Materials	Construction Equipment	Subcontract	Total
215		Construction Plant & Equipment					Takeoff:	1.00 LS		Bid:	1.00 LS	
A		Construction Plant & Equipment		LS			0	0	0	0	0	0
					Hrs/Shift:		*Separate detailed estimate for ownership and operating expenses*					0
		Bid Item Total					**0**	**0**	**0**	**0**	**0**	**0**
		SUBTOTAL of NON-TIME RELATED INDIRECTS					**$0**	**$0**	**$985,000**	**$0**	**$616,300**	**$1,601,300**

Section 7 –

CHALLENGES

Challenges

Availability of Craft Labor

- Craft labor is extremely limited, whereby most local construction craft labor is employed locally at the port or with local contractors. Therefore, recruitment of traveler craft labor persons will be required, which leads to developing construction methods and work hours to minimize the required number of craft labor personnel.
- Craft labor living accommodations are limited in Cordova, especially during the seasonal work windows when tourists occupy a substantial portion of the local motels and boarding houses.

Availability of Local Construction Equipment

- Local construction equipment is limited to trucks, loaders, backhoes with minimal hoisting capacity, and aggregate processing equipment.

Availability of Construction Materials

- Construction material availability is limited to the local hardware store.

Availability of Permanent Materials

- Local permanent materials are limited to concrete aggregate, rock riprap, and aggregate for roadway.

Availability of Power, Water, and Communication Services

- The availability of commercial power is limited and ends at the Cordova Airport.
- Water for concrete may be obtained within the limits of Cordova. To develop water wells near the site is problematic at best.
- Water for personal uses must be obtained from the Cordova Water District.
- Camp power at airport

Communication

- Communication at the jobsite is not available. Cell phone towers are located near the airport. The possibility of adding cell phone towers near the construction site should be investigated.

Access to the Site and Across the River

- Cordova is accessed by either the AMHS, private boat, commercial barges for delivery of materials and construction equipment, container marine service, or via air service (particularly for repair parts that are not in the original job site mobilization).
- The Copper River Bridge #339 west abutment is accessed by the Departments roadway from Cordova. The project site is approximately 35 miles east of Cordova.
- Access to the east abutment is limited to the following: airboat is currently available, the route between the west and east abutment is continually changing as the river meanders across its opening. The airboat provides room for four individuals. The alternative to the airboat is Cordova Helicopter Services. This access is controlled by the weather.

Limited Construction Season

- The construction season is limited to five months (May, June, July, August, and September), with April and October used to mobilize and demobilize the site. The construction season is controlled by excessive winds (reaching more than 100 mph) and snowdrifts. The Department does not maintain the road in the off-season. Access to the work via an ice bridge is not feasible due the amount of suspended solids contained within the flowing river, which does not allow for a solid blanket of ice for construction access. The locals have stressed the extreme weather, which requires that construction equipment be stored and protected during the winter at sites near the airport.

Access to Cordova

Access to Cordova is limited to the following:

- Ferry's of the AMHS departing from Whittier or Valdez, Alaska (daily service during the spring, summer, and fall months)
- Barge service from Anchorage, Alaska and Seattle/Tacoma, Washington
- Private boat
- Alaska Airlines to Cordova
- Charter aircraft (non-jet) from Anchorage/Valdez for personnel and freight

Hydrology Issues

- The United States Department of the Interior USGS is continually monitoring the river, recording stream flow (which has reached in excess of 100,000 CSI), bathymetry, scour, bed load, and suspended sediment.

  All the information that has been obtained defines the living dynamics of the river at Bridge #339. This information has been extremely beneficial in determining a reasonably safe and log-term solution to both the construction approach and long-term life span of a replacement structure.

  The construction approach has taken into account the velocity of the river, weather (wind), scour, sand bars, the continually changing location of the sand bars, and the suspended abrasive soils carried by the river.

Port of Cordova – Capacity, Storage, and Egress

- The limited space for storage and handling of precast concrete girders, coupled with the horizontal and vertical alignment of the port access roads, results in the potential possibility of not being able to transport the 140-foot-long precast concrete "bulb tee" girders out of the port property. Research into drivability of rear-steering dollies or self-driving haulers may get the precast concrete "bulb tee" past the downtown corridor and re-handle to standard trailers for hauling the 140-foot-long precast concrete girders to the job site.

Section 8 –

DISMISSED ALTERNATIVES/ CONCLUSIONS/ RECOMMENDATIONS

Dismissed Alternatives

Site Specific Concepts – Dismissed

- Utilization of the Existing Bridge
    - Utilization of the existing bridge was dismissed based upon the following: currently river sediment has filled the scour holes that initially caused the bridge to be declared unsafe for public and private use. Initial consideration was given to fill container boxes with water (dead) weight and determine the load carrying capabilities in the bridges current condition. After careful consideration, the team determined the current sediment that filled the scour hole did not provide adequate friction or lateral capacity in the case of a seismic event.
    - Removal of Bridges #333, #334, #340, and #344 to guide river to Bridge #336
        - This approach would require numerous agency approvals and extensive hydro analysis is beyond the scope of this project
    - Upstream diversion dikes to control river migration
        - Long-term commitment for continual maintenance, adverse access/logistics, first cost, and continual river migration has determined this approach not feasible.
    - Bridge with shorter spans
        - Creates a long-term issue with ice and debris barrier, which could reduce the life expectancy of the bridge.
    - Bridge with longer spans
        - Foundations would require either temporary cofferdams or water level footing due to additional pile. Long-term maintenance for structural steel superstructure and if cable supported structure foundation is capable of uplift or extensive anchorage foundations.

Foundation Concepts – Dismissed

- H-pile section 18 H 204 – High capacity pile
    - H-pile does not have similar lateral capacity of a pipe pile. H-pile requires additional pile and the H-pile shape acts as a “trap” for debris.
- Concrete or steel caissons
    - Concrete or steel caissons are not cost competitive with the selected foundation concept. Additional stabilizing a caisson with current flow and sediment movement make anchoring of a caisson during construction extremely risky.
- Cofferdams – Required for H-pile, steel pipe pile or drilled shaft and related concrete footings required for longer span bridge
    - Design and impact loading from debris and shifting sediments is a significant design and construction issue.
- Water level footings
    - Impact loading from ice and debris is the basis for dismissing this foundation option, also affecting the span length of various superstructure types.

Superstructure Concepts – Dismissed

- Concrete superstructure types:
    - Cast-in-place either box, floor beam, or segmental box girders
        - Requires falsework and form travelers for segmented box girders. Falsework issues with scour, debris, and ice rule out this option. Form travelers require an increase in the bridge profile due to form traveler dimensions.
    - Precast concrete "U" girders
        - Cost similar to requirement for "bulb tee" girders
    - Precast segmental box girders
        - Erection equipment costs – epoxy joints in cold weather
- Structural steel superstructure type (the following are feasible, but require concrete cast-in-place deck, which extends the schedule, making this alternative not feasible):
    - Structural steel rolled section girders
    - Structural steel fabricated plate girder
    - Structural steel box girders with spread or vertical flange
    - Structural steel truss structure
    - Structural steel arch structure

Superstructure Cable Supported Concepts – Dismissed

- Suspension bridge – structural steel box girder
- Stay cable being with exposed cable either concrete or structural steel superstructure
- Stay cable bridge with concrete encased stays
    - Requires cast-in-place concrete decks, which increases long-term maintenance and renders this option as not being economically feasible

Optional Bridge Construction Methods – Dismissed

- Incremental launch of either concrete or structural steel element with launching nose
- Utilize a high-line for material handling due the lack of tower guy anchorages
- Falsework across the river for cast-in-place concrete structure or a long span steel superstructure
- Floating equipment due to ever-changing sandbars, river current, and depth of water
- Construction dikes for either access or river isolation for constructing the bridge was dismissed due to dewatering, power, and river currents.

Conclusions

Project Risks

- Wind affecting pile driving and erection timeframes, reducing the anticipated construction season.
- Weather – Excess of ice, snow, and rain during the construction season

- River – Current, added flow, early/late ice flow migrating sand bars, debris, continual erosion of abutment embankment, migrating primary flow location
- Environmental Issues
- The following items may require environmental clearance for the replacement of Bridge #339:
    - Clearing and placing embankment at the sites to develop a working area of approximately 10 acres at the west abutment utilizing the Departments 100-foot right-of-way
    - Allow for underwater discharge of material excavated from within the steel pipe pile
    - Allow the construction of water wells at the campsite and at the construction site; potential quality issues and salt water intrusion may exist
    - Allow the use of clear river water for concrete
    - Allow construction of septic tanks at the camp and construction site
    - Clearly define if "fish window" restrictions apply during the construction season of April 15 to October 15 of each year. Define the utilization (approval) of vibratory pile hammers and impact hammers. The potential "fish window" restriction on the Copper River could change the entire project. If the "fish window" criteria affect impact pile hammers, then bubble curtains can be used at significant added cost and delay to the project. The added cost and delay can be mitigated with use of vibration hammers (testing for end bearing would have to be deleted). The results of air bubble curtain methods used to construct steel pipe pile in fish windows are available from Caltrans.
- Transporting construction equipment and materials by barge risks encountering bad weather and having to lay up before crossing the gulf
- Delay in proceeding with the project greatly increases the escalation risk
- Current Alaska Craft Labor Agreements call for an average of 3% increase per annum, escalating the cost between $180,000 to $270,000 per year
- Anticipated construction equipment and material costs appear to remain stable for the next two to four years
- Thorough recruiting of craft labor is always required for a logistical situation such as Bridge #339. A good plan with the working hours and durations should provide for well-qualified craft personnel.
- Protection of the bridge abutment slopes from scour and erosion
- Option #1 - 140' spans - Season 1 – Weather risk due the duration of completing all foundations and substructure within the weather window

Recommendations

Construction Contract Special Provisions

The constructability analysis has brought forward the following items that the Department may determine beneficial to include with its construction contract special provisions for the replacement of Copper river Highway Bridge #339.

- Scour Measurements during Construction
  Require the construction contractor to monitor scour during construction, establish timing and means and methods for measuring scour.
- Wind
  Alert the contractor to severe wind conditions at the site and provide the contractor all wind documentation available from the Department.
- Monitor river flow, current, debris, sand bar migration, and glacial lake breaks
- Prequalify Drilled Shaft Contractors – See attached prequalification documentation developed for the Wisconsin Department of Transportation and approved by the Federal Highway Administration (FHWA). At the time of this writing, this process has been utilized on five separate WisDOT projects.
- Establish geotechnical baseline report
- Obstructions
  Trees, stumps, etc. – bid items for removal (foundation options)
- Fish Work Windows
  Determine work allowed during fish work windows.
- Notice to Proceed
  Contract Notice to Proceed for late fall to allow for procurement, fabrication, and shipping of construction materials, permanent material, and construction equipment.
- Provide for Added Bid Items
  - Additional bents to lengthen the bridge
  - Additional superstructure girders
  - Drilled shaft tip grouting

Suggested Department Project Delivery Strategy

- For Option #1 – 140' Spans with drilled shafts, it is suggested the Department prequalify drilling contractors for the project (see attachments for prequalification sample)
- It is suggested that the Department use a prequalification process if allowed in Alaska. If not allowed, it is suggested that the Department request a special exemption for prequalification due the extreme risk and emergency needs involved in the replacement of this structure.
- The funding for the reconstruction of Bridge #339 becomes available prior to the final design. Where time is important to the economical well being of the area, prequalifying design-build contractors and proceeding with the design-build contract delivery strategy may be considered, particularly since construction engineering of the temporary works is such a large component of the project.
- The Department management structure must have clear lines of authority so that issues are resolved in an expedient manner.

- It was mentioned during the site visit that the Department might be entertaining the idea of a CMGC approach to project delivery. NCG suggests that the Department carefully consider all aspects of this project delivery approach prior to a final decision. It is possible that a CMGC approach could add to the overall project cost.
- The Department could develop a bid item schedule that provides flexibility if the main channel continues its migration either east or west. For example, an additive bid item – Additional Span, Each, Qty. 2, Unit Price.
- Soils Investigation
    - During the October 22-23, 2013 workshop, it was agreed that the Departments maintenance team would monitor the approach embankment to Bridge #339, as is feasible in an effort to assure that in the spring access to the existing Bridge #339 is available. If the project proceeds, a dead load test of the bridge would occur to assure that Bridge #339 is structurally safe to accommodate a Department soils investigation drill that would be required to supplement the existing information.