Advertisement for Bids RFP# EVOSTC-2020

Title: Copper River Watershed Habitat Enhancement Project, Cordova EVOS Sites COP 43, 44, and 45 (Fish Passage Improvement at Mile 25), Copper River Highway, Cordova, Alaska

Copper River Watershed Project
511 1st St.
Cordova, Alaska 99574
January 15, 2020.

Copper River Watershed Project

January 15, 2020.
Advertisement for Bids EVOSTC-2020
Fish Passage Improvement at Mile 25,
Copper River Highway, Cordova, Alaska

Enclosed is the pertinent information for use in preparing your bid. The information will be used as a guide in the preparation of any subsequent contract. A **non-mandatory pre-bid conference** will be held on **February 6th, 2020** at **2pm AKT** at the Copper River Watershed Project (CRWP) office, 511 1st St. Cordova, Alaska 99574, for information on site locations for proposed work. All responses to bidder's questions shall be made to all bidders by addendum.
Teleconference number: 1-800-791-2345
participant code: 48655#
We recommend but do not require a site visit prior to the submission of your fish passage improvement project bids/proposal.

To maintain the project schedule, all questions must be submitted no later than **5pm AKT** on **February 10th, 2020.**

Bids must be received at the Copper River Watershed Project, 511 1st St. PO Box 1560, Cordova Alaska 99574 prior to **February 25, 2020 by 5pm AKT.** Office hours are Monday through Friday, 9:00 am – 12:00 pm and 1:00 pm – 5:00 pm, excluding holidays.

For information about the solicitation, contact Lisa Docken at 907-424-3334 or by email address: lisa@copperriver.org. All correspondence should include the RFP number.

Please submit your proposal and any supplementary material by email to Lisa Docken at lisa@copperriver.org with a subject line including the RFP number. Submissions will be acknowledged with a receipt email response to the sender.

CRWP expressly reserves the right to waive minor informalities, negotiate changes or reject any and all bids, and to not award the proposed project bid, if in its best interest. "Minor Informalities" means matter of form rather than substance which are evident from the submittal, or are inconsequential matters that have negligible effect on price, quantity, delivery, or contractual conditions and can be waived or corrected without prejudice to other bidders.
Sincerely,

Lisa Docken
Executive Director, Copper River Watershed Project

Copper River Watershed Project

Advertisement for Bids EVOSTC-2020
Fish Passage Improvement at Mile 25,
Copper River Highway, Cordova, Alaska

1.0 GENERAL INFORMATION

1.1 Purpose

The Copper River Watershed Project (CRWP), a non-profit organization working to ensure the long-term sustainability of the Copper River watershed's salmon-based economy and culture, is seeking bids for construction services. CRWP is working with Alaska Department of Fish & Game, Chugach National Forest, U.S. Fish & Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), and Alaska Department of Transportation & Public Facilities (ADOT&PF) to install three stream simulation culverts that will ensure fish passage by coho salmon at all life stages. The project generally consists of removing and replacing three existing undersized and failing culverts under the Copper River Highway between mileposts 24.85 -25.13. The culverts are in the ADOT&PF Right of Way crossing Chugach National Forest land.

Included herein are instructions governing the proposals, a description of the work to be performed, requirements that shall be met to be eligible for consideration, evaluation criteria, and other requirements to be met by each Proposer/Bidder (hereafter referred to as proposer).

The purpose of this RFP solicitation is to select a Contractor to complete the referenced project. Proposals shall consist of: (1) a Qualifications Proposal, including experience and qualifications, and (2) a Cost Proposal indicating all costs necessary to complete the Work as outlined in this RFP.

Funding for the installation of these culverts was provided by the Exxon Valdez Oil Spill Trustee Council.

1.2 General Statement of Work

The Work presented in this RFP is for the construction services for replacing 3 culvert replacements consisting of furnishing all labor, equipment, materials, supervision, and other facilities necessary to complete the Work set forth in the terms of the Contract.

1.3 Specifications, Codes, Ordinances, and Standards

The Contractor shall perform all construction in accordance with the Contract Documents, which include the current Alaska Department of Transportation and Public Facilities (ADOT&PF) Standard Specifications for Highway Construction (SSHC) 2017 Edition, as herein revised and supplemented. All Work under this Contract shall comply with the latest edition of all applicable codes, ordinances, standards, and all associated addenda. Refer to Material Certification List in **Appendix A**. For a complete 100% Specifications, refer to **Appendix B.**

1.4 List of permits acquired by CRWP

a. USACE Nationwide Permit Preconstruction Notification 33 CFR 330 OMB No. 0710-0003 (Approved)
b. Alaska Department of Fish & Game Special Area Permit COP 43 (pending)
c. Alaska Department of Fish & Game, Fish Habitat Permit Application for COP 43, 44, 45 (pending)
d. Alaska Department of Fish & Game, Fish Resource Permit (pending)

1.5 Questions

Any questions regarding this proposal are to be submitted in writing to:

Request for Proposal # EVOSTC_2020
Lisa Docken, Executive Director
Copper River Watershed Project
P.O. Box 1560
Cordova, AK 99574
Phone: 907-424-3334
E-Mail: lisa@copperriver.org (preferred method of contact)

Please identify the project/title RFP number in the subject line of any correspondence.

CRWP's Office hours of operation are: 9:00 a.m. to noon; 1:00 p.m. to 5:00 p.m. local time Monday through Friday, excluding CRWP holidays. Due to time constraints on this project, all questions regarding the scope of work should be received prior to the deadline indicated on the RFP cover letter.

1.6 Preparation Costs

CRWP shall not be responsible for proposal preparation costs, nor for costs including attorney fees associated with any (administrative, judicial or otherwise) challenge to the determination of the highest ranked proposer and/or award of contract and/or rejection of proposal. By submitting a proposal each proposer agrees to be bound in this respect and waives all claims to such costs and fees.

2.0 RULES GOVERNING COMPETITION

2.1 Examination of Proposals

Proposers should carefully examine the entire RFP and any addenda thereto, and all related materials and data referenced in the RFP. Proposers should become fully aware of the nature of the work and the conditions likely to be encountered in performing the work.

2.2 Proposal Acceptance Period

Award of this proposal for construction is anticipated to be announced within 30 calendar days, although all offers must be complete and irrevocable for 60 days following the submission date. A pre-bid conference will be held on February 6th, 2020 at 2 p.m. local time at the CRWP office allowing for bidders to visit the proposed site and return for in-house questions. For out of town bidders who will not be able to have a site visit before bidding, you may use this time to call the CRWP office and teleconference call with other bidders.
Teleconference number: 1-800-791-2345
participant code: 48655#

Attendance at the pre-bid conference is highly recommended but not mandatory. Responses to Bidders' questions shall be made to all bidders by addendum.

2.3 Proposal Format

Proposals are to be prepared in such a way as to provide a straight forward, concise delineation of the proposer's capabilities to satisfy the requirements of this RFP. Emphasis should be concentrated on:

1) Conformance to the RFP instructions;
2) Responsiveness to the RFP requirements;
3) Completeness and clarity of content.

Marketing and/or company brochures included as part of the proposal response shall be considered general information and not a response to these RFP requirements. Such material shall be submitted only as attachments and shall not be used as a substitute for written responses. In case of a conflict between the content in any attachments and the contractor's answers in the body of the proposal, the latter shall prevail.

2.4 Signature Requirements

All proposals must be signed. A proposal may be signed: by an officer or other agent of a corporate contractor, if authorized to sign contracts on its behalf; a member of a partnership; the owner of a privately-owned contractor; or other agent if properly authorized by a power of attorney or equivalent document. Signature on the "Letter of Transmittal" will meet this requirement.

Failure to sign the Proposal is grounds for rejection. The name and title of the individual(s) signing the proposal must be clearly shown immediately below the signature.

2.5 Proposal Submission Requirements

The Proposal shall, at a minimum, contain the following information:

1. Fully executed Proposal
2. Items required under Section 4 - Proposal and Submission Requirements

2.6 Disposition of Proposals

All materials submitted in response to this RFP will become the property of CRWP.

2.7 Oral Change/Interpretation

No oral change or interpretation of any provision contained in this RFP is valid whether issued at a pre-proposal conference or otherwise. Written addenda will be issued when changes, clarifications, or amendments to proposal documents are deemed necessary by CRWP and USFWS.

2.8 Modification/Withdrawal of Proposals

A Proposer may withdraw a proposal at any time prior to the final submission date by sending written notification of its withdrawal, signed by an agent authorized to represent the agency. The respondent may thereafter submit a new proposal prior to the final submission date; or submit written modification or addition to a proposal prior to the final submission date. Modifications offered in any other manner, oral or written will not be considered. A final proposal cannot be changed or withdrawn after the time designated for receipt, except for modifications requested by CRWP after the date of receipt and following oral presentations.

2.9 Late Submissions

Proposals not received prior to the date and time specified in the cover letter will not be considered.

2.10 Rejection of Proposals

CRWP reserves the right to reject any or all proposals if determined to be in the best interest of the CRWP.

3.0 PROPOSAL AND SUBMISSION REQUIREMENTS

3.1 Bidder's Checklist/Instruction to Bidder

Bidders are advised that notwithstanding any instructions or implications elsewhere in this Request for Proposal only the documents shown and detailed on this sheet need be submitted with and made part of their proposal. Other documents may be required to be submitted after proposal time, but prior to award. Bidders are hereby advised that failure to submit the documents shown and detailed on this sheet shall be justification for rendering the proposal nonresponsive.

The submission for the RFP shall consist of a single Cost Proposal.

REQUIRED DOCUMENTS TO BE SUBMITTED WITH THE PROPOSAL:

To achieve a uniform review process and obtain the maximum degree of comparability, it is required that the proposals be organized in the manner specified below. Proposals shall not exceed ten (10) pages in length (excluding letter of transmittal, resumes, title page(s), index/table of contents, resumes, forms, attachments, or dividers). Information in excess of those allowed will not be evaluated. One page shall be interpreted as one side of single-spaced, typed, 8 1/2" X 11", piece of paper.

3.2 Title Page

Show the RFP number and subject, the name of your firm, address, telephone number(s), name of contact person, and date.

3.3 Table of Contents

Clearly identify the materials by section and page number.

3.4 Letter of Transmittal

Limited to two (2) pages, briefly state your firm's understanding of the services to be performed and make a positive commitment to provide the services as specified.
Give the name(s) of the person(s) who are authorized to make representations for your firm, their titles, address, and telephone numbers.
The letter must be signed by a corporate officer or other individual who has the authority to bind the firm.

3.5 Firm Profile and Professional Qualifications

Provide a table or chart that shows organizational structure, chain of supervision, decision authority, and communications. Include both the respondent firm and any subcontractors. Provide professional qualifications and resumes of the firms proposed Project Manager, Superintendent, and other key personnel. Include all personnel that will actively be involved with performing the work, to include a listing of all subcontractors, if any, with an explanation of purpose.

3.6 Project Understanding/Project Approach

Narrative submittal must address construction schedule, dewatering approach, method for shipping materials to the site, heavy equipment, quality control, unloading and transport of materials, and traffic control. Contractor should include a clear plan to complete construction within the habitat permit window.

3.7 Local Hire Preference

It is the preference of CRWP to hire locally to the greatest extent possible when working on remote projects. For this project, 'local' refers to the residents within the town of Cordova. We require a 20% local hire for this project.

3.8 Cost

Provide Costs as indicated on the Bid Schedule. (see next 2 pages).

Project Name: Copper River Watershed Habitat Enhancement Project (Fish Passage Improvement)					
Location: COP 43(SITE 20100508), 44(SITE 20100510), 45(SITE 20100511), & 46(20100512),					
	Copper River Highway, MP 24.77-MP25.16, Cordova, Alaska				
BID SCHEDULE					
ITEM NO.	**DESCRIPTION**	**TOTAL**	**UNIT**	**UNIT PRICE**	**TOTAL**
203(6)-1	Borrow, Selected Material, Type A	19272	TON		
203(6)-2	Subbase, Grading F	1392	TON		
301(3)	Aggregate Surface Course, Grading E-1	2508	TON		
602(2)	Structural Plate Aluminum Box Culvert 16'-10" Span, 8'-3" Rise with Solid Invert,Haunch=0.175", Crown=0.125" Thick	175.5	LF		
603(2)	36" x48" Corrugated Steel Pipe Arch, 12 GA Including Connecting Band	6	LF		
611(2)	Riprap, Class II	281	TON		
613(2)	Culvert Marker	7.0	EA		
618(1)	Seeding	0.72	ACRE		
630(3B)	Geotextile Reinforcement, Type 2	1113	SY		
640(1)	Mobilization & Demobilization	All Req'd	LS		
640(4)	Worker Meals and Lodging, or Per Diem	All Req'd	LS		
641(1)	Erosion, Sediment and Pollution Control Administration	All Req'd	LS		

641(3)	Temporary Erosion, Sediment and Pollution Control	All Req'd	LS		
641(7)	SWPPP Manager	All Req'd	LS		
642(1)	Construction Surveying	All Req'd	LS		
642(3)	Three Person Survey Party	16	HR		
643(2)	Traffic Maintenance	All Req'd	LS		
671(2)	Toewood Bank Reconstruction	94	LF		
672(1)	Stream Diversion & Dewatering	All Req'd	LS		
690(1)-1	Culvert/Stream Substrate - Fine Material	722	TON		
690(1)-2	Culvert/Stream Substrate - Coarse Material	1,223	TON		
	PROJECT TOTAL:				

4.0 SELECTION PROCESS

The qualified proposer with the lowest bid cost will be awarded a contract with CRWP. Contractor qualifications will be considered in the bid evaluation only to ensure the contractor has the staff, equipment and relative construction experience to complete the work required under this contract. CRWP reserves the right to not award a contract with the successful proposer should it be in the CRWP's best interest. CRWP reserves the right to reject any and all proposals submitted.

The Bid Proposal contains basic bid and additive alternate schedules. The low Bidder shall be determined by the lowest combination of the basic bid and as many additive alternates as may be selected within the funds available. The Copper River Watershed Project (CRWP) Purchasing Officer may bypass the additive alternate whose selection would cause the Contract to exceed the funds available.

CRWP will provide:

- Project design Drawings and Specifications.
- Project inspector to ensure project is built to specifications.

4.1 Bid Requirements

1. Bidders will not be required to furnish bid bonds or bid security. No additional time will be allowed for providing the required bonds.

2. A Certificate of Insurance for Worker's Compensation and general liability is required before a job contract will be signed.

3. A complete construction schedule using the critical path method (CPM) shall be submitted and approved by CRWP before a job contract will be signed.

4. Performance and payment bonds will be required from selected bidder following award of bid.

5. A pre-construction meeting will be required for contractor to meet with project inspector, CRWP, USFWS, ADF&G, NOAA, USFS, ADOT&PF and Cordova Community Medical Center staff.

6. Contractor shall perform work to the satisfaction of the CRWP and project inspector.

7. No bid will be accepted from any contractor who is not licensed in accordance with the provisions of the Contractor's State license law.

All bids are due in our office by 5 PM AKT on <u>February 21, 2020</u>.

A response will be sent immediately when proposals are received. It is the contractor's responsibility to ensure delivery of its proposal. Any specific questions about this project or proposal contents can be directed to Lisa Docken, (907)424-3334, or address above.

Appendix A. Materials Certification List

MATERIALS CERTIFICATION LIST (2 pages)			
Project Name: Copper River Watershed Habitat Enhancement Project - COP 43, 44, 45, 46			
DESCRIPTION	CONSTRUCTION PROJECT ENGINEER	DESIGN ENGINEER OF RECORD	MANUFACTURER / REMARKS
104 SCOPE OF WORK			
Quality Control Manager Qualifications			
Daily Quality Control Reports			
602 STRUCTURAL PLATE PIPE			
Structural Plate Aluminum Box Culvert 16'-10" Span, 8'-3" Rise with Solid Invert, Haunch=0.175", Crown=0.125" Thick			
603 CULVERTS AND STORM DRAINS			
36"X48" Corrugated Steel Pipe Arch, 12 Gage with Connecting Band			
611 RIPRAP			
Riprap, Class II Materials Analysis			
623 BLOCK SODDING			
623 Vegetated Mat Salvage and Replanting, Work Plan			
640 MOBILIZATION AND DEMOBILIZATION			
Record As-Built Drawings			
641 EROSION SEDIMENT AND POLLUTION CONTROL			
Storm Water Pollution Prevention Plan (SWPPP)			
eNOI			
eNOT and Final SWPPP			
SWPPP Inspection Reports			
642 CONSTRUCTION SURVEYING AND MONUMENTS			
Survey Personnel Qualifications & Equipment List			
Survey Field Notes			
643 TRAFFIC MAINTENANCE			
Traffic Control Plan			
Construction Phasing Plan			
Traffic Control Supervisor and Flagger Certifications			
646 CMP SCHEDULING			
Project Schedule			
671 TOEWOOD BANK RECONSTRUCTION			
Riprap, Class I Materials Analysis			
672 STREAM DIVERSION AND DEWATERING			

Stream Diversion and Dewatering Plan			
690 WATERWAY			
Stream/Weir Substrate - Fine Material Analysis			
Stream/Weir Substrate - Coarse Material Analysis			
703 AGGREGATES			
Select Material Type A Analysis			
Select Material Type E1 Analysis			
Subbase, Grading F Material Analysis			
724 SEED			
Seed Mix Certification			
726 TOPSOIL			
Topsoil Certification			
729 GEOSYNTHETICS			
Geotextile, Reinforcement - Type 2			
Geotextile, Erosion Control, Class 1			

Appendix B. 100% Special Provisions

Copper River Watershed Habitat Enhancement Project
Cordova EVOS Sites COP 43, 44, and 45
Cordova, Alaska

GENERAL REQUIREMENTS

Scope of work

The scope of work requires one extension of existing culvert and removal of three (3) existing culverts along Copper River Highway (locations identified in a table below), and supply and installation of three (3) larger aluminum structural plate box culverts for stream-simulation application as described in these contract documents. The contractor is to supply all labor, materials, and equipment as required to complete the work.

Locations

Stream Name	ADF&G Number	CRWP ID	Latitude	Longitude	HWY MP
Lower Copper River Tributary	20100508	COP 43	N60.44235	W145.13415	24.85
Lower Copper River Tributary	20100510	COP 44	N60.44300	W145.12830	25.05
Lower Copper River Tributary	20100511	COP 45	N60.44318	W145.12714	25.09
Lower Copper River Tributary	20100512	COP 46	N60.44374	W145.12038	25.13

All construction shall be completed in accordance with the Alaska Department of Transportation and Public Facilities (ADOT&PF) Standard Specifications for Highway Construction (SSHC) 2017 or latest edition. Project specific special provisions are provided in the following sections. The requirements contained in the standard specifications and special provisions are hereby made a part of this solicitation and resultant contract.

Contractor shall provide all necessary resources to complete this contract without any adjustments to the original bid amount or contract time.

Road closures are only allowed for Installation of Structural Plate Aluminum Box culverts work. Road Closure times for each culvert installation shall be minimized to either 3 consecutive night shift closures between 8pm-8am, or a single consecutive 36-hour closure that shall begin at 8pm. Closures shall be coordinated with and approved by the Engineer two weeks in advance so that proper public notice may be given. See Special provisions 643-3.03 for notification requirements. Develop Traffic Control Plan for the above road closures for approval. Road Closure interval may include one or several culverts and work may be performed on several pipes simultaneously. The Contractor is only allowed to have one 3 consecutive -day 12-hour closures or a single 36-hour closure before 3-calendar day break must occur. During such break the Contractor shall have at least 1 lane of road open for traffic. Then additional closure may be implemented.

The contractor shall remain on site and shall remain engaged in this project from the time excavation begins until water is flowing down the new culvert and simulation channel, and Copper River Highway is fully operational. All work below the ordinary high-water mark must be

completed between June 1 and July 31, 2020 or as stipulated by the Alaska Department of Fish and Game (ADF&G) Fish Habitat Permit. All construction activities must be completed by August 15th, 2020.

Permits

The contractor is to coordinate permitting with Copper River Watershed Project (CRWP) Program Director to obtain or transfer existing permits to the contractor, including but not limited to:

- ADF&G fish habitat permit
- ADF&G aquatic resource permit
- US Army Corps of Engineers Alaska District (ACOE) wetland permit 404
- Alaska Department of Natural Resources (ADNR) water use permit

The contractor is also required to obtain permits and approvals from:

- Affected utility companies
- Land Owner (ADOT&PF) Use permit
- ADOT&PF for traffic control and road closure
- Alaska Department of Environmental Conservation (ADEC) SWPPP Permit

The total project ground area of disturbance is 2.59 acres, therefore the contractor shall obtain (the latest version) Construction General Permit, develop a SWPPP based on that permit and submit a Notice of Intent (NOI) to ADEC.

Utility Locates

Contractor shall verify locations of all underground utilities present at the site. Before any excavation begins on the Highway, the Contractor shall obtain and fully execute an ADOT&PF Use permit. A minimum of (2 weeks) lead time for coordination with regulatory agencies must be allowed. The Contractor will also be required to furnish all locations, as well as sketches, redlines, and detailed information regarding the utilities and proposed work.

Other Requirements

Wherever the specifications or special provisions refer to the “Engineer” substitute with “Copper River Watershed”.

Contractor must wash equipment prior to mobilization to or from the city of Cordova to ensure that the spread of invasive species is prevented.

Contractor shall notify the ADF&G, and the Engineer a minimum of 72 hours prior to:

- The initial excavation at the start of the project.
- Diverting stream flows into a temporary diversion channel or culvert.
- Placement of fish passage substrate material.
- Placement of new culverts to allow for inspection of bedding materials and finish grade.
- Backfill of culvert above the spring line (to verify the invert elevations).
- Placement of materials within the newly constructed channel to allow for inspection of the subgrade and fill material.
- Re-watering of the new stream bed and diverting stream flows into the newly constructed channel.

A representative from the Alaska Department of Fish and Game shall be given the opportunity to be onsite during stream diversion and dewatering of the constructed channel to relocate

trapped fish. If the ADF&G declines the opportunity to be onsite, the Contractor is responsible for relocating trapped fish in accordance with a valid Aquatic Resource Permit.

COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT

SPECIAL PROVISIONS

TO THE

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION
2017 EDITION

SECTION 104

SCOPE OF WORK

Special Provision

104-1.01 INTENT OF CONTRACT. *Add the following:*
The contractor shall designate a Quality Control (QC) Manager to ensure materials and workmanship meet the contract requirements on a daily basis. Qualifications of the QC Manager shall be submitted to the Engineer for approval. The QC Manager shall prepare daily reports which shall be provided to the Engineer on a daily basis. The daily reports shall contain the following information at a minimum: work performed, equipment and personnel on site, survey notes, quality control activities, test results, submittal information including submittals approved, and delays or predicted delays.

SECTION 105
CONTROL OF WORK

105-1.18 WARRANTIES. *Add the following:*

If within two years after the date of the Project Completion or such longer period of time as may be prescribed elsewhere by the Contract, any work found to be defective, the Contractor shall promptly and without cost to the CRWP, and in accordance with the Engineer's written instructions, either *correct defective work, or, if it has been rejected by the Engineer, remove it from the site and* replace it with conforming work. If the Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, the CRWP may have the defective work corrected or the rejected work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be borne by the Contractor.

SECTION 201
CLEARING AND GRUBBING

201-1.01 DESCRIPTION. *Add the following:*
Selectively cut and remove trees as needed to complete the work. The contractor is to give the Engineer 72-hour notice and cut only the trees approved for removal.

Salvage and stockpile native organic soils and vegetative mat as required by this contract.

201-3.01 GENERAL. *Delete the first sentence and add the following.*
The contractor will restrict all work to the project / excavation / clearing limits as shown on the drawings.

201-3.02 Clearing: *Add the following:*
Clearing and grubbing is not permitted within the migratory bird window of May 15 to July 15; except as permitted by Federal, State and local laws, and when approved by the agencies having jurisdiction (AHJ) or Engineer. Active nests shall not be disturbed (unless approved by AHJ). The contractor is responsible for completing clearing and grubbing as necessary to finish the project within the permitted time frame. It will be the contractor's responsibility to remove and dispose of all stumps in the way of construction activity (unless the debris are approved to be re-used on the project).

201-3.03 Grubbing *Add the following:*
Vegetative mats will be made available offsite. The contractor shall harvest and transport vegetation from an approved offsite location. The contractor is to notify the Engineer 72 hours in advance of vegetative mat placement, so arrangements can be made for offsite harvest. The contractor is to harvest vegetative mats within 1 day of transplanting from the locations (within 5 miles from the project site) approved by Engineer.

201-5.01 BASIS OF PAYMENT. *Add the following*:
Item 201 (3A) Clearing and Grubbing is subsidiary to Pay Item 602 (2) Structural Plate Aluminum Box Culvert. Vegetative Mats harvest, transportation and placement is subsidiary to Pay Item 671(2) Toewood Bank Reconstruction.

SECTION 202
REMOVAL OF STRUCTURES AND OBSTRUCTIONS

202-3.01 GENERAL.
Existing Culvert Pipe: If directed by the Engineer, the replaced culverts shall be salvaged and delivered to Cordova state ADOT&PF M&O Maintenance Yard. The existing culverts, that are not salvaged, shall be legally disposed of offsite.

202-5.01 BASIS OF PAYMENT. *Add the following:*
Item 202 (4) Removal of Structures and Obstructions is subsidiary to Item 602(2) Structural Plate Aluminum Box Culvert.

SECTION 203
EXCAVATION AND EMBANKMENT

203-2.01 MATERIALS. *Add the following:*
Borrow. Approved material required for embankments or for other portions of the work and obtained from sources outside the right-of-way limits for the project.

203-3.01 GENERAL. *Add the following:*
Inspect excavation for hazardous conditions before worker entry daily and as conditions change. Inspections are to be completed by a competent person as defined by OSHA.

The contractor shall test and reuse the existing material in construction if approved by the Engineer representative. If additional material is required, supplement with borrow to maintain the side slopes and elevations as shown on the drawings. Fill all ditches and low areas to prevent ponding (unless required for drainage). Grade the disturbed adjacent areas to drain into the new channels; grade all other disturbed areas to the approximate original ground contour and assure proper drainage.

The contractor shall perform a gradation test on the existing embankment material in accordance with ASTM D-422. Density testing shall be completed according to ASTM D698 / AASHTO T99 (Proctor Test) or ASTM D1557 / AASHTO T180 Modified Proctor Test.

203-3.03 EMBANKMENT CONSTRUCTION. *Delete the first paragraph and add the following:*
Prior to any excavation of the existing embankment at or below the existing water level, a cofferdam made out of super sacks and/or other methods shall be installed as shown on the drawings. Use only approved materials in construction of road embankment and culvert backfill.

Delete the second paragraph and add the following:
Borrow materials for the new embankment shall be selected material Type A for backfill and Subbase, Grading F for bedding; all meeting the requirements of Subsection 703-2.07 and 703-2.09. Selected material Type A and Subbase, Grading F materials shall be obtained from borrow sources that have been laboratory tested and meet the project gradation requirements.

203-3.06 COMPACTION BY PROOF ROLLING. *Add the following:* Proof-roll the base of excavation and where the embankment crosses previously undisturbed ground, prior to placing new embankment material, to the extent that ensures the first lift of material placed upon it can be compacted to the specified density. Omit proof rolling only if approved by the Engineer and if necessary, to prevent liquefaction of surface soils.

203-5.01 BASIS OF PAYMENT

Payment will be made under:

Pay Item		Pay Unit
203 (6) – 1	Borrow	Ton
203 (6) – 2	Subbase, Grading F	Ton

SECTION 204
STRUCTURE EXCAVATION FOR CONDUITS AND MINOR STRUCTURES

204-2.01 MATERIALS. *Delete the first 3 sentences and add the following:*
Backfill material around the culvert will be ADOT&PF Borrow Selected Material Type A and bedding material Subbase, Grading F as described in Section 703-2.07 and 703-2.09.

204-5.01 BASIS OF PAYMENT. *Delete the fourth paragraph and substitute the following:*
Item 204 (1) Structure Excavation for Conduits and Minor Structures is a subsidiary to Pay Item 602(2) Structural Plate Aluminum Box Culvert. Subbase, Grading F materials is subsidiary to Pay Item 203 (6) – 2.

SECTION 301
AGGREGATE BASE AND SURFACE COURSE

301-1.01 DESCRIPTION. *Add the following:*
Construct an aggregate surface course on an approved foundation, as shown on the Plans. Use Aggregate Surface Course, Grading E-1 surface course as described in 703-2.03.

301-5.01 BASIS OF PAYMENT. Water for compaction, added to the aggregate on the grade, is subsidiary. Subbase, Grading F materials is subsidiary to Pay Item 203 (6) – 2.

Payment will be made under:

Pay Item		Pay Unit
301 (3)	Aggregate Surface Course, Grading E-1	Ton

SECTION 602
STRUCTURAL PLATE, ALUMINUM PLATE, AND BOX CULVERTS

602-1.01 DESCRIPTION. *Add the following:*
Contractor shall provide manufacturer-designed culvert bridges to meet the contract requirements and provide an independent check. Inspect and perform quality acceptance on culvert bridges. Provide design calculations with load ratings for the culvert bridges for review and approval.

Add the following Subsection:

602-1.02 DEFINITIONS.

Culvert Bridge stands for culverts and buried structures meeting the requirements of National Bridge Inspection Standards (NBIS) CFR§650.305; individual culverts and buried structures greater than 10 feet in width, as measured along the centerline of roadway crossing over the structure. When specified in the contract or required by the DOR (Designer of Record), this includes the headwalls, toe walls, wingwalls, and foundation.

Culvert Bridge Design Package (CBDP). DOR design calculations, DOR load ratings, IE design check calculations, IE load ratings, working drawings, and specifications.

Designer of Record (DOR). A civil engineer registered as a Professional Engineer in the State of Alaska, and in responsible charge of the work described. The DOR must have adequate and relevant prior structural design and inspection experience. The DOR may delegate portions of design, quality acceptance, and inspection work, to qualified technicians. The DOR and qualified technicians must not be supervised by, or under the direction of the Contractor's superintendent and work crew.

Independent Design Check (IDC). An independent design check of the design and load rating calculations including but not limited to: design, load ratings, location and dimensions of the foundation, structural members, connections, erection plan and temporary bracing (when required), safety barrier, and independent calculations of design loads, member stress, material properties, hydraulic capacity and scour protection.

Independent Engineer (IE). An engineer registered as Professional Engineer in the State of Alaska, and in responsible charge of the independent design check. The engineer responsible for the check must have adequate and relevant prior structural design experience.

602-2.02 GEOTECHNICAL DATA AND HYDROLOGY INFORMATION. The Contactor is responsible for obtaining additional geotechnical data as necessary for the design and construction of the culvert bridge.

The Contractor is responsible for obtaining hydrology and hydraulics data as necessary for the design and construction of the culvert bridge.

Add the following Subsection:
602-2.03 DESIGN REQUIREMENTS. Retain the services of a DOR to design and provide a CBDP for each culvert bridge. Retain the services of an IE to perform an IDC of each CBDP.

1. Design culvert bridges according to the following documents:

a. Alaska DOT&PF Standard Specifications for Highway Construction for recommended construction methods, material properties, and sampling and testing.
b. AASHTO LRFD Bridge Design Specifications, as modified by Subsection 602-2.03;
c. Alaska Highway Preconstruction Manual; and the
d. Alaska Bridges and Structures Manual (BSM).

2. Design culvert bridges that:
   a. Support 100% of HL93 live loads or the Contractor's maximum construction load whichever is greater, without overstress. Follow the most recent version, including interim version, of the AASHTO LRFD Bridge Design Specifications. Indicate governing live load on working drawings;
   b. Meet the design life specified in AASHTO LRFD Bridge Design Specifications after allowing for metal section loss associated with abrasion and pH levels of the substrate and water;
   c. Meet the seismic acceleration values recommended in the AASHTO LRFD Bridge Design Specifications;
   d. Include the capacities and demands of load-supporting members in the design calculations;
   e. Meet the dimensions, stations, offsets and elevations of inverts and riprap requirements shown on the plans;
   f. Provide the minimum hydraulic capacity shown on the Plans when openings are required to allow for the passage of water; and
   g. Provide the minimum horizontal and vertical clearances shown on the Plans when openings are required to allow the passage of traffic. If no vertical clearance is provided, follow the requirements in the Alaska Highway Preconstruction Manual.

3. Provide working drawings for culvert bridges including:
   a. Dimensions controlling the culvert bridge design and erection, including proposed fill depth, corrugation spacing, corrugation depth, gauge thickness, concrete thickness, reinforcing steel size and locations, clear opening sizes, utility size and locations, and similar controlling dimensions;
   b. Design loads and material properties; and
   c. The soil bearing values.

4. Provide load ratings for the culvert bridges according to the most recent version, interim version, of the AASHTO Manual for Bridge Evaluation (MBE) and the BSM. Load rate metal and concrete culvert bridges using the Load Factor Rating (LFR) and Load and Resistance Factor Rating (LRFR) methods.

   Provide load ratings that reflect the bridge culvert final as-constructed condition. Include values for moment, shear and, where applicable, thrust for concrete culvert bridges. Include values for wall area, buckling, and seam strength for metal culvert bridges. Specify live load type, placement for maximum stress, distribution, and impact.

   Include the following cases for LFR load ratings:
   a. Inventory with multiple lanes and impact included
   b. Operating with multiple lanes and impact not included
   c. Operating with one lane centered on the roadway and impact not included.

   Include the following cases for LRFR load ratings:
   d. Inventory with multiple lanes and impact included
   e. Operating with multiple lanes and impact included

f. Operating with one centered on the roadway and impact not included.

Add the following Subsection:

602-2.04 DESIGN SUBMITTALS AND REVIEW. Submit the following for review and approval at least 30 days prior to the beginning or construction related to the culvert bridges:

1. The CBDP. The design drawings and load ratings in the CBDP must be stamped with the seal of, dated by, and signed by the DOR;
2. An IDC letter stamped with the seal of, dated by, and signed by the IE certifying: "The Culvert Design Bridge Package meets the AASHTO LRFD Bridge Design Specifications, the AASHTO Manual for Bridge Evaluation, and the Contract requirements".

Revise and resubmit the CBDP to incorporate any comments received during review. Resubmit the IDC letter after comments have been incorporated.

The approval of the CBDP shall not be construed as complete review but will only indicate that the general method of construction and working drawings are acceptable to the CRWP, that the CBDP appears complete, and that an IDC letter was provided. The Contractor shall remain responsible for all aspects of the culvert bridge.

602-3.01 CONSTRUCTION REQUIRMENTS. *Add the following:* When shown on the Plans, place riprap in accordance with Section 611.

Do not begin fabrication or construction of culvert bridges without the written approval of the Engineer. Do not open culvert bridges to traffic without approval of the Engineer.

602-5.01 BASIS OF PAYMENT. *Replace the first sentence with the following:* Structure excavation for culvert is subsidiary to this Section 602 (2). The CBDP, engineering, inspection, labor, equipment, and materials necessary to design, load rate, and install culvert bridges are subsidiary.

Payment will be made under:

Pay Item		Pay Unit
602 (2)	Structural Plate Aluminum Box Culvert 16'-10" Span x 8'-3" Rise with Solid Invert, Haunch 0.175" Crown, 0.125" Thick	Linear Foot

SECTION 603
CULVERTS AND STORM DRAINS

603-5.01 BASIS OF PAYMENT. *Add the following:*

Payment will be made under:

Pay Item	Pay Unit
603 (2) 36”X48” Corrugated Steel Pipe Arch, 12 ga w/ connecting band	Linear Foot

SECTION 611
RIPRAP

611-2.01 MATERIALS. *Add the following:*
Meet the following gradation for the class II. Percentages are by total weight; weights are for each stone:

50-100% weighing 200 pounds or more
0-15% weighing up to 25 pounds
0-10% weighing more than 400 pounds

611-3.01 CONSTRUCTION REQUIREMENTS. *Add the following:*
Use riprap to construct revetment to the lines and grades shown on the Plans. Use borrow or salvaged organic soil to fill surface and sub-surface voids in the riprap to the satisfaction of the Engineer. Borrow or salvaged organic soil shall not prevent rock to rock contact. Cover riprap with 4" of topsoil and seed.

611-5.01 BASIS OF PAYMENT. *Add the following:*
Filling voids in riprap with borrow or salvaged organic soils is subsidiary to Pay Item 611(2) Riprap, Class II. Geotextile, Erosion Control, Class I is subsidiary to Pay Item 611(2) Riprap, Class II.

Payment will be made under:

Pay Item		Pay Unit
611 (2)	Riprap, Class II	Ton

SECTION 613
MONUMENTS AND MARKERS

613-1.01 DESCRIPTION. *Delete subsection in entirety and substitute the following*:
Furnish and install culvert marker posts according to the Plans.

631-5.01 BASIS OF PAYMENT.

Payments will be made under:

Pay Item		Pay Unit
613 (2)	Culvert Marker Post	EA

SECTION 618
SEEDING

618-1.01 DESCRIPTION. *Delete subsection in entirety and substitute the following*:
Topsoil and seed new or disturbed slopes, riprap slope protection, and other areas shown on the drawings. Place the soil, then seed and water. Provide a living ground cover on slopes as soon as possible.

618-3.01 SOIL PREPARATION. *Add the following*:
Apply seed as detailed in subsection 618-3.03 immediately after the shaping of the slopes. Cover all slopes to be seeded with topsoil according to Section 620. Complete slope preparation as soon as topsoil is placed on the slopes.

618-3.03 APPLICATION. *Add the following*:
Evenly mix the seeds in a sack immediately before dispersing or adding to a hydro seeding solution, and then evenly mix the seeds into solution. Water lightly, keep top 1/8" soil moist until final acceptance of the Project is received.

Apply at one pound per 1000 square feet (43 lbs./Acre) or as recommended by the seed supplier

Contractor must provide the Engineer with seed tags provided by seed supplier showing seed purity and germination in compliance with Section 724 Seed for approval prior to applying seed to project site.

618-4.01 METHOD OF MEASUREMENT. *Add the following:*
The quantity of seeding shall include all cultivation, seeding, and limestone if required.

618-5.01 BASIS OF PAYMENT. *Add the following:*
Furnishing, mobilizing, modifying, operating, and maintaining all materials and equipment necessary to install seed is subsidiary to pay item 618(1) Seeding. For warranty and more on maintenance requirements see Section 690-3.05.

Payment will be made under:

Pay Item		Pay Unit
618 (1)	Seeding	Acre

SECTION 620
TOPSOIL

620-1.01 DESCRIPTION. *First paragraph Add the following:*
The contractor shall revegetate the ground as specified on the drawings with vegetative (veg) mat to match the existing landscape. Veg mat needs to have a 4-inch layer of topsoil below.

Where vegetative mat is not available, or is not feasible due to ground contours, or does not match the surrounding area, the contractor is to apply topsoil and seed. Contractor must stabilize the fill material from erosion.

620-3.01 PLACING. *Add the following:*
Place native organic soils (salvaged from clearing, grubbing, and excavation work) or topsoil to meet the requirements of Section 726 to a thickness of 4 inches (or as shown on the drawings) on all disturbed ground away from the road prism; seed according to Section 618, Seeding, of these specifications.

620-5.01 BASIS OF PAYMENT.
Item 620 (1) Topsoil is a subsidiary to Pay Item 618 (1) Seeding.

SECTION 630
GEOTEXTILE FOR EMBANKMENT AND ROADWAY SEPARATION, STABILIZATION AND REINFORCEMENT

630-1.01 DESCRIPTION. Prepare ground surface, and furnish and place geotextiles for separation, stabilization, and/or reinforcement as shown on the Plans.

630-2.01 MATERIALS. Use materials that conform to the following:

Geotextiles and Sewn Seam Strength Subsection 729-2.01

Sewing Thread. Use high strength polypropylene, or polyester. Do not use nylon thread. Use thread of contrasting color to that of the geotextile itself.

630-3.01 CONSTRUCTION.

1. Surface Preparation. Prepare ground surface by removing stumps, brush, boulders, and sharp objects. Fill holes and ruts over 3 inches deep, with material shown on the Plans or as approved by the Engineer.

2. Geotextile Placement. Unroll geotextile directly onto the prepared surface. Stretch geotextile to remove any creases, folds or wrinkles. Do not drag the geotextile through mud or over sharp objects that could damage the geotextile. Do not expose geotextiles to sunlight for longer than 14 days after removal of protective covering. Do not allow geotextiles to get wet prior to installation.

    a. Separation and Stabilization. Lay geotextile for embankment separation and stabilization parallel to roadway centerline. Shingle overlaps in the same direction as fill placement. Prevent overlapped edges from lifting during construction.

    b. Reinforcement. Lay the machine direction of the geotextile for culvert foundation reinforcement perpendicular to the roadway centerline (i.e. parallel to the culvert centerline). Join seams perpendicular to the road centerline (i.e. parallel to the culvert centerline) by overlapping a minimum of 5 feet. Seams parallel to the road centerline (i.e. perpendicular to the culvert centerline) shall not be allowed. Prevent overlapped edges from lifting during construction.

3. Joining. Join adjacent geotextiles for separation or stabilization by overlapping a minimum of 3 feet or sewing. Join adjacent geotextiles for reinforcement by overlapping a minimum of 5 feet.

    a. Sew seams with a Butterfly or J-Seam using a double-thread chain stitch (lock stitch). Bring adjacent sections of geotextile together and fold so that the stitching penetrates four layers of geotextile for the full seam length. Make the stitching line 1-1/4 inches (±1/4 inch) from the folded edge of the seam and at least 1/2 inch from the free edge of the geotextile. Sew seams so that they face upward and can be easily inspected by the Engineer. Illustrations showing correct stitch formation and seam configurations are provided in Figure 1-2 (page 1-28) of the FHWA publication, *Geosynthetic Design & Construction Guidelines*, FHWA-NHI-07-092, August 2008.

4. Material Placing and Spreading. During placing and spreading of material, maintain a minimum depth of 6 inches of cover material at all times between the geotextile and the

wheels or tracks of the construction equipment. Limit the size and weight of construction equipment to reduce rutting in the initial lift above the geotextile to not greater than 3 inches deep to prevent overstressing the geotextile.

Place the cover material and spread in only one direction for the entire length of the geotextile. On weak subgrades limit height of dumped cover material to prevent localized subgrade and/or geotextile failure.

Compact using a smooth drum roller. Do not allow construction equipment to make sudden stops, starts, or turns on the cover material. Do not allow turning of vehicles on the initial lift of cover material above the geotextile. Fill any ruts over 3 inches deep occurring during construction with material shown on the Plans; do not grade adjacent material into rut; and compact to the specified density.

5. Geotextile Repair. Repair and replace damaged geotextile (torn, punctured, or disturbed at the overlaps or sewn joints). For damage evidenced by visible geotextile damage, subgrade pumping, intrusion, or embankment distortion, remove the backfill around and under the damaged or displaced area, and repair with material matching the damaged material. Make patches overlap or sew patches to the existing geotextile.

   a. Separation and Stabilization. Overlay torn area with geotextile with a minimum 3 foot overlap around the edges of the torn or damaged area or sew and bond according to Subsection 630-3.01.3.a. Ensure the patch remains in place when cover material is placed over the affected area.

   b. Reinforcement. Overlay torn area with geotextile with a minimum 3 foot overlap around the edges of the torn or damaged area. Ensure the patch remains in place when cover material is placed over the affected area.

630-4.01 METHOD OF MEASUREMENT. By multiplying plan neat line width by the measured length in final position parallel to installation centerline along the ground surface. No allowance will be made for overlap, whether at joints or patches.

630-5.01 BASIS OF PAYMENT. Payment will be made at the contract unit price per square yard. Material used to fill ruts and holes is subsidiary to the 630 (3B) pay item.

Pay Item	Pay Unit
630(3B) Geotextile, Reinforcement – Type 2	Square Yard

SECTION 631
GEOTEXTILE FOR SUBSURFACE DRAINAGE AND EROSION CONTROL

631-1.01 DESCRIPTION. Prepare ground surface, and furnish and place geotextiles for subsurface drainage and erosion control, as shown on the Plans.

631-2.01 MATERIALS. Use materials that conform to the following for the class specified in the bid schedule:

Geotextiles and Sewn Seam Strength Subsection 729-2.01

Sewing Thread. Use high strength polypropylene, or polyester. Do not use nylon thread. Use thread of contrasting color to that of the geotextile itself.

631-3.01 CONSTRUCTION.

1. Surface Preparation. Prepare ground surface by removing stumps, brush, boulders, and sharp objects. Fill holes and ruts over 3 inches deep, with material shown on the Plans or as approved by the Engineer. Construct smooth and stable trench walls.

2. Geotextile Placement. Unroll geotextile directly onto the prepared surface. Stretch geotextile to remove any creases, folds or wrinkles. Place geotextile in a manner which will ensure intimate contact between the trench wall and the geotextile (i.e., no voids, folds, or wrinkles). The geotextile may be held in place with securing pins at 3-foot spacing along all edges (but not closer than 2 inches from the edge) to prevent movement during construction. Do not expose geotextiles to sunlight for longer than 14 days after removal of protective covering. Do not allow geotextile rolls to get wet prior to installation.

    a. Subsurface Drainage. In trenches, after placing the geotextile and material shown on the Plans, fold the geotextile over the top of the material shown on the Plans to produce a minimum overlap of 12 inches, for trenches greater than 12 inches wide. In trenches less than 12 inches wide, make the overlap equal to the width of the trench. Then cover the geotextile with the subsequent course of material.

    b. Erosion Control. Place and anchor geotextile on the approved surface so it will not be torn or excessively stretched by placement of the overlying materials. Secure the geotextile to the slope but secure it loosely enough so that the geotextile will not tear when riprap or other cover material is placed on the geotextile. The geotextile shall not be keyed at the top of the slope until the riprap or other cover material is in place at the top of the slope. Anchor the terminal ends of the geotextile using key trenches or aprons with a minimum of 24 inches depth into the soil substrate at the crest and toe of slope, or as shown on the Plans. Place geotextile with the machine direction parallel to the direction of water flow (normally parallel to the slope for erosion control runoff and wave action, and parallel to the stream or channel).

3. Joining. Join geotextile by sewing or overlapping.

    a. Sew seams with a Butterfly or J-Seam using a double thread chain stitch (lock stitch). Bring adjacent sections of geotextile together and fold so that the stitching penetrates four layers of geotextile for the full seam length. Make the stitching line 1-1/4 inches (±1/4 inch) from the folded edge of the seam and at least 1/2 inch from the free edge of the

geotextile. Sew seams so that they can be easily inspected by the Engineer or representative. Illustrations showing correct stitch formation and seam configurations are provided in Figure 1-2 (page 1-28) of the FHWA publication, *Geosynthetic Design & Construction Guidelines*, FHWA-NHI-07-092, August 2008. Conform both factory and field sewn seams to the strength requirements of Table 1 as outlined in the AASHTO M288 for subsurface drainage and erosion control applications.

b. Overlap geotextile sections by a minimum of 3 feet at all longitudinal and transverse joints. Overlap successive geotextile sheets in the direction of flow so that the upstream sheet is placed over the downstream sheet and/or upslope over downslope. In trenches, where overlapped seams are constructed in the longitudinal trench direction, make the overlap equal to the width of the trench.

4. Placement of Cover Material. Following placement of the geotextile on the prepared surface, place cover material of the type shown on the Plans. Place the cover material and armor from the bottom to the top of the slope using methods which minimize tearing and/or excessive stretching of the geotextile. In underwater applications, place the geotextile and the required thickness of cover material in the same day. Maintain proper overlap and geotextile continuity. Do not exceed the allowable drop heights for cover material shown in Table 631-1. Do not allow stones with a weight of more than 100 pounds to roll down the slope on the geotextile. Do not grade the slope in a way that will disturb the cover material or armor stone once it has been placed. Backfill all voids in the riprap or other cover material, which allows the geotextile to be visible, with material shown on the Plans, so that the geotextile is completely covered.

TABLE 631-1 ALLOWABLE DROP HEIGHT FOR GEOTEXTILE

INDIVIDUAL STONE Max. Weight (lbs)	**ALLOWABLE DROP HEIGHT (ft)**	
	UNPROTECTED GEOTEXTILE	PROTECTED GEOTEXTILE*
< 5	3	3
5-250	0	3
> 250	0	0**

* Protected geotextile is defined as having a gravelly covering (cushion layer) at least 6 inches thick.

** If stones greater than 250 pounds must be dropped or if a height of drop greater than 3 feet is required, then perform field trials to determine the minimum cushion thickness and/or maximum height of safe drop without damaging the geotextile.

Maintain a minimum depth of 12 inches of cover material between the geotextile and the wheels or tracks of the construction equipment.

5. Geotextile Repair. Should the geotextile be torn, punctured, or the overlaps or sewn joints disturbed – as evidenced by visible geotextile damage – remove the backfill around the damaged area and repair or replace the damaged area at no additional expense to the State. Make repairs to the damaged area with a patch of the same type of geotextile originally placed. Overlay torn area with geotextile with a minimum 3 foot overlap around the edges of the torn area. Ensure that the patch remains in place when material is placed over the affected area.

631-4.01 METHOD OF MEASUREMENT. Geotextile, Erosion Control, Class 1 will not be measured.

631-5.01 BASIS OF PAYMENT. Geotextile, Erosion Control, Class 1 and material used to fill ruts and holes are subsidiary to Pay Item 611(2) Riprap Class II.

SECTION 633
SILT FENCE

633-1.01 DESCRIPTION. Furnish, install, maintain, and remove temporary silt fence as shown on the Plans or as directed.

633-2.01 MATERIALS. Use materials that conform to the following:

Geotextile	Subsection 729-2.01
Silt Fence	Subsection 729-2.04
Posts	Wood 1.5-inch x 1.5-inch x 36-inch min., steel, or approved synthetic material.
Prefabricated Silt Fence	Meet the Plans and Section 633 requirements.
Attachment Devices	Staples; wire; self-locking nylon, plastic, wire ties; or other approved means to attach fabric to posts.
Support Mesh between Posts	14-gage welded wire fencing, metal chain-link fabric, or geosynthetic mesh with equivalent strength. Use maximum mesh spacing of 6 inches. Use height shown on the Plans, or specified in the Bid Schedule.

633-3.01 CONSTRUCTION. Install silt fence according to Plans. Use Trenchless Detail when installing silt fence over permanently frozen ground. Drill holes for support posts, if required. When joining to another roll, place both end posts together and wrap them with silt fence by turning them one full rotation. Drive the wrapped posts.

633-3.02 MAINTENANCE. Maintain the integrity of the fence to contain sediment in runoff until final stabilization.

633-3.03 REMOVAL. After disturbed area has been accepted as permanently stabilized or when sediment protection is no longer needed, remove silt fence.

633-4.01 METHOD OF MEASUREMENT. Section 109. Silt Fence will not be measured.

633-5.01 BASIS OF PAYMENT. Silt Fence is subsidiary to Pay Item 641(3) TEMPORARY EROSION AND POLLUTION CONTROL.

SECTION 640
MOBILIZATION AND DEMOBILIZATION

640-3.01 CONSTRUCTION REQUIREMENTS. *Add the following:*
Pressure wash all tracked equipment, excavation equipment, and excavation hauling equipment prior to every mobilization to ensure that the spread of invasive species is minimized. Clean equipment so that no invasive species would have the chance of being spread or imported into the site. At a minimum, there should be no visible dirt on equipment.

All equipment must be re-washed every time if it was removed from the site before it is returned to the site.

640-5.01 BASIS OF PAYMENT.

Payment will be made under:

Pay Item		Pay Unit
640 (1)	Mobilization and Demobilization	Lump Sum
640 (4)	Worker Meals and Lodging, or per Diem	Lump Sum

SECTION 641
EROSION SEDIMENT AND POLLUTION CONTROL

641-1.01 DESCRIPTION. *Add the following:*
Provide project administration and Work relating to control of erosion, sedimentation, and discharge of pollutants, according to this section and applicable local, state, and federal requirements.

641-1.03 PLAN SUBMITTLAS. *Add the following:*
Partial and incomplete submittals will not be accepted for review. Any submittal that is re-submitted or revised after submission, but before the review is completed, will restart the submittal review timeline. No additional Contract time or additional compensation will be allowed due to delays caused by partial or incomplete submittals or required re-submittals.

Storm Water Pollution Prevention Plan. Submit an electronic copy and three hard copies of the SWPPP to the Engineer for approval. Deliver these documents to the Engineer at least 21 days before beginning Construction Activity.

The CWRP will review the SWPPP submittals within 14 days after they are received. Submittals will be returned to the Contractor and marked as either "rejected" with reasons listed or as "approved" by the CWRP. When the submittal is rejected, the Contractor must revise and resubmit the SWPPP. The 14-day review period will restart when the contractor submits an electronic copy and three hard copies of the revised SWPPP to the Engineer for approval.

After the SWPPP is approved by the CWRP, the Contractor must sign and certify the approved SWPPP.

DEC SWPPP Review.
- Transmit a copy of the CWRP approved SWPPP to DEC
- Transmit a copy of the delivery receipt confirmation to the Engineer within (7) days of receiving the confirmation; and
- Retain a copy of delivery receipt confirmation in the SWPPP

641-1.06 RESPONSIBILITY FOR STORM WATER PERMIT COVERAGE.
- CWRP and the Contractor are jointly responsible for permitting and permit compliance with the project zone.
- The Contractor is responsible for permitting and permit compliance outside of project zone. The Contractor has sole responsibility for compliance with all federal, state, and local requirements, and for securing all necessary clearances, rights, and permits.
- An entity, that owns or operates material source or disposal site outside of project zone, is responsible for permitting and permit compliance. The Contractor has sole responsibility to verify that the entity has appropriate permit coverage.
- The CWRP is not responsible for permitting or permit compliance, and is not liable for fines resulting from noncompliance with permit conditions:
  - For areas outside the project zone
  - For construction activity and support activities outside of project zone and;
  - For commercial plants, commercial material sources, and commercial disposal sites.

641-2.04 RESPONSIBILITY AND AUTHORITY OF THE SWPPP MANAGER.

The SWPPP Manager must be available at all times to administer SWPPP requirements and be physically present within the project zone or the project office, for at least eight hours per day when construction activities are occurring.

The SWPPP Manager shall have the Contractor's complete authority and be responsible for suspending construction activities that do not conform to the SWPPP.

641-5.01 BASIS OF PAYMENT.

Payment will be made under:

Pay Item		Pay Unit
641 (1)	Erosion, Sediment and Pollution Control Administration	Lump Sum
641 (3)	Temporary Erosion and Pollution Control	Lump Sum
641 (4)	Temporary Erosion, Sediment and Pollution Control Additives	Contingent Sum
641 (5)	Temporary Erosion, Sediment and Pollution Control by Directive	Contingent Sum
641 (6)	Withholding	Contingent Sum
641 (7)	SWPPP Manager	Lump Sum

SECTION 642
CONSTRUCTION SURVEYING AND MONUMENTS

642-3.01 GENERAL. *First paragraph Add the following:*
The contractor shall submit for approval the qualifications of all persons engaged in grade control. The lead person establishing and checking grades in the field must have a minimum of 2 years of relative experience and be assigned to the project with the primary responsibility of grade control. Equipment operators or other personnel with other project responsibilities cannot be responsible for grade control duties. At least one person competent in setting, adjusting and recording grades *shall always be on site* during streambed excavation, culvert placement and backfill operations.

642-4.01 METHOD OF MEASUREMENT. *Delete all 6 paragraphs and add the following:*
No measurement of quantities will be made.

Delete the Pay Item table and add the following:

642-5.01 BASIS OF PAYMENT. Construction Surveying includes field and office work required to accomplish the work, including furnishing necessary personnel, equipment, transportation and supplies.

Traffic control devices necessary for the survey parties are considered subsidiary.

Payment will be made under:

Pay Item		Pay Unit
642 (1)	Construction Surveying	Lump Sum
642 (3)	Three Person Survey Party	Hour

SECTION 643
TRAFFIC MAINTENANCE

643-1.03 TRAFFIC CONTROL PLAN. *Add the following:*
The contractor shall submit for approval to ADOT&PF and the Engineer a traffic control plan prepared under the supervision of a Traffic Control Supervisor assigned to this project. No work shall begin on the project site until the traffic control plan is approved.

643-3.03 PUBLIC NOTICE. *Add the following:*

- Alaska DOT &PF NR Public Information Officer Caitlin.Frye@alaska.gov (907)451-5307
- DOT&PF M&O Valdez District Superintendent Robert.Dunning@alaska.gov (907)834-1039
- DOT&PF Cordova Foreman M&O Robert.Mattson@alaska.gov (907)424-3202
- Orca Adventure Lodge (907) 424-7249 orcaadventurelodge@gmail.com
- Glacier Lodge, Luke Borer (907) 429-7394 Luke Borer interest@childsglacierlodge.com
- City of Cordova (907) 424-6248 cityclerk@cityofcordova.net

643-4.01 METHOD OF MEASUREMENT. *Delete items 1 thru 16 and add the following:*
Traffic Maintenance will be lump sum and shall include preparation of TCPs, and all labor, materials, traffic control devices and equipment required to implement the Traffic Control Plans as specified and as directed. Temporary construction signs, flagging and pilot car, if required by TCP, will be subsidiary.

643-5.01 BASIS OF PAYMENT. *Delete paragraphs1 - 17 and add the following:*
Traffic Maintenance. The contract price includes all resources required to provide all required Traffic Control Plans and public notices, and the maintenance of all roadways, approaches, crossings, intersections and pedestrian and bicycle facilities, as required. This item also includes any temporary construction signs and traffic control devices required but not shown on the bid schedule.

Payment will be made under:

Pay Item		Pay Unit
643 (2)	Traffic Maintenance	Lump Sum
643 (25)	Traffic Control	Contingent Sum

SECTION 671
TOEWOOD BANK RECONSTRUCTION

671-1.01 GENERAL. *Add the following:*

Conduct a Toewood Bank Reconstruction as detailed on the Plans.
Inspect excavation for hazardous conditions before worker entry daily and as conditions change. Inspections are to be completed by a competent person as defined by OSHA.

The contractor is to test and reuse the existing material in construction if approved by the Engineer representative. If additional material is required, supplement with borrow to maintain the side slopes and elevations as shown on the drawings. Fill all ditches and low areas to prevent ponding (unless required for drainage). Grade the disturbed adjacent areas to drain into the new channels; grade all other disturbed areas to the approximate original ground contour and assure proper drainage. Contractor must stabilize the fill material from erosion.

671-2.01 MATERIALS.

Use riprap class I to anchor foundation logs as shown on the Plans. Use salvaged backfill to fill voids in the riprap to the satisfaction of the Engineer.

671-5.01 BASIS OF PAYMENT. *Add the following:*

The contract price includes all resources required to provide all required: clearing and grubbing, borrow, salvaging, harvesting, stockpiling, transporting and placing native organic soils and seeding.

Payment will be made under:

Pay Item		Pay Unit
671 (2)	Toewood Bank Reconstruction	Linear Foot

SECTION 672
STREAM DIVERSION & DEWATERING

672-1.01 DESCRIPTION.
The Work under this Section consists of performing all operations pertaining to the dewatering of Work areas and diversion of surface and subsurface water flows for excavation and backfill during construction operations as shown on the drawings.

672-1.02 GENERAL.
A recommended Stream Diversion Plan has been provided on the drawings. The provided stream diversion plan is intended to convey the engineered design concept. The location shown, and the design can be adjusted by the contractor as needed to better fit field conditions, including the locations of bulk bags (Super Sacks), coffer dams, the diversion culvert, and related items. The contractor *can propose an alternative diversion plan* to the Engineer for approval. The Contractor shall review the contract documents and submit any changes to the Engineer for approval in writing in advance before implementing a modified plan. Divert water and dewater work area only as approved by the permits. The streambed, downstream of the work shall not be allowed to dry out. The contractor shall use work methods that will allow the portion of the streambed, outside the limits of construction, to remain wet for the duration of this project.

Required Notifications:
The Contractor shall provide notification a minimum of 72 hours prior, or as required by the permit, to the USFWS, Alaska Department of Fish and Game (ADF&G) and the Engineer of record before:

1. Diverting stream flows into the temporary diversion culvert.
2. Diverting stream flows into the reconstructed channel within the new culvert.

672-2.01 MATERIALS.
Contractor shall be responsible for obtaining, mobilizing, operating, and maintaining all materials and equipment necessary to complete dewatering operations, including machinery, bulk bags, sandbags, hoses, pumping facilities, piping, temporary culverts, and the like. All material costs are incidental to pay item 672(1) Stream Diversion & Dewatering.

672-3.01 CONSTRUCTION.
Comply with construction design, installation, and operation of dewatering systems with current safety and environmental regulations. Work must be performed in dry conditions. Minimize disturbance of undisturbed ground. Engineer will approve placement of pads for dewatering equipment.

Maintain 24-hour pump operation for trench dewatering until backfill is at least 1’ above the groundwater elevation.

672-3.02 DEWATERING.
Acceptance of Contractor’s written Stream Diversion Plan by the Engineer does not relieve Contractor of responsibility for the exercise of reasonable precaution, prudent construction practices, overloading or misuse of existing or new structures, the adequacy and safety of such works, and the potential damage due to undermining existing or completed works.

Relocate all the fish contained within any coffer/diversion dams, the scour pool, or the old channel before the site is completely dewatered. Place relocated fish in the closest pool upstream of the construction area. If trash pumps are used for stream diversion, the intake must be operated and maintained to prevent fish entrapment, entrainment, or injury. Around the intake use perforated

or slotted plate and woven wire with a mesh size not greater than 1/10 inch or a profile bar and wedge wire with openings not greater than 1/10 inch. Intake velocities shall not exceed a passive velocity of 0.2 feet per second (fps) or an active velocity 0.5 fps.

Water resulting from Contractor's dewatering effort may not be pumped or otherwise diverted into creeks unless required permits, including, but not limited to, ADNR, ADEC and the U.S. Environmental Protection Agency, are obtained. Under no circumstances will the Contractor be allowed to divert water from the excavation onto roadways. Contractor is to provide a disposal site for excess water, within the limits of construction, in accordance with all necessary permits.

Maintain the dewatering pumping operations to ensure return flow does not exceed State of Alaska water quality standards. Water pumped from the construction site may require additional filtration by filter fabrics, settling, or other methods to prevent turbid water from directly entering the stream. Turbid water pumped from the work site for the purpose of lowering the water table in the trench during stream channel reconstruction shall be discharged at least 100 feet from stream flows, except when performing dewatering procedures described in the next subsection.

672-3.03 REWATERING.
Conduct re-watering activities to minimize sediment movement downstream of the site upon completion of in-stream work. Prior to re-diverting full stream flows to reconstructed channel (including culvert), wet the channel to wash fines into stream bed. Slowly wet the channel through use of pumps or by diverting a small portion of stream flows into the reconstructed channel. Provide means for collecting sediment and turbid water at downstream end of reconstructed channel. Capture and pump turbid water from downstream end of channel back to upstream end of channel until fines are washed into stream bed and water runs clear as determined by the Engineer. After the initial sediment is removed, slowly breach the coffer/diversion dams to avoid a large pulse of water being sent through the newly constructed channel.

672-4.01 METHOD OF MEASUREMENT. Section 109.
Temporary culverts, pumps, hoses, stilling basins, sandbags, bulk bags (e.g., Super Sacks), plastic liners, temporary rock and riprap, and other materials will not be measured for payment.

672-5.01 BASIS OF PAYMENT.
All administrative costs, materials, equipment and labor necessary to complete the scope of work as specified under this section and not paid for under other items on the bid schedule, including temporary culverts, pumps, hoses, stilling basins, sandbags, bulk bags (e.g., Super Sacks), plastic liners, temporary rock and riprap, are subsidiary to Item 672 (1), Stream Diversion & Dewatering.

Payment will be made under:

Pay Item		Pay Unit
672 (1)	Stream Diversion & Dewatering	Lump Sum

SECTION 690
WATERWAY

690-1.01 DESCRIPTION.
Construct a waterway bed (stream bed, river bed, creek bed, and or similar), and waterway bank (protection and revegetation), at the location shown on the drawings.

690-1.02 REFERENCES.
Stream Bank Revegetation and Protection: A Guide for Alaska; published by Alaska Department of Fish and Game; printed copy available from the CWRP, and electronic copy available on the internet.

690-2.01 MATERIALS.

Clearing and Grubbing	Section 201
Seeding	Section 618 & 724
Topsoil	Section 620 & 726
Aluminum Box Culvert	Section 602

Waterway Bank Fill: Selected Material, Type A.

Salvaged Organic Soil: Salvaged topsoil, overburden material, or useable excavation high in organics and fines.

690-3.01 CONSTRUCTION REQUIREMENTS.
Provide equipment of a size and type to efficiently complete the work with the least impact on the waterway. Submit to the Engineer a list of equipment to be used during construction for review and approval. Do not damage the culvert structure or surface finish. Do not operate equipment directly on the surface of the culvert; work off of protective pad/dunnage or waterway bed fill material.

690-3.02 EXCAVATION.
Excavate to the dimensions shown on the Plans. Control excavated material to minimize disturbance to the new channel and banks.

690-3.03 WATERWAY BED.
Place channel armor substrate material in the channel by methods that do not cause segregation or damage. The Channel Armor Substrate will be placed in lifts of various depths depending on the size of the material. The large riprap boulders are to be placed so that they are in solid contact with each other. The fines in between the larger riprap are an integral part of the waterway bed and are to be compacted tightly into the voids. Acceptable methods involve using water pressure, metal rods and hand tamping methods to force material into the voids until full. Make waterway bed surface roughness similar to the natural waterway bed. Layers of riprap separated by layers of fines are not acceptable.

690-3.04 WATERWAY BANK.
Tie the ends of constructed banks to the existing grade. Modify bank height and width as necessary to create a smooth transition from constructed bank to existing grade. Replace vegetative mat along the channel banks.

Construct Banks:

Place the bank reconstruction materials as shown on the Plans and noted in the Specifications. Place the bank fill material with vegetative mat such that the top of the bank, the vegetated mat, is flat and at the same elevation as the existing bank.

1. Install Erosion Control measures before beginning work.

2. Salvage/harvest and stockpile vegetative mat.

3. Excavate the waterway bank.

4. Place waterway bank fill.

5. Place vegetative mat on the topsoil. Plant vegetative mats between June 1 and August 31.
   a.) Wet the bank. Soak vegetative mats to saturation prior to placing.
   b.) If the vegetative mat has lost topsoil, such that the in-place thickness of the mat will not be 12-inches thick, place additional topsoil over the Willows, filling voids, and increasing the mat thickness to 12-inches plus the initial 4-inches of topsoil.
   c.) Stake all areas to be planted with vegetative mats as shown on the Plans prior to installation. Notify the Engineer of the delineated areas three working days prior to installation. Install only after receiving the Engineers approval.
   d.) Place vegetative mats tightly together, without gaps, with full contact of the root mass to the soil surface below, tamp into place and anchor with wooden stakes 18-inches long and spaced 1 per square yard.

690-3.05 ESTABLISHMENT PERIOD
Establishment period shall extend for two complete growing seasons after the required planting is completed. A growing season is from May1 to September 30. The engineer may choose to withhold some payment until vegetation is established.

Employ all possible means to preserve the vegetative mat in a healthy and vigorous condition to ensure successful establishment. During this period, perform the necessary weeding to keep the area of disturbance free from invasive species. Water as frequently as necessary to keep the immediate root area moist at all times.

The engineer may, but is not required to, determine the Project is complete except for the period of establishment, and issue a letter of final acceptance. After final acceptance, work or materials due under this subsection during any remaining period of establishment are considered warranty obligations that continue to be due following final acceptance in accordance with Subsection 105-1.18

690-3.06 PLANT REPLACEMENT
Engineer and Contractor's representative, in the spring of the year following the planting year and before June 30, inventory Willow cuttings, transplants, and vegetative mat planted on the project to determine the number/area of dead plants/organic materials.

1. Willow Cuttings. At least 4 cuttings per foot, on average over a 4-foot section, for each individual layer, shall be healthy and in a flourishing condition. For areas not meeting this requirement, replant the areas using live staking techniques; space the replacement live stakes at 6-inches along the layer or as directed by the Engineer. Do not remove the dead cuttings.

2. Planted new saplings that replaced every tree removed as approved by the Engineer; shall be healthy and in flourishing condition. For those not meeting the requirements – re-plant with new healthy plants.

3. Vegetative Mat. If the planted vegetative mat survival (mat being vigorous and healthy) area is greater than 75% of the original planting area, no replacement mat is required. If the mat survival area is less than 75%, replace the vegetative mat to increase the area to 75% of the originally planted area.

Coordinate the replacement of the vegetative mat with the planting of transplants to minimize damage to healthy organic materials. The Engineer will select which of the dead or unhealthy Willow cuttings, transplants, and vegetative mat area to replace.

Perform replacement planting between July 1 and July 15 according to the original planting procedures and as described in this subsection.

If after the maintenance period a survival rate, as described in 1 and 2 above, of planted organic material has not been attained, replant the materials to attain the levels of survival as described in 1 and 2 above, for each live organic material planted.

Contractor is responsible for replacing plants vandalized, stolen, or damaged during the maintenance period. Replace plants as soon as weather conditions permit. Provide replacement plant quality equal to, or better than, initially specified.

There is additional vegetated mat available for revegetation off site at a designated location. The contractor is to notify the Engineer, coordinate the schedule and provide manpower and equipment for harvesting and transporting the replacement mat to the job site.

All plants are to be sourced locally on the island with an exception of grass seed. Plants are to be obtained from the area(s) identified by the Engineer.

690-3.07 MAINTENANCE.
Install and maintain plastic safety fence meeting the requirements in Section 643, in the locations shown in the Revegetation Details on the Plans. Install plastic safety fence per the manufacturer's recommendations upon completion of waterway bank protection and revegetation. Remove plastic safety fence at the end of the maintenance period for the willow cuttings, live willow stakes, and vegetative mat.

Deepwater vegetative mat, willow cuttings, and transplants immediately after planting. Deepwatering shall provide water penetration throughout the entire layer, to the top of the waterway bank fill, with minimum runoff. Rain will not be considered a substitute for deepwatering unless permitted by the Engineer.

Deepwater the vegetative mat, Willow cuttings and transplants as follows:

1. Once a week until August 20.

2. The Engineer may direct the Contractor to deep water past August 20 or provide supplemental watering any time during the life of the project when weather conditions are excessively warm or dry.

Daily water vegetative mat, willow cuttings, and transplants, or as directed by the Engineer. Keep the mats moist until final acceptance of the project or as accepted by the Engineer.

Watering equipment shall be equipped with or followed by a vehicle equipped with a Type B advance warning arrow panel using caution mode according to Part VI of the Alaska Traffic Manual.

The warranty and maintenance period for this work shall extend from the time of planting to September 30 of the second year (second growing season).

690-5.01 BASIS OF PAYMENT.

1. Pay Items 690 (1) include the materials and all work to place and maintain the materials in place, including but not limited to, excavation, placement/backfilling, benching, compacting, filling voids and similar. Pay Item 690 (1) includes the materials and all work to salvage/harvest, store, transport, place and maintain organic materials, salvaged vegetation, topsoil, watering, and similar. Watering is subsidiary.

2. Water diversion is paid under Section 672.

3. Offsite disposal of any material attributed to this feature of work shall be subsidiary to and paid under section Pay Item 602 (2) Aluminum Box Culvert.

4. Vegetative mat shall be a minimum of three (3) feet wide. Vegetative Mats harvest, transportation and placement is subsidiary to Pay Item 671 (2) Toewood Bank Reconstruction.

   Payment will be made under:

Pay Item		Pay Unit
690 (1) – 1	Stream/Weir Substrate – Fine Material	Ton
690 (1) – 2	Stream/Weir Substrate – Course Material	Ton

SECTION 703
AGGREGATES

703-2.09 SUBBASE. *Add the following:*

Subbase, Grading F. Aggregate containing no muck, frozen material, roots, sod or other deleterious matter and with a plasticity index not greater than 6 as tested by ATM 204 and ATM 205. Meet the following gradation as tested by ATM 304:

SIEVE	PERCENT PASSING BY WEIGHT
2 in	100
No. 4	15 – 65
No. 200	0 – 6

SECTION 724
SEED

724-2.01 MATERIALS *Add The following*:
The required seed mix for this project is:

Name	Proportion by Weight
Nortran Tufted Hair grass, *Deschampsia caespitosa*	20%
Arctared' Red Fescue, *Festuca rubra*	60%
Calamogrostis canadensis	20%

SECTION 726
TOPSOIL

726-2.01 *Delete sentence number 2 and replace with the following:*
Contains a minimum of 10 percent organic matter as determined by loss-on-ignition of oven dried samples according to ATM 203.

Topsoil to be weed-free certified. Suppliers are to be approved by the owner or engineer.

SECTION 729
GEOSYNTHETICS

729-2.01 GEOTEXTILE FOR SUBSURFACE DRAINAGE, SEPARATION, STABILIZATION, EROSION CONTROL AND EMBANKMENT REINFORCEMENT.

1. Subsurface Drainage. Meet AASHTO M 288 for Subsurface Drainage, except provide a minimum permittivity of 0.50 sec^{-1}, and meet Class 2 Strength Property Requirements.
2. Separation. Meet AASHTO M 288 for Separation, except provide a minimum permittivity of 0.50 sec^{-1}, and meet Class 3 Strength Property Requirements.
3. Stabilization. Meet AASHTO M 288 for Stabilization, except provides a minimum permittivity of 0.50 sec^{-1}, and meet Class 1 Strength Property Requirements.
4. Erosion Control. Meet AASHTO M 288 for Permanent Erosion Control and meet Class 1 Strength Property Requirements.
5. Reinforcement. Meet the requirements in Table 729-1 for Type 1 or Type 2.

Package, label, handle and store geotextile materials according to ASTM D 4873.

TABLE 729-1
GEOTEXTILE REINFORCEMENT PROPERTIES

Property	Test Method	Units	Requirement[a]	
			Type 1	Type 2
Grab Tensile	ASTM D4632	lb.	200/200	400/400
Grab Elongation	ASTM D4632	% (MD)	10	10
Wide Width Tensile	ASTM D4595	lb/in. (ultimate)	200/200	400/400
Wide Width Tensile	ASTM D4595	lb/in. (@ 5% strain)	100/100	200/200
Seam Breaking Strength	ASTM D4632	lb./in.	180	360
Puncture	ASTM D6241	lb.	500	1500
Trapezoidal Tear	ASTM D4533	lb.	100	150
AOS	ASTM D4751	U.S. sieve size	#30[b]	#30[b]
Permittivity	ASTM D4491	sec^{-1}	0.20	0.20
Flow Rate	ASTM D4491	gal./min./ft^2	10	10

[a] Minimum Average Roll Values (MARV) in machine direction (MD) / cross-machine direction (XD) unless otherwise specified
[b] Maximum average roll value

729-2.02 SILT FENCE. Meet AASHTO M 288 for Temporary Silt Fence.

Appendix C. 100% Drawings

US FISH & WILDLIFE SERVICE (USFWS)

COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT

CORDOVA EVOS SITES COP 43, 44, AND 45

CORDOVA, ALASKA

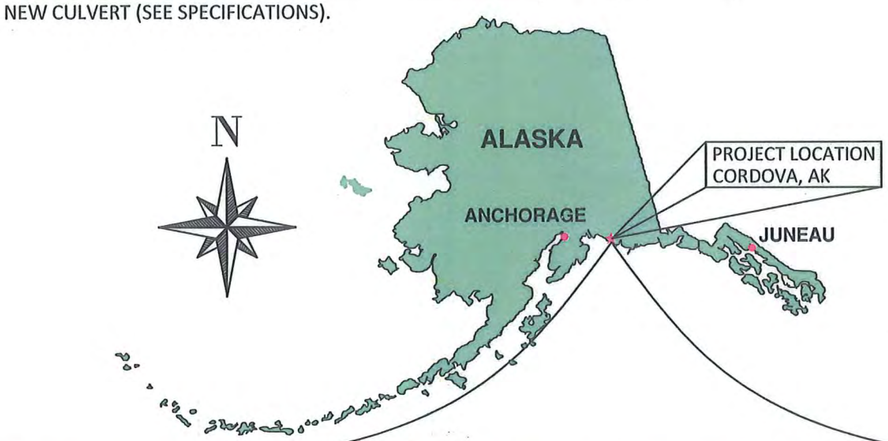
DECEMBER 23, 2019

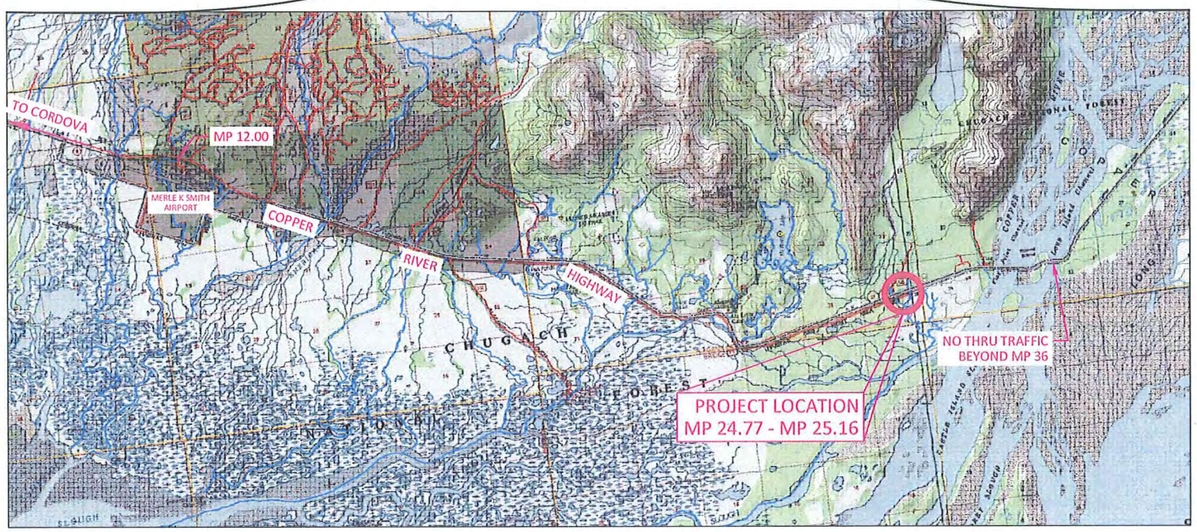
COPPER RIVER WATERSHED PROJECT

U.S. FISH & WILDLIFE SERVICE — DEPARTMENT OF THE INTERIOR

PROJECT DESCRIPTION

THE PROPOSED PROJECT INVOLVES REPLACING EXISTING CULVERTS WITH A LARGER STREAM SIMULATION ALUMINUM BOX CULVERTS AT THREE (3) LOCATIONS AND EXTENSION OF ONE (1) CULVERT (SEE TABLE), ALONG COPPER RIVER HIGHWAY IN CORDOVA, ALASKA.
THE CONTRACTOR SHALL PROVIDE ALL CULVERT MATERIALS, LABOR, EQUIPMENT, ASSEMBLY AND INSTALLATION OF THE NEW CULVERT (SEE SPECIFICATIONS).





VICINITY MAP
(COPPER RIVER HIGHWAY)

PROJECT LOCATION				
ADF&G SITE NO.	CRWP ID	COPPER RIVER HWY MP	STATION SHOWN ON PLAN	WORK DESCRIPTION
20100508	COP 43	24.85	4+10.82	REPLACEMENT
20100510	COP 44	25.05	14+58.83	REPLACEMENT
20100511	COP 45	25.09	16+81.44	REPLACEMENT
20100512	COP 46	25.13	19+16.12	EXTENSION

ROADWAY SECTION	MILEPOINT	LENGTH(FT)	WIDTH (FT)
COPPER RIVER HIGHWAY	24.77 - 25.16	2,045	32

DESIGN DESIGNATIONS	
AADT 2015	96

DRAWING INDEX	
SHEET NO.	TITLE
G-001	TITLE SHEET
G-002	ESTIMATE OF QUANTITIES, GENERAL NOTES & ABBREVIATIONS
G-003	ESTIMATE OF QUANTITIES(SUBSIDIARY ITEMS), H&H SUMMARY, & EROSION & SEDIMENT CONTROL NOTES
G-004	COFFERDAM &SILT FENCE DETAILS
C-100	COPPER RIVER HIGHWAY PLAN & PROFILE
C-101	TYPICAL CROSS SECTIONS
C-200	COP 43 (20100508) CULVERT PLAN
C-201	COP 44 (20100510) CULVERT PLAN
C-202	COP 45 (20100511) CULVERT PLAN
C-300	COP 43 (20100508) EROSION & SEDIMENT CONTROL PLAN
C-301	COP 44 (20100510) EROSION & SEDIMENT CONTROL PLAN
C-302	COP 45 (20100511) EROSION & SEDIMENT CONTROL PLAN
C-400	COP 43 (20100508) SUBSTRATE PLAN & PROFILE
C-401	COP 44 (20100510) SUBSTRATE PLAN & PROFILE
C-402	COP 45 (20100511) SUBSTRATE PLAN & PROFILE
C-500	COP 43 (20100508) STREAM CROSS SECTIONS
C-501	COP 44 (20100510) STREAM CROSS SECTIONS
C-502	COP 45 (20100511) STREAM CROSS SECTIONS
C-600	REVEGETATION PLAN
C-601	TOEWOOD BANK DETAILS
C-700	CULVERT MARKER
V-100	COP 43 (20100508) EXISTING CONDITION (SURVEY)
V-101	COP 44 (20100510) EXISTING CONDITION (SURVEY)
V-102	COP 45 (20100511) EXISTING CONDITION (SURVEY)

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100S

PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING: TITLE SHEET

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CORPORATE LICENSE
AECL 1088

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STANDARDS OF PRACTICE ESTABLISHED BY THE STATE OF ALASKA, AS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND ETI'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

STATE OF ALASKA — STEVEN R. PANNONE — CE 8548 — REGISTERED PROFESSIONAL ENGINEER

JOB NO. 1684.18

SHEET
G-001

ESTIMATE OF QUANTITIES

ITEM NO.	ITEM DESCRIPTION	PAY UNIT	ESTIMATED QUANTITIES			
			SITE 20100508 (COP 43)	SITE 20100510 (COP 44)	SITE 20100511 (COP 45)	TOTAL
203(6)-1	BORROW	TON	19272			19272
203(6)-2	SUBBASE, GRADING F	TON	464	464	464	1392
301(3)	AGGREGATE SURFACE COURSE, GRADING E-1	TON	2508			2508
602(2)	STRUCTURAL PLATE ALUMINUM BOX CULVERT 16'-10" SPAN x 8'-3" RISE W/ SOLID INVERT, HAUNCH=0.175", CROWN=0.125" THICK	LF	58.5	58.5	58.5	175.5
603(2)	36"x48" CORRUGATED STEEL PIPE ARCH, 12ga W/ CONNECTING BAND	LF	6 (EXTENSION AT COP 46)			6
611(2)	RIPRAP, CLASS II	TON	95	94	92	281
613(2)	CULVERT MARKER POST	EA	2	2	2	7*
618(1)	SEEDING	ACRE	0.72			0.72
630(3B)	GEOTEXTILE, REINFORCEMENT, TYPE 2	SY	371	371	371	1113
640(1)	MOBILIZATION & DEMOBILIZATION	LS	ALL REQ'D			ALL REQ'D
640(4)	WORKER MEALS AND LODGING, OR PER DIEM	LS	ALL REQ'D			ALL REQ'D
641(1)	EROSION, SEDIMENT AND POLLUTION CONTROL ADMINISTRATION	LS	ALL REQ'D			ALL REQ'D
641(3)	TEMPORARY EROSION, SEDIMENT AND POLLUTION CONTROL	LS	ALL REQ'D			ALL REQ'D
641(4)	TEMPORARY EROSION, SEDIMENT AND POLLUTION CONTROL ADDITIVES	CS	ALL REQ'D			ALL REQ'D
641(5)	TEMPORARY EROSION, SEDIMENT AND POLLUTION CONTROL BY DIRECTIVE	CS	ALL REQ'D			ALL REQ'D
641(6)	WITHHOLDING	CS	ALL REQ'D			ALL REQ'D
641(7)	SWPPP MANAGER	LS	ALL REQ'D			ALL REQ'D
642(1)	CONSTRUCTION SURVEYING	LS	ALL REQ'D			ALL REQ'D
642(3)	THREE PERSON SURVEY PARTY	HOUR	16			16
643(2)	TRAFFIC MAINTENANCE	LS	ALL REQ'D			ALL REQ'D
643(25)	TRAFFIC CONTROL	CS	ALL REQ'D			ALL REQ'D
671(2)	TOEWOOD BANK RECONSTRUCTION	LF	30	26	38	94
672(1)	STREAM DIVERSION & DEWATERING	LS	ALL REQ'D			ALL REQ'D
690(1)-1	STREAM/WEIR SUBSTRATE - FINE MATERIALS	TON	232	256	234	722
690(1)-2	STREAM/WEIR SUBSTRATE - COARSE MATERIALS	TON	393	434	396	1223

ESTIMATE OF QUANTITY NOTES

1. THE WORK OF SECTION 201-CLEARING & GRUBBING IS SUBSIDIARY TO PAY ITEM 602(2)-ALUMINUM BOX CULVERT.
2. THE WORK OF SECTION 202(4)-REMOVAL OF STRUCTURES AND OBSTRUCTION IS SUBSIDIARY TO PAY ITEM 602(2)-ALUMINUM BOX CULVERT.
3. THE WORK OF SECTION 203-EXCAVATION AND EMBANKMENT, EXCEPT BORROW, IS SUBSIDIARY TO PAY ITEM 602(2) ALUMINUM BOX CULVERT. FURNISHING BORROW ACCORDING TO SECTION 203 WILL BE PAID FOR AS PAY ITEM 203(6)-1 BORROW.
4. THE WORK OF SECTION 204-STRUCTURE EXCAVATION FOR CONDUITS AND MINOR STRUCTURES IS SUBSIDIARY TO PAY ITEM 602(2)-ALUMINUM BOX CULVERT.
5. THE WORK OF SECTION 620-TOPSOIL IS SUBSIDIARY TO PAY ITEM 618(1)-SEEDING.
6. THE WORK OF SECTION 631(2) GEOTEXTILE, EROSION CONTROL, CLASS 1 IS SUBSIDIARY TO PAY ITEM 611(2)-RIPRAP, CLASS II.
7. * - TWO (2) CULVERT MARKER WILL BE INSTALLED ON EACH SITE FOR COP 43, 44, & 45 AND 1 FOR COP 46.

ESTIMATING FACTORS

ITEM NO.	ITEM DESCRIPTION	FACTOR	UNITS
203(6)-1	BORROW	2	TONS/CY
203(6)-2	SUBBASE, GRADING F	2	TONS/CY
301(3)	AGGREGATE SURFACE COURSE, GRADING E-1	2	TONS/CY
611(2)	RIPRAP, CLASS II	1.6	TONS/CY
690(1)-1	STREAM/WEIR SUBSTRATE - FINE MATERIALS	2	TONS/CY
690(1)-2	STREAM/WEIR SUBSTRATE - COARSE MATERIALS	1.7	TONS/CY

GENERAL NOTES

1. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CURRENT ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES (ADOT&PF) STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (SSHC) 2017 EDITION, EXCEPT AS AMENDED OR SUPERSEDED BY THE SPECIAL PROVISIONS IN THESE PROJECT SPECIFICATIONS.
2. THE LOCATION OF THE EXISTING FEATURES AND UTILITIES SHOWN IN THESE DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES ENCOUNTERED AND RECORD THEIR LOCATION ON THE CONTRACT RECORD DRAWINGS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO BEGINNING CONSTRUCTION. THE PERMITS SHALL BE KEPT ON THE PROJECT SITE. THE EROSION AND SEDIMENT CONTROL PLAN (ESCP) HAS BEEN PROVIDED ONLY AS A CONTRACTOR'S GUIDE. IF THE CONTRACTOR MODIFIES THE PLAN TO ACCOMMODATE DIFFERENT PROCEDURES OR WORK SEQUENCE, IT SHALL BE DONE AT HIS/HER EXPENSE AND MUST BE APPROVED BY APPLICABLE REGULATORY AGENCIES.
4. THE CONTRACTOR MUST NOTIFY THE CONTRACTING OFFICER (CO) OR CONTRACTING OFFICER REPRESENTATIVE (COR), ADOT&PF, ADF&G, USCOE REPRESENTATIVES AND UTILITY COMPANIES AT LEAST 10 DAYS PRIOR TO STARTING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PREVENTING DAMAGE TO THE UTILITIES NOT AFFECTED BY WORK. IF DAMAGE OCCURS, CONTRACTOR SHALL REPAIR UTILITY AT NO ADDITIONAL COST TO THE PROJECT.
5. ANY WORK IN PROXIMITY TO EXISTING UTILITIES SHALL COMPLY WITH APPLICABLE FEDERAL, STATE, AND LOCAL STATUTES, CODES AND GUIDELINES AND THE CLEARANCE REQUIREMENTS OF THE SERVING UTILITY.
6. CLEARING AND GRUBBING SHALL BE PERFORMED AS DESCRIBED IN THE SPECIFICATIONS ONLY IN THE AREAS IDENTIFIED ON THE DRAWINGS. CLEARING AND GRUBBING IS NOT PERMITTED WITHIN THE MIGRATORY BIRD WINDOW OF MAY 15 TO JULY 15; EXCEPT AS PERMITTED BY FEDERAL, STATE AND LOCAL LAWS, AND WHEN APPROVED BY THE AGENCIES HAVING JURISDICTION (AJH) OR ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF VEGETATIVE MAT IN THE AREAS NOT IDENTIFIED OR AFFECTED BY THE PROJECT.
7. CONTRACTOR SHALL RESTORE DISTURBED PROPERTY TO PRE-CONSTRUCTION CONDITIONS, UNLESS OTHERWISE DIRECTED BY ENGINEER. DISTURBED AREAS OUTSIDE THE ROAD PRISM SHALL BE TOPSOILED AND SEEDED PER THE REVEGETATION PLAN.
8. EXCAVATION SHALL BE PERFORMED IN COMPLIANCE WITH ALL LOCAL AND FEDERAL (OSHA) SAFETY REGULATIONS AND REQUIREMENTS.
9. ALL FILL, USABLE EXCAVATION, AND BEDDING MATERIAL SHALL BE PLACED AND COMPACTED WITH CARE AS PER SECTION 203-3.03 & SECTION 204-3.01 OF ADOT&PF STANDARD SPECIFICATIONS.
10. EXCAVATED MATERIAL UNSUITABLE FOR EMBANKMENT WILL BE DISPOSED OF AT A CONTRACTORS FURNISHED LOCATION. HANDLING AND DISPOSAL WILL BE CONSIDERED SUBSIDIARY TO OTHER ITEMS.
11. ALL MATERIAL NOT DESIGNATED FOR SALVAGE SHALL BECOME THE PROPERTY OF CONTRACTOR AND BE PROPERLY DISPOSED OF BY CONTRACTOR. CONTRACTOR SHALL REMOVE ANY LITTER OR DEBRIS WITHIN THE PROJECT LIMITS AT THE END OF CONSTRUCTION AND BEFORE DEMOBILIZATION.
12. SOIL CLASSIFICATION AND DEPTHS OF GROUNDWATER AT THE PROJECT LOCATION ARE DESCRIBED IN DETAIL IN THE GEOTECH REPORT BY NORTHERN GEOTECHNICAL ENGINEERING, INC. DATED APRIL 30, 2019.
13. ALUMINUM BOX CULVERTS
    A. THE BOX CULVERT SHALL BE FABRICATED, ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS, THE MANUFACTURER'S RECOMMENDATIONS, AND THE AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES, SECTION 26 (DIVISION II).
    B. THE BEDDING SHALL BE CONSTRUCTED TO A UNIFORM LINE AND GRADE USING MATERIAL OUTLINED IN THE SPECIFICATIONS.
    C. UPON APPROVAL BY ADOT&PF, ALL CULVERTS REPLACED SHALL BE SALVAGED AND DELIVERED TO CORDOVA STATE ADOT&PF M&O MAINTENANCE YARD . HANDLING AND DELIVERY OF REPLACED CULVERTS ARE SUBSIDIARY TO ITEM 602(2). CONTACT ROBBIE MATTSON, STATION FOREMAN (907) 424-3202 OR BY e-mail robert.mattson@alaska.gov BEFORE DELIVERY. DELIVER MONDAY-THURSDAY DURING BUSINESS HOURS.

ABBREVIATIONS:

AC	ASPHALT CONCRETE
ADF&G	ALASKA DEPARTMENT OF FISH & GAME
AH	AHEAD
ADOT&PF	ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ALBC	ALUMINUM BOX CULVERT
BMP	BEST MANAGEMENT PRACTICE
BR	BEDROCK
CFS	CUBIC FEET PER SECOND
CMP	CORRUGATED METAL PIPE
CO	CONTRACTING OFFICER
COR	CONTRACTING OFFICER REPRESENTATIVE
CRWP	COPPER RIVER WATERSHED PROJECT
CS	CONTINGENT SUM
CSP	CORRUGATED STEEL PIPE
CY	CUBIC YARDS
E	EASTING
EA	EACH
ELEV	ELEVATION
ESCP	EROSION & SEDIMENT CONTROL PLAN
EVOS	EXXON VALDEZ OIL SPILL
FT	FEET
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
HR	HOUR
IE	INVERT ELEVATION
IN	INCH
LF	LINEAL FEET
LS	LUMP SUM
LT	LEFT
MI	MILES
MID	MIDPOINT
MIN	MINIMUM
MSF	THOUSAND SQUARE FEET
N	NORTHING
NTS	NOT TO SCALE
OHW	ORDINARY HIGH WATER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PI	POINT OF INTERSECTION
PRC	POINT OF REVERSE CURVATURE
PT	POINT OF TANGENCY
PSF	POUNDS PER SQUARE FOOT
Q	FLOW
R	RADIUS
REQ'D	REQUIRED
ROW	RIGHT OF WAY
RP	RADIUS POINT
RT	RIGHT
S	SOUTH
SM	SILTY SAND WITH GRAVEL
SP	POORLY GRADED SAND
STA	STATION
SY	SQUARE YARDS
TYP	TYPICAL
USFS	U.S. FOREST SERVICE
USFWS	U.S. FISH AND WILDLIFE SERVICE
USGS	U.S. GEOLOGICAL SURVEY
VAP	VERTICAL ADJUSTMENT POTENTIAL
W/	WITH

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED: ____
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100%

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING ESTIMATE OF QUANTITIES, GENERAL NOTES, & ABBREVIATIONS

BCE
500 W. 27th AVE., SUITE A
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CONSULTING ENGINEERS, PC

PANNONE ENGINEERING SERVICES, LLC
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE
AECL 1088

STATE OF ALASKA — STEVEN R. PANNONE — 12-23-19 — REGISTERED PROFESSIONAL ENGINEER

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

SHEET
G-002

ESTIMATE OF QUANTITIES (SUBSIDIARY ITEMS)

ITEM NO.	ITEM DESCRIPTION	PAY UNIT	ESTIMATED QUANTITIES			
			SITE 20100508 (COP 43)	SITE 20100510 (COP 44)	SITE 20100511 (COP 45)	TOTAL
201(3A)	CLEARING AND GRUBBING	ACRE	0.05	0.05	0.05	0.15
202(4)	REMOVAL OF CULVERT PIPE	LF	40	40	40	120
204(1)	STRUCTURE EXCAVATION	CY	697	732	759	2188
620(1)	TOP SOIL	SY	3473			3473
631(2)	GEOTEXTILE, EROSION CONTROL, CLASS 1	SY	89	88	87	264

EROSION AND SEDIMENT CONTROL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL AND SHALL OBTAIN ALL NECESSARY APPROVAL AND PERMITS REQUIRED. MINIMAL BMP'S ARE SHOWN ON THE DRAWING AS A GUIDE FOR THE CONTRACTOR. THE CONTRACTOR HOWEVER, AT HIS DISCRETION MAY PROVIDE AN ALTERNATE CHANNEL DIVERSION AND COFFERDAM CONSTRUCTION OPTION SUBJECT TO THE APPROVAL OF THE ENGINEER AND MUST BE SUBMITTED 10 DAYS PRIOR TO THE START OF CONSTRUCTION.
2. THE USE OF SUPERSACKS AND/OR OTHER METHODS TO DEWATER WORK AREA DURING STREAM DIVERSION MUST BE APPROVED BY THE ENGINEER. USE VELOCITY DISSIPATORS AT ALL DEWATERING DISCHARGE POINTS. DO NOT ALLOW STREAM DIVERSION OR DEWATERING DISCHARGE WATER TO ERODE EXISTING SOILS TO CREATE POT HOLES, RUNOFF CHANNELS, OR RESHAPE THE EXISTING LANDSCAPE IN ANY WAY.
3. EROSION AND SEDIMENT CONTROL PLAN SHEETS GIVE GENERAL INFORMATION. ADJUST PERIMETER CONTROLS AS NECESSARY FOR EQUIPMENT ACCESS AND ACTIVE WORK AREAS. MINIMIZE THE AMOUNT OF DISTURBED AREA OPEN TO EROSION AT ANY GIVEN TIME. THE CONTRACTOR IS EXPECTED TO PROVIDE SITE SPECIFIC DETAILS AND BMP'S BASED ON THE CONTRACTOR'S METHODS.
4. PERIMETER SEDIMENT CONTROL SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. UTILIZE VEGETATED BUFFERS, STRAW WATTLES, AND/OR SILT FENCE AT THE APPROXIMATE LOCATIONS SHOWN ON THE PLAN. TEMPORARY STABILIZATION SHALL BE INSTALLED UNTIL PERMANENT STABILIZATION IS ACHIEVED. ALL STOCKPILES OF ERODIBLE MATERIAL SHALL HAVE PERIMETER CONTROLS AROUND THE BASE.
5. EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSPECTED AND MAINTAINED ON A DAILY BASIS. MAINTENANCE SHALL INCLUDE REMOVAL AND DISPOSAL OF ACCUMULATED SEDIMENT, CLEANING AND REPAIR OF DAMAGED SEDIMENT CONTROL DEVICES.
6. ALL DISTURBED GROUND CAPABLE OF SUPPORTING VEGETATION SHALL BE REVEGETATED FOR FINAL STABILIZATION. ALL AREAS NOT REVEGETATED SHALL BE 100% COVERED BY ROCK OR OTHER PERMANENT NON-ERODIBLE MATERIAL. ATTAINMENT OF FINAL STABILIZATION SHALL BE AS APPROVED BY THE ENGINEER.
7. ANY IDENTIFIED STOCKPILE AND STAGING AREAS SHALL BE CLEANED AND FINAL GRADED TO THEIR ORIGINAL CONDITION.
8. WHEN VEGETATION IS ESTABLISHED AND ALLOWED BY ENGINEER, REMOVE AND DISPOSE OF SILT FENCES AND OTHER TEMPORARY BARRIERS IN A LEGAL MANNER.
9. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND HAZARDOUS MATERIAL CONTROL PLAN (HMCP) ARE REQUIRED ON THIS PROJECT.
10. IF NEEDED FOR IN-WATER CONSTRUCTION AND IN TIGHT ACCESS AREAS UTILIZE TEMPORARY RIPRAP WORK PADS APPROXIMATELY SIZED 20'x10'x4'. THEN REMOVE AND RE-INCORPORATE ROCK INTO TYPICAL TEMPLATE. THIS WORK IS SUBSIDIARY TO PAY ITEM 611(2) RIPRAP, CLASS II.

HYDROLOGIC AND HYDRAULIC SUMMARY

CULVERT SITE			DRAINAGE AREA (SQ. MILES)	ANNUAL PRECIPITATION (INCHES/YR)	EXCEEDANCE PROPBABILITY	RETURN PERIOD (YEAR)	DESIGN DISCHARGE (CFS)	DESIGN HIGH WATER ELEVATION (FT)	DESIGN STREAMBED ELEVATION (FT)	ANTICIPATED ADDITIONAL BACKWATER	OVERTOPPING FLOOD (CFS)	DATUM ELEVATION
COPPER RIVER HWY MP	ADF&G SITE NO.	CRWP ID										
24.85	20100508	COP 43	1.72 COMMON DRAINAGE BASIN FOR THE THREE SITES	126	10.00%	10	113	48.28	46.03	0	494	NAVD 88
					2.00%	50	206	49.36				
					1.00%	100	236	49.69				
25.05	20100510	COP 45			10.00%	10	11	46.95	46.45	0	470	
					2.00%	50	168	49.36				
					1.00%	100	197	49.69				
25.09	20100511	COP 45			10.00%	10	34	46.95	45.93	0	498	
					2.00%	50	215	49.36				
					1.00%	100	246	49.69				

NOTES ON HYDROLOGIC AND HYDRAULIC SUMMARY

1. THESE THREE DRAINAGES ARE HYDRAULICALLY CONNECTED BY PONDS AND DITCH LINES ON THE UPSTREAM SIDE. COMBINED THEY PROVIDE CONVEYANCE FOR A COMMON DRAINAGE OF 1.72 SQUARE MILES. THE BACKWATER ELEVATIONS ARE THE SAME FOR ALL THREE CULVERTS AND THE FLOOD FLOWS ARE SPLIT BETWEEN THEM IN ACCORDANCE WITH THEIR RESPECTIVE ELEVATIONS AND GEOMETRY.

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-1002

PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING: ESTIMATE OF QUANTITIES(SUBSIDIARY ITEMS), H&H SUMMARY & EROSION & SEDIMENT CONTROL NOTES

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CONSULTING ENGINEERS, LLC
Brad Gandy

PANNONE ENGINEERING SERVICES, LLC
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE
AECL 1088

STATE OF ALASKA
STEVEN R. PANNONE
CE 8146
REGISTERED
12/23/19

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

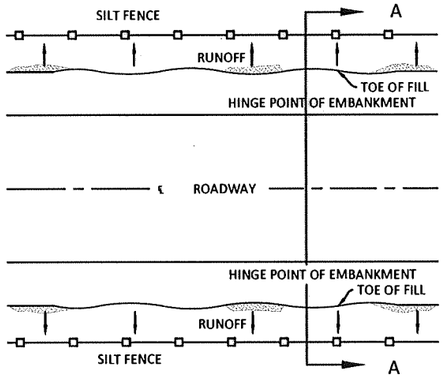
SHEET
G-003

COFFERDAM NOTES:

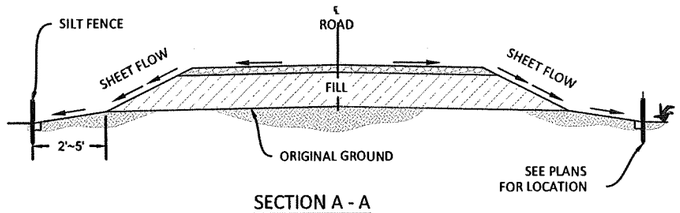
1. COFFERDAM SHALL BE CONSTRUCTED OF MULTIPLE UNITS OF SUPERSACKS FILLED WITH CLEAN GRAVEL OR COBBLE, AND ABUTTED SIDE BY SIDE TO CREATE A WATER TIGHT BARRIER THAT SEPARATES THE CONSTRUCTION SITE FROM THE STREAM.
2. IF WATER DEPTH EXCEEDS 85% OF THE SUPER SACK HEIGHT, AN ADDITIONAL TOP ROW OF BAGS SHALL BE INSTALLED AND SUPPORTED BY TWO BOTTOM ROWS OF SUPERSACK BAGS.
3. THE COFFERDAM SHALL BE SEALED BY COVERING IT WITH REINFORCED PLASTIC SHEETING THAT IS HELD IN PLACE BY ROWS OF SANDBAGS OR ROCK. INTERMITTENT PLACEMENT OF SANDBAGS OR ROCKS WILL BE EFFECTIVE. THE SANDBAGS MUST BE PLACED ON THE TOP OF THE SACKS AS WELL AS ALONG THE TOE OF THE COFFERDAM TO HOLD IT IN PLACE. THE PORTION OF THE SHEETING DRAPED ONTO THE WATER SIDE OF THE COFFERDAM SHALL BE WEIGHTED TO THE BOTTOM WITH A MINIMUM OF TWO ROWS OF SANDBAGS.
4. THE ENDS OF THE COFFERDAM SHALL BE EXTENDED ONTO DRY LAND AND THE ENDS OF THE POLY SHEETING SHALL BE SECURED ABOVE THE WATERLINE WITH MULTIPLE LAYERS OF SANDBAGS. IF THE ENDS MUST BE TERMINATED AT A WET LOCATION THE COFFERDAM SHALL BE TIGHTLY SEALED TO THE GROUND WITH MULTIPLE LAYERS OF SHEETING AND SANDBAGS.
5. THE SUPERSACKS SHALL BE WATERPROOF, CUBE SHAPED, POLYPROPYLENE WOVEN FABRIC WITH A FLAT BOTTOM, FOUR LIFTING LOOPS, RATED FOR A MINIMUM OF 2.5 TONS WORKING LOAD WITH A 5:1 SAFETY FACTOR.
6. THE POLY SHEETING SHALL BE A MINIMUM OF 6 MIL THICKNESS. THE ROLL SHALL BE A MINIMUM OF 12 FEET WIDE AND LONG ENOUGH TO SPAN THE LENGTH OF THE COFFERDAM WITHOUT A SEAM.
7. THE CONTRACTOR SHALL PROVIDE DEWATERING, AS NEEDED, ON THE BACK SIDE OF THE COFFERDAM IN THE WORK AREA. DEWATERING OPERATIONS SHALL CONSIST OF A PRIMARY PUMP AND BACKUP PUMP BOTH LARGE ENOUGH TO MAINTAIN THE WATER LEVEL SO THE EXCAVATION AND BACKFILL OPERATIONS CAN BE COMPLETED. DEWATERING OPERATIONS SHALL BE MONITORED 24 HOURS A DAY UNTIL THE PUMPS CAN BE SAFELY SHUT DOWN WITHOUT THE RISK OF DAMAGE TO THE WORK.
8. THE COFFERDAM AND DEWATERING WORKS MUST ENSURE THAT THE CULVERTS WILL BE INSTALLED ON A DRY FOUNDATION.
9. WHEN THE WORK IS COMPLETED ALL SUPERSACKS, SANDBAGS, POLY SHEETING AND ALL DEBRIS SHALL BE CLEANED UP AND LEGALLY DISPOSED OF OFFSITE.

SILT FENCE GENERAL NOTES:

1. INSTALLATION AND APPLICATION SHALL BE IN ACCORDANCE WITH THE ADOT&PF SEDIMENT AND EROSION CONTROL MANUAL (http:\\www.dot.state.ak.us).
2. SILT FENCE FABRIC SHALL BE OVERLAPPED 6" AT FENCE SUPPORT.
3. SILT FENCE FABRIC SHALL BE TAUT, NOT LOOSE OR FOLDED.
4. THE CONTRACTOR SHALL INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT.
5. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
6. FENCE SHALL BE PLACED AT 2' TO 5' FROM THE TOE OF EMBANKMENT OR EXCAVATION AREAS, OR AS DIRECTED BY THE ENGINEER.
7. ACCUMULATION OF SEDIMENT BEHIND SILT FENCE SHALL BE REMOVED WHEN DEPTH REACHES 8". REMOVED SEDIMENT SHALL BE DEPOSITED IN AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.



PLAN VIEW



SECTION A - A

B SILT FENCE DETAILS
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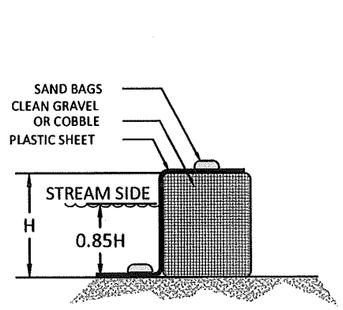
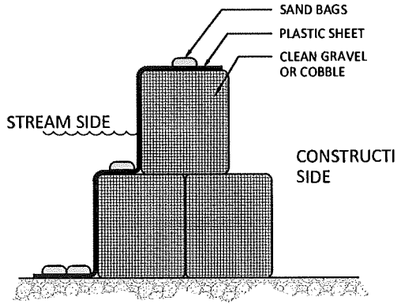
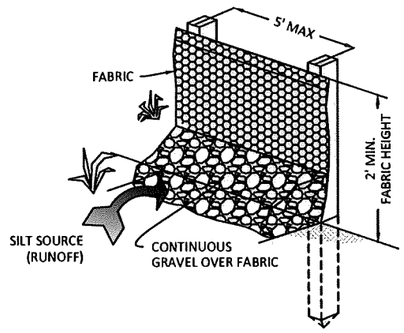


WATER DEPTH LESS THAN 0.85H

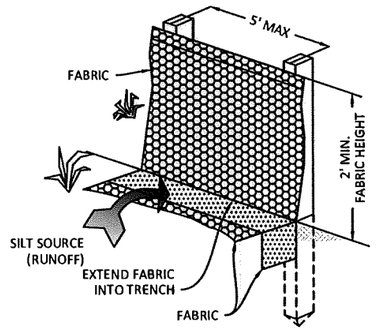


WATER DEPTH GREATER THAN 0.85H

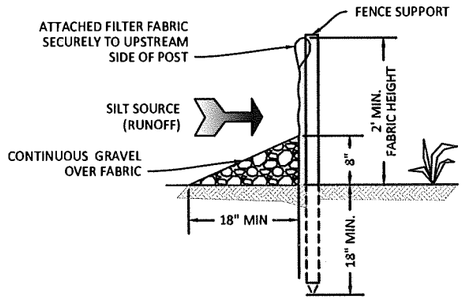
A COFFERDAM DETAILS
SCALE: NTS



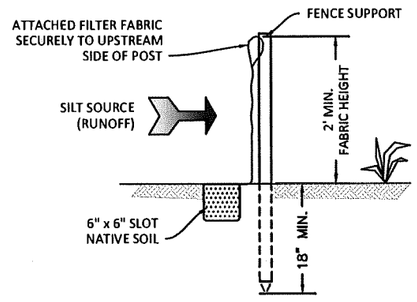
BACKFILL ALTERNATIVE



TRENCH ALTERNATIVE



BACKFILL CROSS SECTION



TRENCH CROSS SECTION

100% SUBMITTAL - DECEMBER 23, 2019

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CHECKED: SP
SCALE: AS NOTED
FILE: 1854.10-1005

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COFFERDAM & SILT FENCE DETAILS

BCE
BAUTISTA CONSULTING ENGINEERS
500 W 27th AVE., SUITE A
ANCHORAGE, ALASKA 99503
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I, STEVEN J. BAUTISTA, P.E. HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AKLS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

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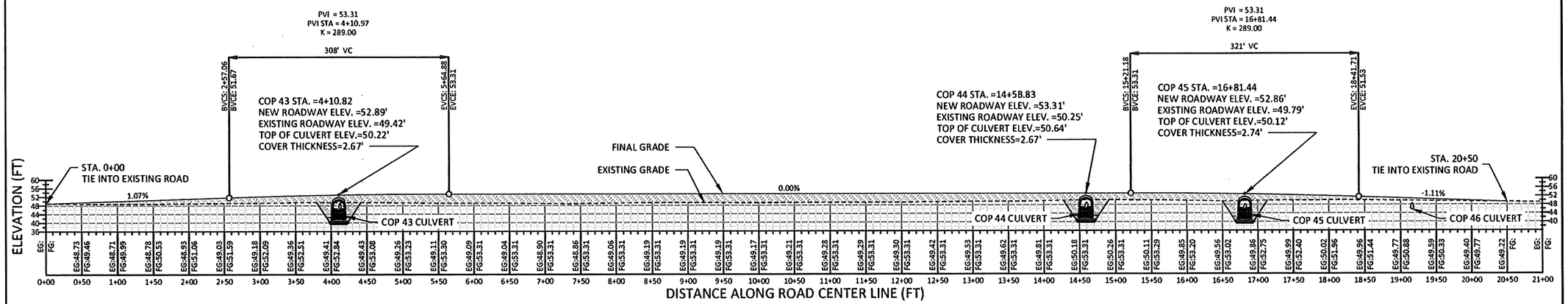
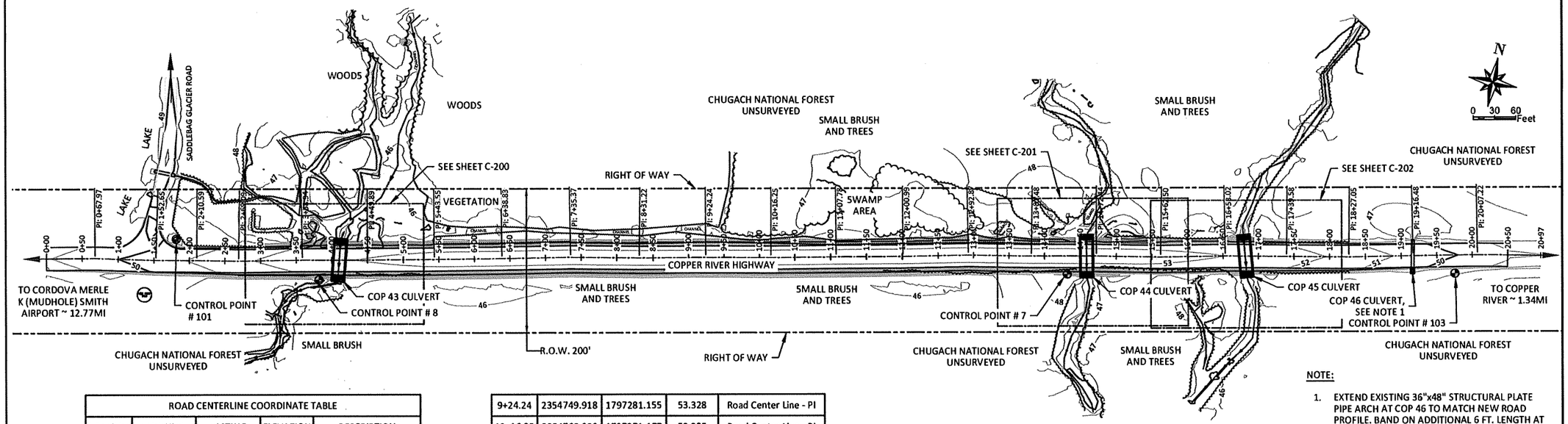
STATE OF ALASKA — STEVEN J. BAUTISTA — 12-23-19 — REGISTERED PROFESSIONAL ENGINEER — CE 8140

JOB NO.

SHEET G-004



A COPPER RIVER HIGHWAY PROFILE MP 24.77 - MP 25.16
SCALE: H=1 : 75, V=1:3



ROAD CENTERLINE COORDINATE TABLE				
STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
0+00.00	2354555.583	1796377.673	48.930	Road Center Line - BOA
0+67.97	2354570.303	1796444.026	49.536	Road Center Line - PI
1+52.65	2354585.346	1796527.363	50.476	Road Center Line - PI
2+10.59	2354597.202	1796584.079	51.119	Road Center Line - PI
2+69.09	2354608.531	1796641.474	51.762	Road Center Line - PI
3+58.94	2354628.641	1796729.043	52.561	Road Center Line - PI
4+49.89	2354647.779	1796817.956	53.084	Road Center Line - PI
5+43.55	2354667.98	1796909.405	53.325	Road Center Line - PI
6+38.83	2354689.012	1797002.336	53.336	Road Center Line - PI
7+35.37	2354710.926	1797096.356	53.333	Road Center Line - PI
8+31.22	2354729.958	1797190.298	53.330	Road Center Line - PI
9+24.24	2354749.918	1797281.155	53.328	Road Center Line - PI
10+16.25	2354768.929	1797371.177	53.325	Road Center Line - PI
11+07.78	2354788.859	1797460.512	53.322	Road Center Line - PI
12+00.99	2354808.849	1797551.555	53.320	Road Center Line - PI
12+92.87	2354829.77	1797641.024	53.317	Road Center Line - PI
13+81.48	2354846.832	1797727.972	53.315	Road Center Line - PI
14+72.44	2354865.773	1797816.938	53.312	Road Center Line - PI
15+62.50	2354883.194	1797905.301	53.281	Road Center Line - PI
16+53.02	2354903.479	1797993.517	53.008	Road Center Line - PI
17+39.58	2354920.747	1798078.338	52.482	Road Center Line - PI
18+27.05	2354938.252	1798164.037	51.688	Road Center Line - PI
19+16.48	2354958.476	1798251.149	50.699	Road Center Line - PI
20+07.22	2354978.792	1798339.589	49.693	Road Center Line - PI
20+96.82	2354996.545	1798427.407	49.050	Road Center Line - EOA

B COPPER RIVER HIGHWAY PLAN MP 24.77 - MP 25.16
SCALE: 1 : 75

NOTE:

1. EXTEND EXISTING 36"x48" STRUCTURAL PLATE PIPE ARCH AT COP 46 TO MATCH NEW ROAD PROFILE. BAND ON ADDITIONAL 6 FT. LENGTH AT THE CULVERT OUTLET.

CONTROL POINTS				
POINT	NORTH	EAST	ELEVATION	DESCRIPTION
7	2354832.87	1797782.51	49.60	2" ALUMINUM CAP / ⅝" REBAR
8	2354606.43	1796757.35	48.00	⅝" REBAR
101	2354620.20	1796549.30	50.50	2" ALUMINUM CAP/ ⅝" REBAR
103	2355145.43	1799237.76	47.90	2" ALUMINUM CAP/ ⅝" REBAR

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100%

PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING: COPPER RIVER HIGHWAY PLAN & PROFILE MP 24.77 – MP25.16

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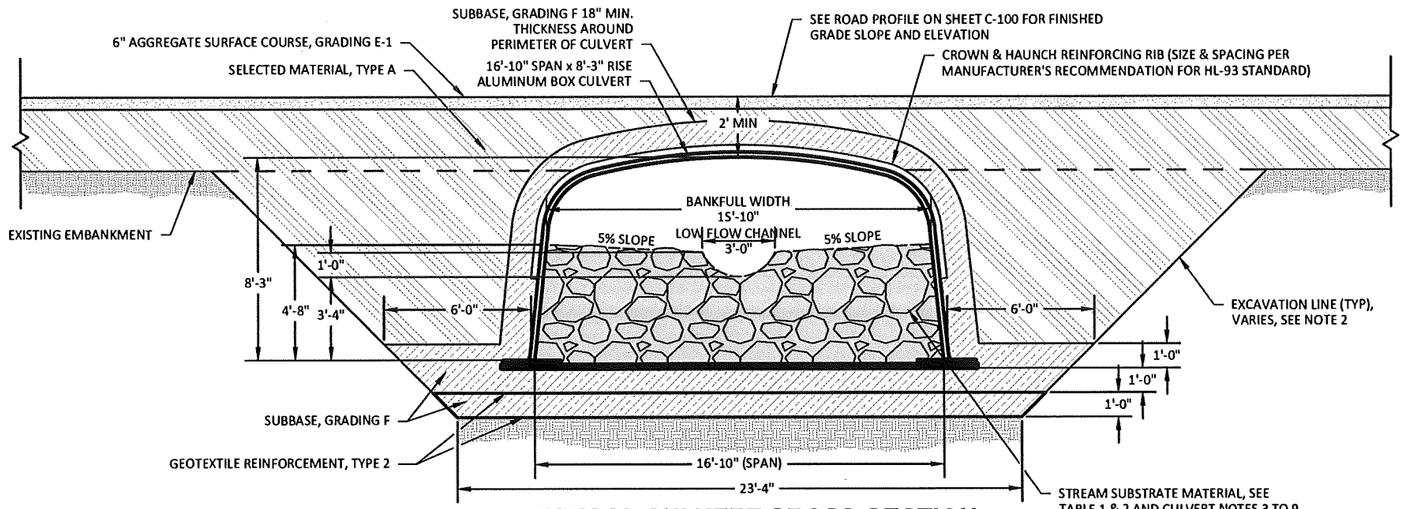
PALMER, AK 9645
CORPORATE LICENSE
AECL 1088

STATE OF ALASKA — REGISTERED PROFESSIONAL ENGINEER — STEVEN R. PANNONE — CE 8148 — 12/23/19

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AES REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND SIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

SHEET C-100



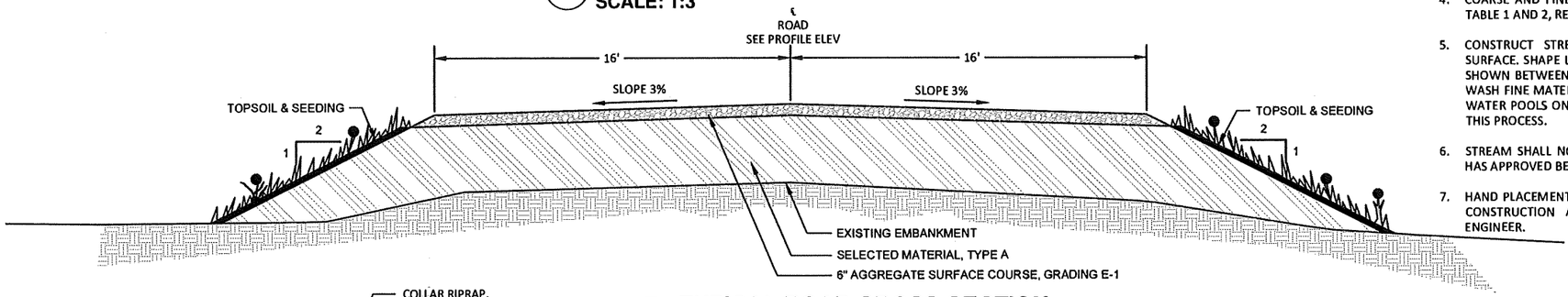
A TYPICAL CULVERT CROSS-SECTION
SCALE: 1:3

TABLE 1-STREAM SUBSTRATE MATERIAL REQUIREMENTS	
COARSE MATERIAL (2 PARTS)	
SIZE	% PASSING
20"	100%
17"	80-90%
10"	45-55%
7"	25-35%
5"	10-20%

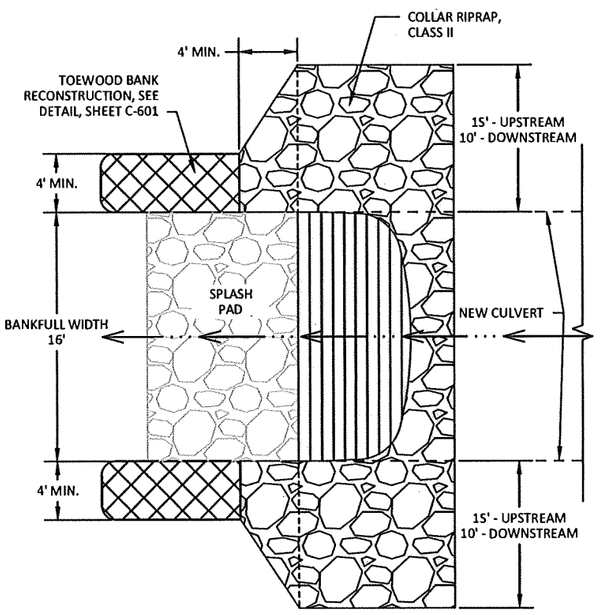
TABLE 2- STREAM SUBSTRATE MATERIAL REQUIREMENTS	
FINE MATERIAL (1 PART)	
SIZE	% PASSING
5"	100%
3.5"	75-85%
2.5"	65-75%
1.25"	45-55%
0.5"	20-30%
# 10	10%
# 40	5%

CULVERT NOTES:

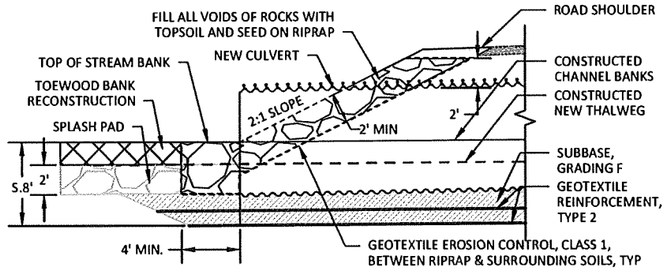
1. EXCAVATED MATERIAL MAY BE USED FOR SELECTED MATERIAL, TYPE A LOCATED A MINIMUM OF 30 INCHES BELOW THE ROAD SURFACE, AS APPROVED BY THE ENGINEER, PROVIDED IT CONFORMS TO 703-2.07-3 SELECTED MATERIAL, TYPE C.
2. CONTRACTOR SHALL SLOPE TRENCH WALL AND/OR SHORE EXCAVATIONS TO ASSURE SAFETY IN ACCORDANCE WITH CURRENT OSHA ALASKA REQUIREMENTS.
3. STREAM SUBSTRATE MATERIAL SHALL BE THOROUGHLY MIXED AT SITE BEFORE PLACING USING 2 PARTS COARSE MATERIAL TO 1 PART FINE. IF ADDITIONAL FINES ARE NEEDED, EQUIPMENT SMALL ENOUGH TO FIT INTO CULVERT MAY BE USED TO FILL IN THE SUBSTRATE VOIDS.
4. COARSE AND FINE MATERIALS SHALL FOLLOW THE GRADATION NOTED IN TABLE 1 AND 2, RESPECTIVELY.
5. CONSTRUCT STREAM SUBSTRATE LEAVING A NON-UNIFORM, ROUGH SURFACE. SHAPE LOW FLOW CHANNEL TO THE APPROXIMATE DIMENSIONS SHOWN BETWEEN AND AROUND LARGER SUBSTRATE. CONTRACTOR SHALL WASH FINE MATERIALS INTO COARSE MATERIALS UNTIL BED IS SEALED AND WATER POOLS ON SURFACE. ADDITIONAL FINES MAY BE REQUIRED DURING THIS PROCESS.
6. STREAM SHALL NOT BE RE-DIVERTED INTO CULVERT UNTIL THE ENGINEER HAS APPROVED BED MATERIALS AS SUFFICIENTLY SEALED.
7. HAND PLACEMENT OF ROCKS WILL BE REQUIRED FOR LOW FLOW CHANNEL CONSTRUCTION AND WILL BE SUPERVISED AND APPROVED BY THE ENGINEER.
8. ON LOW FLOW CHANNELS - GEOMETRY AND DIMENSIONS OF THE LOW FLOW CHANNEL ARE GIVEN FOR GUIDANCE, IT IS ASSUMED THAT THE ACTUAL CHANNEL WILL BE SHAPED IN AND AROUND THE LARGER SUBSTRATE. AS SUCH IT MAY MEANDER SOMEWHAT FROM THE ACTUAL LOCATION SHOWN ON THE PLANS AND ITS GEOMETRY MAY SHIFT TO ACCOMMODATE. IN THE END THE CROSS SECTIONAL AREA AND DEPTH SHOULD APPROXIMATE THAT SHOWN HERE.
9. ON BACKFILL - CARE MUST BE TAKEN IN CULVERT BACKFILL AND INFILL OPERATIONS. FOLLOW MANUFACTURERS GUIDELINES FOR BACKFILL AND THE OPERATION OF EQUIPMENT AROUND, IN, AND OVER THE STRUCTURES DURING CONSTRUCTION. NEVER EXCEED THE LOAD LIMITS OF THE UNFINISHED OR PARTIALLY BACKFILLED STRUCTURE. CARE MUST BE TAKEN NOT TO DAMAGE THE STRUCTURES DURING INFILLING WITH STREAM SUBSTRATE. A 6 - 12 INCH LIFT OF BEDDING MATERIAL SHOULD BE PLACED INSIDE THE CULVERT TO PREVENT DAMAGE TO THE FLOOR FROM MOVEMENT OF EQUIPMENT IN AND OUT OF THE EMPTY SHELL. USE ONLY RUBBER TRACKED EQUIPMENT FOR THIS OPERATION.



B TYPICAL ROAD CROSS-SECTION
SCALE: 1:3



PLAN



PROFILE

C TYPICAL RIPRAP, CLASS II DETAIL
SCALE: NTS

ROADWAY NOTES:

1. ROAD GRADES AND ALIGNMENTS, AS SHOWN ON PLANS, MAY BE SUBJECT TO MINOR REVISIONS AS DIRECTED BY THE ENGINEER.
2. PROFILE ELEVATIONS ARE TO FINISHED GRADES.
3. UTILIZE EXISTING ROAD WIDTH OR MINIMUM ROAD WIDTH ESTABLISHED WHICHEVER IS GREATER.
4. ANY DAMAGE TO THE EXISTING ROAD SYSTEM DUE TO CONTRACTOR OPERATIONS SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE PRIOR TO ACCEPTANCE BY ENGINEER.
5. CONTRACTOR SHALL COMPLY WITH ALL LEGAL LOAD RESTRICTIONS IN HAULING OF MATERIALS.

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100%

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING TYPICAL CROSS SECTIONS

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Bettinger
CONSULTING ENGINEERING

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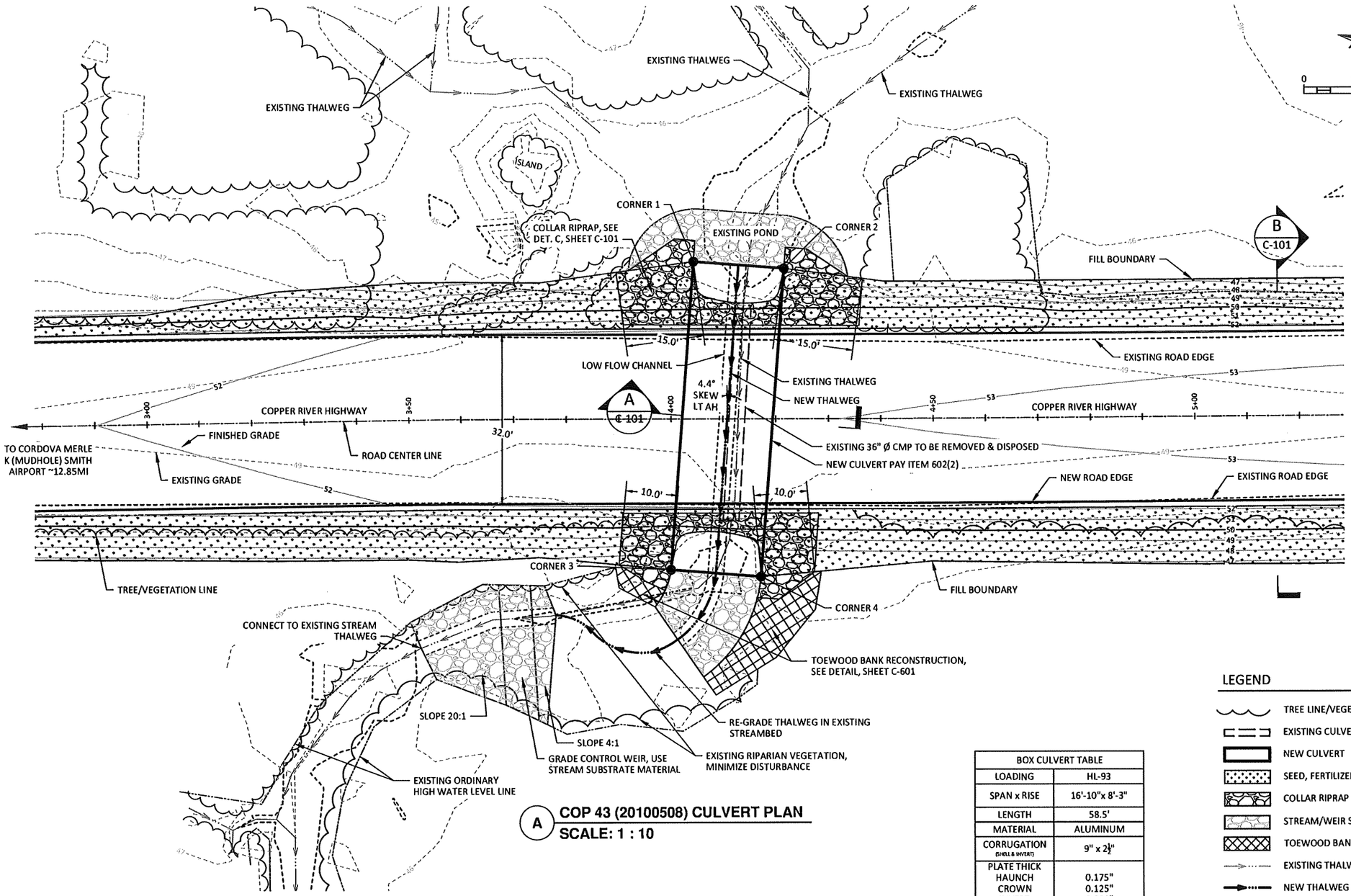
PALMER, AK 9645
CORPORATE LICENSE
ECL 1088

STATE OF ALASKA — STEVEN R. PANNONE — 12-23-19 — ASBUILT — REVISED

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

SHEET C-101



A COP 43 (20100508) CULVERT PLAN
SCALE: 1 : 10

COP 43 CULVERT COORDINATE TABLE				
SIZE	CORNER	NORTHING	EASTING	INVERT ELEVATION
16'-10" SPAN x 8'-3" RISE	1	2354667.3858	1796767.2792	41.93'
	2	2354669.6998	1796784.3990	41.93'
	3	2354609.4130	1796775.1153	41.53'
	4	2354611.7270	1796792.2351	41.53'

BOX CULVERT TABLE	
LOADING	HL-93
SPAN x RISE	16'-10"x 8'-3"
LENGTH	58.5'
MATERIAL	ALUMINUM
CORRUGATION (SHELL & INVERT)	9" x 2½"
PLATE THICK HAUNCH CROWN INVERT	 0.175" 0.125" 0.100"
REINF. RIB HAUNCH CROWN	 PER MANUFACTURER'S RECOMMENDATION
COVER MAX.	 4.0'

LEGEND

- TREE LINE/VEGETATION LINE
- EXISTING CULVERT AS NOTED
- NEW CULVERT
- SEED, FERTILIZER & MULCH
- COLLAR RIPRAP
- STREAM/WEIR SUBSTRATE
- TOEWOOD BANK
- EXISTING THALWEG
- NEW THALWEG
- EXISTING ROAD EDGE
- NEW ROAD EDGE
- EXISTING GROUND CONTOUR
- FINISHED GROUND CONTOUR

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100C

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 43 (20100508) CULVERT PLAN

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CONSULTING ENGINEERS
Bettinger

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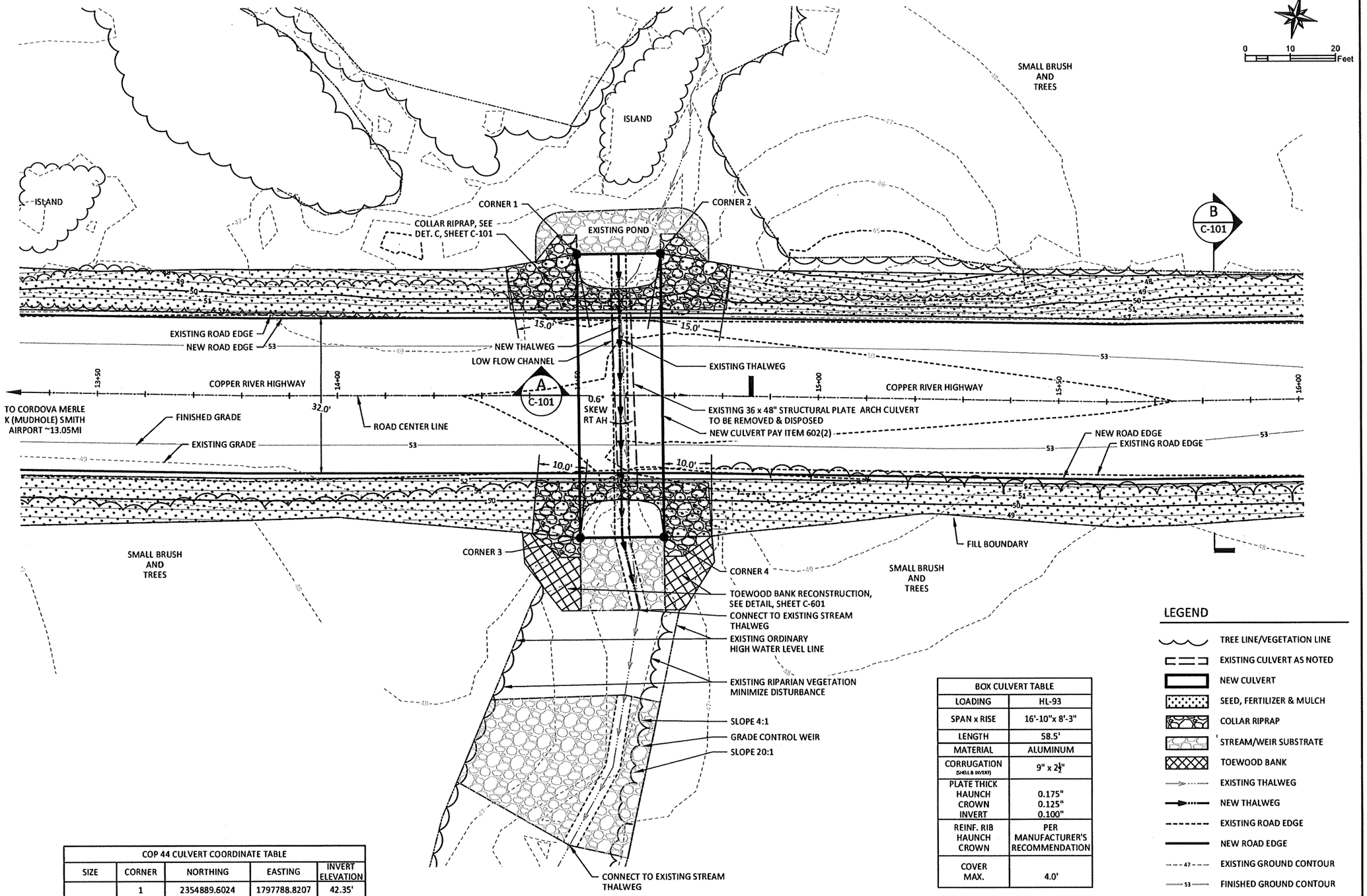
CORPORATE LICENSE
AECL 1088

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

SHEET
C-200



COP 44 CULVERT COORDINATE TABLE				
SIZE	CORNER	NORTHING	EASTING	INVERT ELEVATION
16'-10" SPAN x 8'-3" RISE	1	2354889.6024	1797788.8207	42.35'
	2	2354893.3692	1797805.6805	42.35'
	3	2354832.5099	1797801.5763	41.95'
	4	2354836.2768	1797818.4361	41.95'

BOX CULVERT TABLE	
LOADING	HL-93
SPAN x RISE	16'-10"x 8'-3"
LENGTH	58.5'
MATERIAL	ALUMINUM
CORRUGATION (SHELL & INVERT)	9" x 2½"
PLATE THICK HAUNCH CROWN INVERT	 0.175" 0.125" 0.100"
REINF. RIB HAUNCH CROWN	PER MANUFACTURER'S RECOMMENDATION
COVER MAX.	4.0'

LEGEND

- TREE LINE/VEGETATION LINE
- EXISTING CULVERT AS NOTED
- NEW CULVERT
- SEED, FERTILIZER & MULCH
- COLLAR RIPRAP
- STREAM/WEIR SUBSTRATE
- TOEWOOD BANK
- EXISTING THALWEG
- NEW THALWEG
- EXISTING ROAD EDGE
- NEW ROAD EDGE
- EXISTING GROUND CONTOUR
- FINISHED GROUND CONTOUR

A COP 44 (20100510) CULVERT PLAN
SCALE: 1 : 10

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100%

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 44 (20100510) CULVERT PLAN

BCE Bettinger Consulting Engineers
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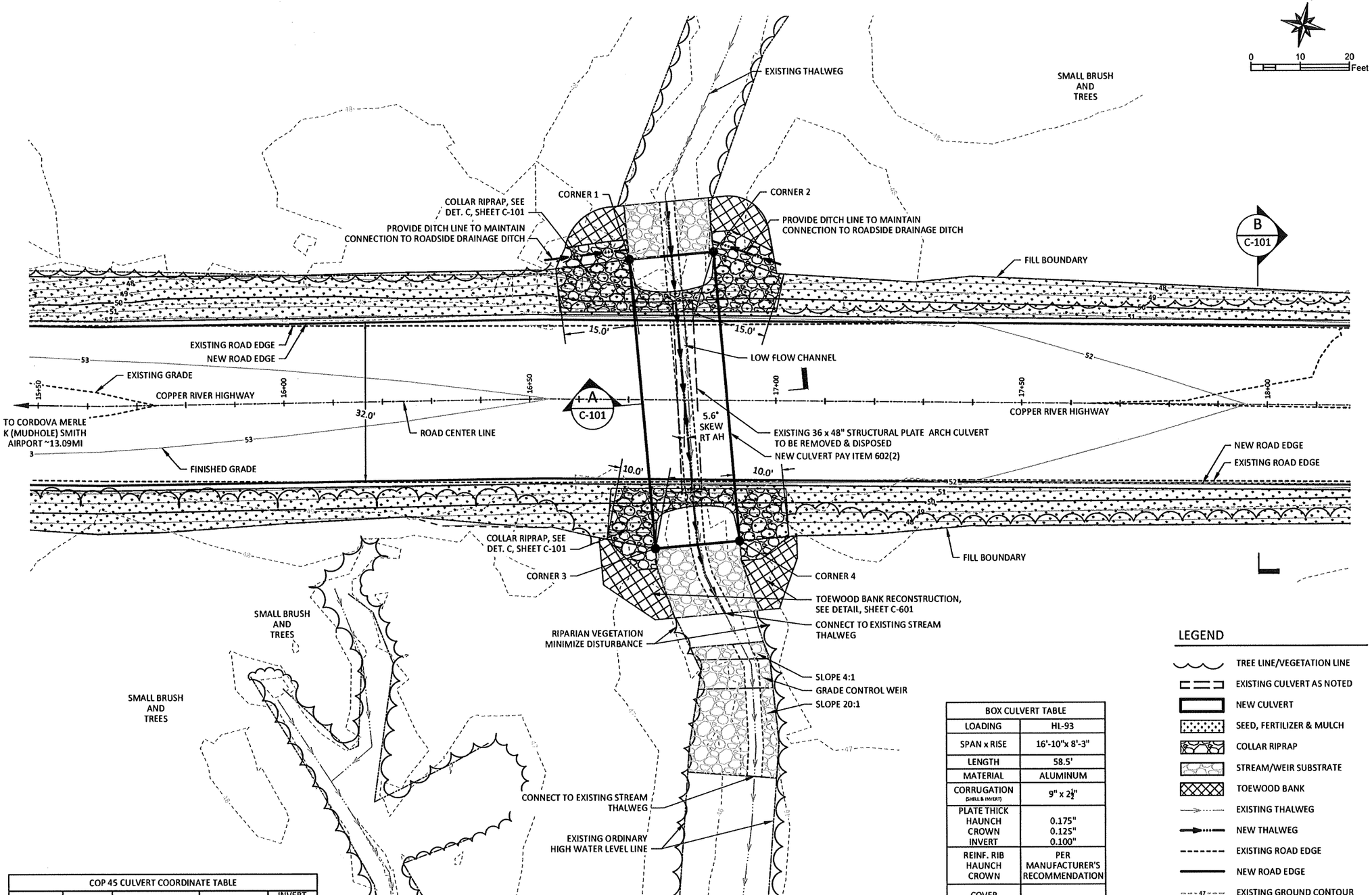
CORPORATE LICENSE AECL 1088

STATE OF ALASKA — STEVEN R. PANNONE — CE 8148 — REGISTERED PROFESSIONAL ENGINEER — 10th DAY OF JANUARY 2020

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

SHEET C-201



COP 45 CULVERT COORDINATE TABLE				
SIZE	CORNER	NORTHING	EASTING	INVERT ELEVATION
16'-10" SPAN x 8'-3" RISE	1	2354934.5730	1798004.5184	41.83'
	2	2354939.6458	1798021.0323	41.83'
	3	2354878.6520	1798021.7025	41.43'
	4	2354883.7265	1798038.2159	41.43'

BOX CULVERT TABLE	
LOADING	HL-93
SPAN x RISE	16'-10"x 8'-3"
LENGTH	58.5'
MATERIAL	ALUMINUM
CORRUGATION (SHELL & INVERT)	9" x 2½"
PLATE THICK HAUNCH CROWN INVERT	 0.175" 0.125" 0.100"
REINF. RIB HAUNCH CROWN	 PER MANUFACTURER'S RECOMMENDATION
COVER MAX.	 4.0'

LEGEND

- TREE LINE/VEGETATION LINE
- EXISTING CULVERT AS NOTED
- NEW CULVERT
- SEED, FERTILIZER & MULCH
- COLLAR RIPRAP
- STREAM/WEIR SUBSTRATE
- TOEWOOD BANK
- EXISTING THALWEG
- NEW THALWEG
- EXISTING ROAD EDGE
- NEW ROAD EDGE
- 47 EXISTING GROUND CONTOUR
- 53 FINISHED GROUND CONTOUR

A COP 45 (20100511) CULVERT PLAN
SCALE: 1 : 10

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-1002

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 45 (20100511) CULVERT PLAN

BCE Bettinger Consulting Engineering
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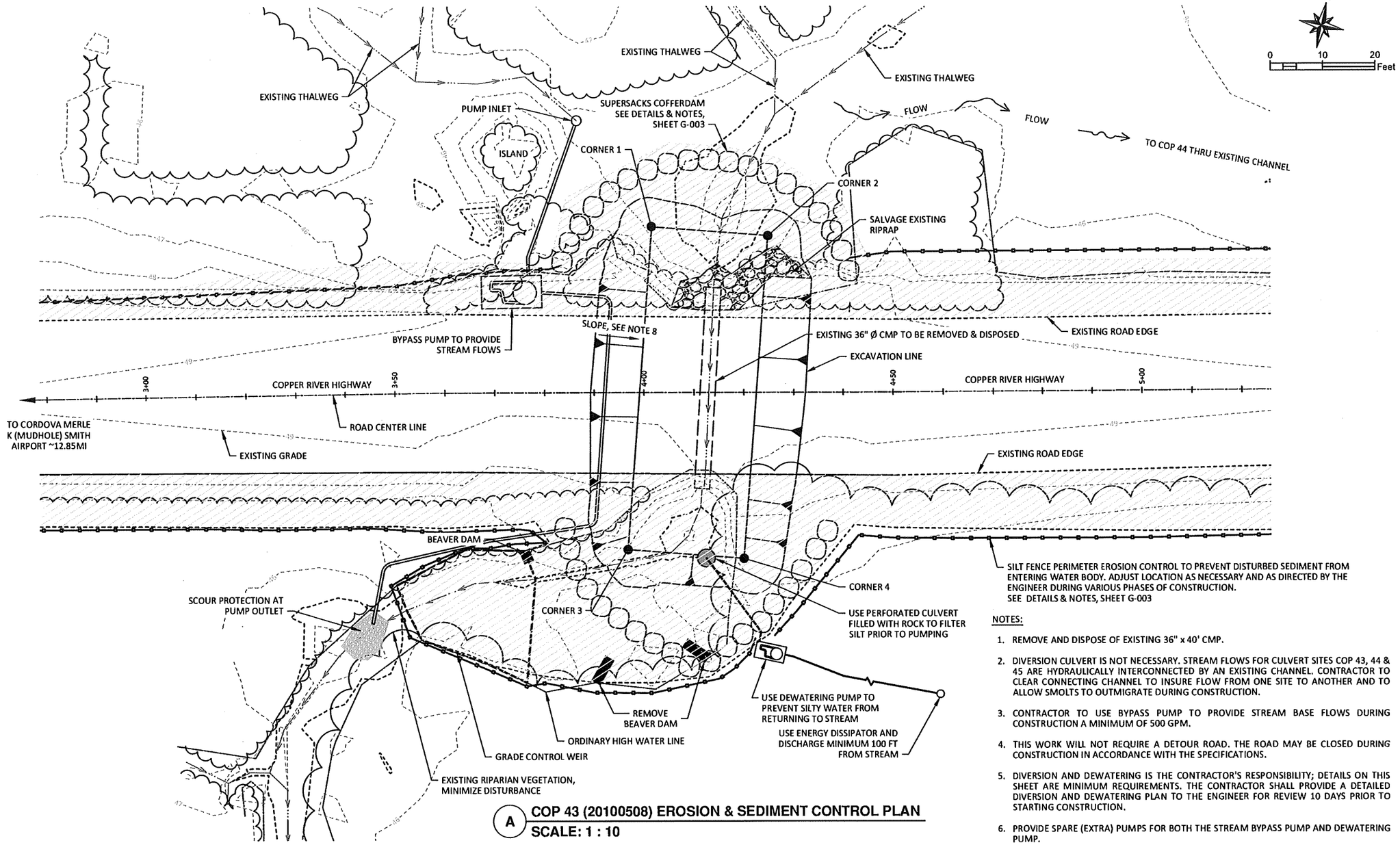
CORPORATE LICENSE AECL 1088

STATE OF ALASKA — REGISTERED — STEVEN R. PANNONE — CE 9749 — 12/09/19

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

SHEET C-202



A **COP 43 (20100508) EROSION & SEDIMENT CONTROL PLAN**
SCALE: 1 : 10

COP 43 EXCAVATION			
CORNER	NORTHING	EASTING	ELEVATION
1	2354670.5671	1796764.2104	39.76'
2	2354673.5817	1796786.5130	39.76'
3	2354606.6484	1796772.8502	39.36'
4	2354609.6630	1796795.1529	39.36'

LEGEND

- TREE LINE/VEGETATION LINE
- EXISTING CULVERT AS NOTED
- DISTURBANCE AREA
- EXISTING THALWEG
- 47 EXISTING GROUND CONTOUR

NOTES:

1. REMOVE AND DISPOSE OF EXISTING 36" x 40' CMP.
2. DIVERSION CULVERT IS NOT NECESSARY. STREAM FLOWS FOR CULVERT SITES COP 43, 44 & 45 ARE HYDRAULICALLY INTERCONNECTED BY AN EXISTING CHANNEL. CONTRACTOR TO CLEAR CONNECTING CHANNEL TO INSURE FLOW FROM ONE SITE TO ANOTHER AND TO ALLOW SMOLTS TO OUTMIGRATE DURING CONSTRUCTION.
3. CONTRACTOR TO USE BYPASS PUMP TO PROVIDE STREAM BASE FLOWS DURING CONSTRUCTION A MINIMUM OF 500 GPM.
4. THIS WORK WILL NOT REQUIRE A DETOUR ROAD. THE ROAD MAY BE CLOSED DURING CONSTRUCTION IN ACCORDANCE WITH THE SPECIFICATIONS.
5. DIVERSION AND DEWATERING IS THE CONTRACTOR'S RESPONSIBILITY; DETAILS ON THIS SHEET ARE MINIMUM REQUIREMENTS. THE CONTRACTOR SHALL PROVIDE A DETAILED DIVERSION AND DEWATERING PLAN TO THE ENGINEER FOR REVIEW 10 DAYS PRIOR TO STARTING CONSTRUCTION.
6. PROVIDE SPARE (EXTRA) PUMPS FOR BOTH THE STREAM BYPASS PUMP AND DEWATERING PUMP.
7. EXISTING RIPARIAN VEGETATION SHOULD BE PROTECTED TO MINIMIZE DISTURBANCE. USE CRANE MAT TO PROVIDE TEMPORARY ROAD TO CONSTRUCT THE GRADE CONTROL WEIR.
8. EXCAVATION BACK SLOPES SHALL BE PERFORMED IN COMPLIANCE WITH ALL LOCAL AND FEDERAL (OSHA) REGULATIONS AND REQUIREMENTS.
9. PLACE RIPRAP AS SHOWN AND AS DIRECTED BY THE ENGINEER. SALVAGE ANY EXISTING RIPRAP AND INCORPORATE INTO NEW RIPRAP, CLASS II STRUCTURE. MANIPULATE AS REQUIRED TO INCORPORATE INTO TYPICAL SECTION. THIS WORK IS SUBSIDIARY TO THE 611 PAY ITEMS. APPROXIMATE QUANTITY OF OLD EXISTING RIPRAP IS 6 CY.

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100C

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 43 (20100508) EROSION & SEDIMENT CONTROL PLAN

BCE Bettinger Consulting Engineers
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FAX (907) 272-5214
mail@bce-ak.com

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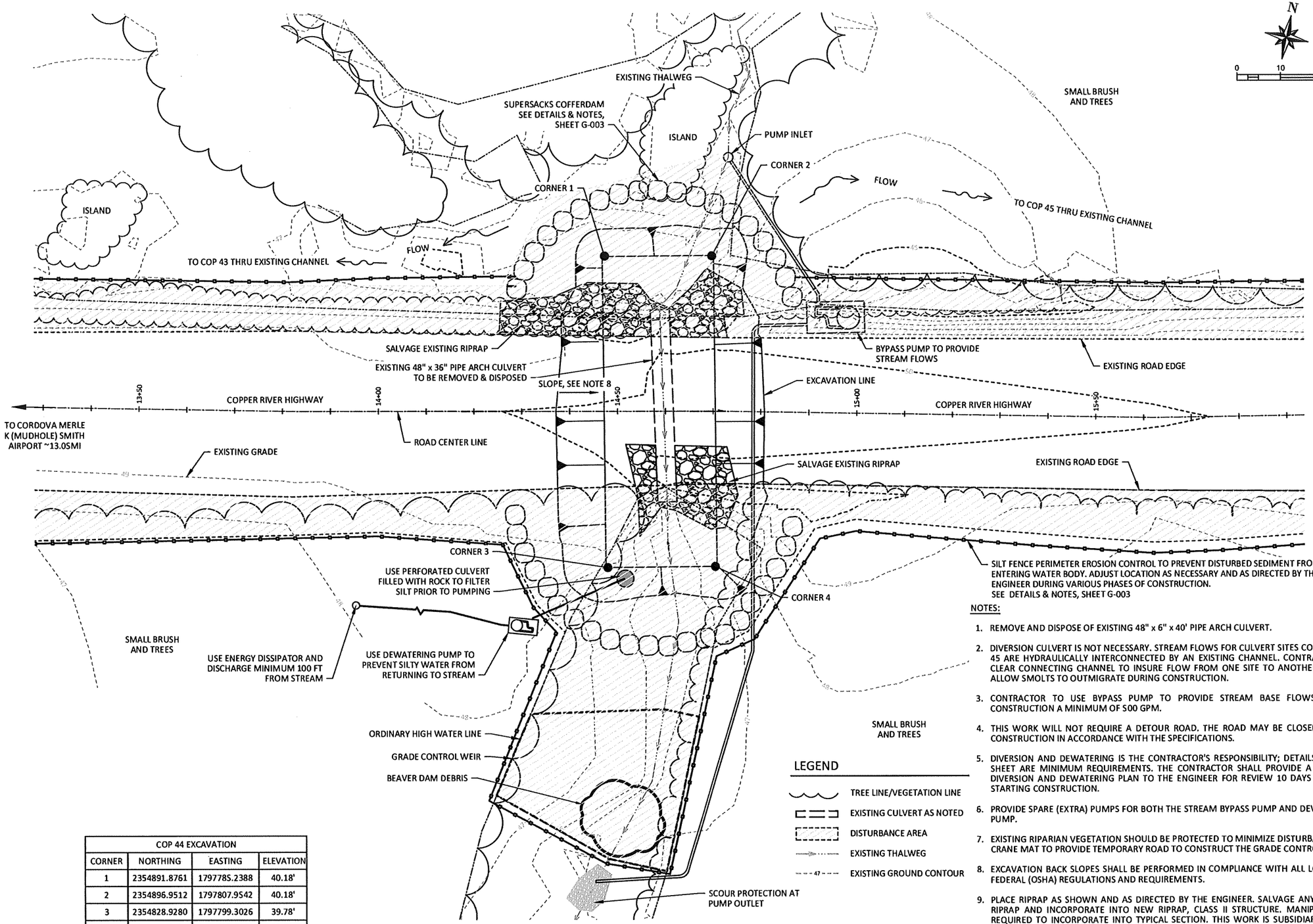
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE
AECL 1088

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

SHEET
C-300



COP 44 EXCAVATION			
CORNER	NORTHING	EASTING	ELEVATION
1	2354891.8761	1797785.2388	40.18'
2	2354896.9512	1797807.9542	40.18'
3	2354828.9280	1797799.3026	39.78'
4	2354834.0031	1797822.0180	39.78'

LEGEND

- TREE LINE/VEGETATION LINE
- EXISTING CULVERT AS NOTED
- DISTURBANCE AREA
- EXISTING THALWEG
- 47 EXISTING GROUND CONTOUR

NOTES:

1. REMOVE AND DISPOSE OF EXISTING 48" x 6" x 40' PIPE ARCH CULVERT.
2. DIVERSION CULVERT IS NOT NECESSARY. STREAM FLOWS FOR CULVERT SITES COP 43, 44 & 45 ARE HYDRAULICALLY INTERCONNECTED BY AN EXISTING CHANNEL. CONTRACTOR TO CLEAR CONNECTING CHANNEL TO INSURE FLOW FROM ONE SITE TO ANOTHER AND TO ALLOW SMOLTS TO OUTMIGRATE DURING CONSTRUCTION.
3. CONTRACTOR TO USE BYPASS PUMP TO PROVIDE STREAM BASE FLOWS DURING CONSTRUCTION A MINIMUM OF 500 GPM.
4. THIS WORK WILL NOT REQUIRE A DETOUR ROAD. THE ROAD MAY BE CLOSED DURING CONSTRUCTION IN ACCORDANCE WITH THE SPECIFICATIONS.
5. DIVERSION AND DEWATERING IS THE CONTRACTOR'S RESPONSIBILITY; DETAILS ON THIS SHEET ARE MINIMUM REQUIREMENTS. THE CONTRACTOR SHALL PROVIDE A DETAILED DIVERSION AND DEWATERING PLAN TO THE ENGINEER FOR REVIEW 10 DAYS PRIOR TO STARTING CONSTRUCTION.
6. PROVIDE SPARE (EXTRA) PUMPS FOR BOTH THE STREAM BYPASS PUMP AND DEWATERING PUMP.
7. EXISTING RIPARIAN VEGETATION SHOULD BE PROTECTED TO MINIMIZE DISTURBANCE. USE CRANE MAT TO PROVIDE TEMPORARY ROAD TO CONSTRUCT THE GRADE CONTROL WEIR.
8. EXCAVATION BACK SLOPES SHALL BE PERFORMED IN COMPLIANCE WITH ALL LOCAL AND FEDERAL (OSHA) REGULATIONS AND REQUIREMENTS.
9. PLACE RIPRAP AS SHOWN AND AS DIRECTED BY THE ENGINEER. SALVAGE ANY EXISTING RIPRAP AND INCORPORATE INTO NEW RIPRAP, CLASS II STRUCTURE. MANIPULATE AS REQUIRED TO INCORPORATE INTO TYPICAL SECTION. THIS WORK IS SUBSIDIARY TO THE 611 PAY ITEMS. APPROXIMATE QUANTITY OF OLD EXISTING RIPRAP IS 26 CY.

A **COP 44 (20100510) EROSION & SEDIMENT CONTROL PLAN**
SCALE: 1 : 10

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GLI
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100%

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 44 (20100510) EROSION & SEDIMENT CONTROL PLAN

BCE Bettinger Consulting Engineers
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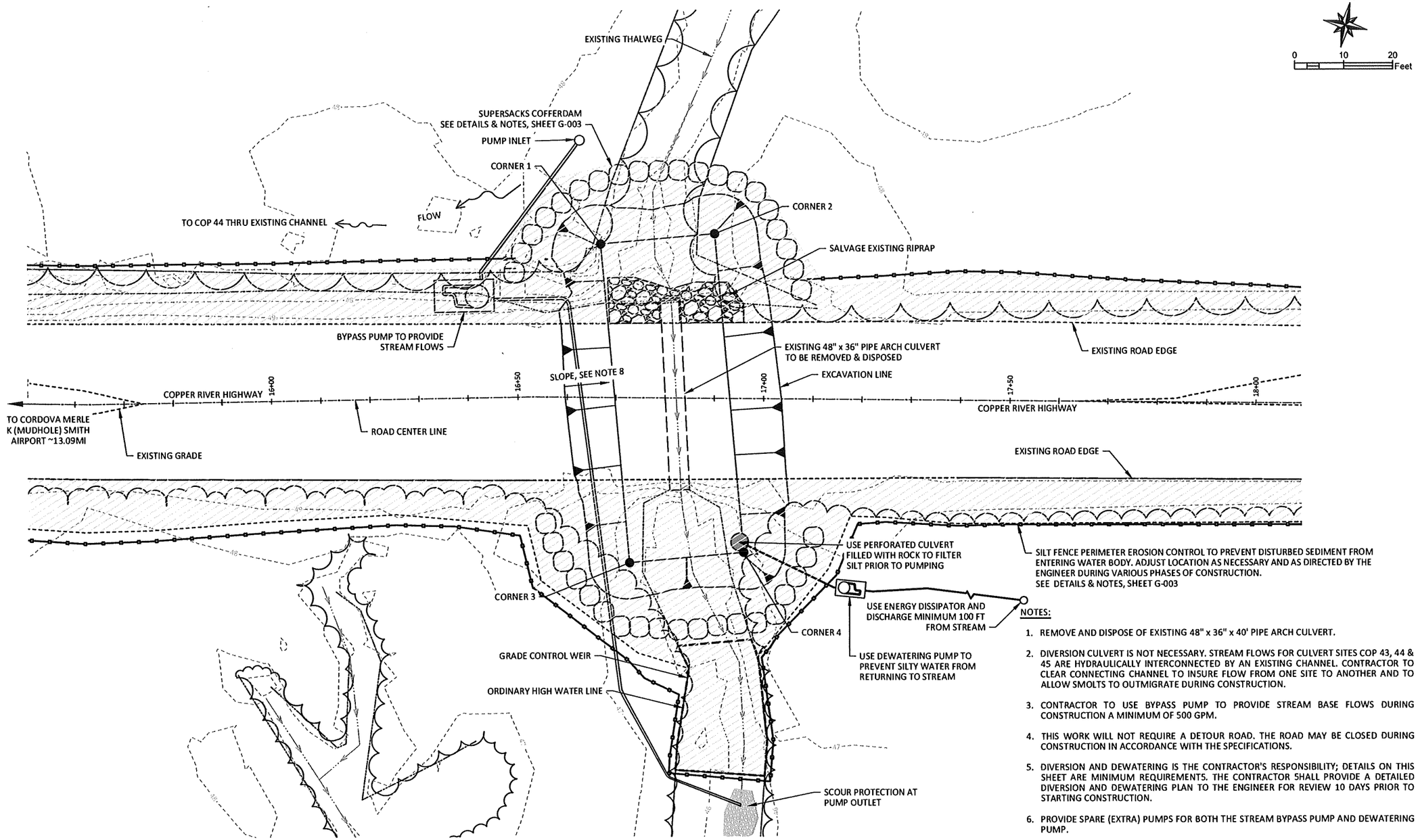
CORPORATE LICENSE
AECL 1088

STATE OF ALASKA — STEVEN R. PANNONE — 12570 — REGISTERED PROFESSIONAL ENGINEER — 2020

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

SHEET C-301



COP 45 EXCAVATION			
CORNER	NORTHING	EASTING	ELEVATION
1	2354936.5578	1798000.7700	39.66'
2	2354943.3969	1798023.0258	39.66'
3	2354874.9032	1798019.7161	39.26'
4	2354881.7400	1798041.9648	39.26'

A COP 45 (20100511) EROSION & SEDIMENT CONTROL PLAN
SCALE: 1 : 10

LEGEND

- TREE LINE/VEGETATION LINE
- EXISTING CULVERT AS NOTED
- DISTURBANCE AREA
- EXISTING THALWEG
- 47 EXISTING GROUND CONTOUR

NOTES:

1. REMOVE AND DISPOSE OF EXISTING 48" x 36" x 40' PIPE ARCH CULVERT.
2. DIVERSION CULVERT IS NOT NECESSARY. STREAM FLOWS FOR CULVERT SITES COP 43, 44 & 45 ARE HYDRAULICALLY INTERCONNECTED BY AN EXISTING CHANNEL. CONTRACTOR TO CLEAR CONNECTING CHANNEL TO INSURE FLOW FROM ONE SITE TO ANOTHER AND TO ALLOW SMOLTS TO OUTMIGRATE DURING CONSTRUCTION.
3. CONTRACTOR TO USE BYPASS PUMP TO PROVIDE STREAM BASE FLOWS DURING CONSTRUCTION A MINIMUM OF 500 GPM.
4. THIS WORK WILL NOT REQUIRE A DETOUR ROAD. THE ROAD MAY BE CLOSED DURING CONSTRUCTION IN ACCORDANCE WITH THE SPECIFICATIONS.
5. DIVERSION AND DEWATERING IS THE CONTRACTOR'S RESPONSIBILITY; DETAILS ON THIS SHEET ARE MINIMUM REQUIREMENTS. THE CONTRACTOR SHALL PROVIDE A DETAILED DIVERSION AND DEWATERING PLAN TO THE ENGINEER FOR REVIEW 10 DAYS PRIOR TO STARTING CONSTRUCTION.
6. PROVIDE SPARE (EXTRA) PUMPS FOR BOTH THE STREAM BYPASS PUMP AND DEWATERING PUMP.
7. EXISTING RIPARIAN VEGETATION SHOULD BE PROTECTED TO MINIMIZE DISTURBANCE. USE CRANE MAT TO PROVIDE TEMPORARY ROAD TO CONSTRUCT THE GRADE CONTROL WEIR.
8. EXCAVATION BACK SLOPES SHALL BE PERFORMED IN COMPLIANCE WITH ALL LOCAL AND FEDERAL (OSHA) REGULATIONS AND REQUIREMENTS.
9. PLACE RIPRAP AS SHOWN AND AS DIRECTED BY THE ENGINEER. SALVAGE ANY EXISTING RIPRAP AND INCORPORATE INTO NEW RIPRAP, CLASS II STRUCTURE. MANIPULATE AS REQUIRED TO INCORPORATE INTO TYPICAL SECTION. THIS WORK IS SUBSIDIARY TO THE 611 PAY ITEMS. APPROXIMATE QUANTITY OF OLD EXISTING RIPRAP IS 7 CY.

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-1002

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 45 (20100511) EROSION & SEDIMENT CONTROL PLAN

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CONSULTING ENGINEERING

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PALMER, AK 9645
CORPORATE LICENSE
AECL 1088

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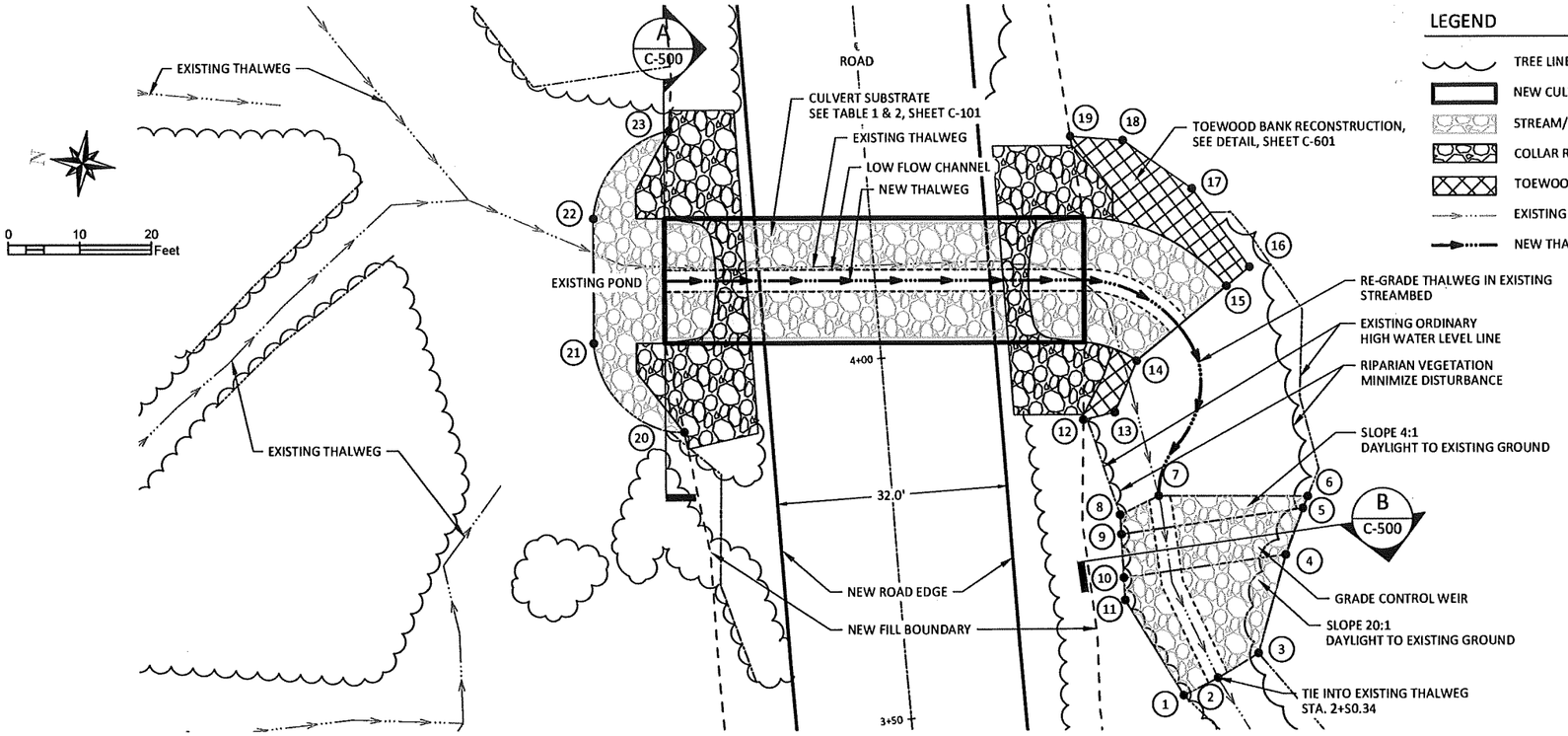
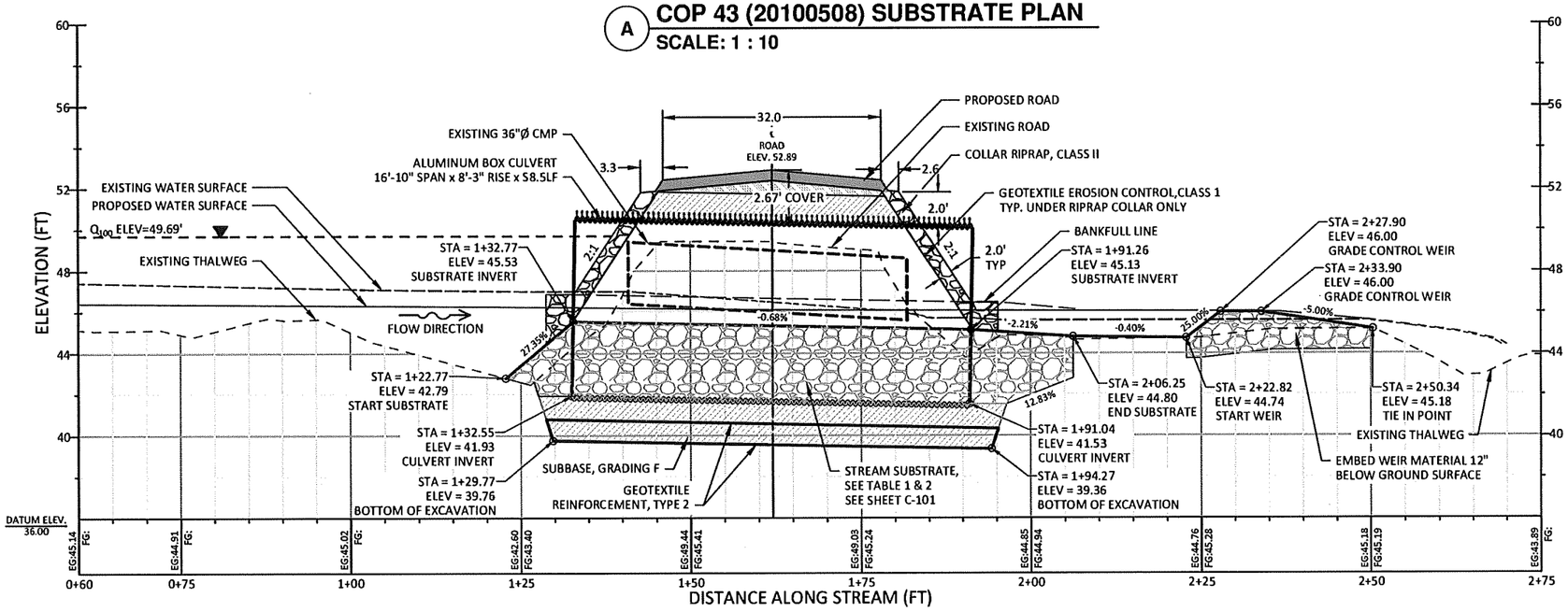
JOB NO. 1684.18

SHEET
C-302



COP 43 POINTS		
POINT #	NORTHING	EASTING
1	2354589.380	1796728.540
2	2354584.985	1796731.553
3	2354579.840	1796735.680
4	2354577.846	1796749.680
5	2354576.319	1796756.361
6	2354575.883	1796758.087
7	2354596.444	1796755.405
8	2354601.398	1796752.100
9	2354600.898	1796749.465
10	2354599.775	1796743.551
11	2354599.202	1796740.516
12	2354608.151	1796764.469
13	2354603.969	1796766.069
14	2354601.896	1796773.546
15	2354590.895	1796785.426
16	2354588.068	1796788.478
17	2354597.410	1796798.221
18	2354607.813	1796803.564
19	2354615.077	1796803.140
20	2354663.109	1796755.427
21	2354677.296	1796765.940
22	2354679.610	1796783.060
23	2354670.697	1796796.515

A COP 43 (20100508) SUBSTRATE PLAN
SCALE: 1 : 10



B COP 43 (20100508) CULVERT PROFILE
SCALE: H=1 : 10 V=1:3

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100%

PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING: COP 43 (20100508) SUBSTRATE PLAN & PROFILE

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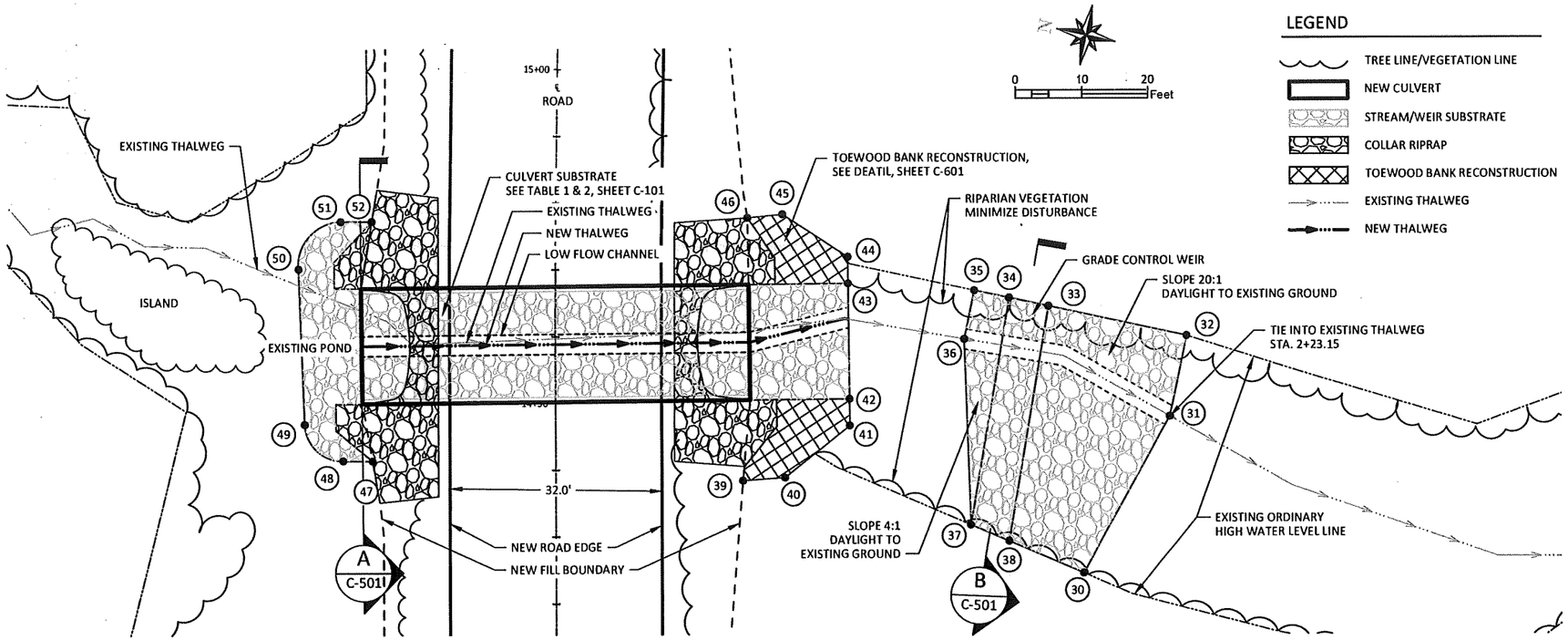
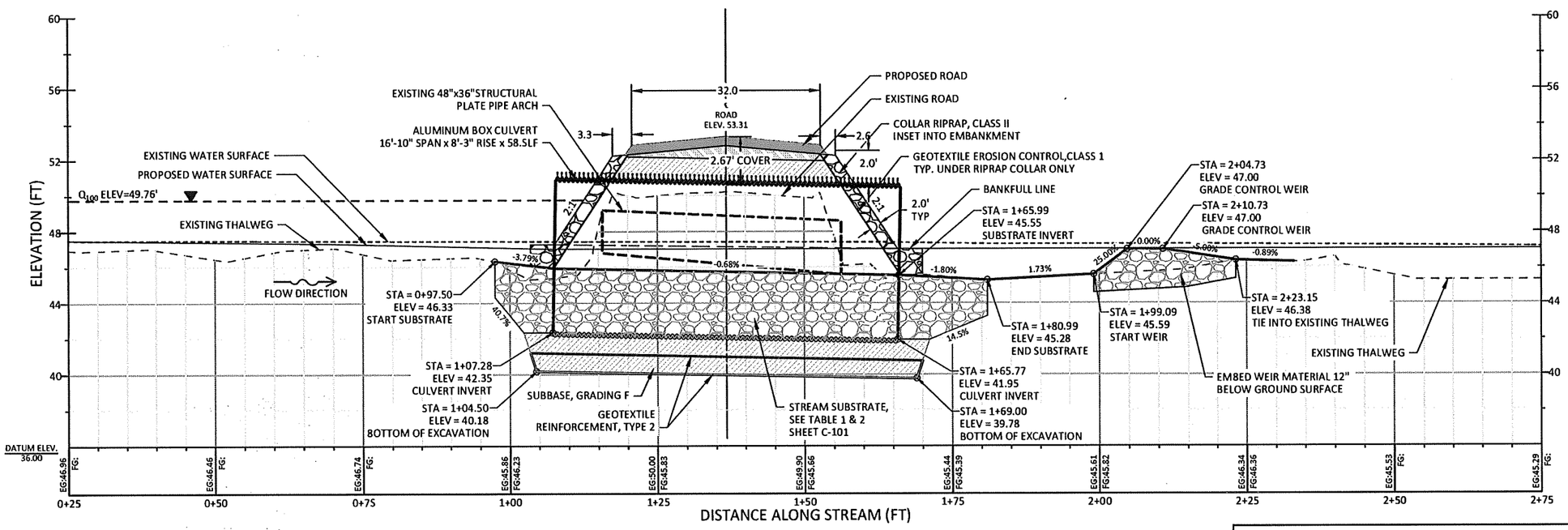
JOB NO. 1684.18

SHEET C-400

COP 44 POINTS		
POINT #	NORTHING	EASTING
30	2354778.021	1797786.724
31	2354770.057	1797812.384
32	2354770.057	1797824.720
33	2354791.465	1797824.687
34	2354797.470	1797824.678
35	2354802.760	1797824.678
36	2354802.741	1797817.223
37	2354795.994	1797790.219
38	2354789.966	1797789.047
39	2354831.081	1797789.528
40	2354824.978	1797791.299
41	2354816.999	1797800.943
42	2354817.870	1797804.847
43	2354821.635	1797821.706
44	2354822.510	1797825.611
45	2354833.477	1797829.798
46	2354838.506	1797828.185
47	2354886.340	1797780.759
48	2354890.676	1797779.867
49	2354897.451	1797783.993
50	2354903.126	1797806.575
51	2354898.494	1797814.851
52	2354893.838	1797815.852



A COP 44 (20100510) SUBSTRATE PLAN
SCALE: 1 : 10



B COP 44 (20100510) CULVERT PROFILE
SCALE: H=1 : 8 V=1:3

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

100% SUBMITTAL - DECEMBER 23, 2019

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED: ____
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100S

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 44 (20100510) SUBSTRATE PLAN & PROFILE

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FAX (907) 272-0344
EMAIL@BCE-AK.COM
CONSULTING ENGINEERS

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EITS IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

PANNONE ENGINEERING SERVICES, LLC
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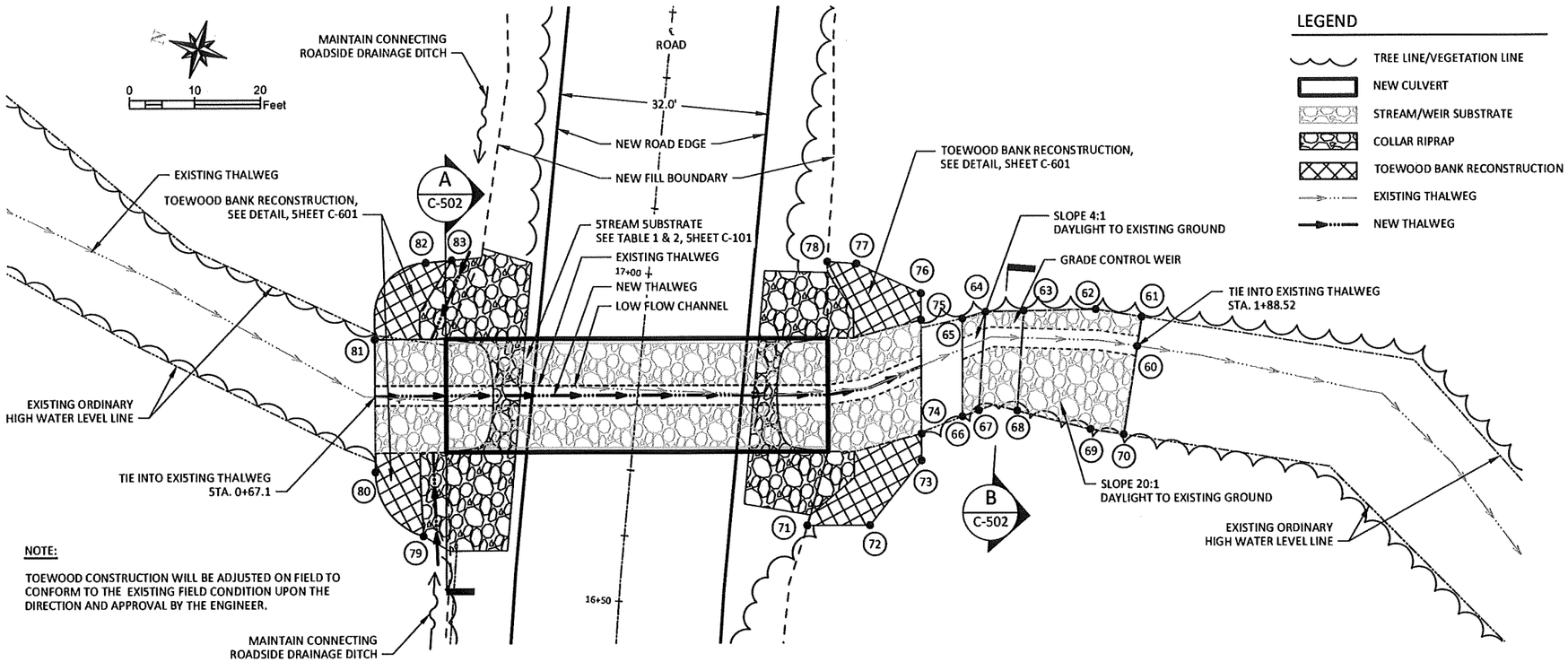
CORPORATE LICENSE AECL 1088

STATE OF ALASKA — STEVEN R. PANNONE — CE 8149 — REGISTERED PROFESSIONAL ENGINEER

JOB NO. 1684.18

SHEET C-401

COP 45 POINTS		
POINT #	NORTHING	EASTING
60	2354837.981	1798050.888
61	2354838.607	1798055.365
62	2354845.740	1798054.369
63	2354856.231	1798050.994
64	2354861.832	1798049.089
65	2354864.902	1798047.070
66	2354860.551	1798032.817
67	2354858.451	1798034.449
68	2354852.770	1798036.095
69	2354841.173	1798036.693
70	2354836.044	1798037.426
71	2354878.411	1798010.041
72	2354869.278	1798012.868
73	2354864.618	1798024.586
74	2354865.816	1798028.482
75	2354870.895	1798045.004
76	2354872.092	1798048.897
77	2354882.775	1798050.372
78	2354887.115	1798049.356
79	2354934.206	1797991.316
80	2354944.105	1797998.451
81	2354950.089	1798017.725
82	2354945.926	1798031.255
83	2354942.233	1798032.762

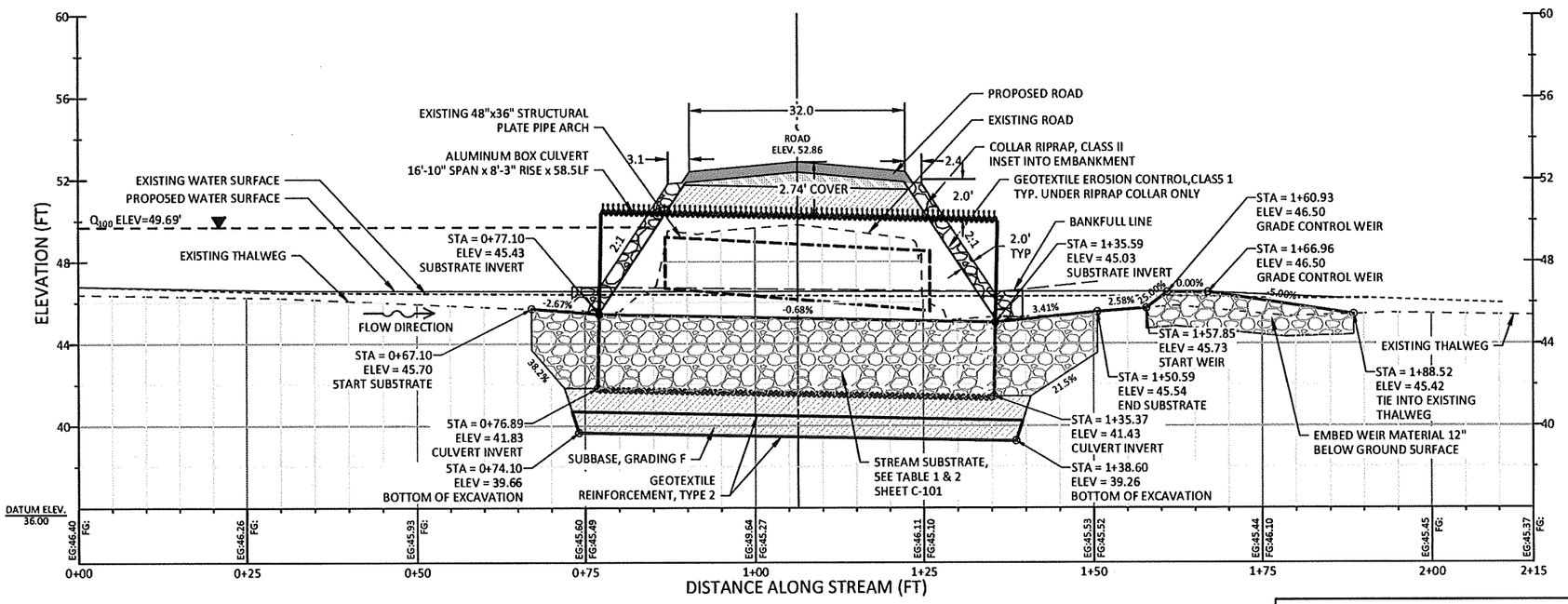


NOTE:

TOEWOOD CONSTRUCTION WILL BE ADJUSTED ON FIELD TO CONFORM TO THE EXISTING FIELD CONDITION UPON THE DIRECTION AND APPROVAL BY THE ENGINEER.

A COP 45 (20100511) SUBSTRATE PLAN

SCALE: 1 : 10



B COP 45 (20100511) CULVERT PROFILE

SCALE: H=1 : 10 V=1:3

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-1002

PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING: COP 45 (20100511) SUBSTRATE PLAN & PROFILE

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Bautzmann

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AECL 1088

STATE OF ALASKA — STEVEN R. PANNONE — CE 9149 — REGISTERED PROFESSIONAL ENGINEER
12/23/19

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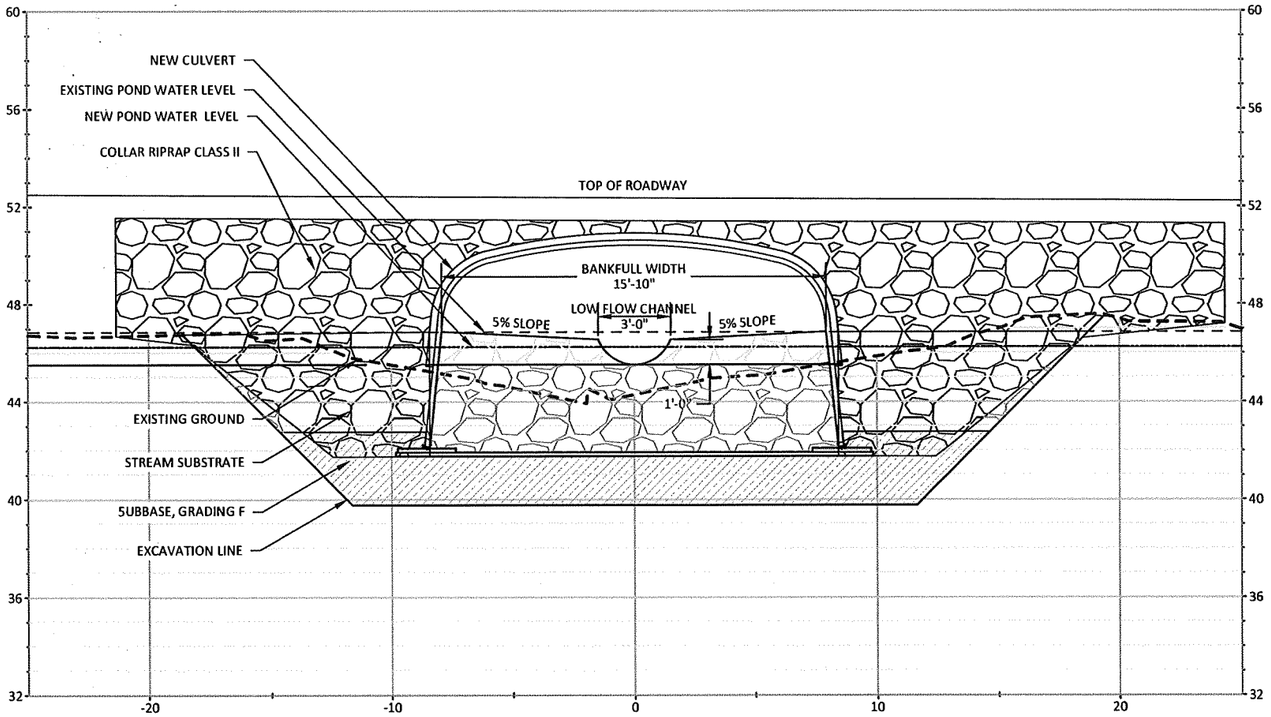
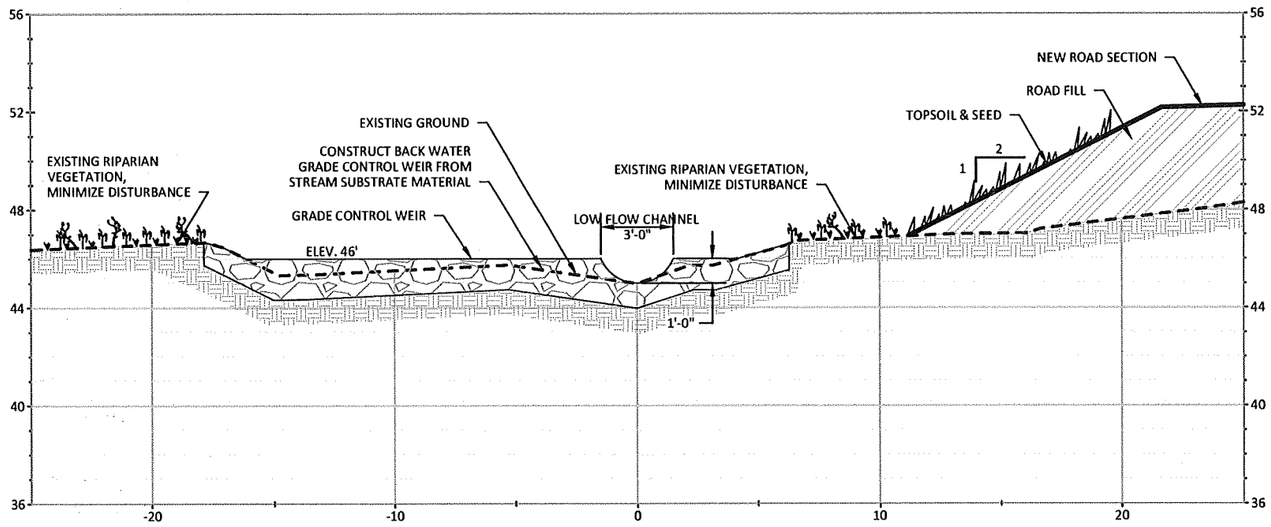
JOB NO. 1684.18

SHEET C-402



A C-400 **SECTION A**
SCALE: 1 : 3



B C-400 **SECTION B**
SCALE: 1 : 3

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
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DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684-18-100S

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 43 (20100508) STREAM SECTIONS

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mail@bce-ak.com
BCE CONSULTING ENGINEERS, LLC

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PANNONE ENGINEERING SERVICES, LLC
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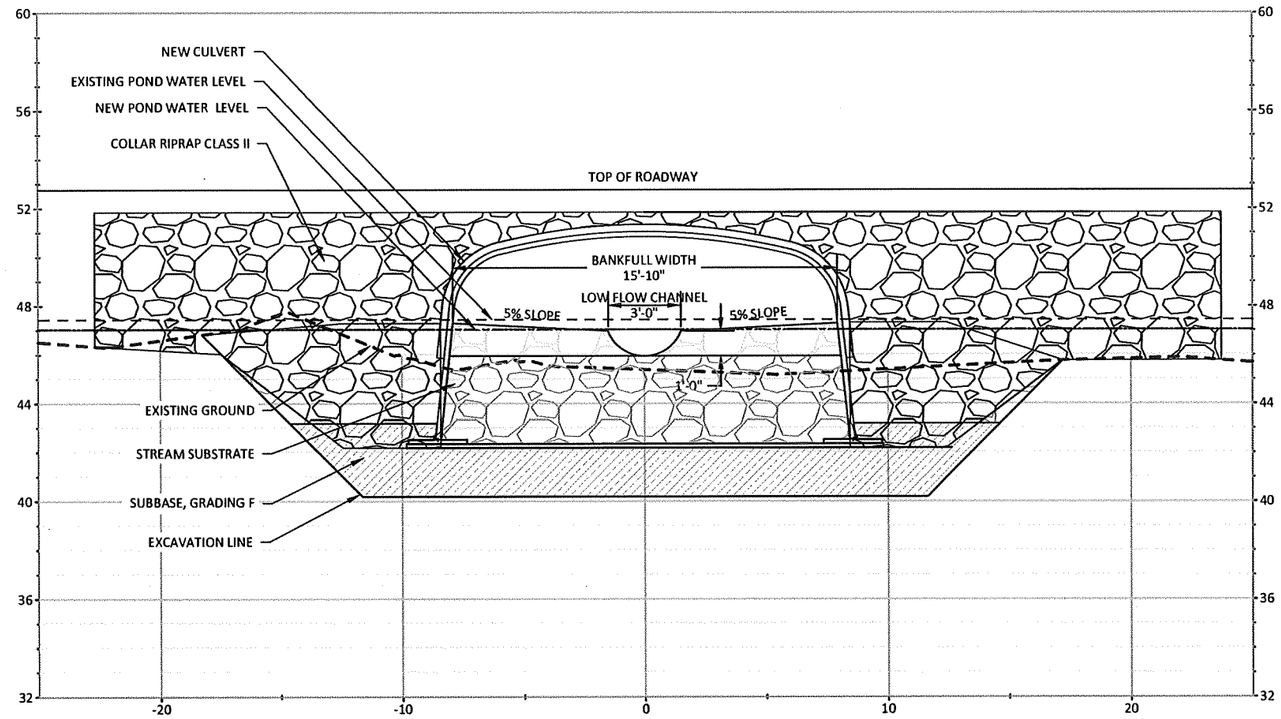
CORPORATE LICENSE
AECL 1088

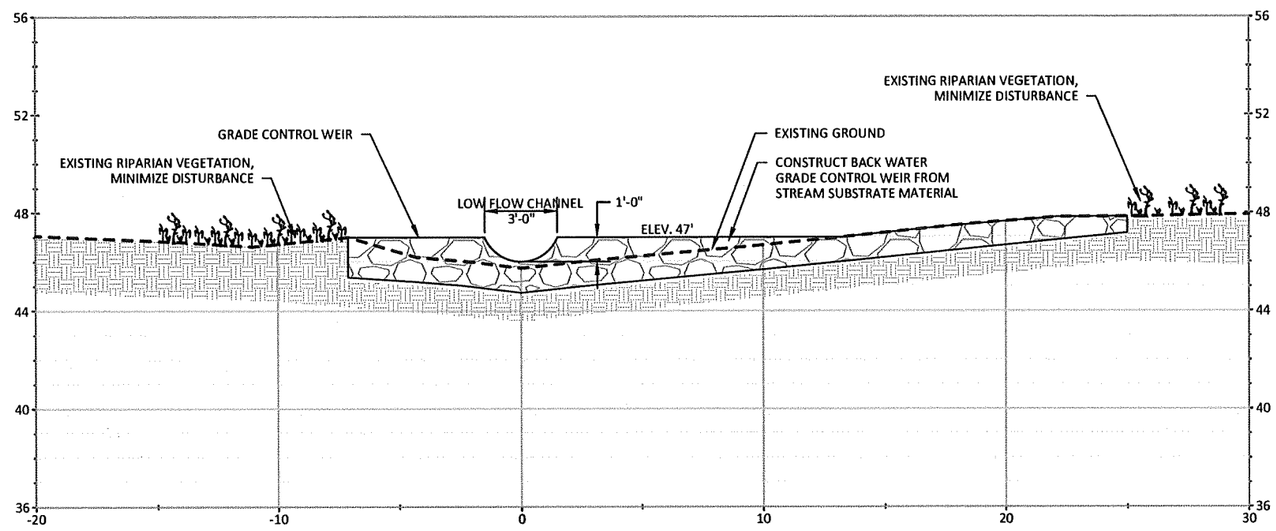
STATE OF ALASKA — STEVEN R. PANNONE — CE 8149 — REGISTERED PROFESSIONAL ENGINEER

JOB NO. 1684.18

SHEET
C-500



A C-401 **SECTION A**
SCALE: 1 : 3



B C-401 **SECTION B**
SCALE: 1 : 3

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REV. NO.	DATE	REVISIONS

DATE 12/23/19
DESIGNED
DRAWN GU
CHECKED SP
SCALE AS NOTED
FILE 1684.18-100%

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 44 (20100510) STREAM SECTIONS

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Brandon Gray

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STATE OF ALASKA
STEVEN R. PANNONE
CE 8149
REGISTERED PROFESSIONAL ENGINEER
12/23/19

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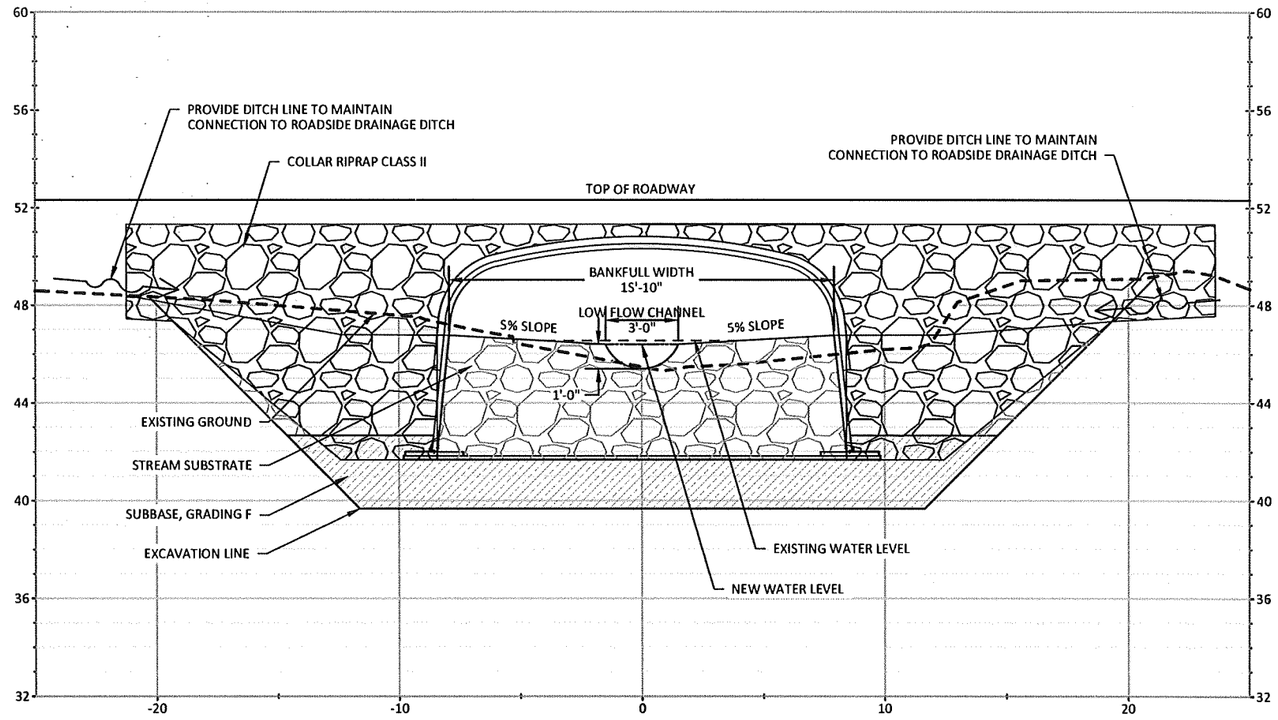
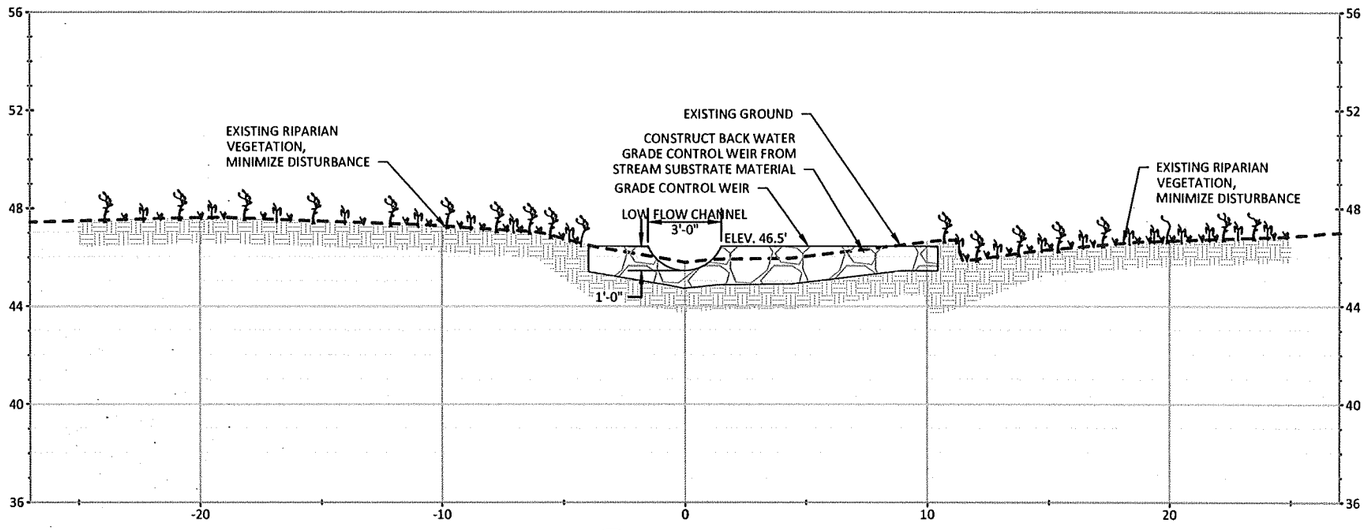
JOB NO. 1684.18

SHEET C-501



A C-402 **SECTION A**
SCALE: 1 : 3



B C-402 **SECTION B**
SCALE: 1 : 3

100% SUBMITTAL - DECEMBER 23, 2019

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PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING COP 45 (20100511) STREAM SECTIONS

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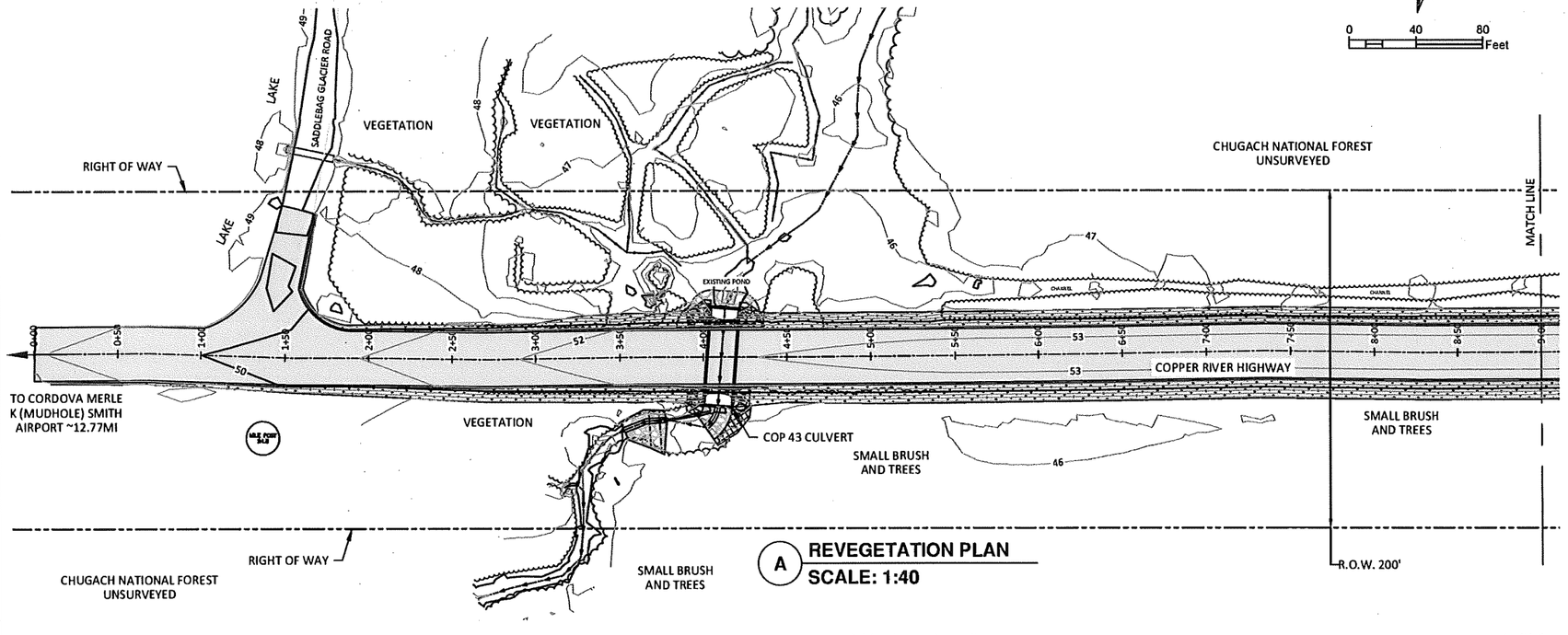
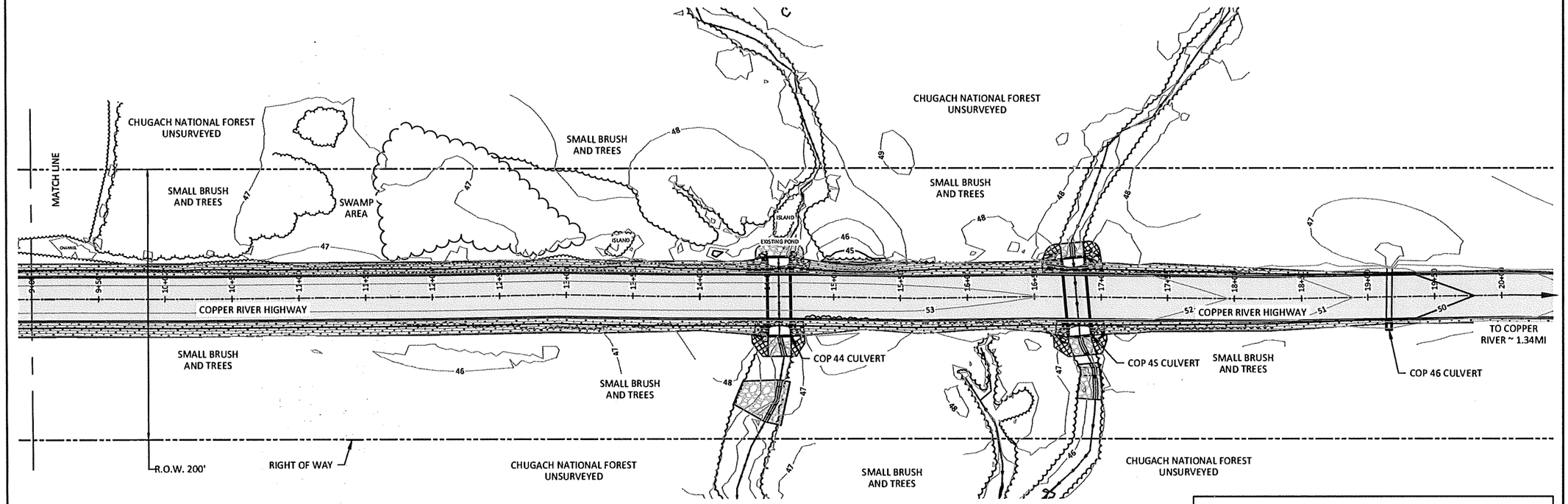
SHEET C-502



A **REVEGETATION PLAN**
SCALE: 1:40



B **REVEGETATION PLAN**
SCALE: 1:40

SEED	
NAME	PROPORTION BY WEIGHT
NORTAN TUFTED HAIR GRASS, *DESCHAMPISA CAESPITOSA*	20%
ARCTARED' RED FESCUE, *FESTUCA RUBRA*	60%
CALAMANGROTIS CANADENSIS	20%

LEGEND

- TREE LINE/VEGETATION LINE
- EXISTING CULVERT
- NEW CULVERT
- SEED, FERTILIZER & MULCH, A=3473 SY
- COLLAR RIPRAP
- STREAM/WEIR SUBSTRATE
- TOEWOOD BANK
- NEW ROAD EMBANKMENT
- THALWEG
- 53 FINISHED GROUND CONTOUR

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-100C

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING REVEGETATION PLAN

BCE
800 W 27th AVE., SUITE A
ANCHORAGE, ALASKA 99503
WWW.BCE-AK.COM
PHONE (907) 272-5314
FAX (907) 272-5314
mail@bce-ak.com
Bretwalda
CONSULTING ENGINEERS, LLC

PANNONE ENGINEERING SERVICES, LLC
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE
AECL 1088

STATE OF ALASKA
STEVEN R. PANNONE
CE 8148
REGISTERED PROFESSIONAL ENGINEER
12/23/19

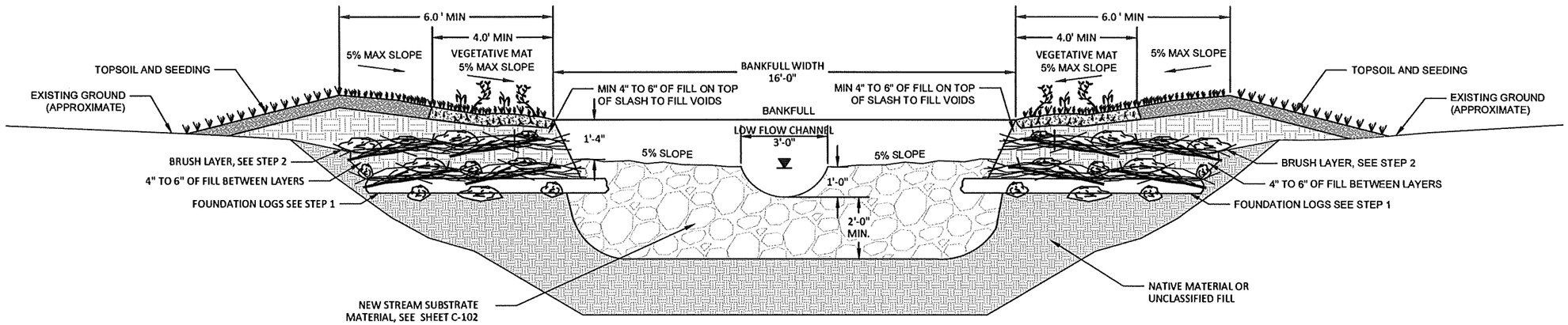
I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

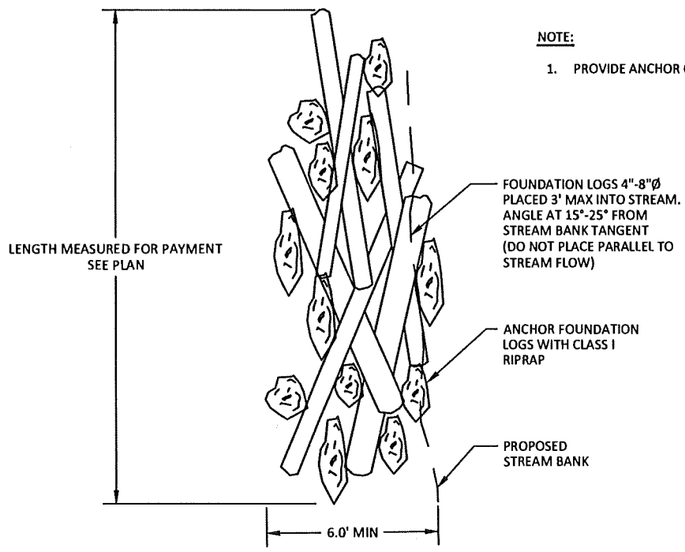
SHEET
C-600

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.



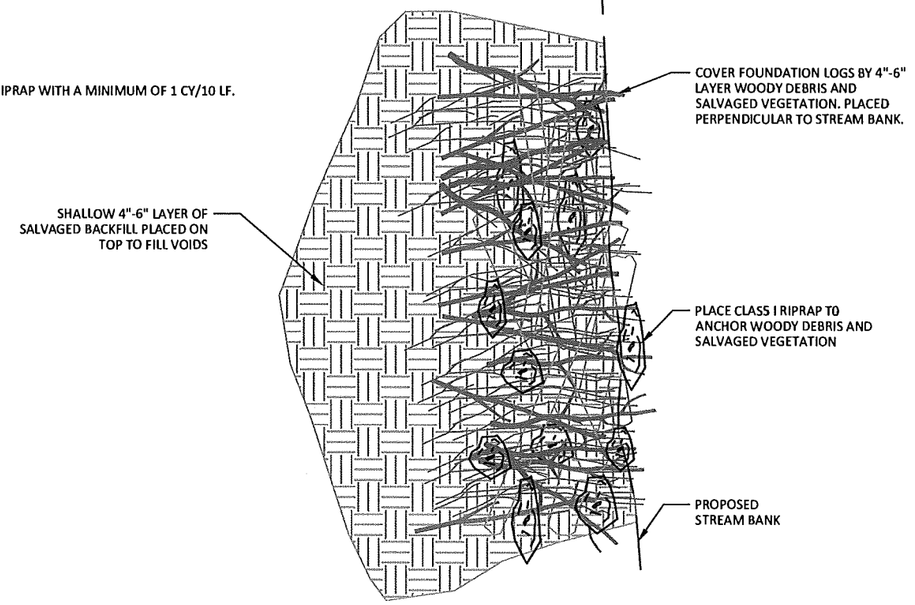
STREAM CROSS SECTION



NOTE:

1. PROVIDE ANCHOR CLASS 1 RIPRAP WITH A MINIMUM OF 1 CY/10 LF.

STEP 1: TOEWOOD BANK RECONSTRUCTION FOUNDATION



STEP 2: TOEWOOD BANK RECONSTRUCTION BRUSH LAYERS

(A) TOEWOOD BANK RECONSTRUCTION DETAILS

SCALE : NTS

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1884.18-100S

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING TOEWOOD BANK RECONSTRUCTION DETAILS

BCE CONSULTING ENGINEERS
500 W 27th AVE, SUITE A
ANCHORAGE, ALASKA 99503
WWW.BCE-AK.COM
PHONE (907) 272-5264
FAX (907) 272-3214
mail@bce-ak.com

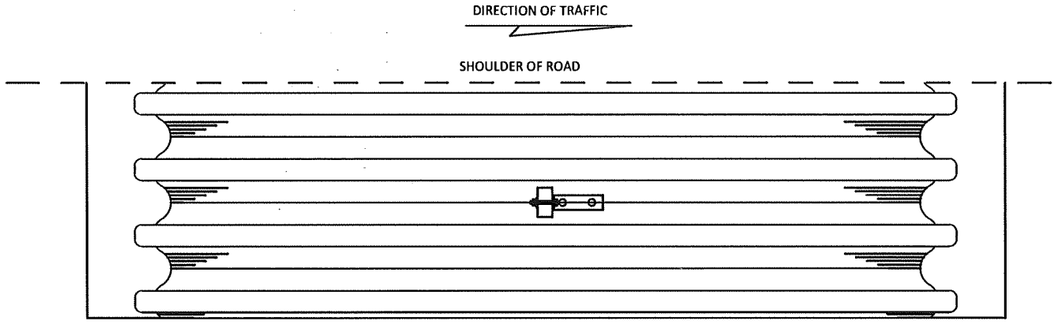
PANNONE ENGINEERING SERVICES, LLC
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE AECL 1088

I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EIT'S IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

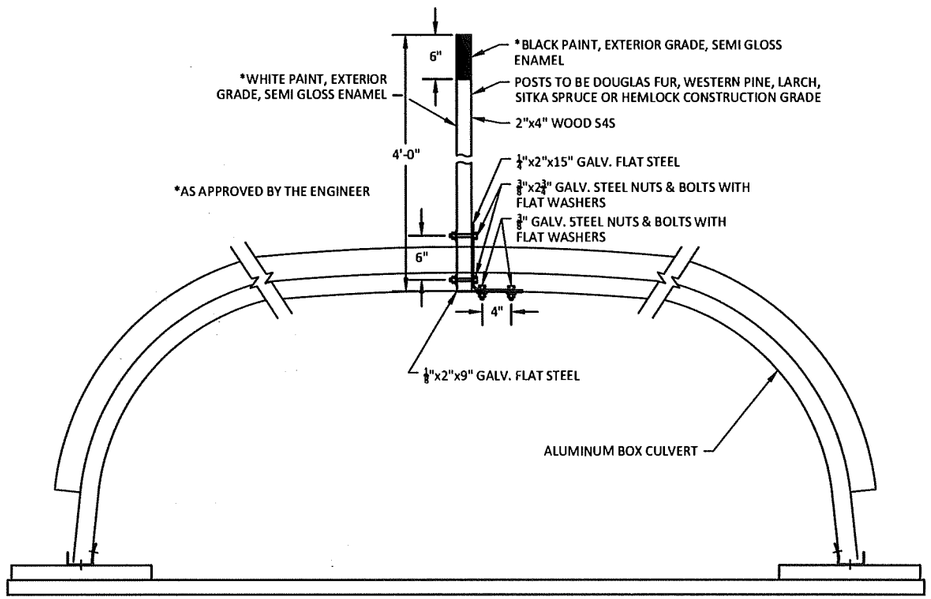
STATE OF ALASKA — STEVEN R. PANNONE — CE 8149 — REGISTERED PROFESSIONAL ENGINEER — 12/30/19

JOB NO. 1884.18

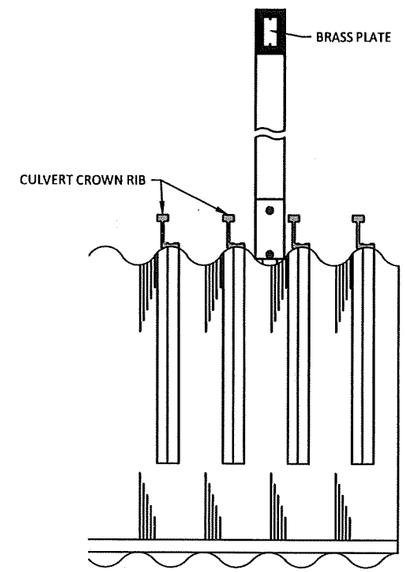
SHEET C-601



TOP VIEW



END VIEW



SIDE VIEW

GENERAL NOTES:

1. CULVERT MARKER POST SHALL BE INSTALLED WITH GALVANIZED STEEL HARDWARE MEETING THE FOLLOWING REQUIREMENTS: GALVANIZING FOR NUTS AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM A-153, CLASS C. GALVANIZING FOR STEEL MOUNTING SUPPORTS SHALL MEET THE REQUIREMENTS OF MIL-P-2691SA, OR ASTM A-153, CLASS C.
2. DRILL ALL BOLT HOLES. FLAME CUTTING SHALL NOT BE PERMITTED.
3. GASKET MATERIAL SHALL BE PLACED BETWEEN DISSIMILAR METALS. GASKET MATERIAL SHALL BE APPROVED PRIOR TO INSTALLATION.
4. SOME DETAILS ON THIS SHEET WERE COPIED FROM AKDOT&PF STANDARD DETAILS FOR CULVERT MARKER D-09.00.

24 + 85 • 16'-10" x 8'-3" • x 58.5'	25 + 05 • 16'-10" x 8'-3" • x 58.5'	25 + 09 • 16'-10" x 8'-3" • x 58.5'	25 + 13 • 36" x 48" x • 46.5'
SITE 20100508	SITE 20100510	SITE 20100511	SITE 20100512

STA. AND SIZE OF CULVERT TO BE STAMPED INTO A 2"x4"x0.064" THICK BRASS PLATE. FASTENED, WITH NO. 8 ROUND HEAD BRASS SCREWS, TO THE MARKER POST AS SHOWN. PLATE TO BE ON SIDE OF POST FACING TRAFFIC.

A CULVERT MARKER POST DETAIL
SCALE: NTS

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-1005

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING CULVERT MARKER POST

BCE Bettinger Consulting Engineering
501 W 27th AVE., SUITE A
ANCHORAGE, ALASKA 99503
WWW.BCE-AK.COM
PHONE (907) 272-5254
FAX (907) 272-5214
mail@bce-ak.com

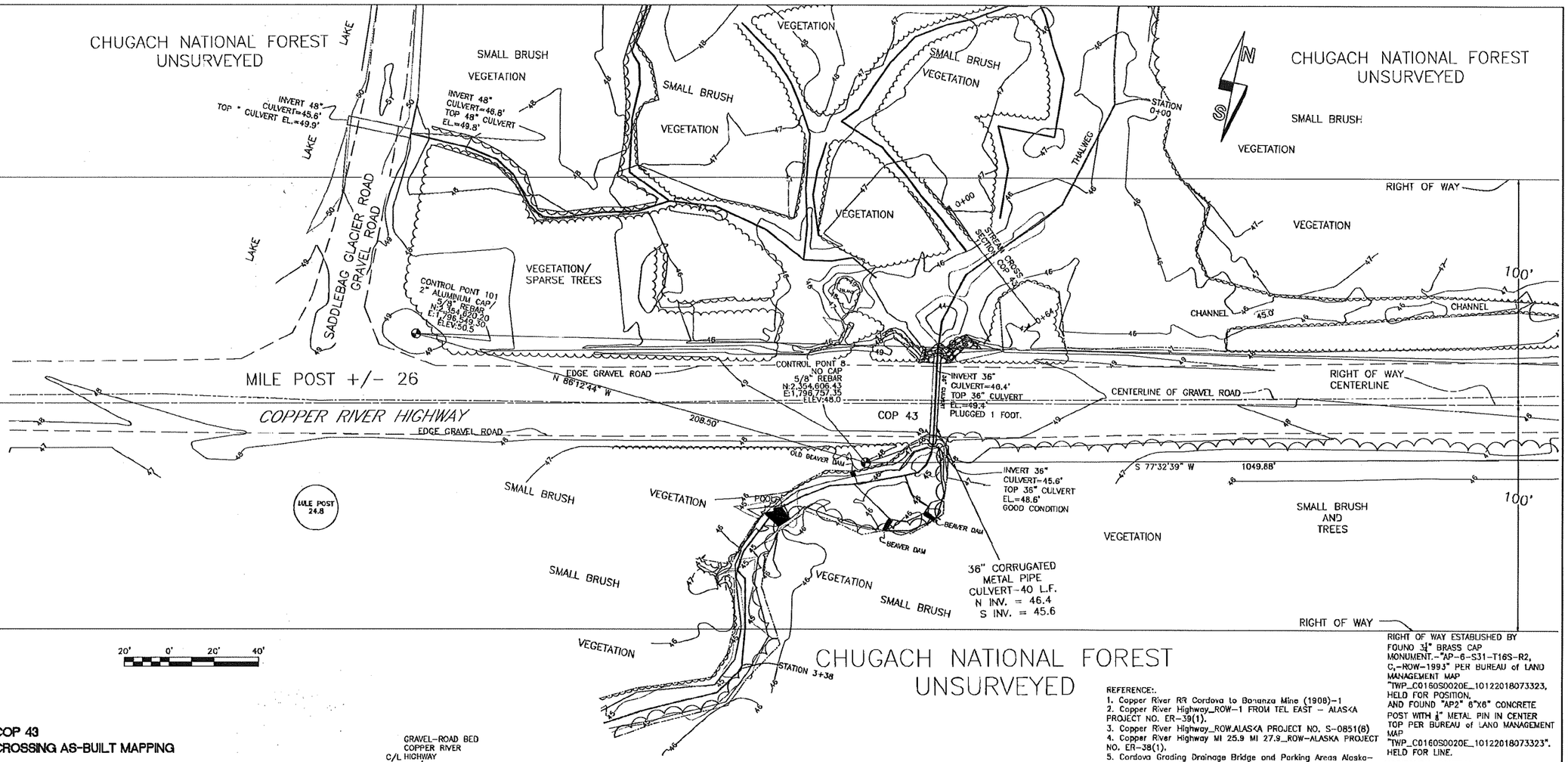
PANNONE ENGINEERING SERVICES, LLC
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE AECL 1088

STATE OF ALASKA — STEVEN R. PANNONE — CE 8148 — REGISTERED PROFESSIONAL ENGINEER

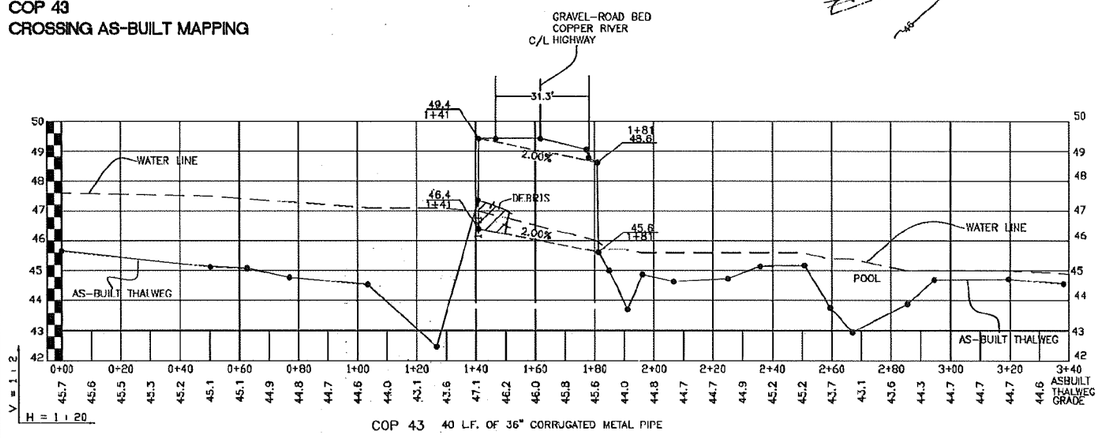
I, STEVEN R. PANNONE, P.E., HAVE REVIEWED THE CALCULATIONS, DESIGN AND DRAWING FOR ACCURACY AND CONFORMANCE WITH THE STATE OF ALASKA AELS REGULATIONS. FURTHER, I HAVE VERIFIED THE WORK PERFORMED BY THE TECHNICIANS, DRAFTERS AND EITS IN THE DEVELOPMENT OF THESE DESIGN DRAWINGS AND SPECIFICATIONS.

JOB NO. 1684.18

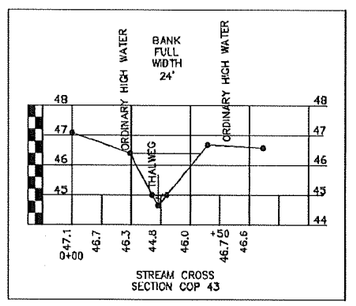
SHEET
C-700



COP 43
CROSSING AS-BUILT MAPPING



COP 43 40 L.F. OF 36" CORRUGATED METAL PIPE



REFERENCE:
1. Copper River RR Cordova to Bonanza Mine (1908)-1
2. Copper River Highway_ROW-1 FROM TEL EAST – ALASKA PROJECT NO. ER-39(1).
3. Copper River Highway_ROW.ALASKA PROJECT NO. S-0851(8)
4. Copper River Highway MI 25.9 MI 27.9_ROW-ALASKA PROJECT NO. ER-38(1).
5. Cordova Grading Drainage Bridge and Parking Areas Alaska-Forest Highways Cordova Copper River Highway. Chugach National Forest Alaska_As3uit-ALASKA PROJECT NO. FH4-E,B5 &FH3 32-2(1).
6. TWP_C0160S0020E_10122018073323-BLM.

RIGHT OF WAY ESTABLISHED BY FOUND ¾" BRASS CAP MONUMENT.-"AP-6-S31-T16S-R2, C,-ROW-1993" PER BUREAU of LAND MANAGEMENT MAP "TWP_C0160S0020E_10122018073323, HELD FOR POSITION, AND FOUND "AP2" 6"X6" CONCRETE POST WITH ½" METAL PIN IN CENTER TOP PER BUREAU of LAND MANAGEMENT MAP "TWP_C0160S0020E_10122018073323". HELD FOR LINE.

HORIZONTAL CONTROL:
BASED ON STATIC OBSERVATION ON POINTS 101 AND 103, USING TRIMBLE R10 GLOBAL POSITIONING SYSTEMS RECEIVERS. DATA REDUCED AND SOLUTION MADE BY NATIONAL GEOGRAPHIC SURVEY OPUS PROGRAM.
REFERENCE FRAME:NAD_83(2011) (EPOCH:2010).

VERTICAL CONTROL:
BASED ON STATIC OBSERVATION ON POINTS 101 AND 103, USING TRIMBLE R10 GLOBAL POSITIONING SYSTEMS RECEIVERS. DATA REDUCED AND SOLUTION MADE BY NATIONAL GEOGRAPHIC SURVEY OPUS PROGRAM.
REFERENCE FRAME:NAD_83(2011) (EPOCH:2010).
NAVD 88. COMPUTING USING GEOID MODEL 12B.
HELD POINT 101- 50.53' FOR ELEVATION.

Description: AS-BUILT MAPPING
COPPER RIVER HIGHWAY
COP 43
CROSSING
CORDOVA ALASKA

DRAWN BY	DATE
MTB	10-18-19
SCALE	SHEET #
1" = 40'	1 OF 1

REVISIONS BY BCE, T16S-R1E, COPPER RIVER MERIDIAN, ALASKA
ST. BERRY PROJECT NO. 18-010A
COPPER RIVER WATERSHED PROJECT FISH PASSAGE REVISIONS
ST. BERRY SURVEYING INC.
P.O. BOX 868, KODIAK, ALASKA 99615 (907) 481-3000

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE 12/23/19
DESIGNED
DRAWN GU
CHECKED SP
SCALE AS NOTED
FILE 1684.18-100S

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING EXISTING CONDITION - COP 43 ADF&G # 20100508

BCE Bettinger
300 W 27th AVE. SUITE A
ANCHORAGE, ALASKA 99503
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PHONE (907) 272-5264
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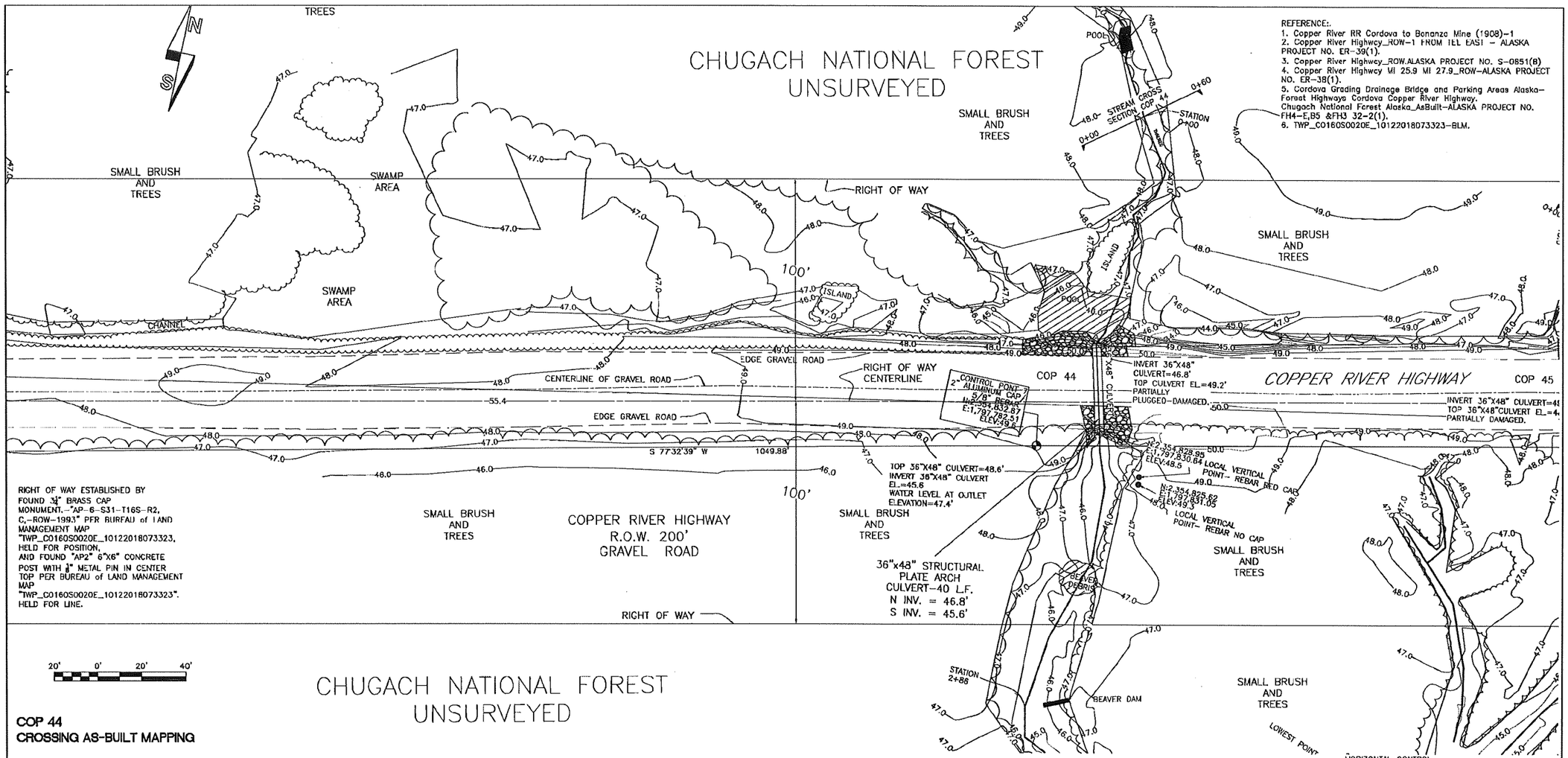
mail@bce-ak.com
CONSULTING ENGINEERS

PANNONE ENGINEERING SERVICES, LLC
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE
AECL 1088

JOB NO. 1684.18

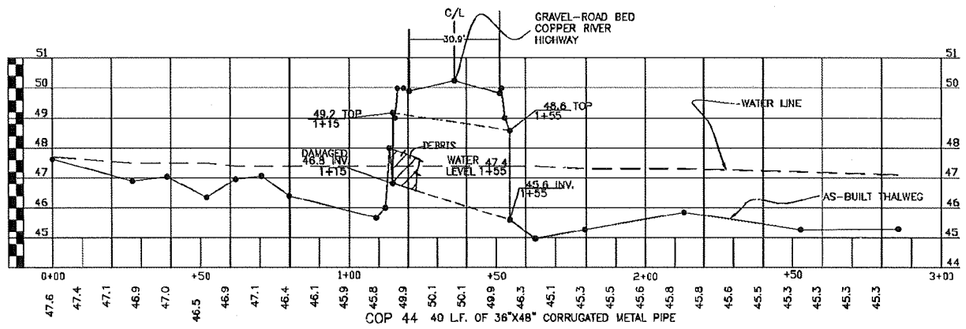
SHEET
V-100



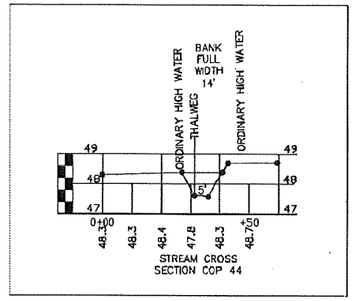
20' 0' 20' 40'

CHUGACH NATIONAL FOREST UNSURVEYED

COP 44
CROSSING AS-BUILT MAPPING



COP 44 40 L.F. OF 36"X48" CORRUGATED METAL PIPE



HORIZONTAL CONTROL:
BASED ON STATIC OBSERVATION ON POINTS 101 AND 103. USING TRIMBLE R10 GLOBAL POSITIONING SYSTEMS RECEIVERS. DATA REDUCED AND SOLUTION MADE BY NATIONAL GEOGRAPHIC SURVEY OPUS PROGRAM.
REFERENCE FRAME:NAD_83(2011) (EPOCH:2010).

VERTICAL CONTROL:
BASED ON STATIC OBSERVATION ON POINTS 101 AND 103. USING TRIMBLE R10 GLOBAL POSITIONING SYSTEMS RECEIVERS. DATA REDUCED AND SOLUTION MADE BY NATIONAL GEOGRAPHIC SURVEY OPUS PROGRAM.
REFERENCE FRAME:NAD_83(2011) (EPOCH:2010).
NAVD 88. COMPUTING USING GEOID MODEL 12B.
HELD POINT 101- 50.53' FOR ELEVATION.

STATE OF ALASKA — 49 TH — LICENSED PROFESSIONAL LAND SURVEYOR — No. 12727

Description: AS-BUILT MAPPING
COPPER RIVER HIGHWAY
COP 44
CROSSING
CORDOVA ALASKA

DRAWN BY	DATE	SURVEYED 05, T16S-R4E, COPPER RIVER MERIDIAN, ALASKA
BYFD	02-16-18	
SCALE 1"= 40'	SHEET 1 of 1	ST. BENNY PROJECT NO. 18-010A

COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
ST. BENNY SURVEYING INC.
P.O. BOX 566, CORDOVA, ALASKA, 99574 (907) 424-5800

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1884.18-100S

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)

DRAWING EXISTING CONDITION - COP 44 ADF&G # 20100510

BCE
300 W 27th AVE., SUITE A
ANCHORAGE, ALASKA 99503
WWW.BCE-AK.COM
PHONE (907) 272-0254
FAX (907) 272-0344
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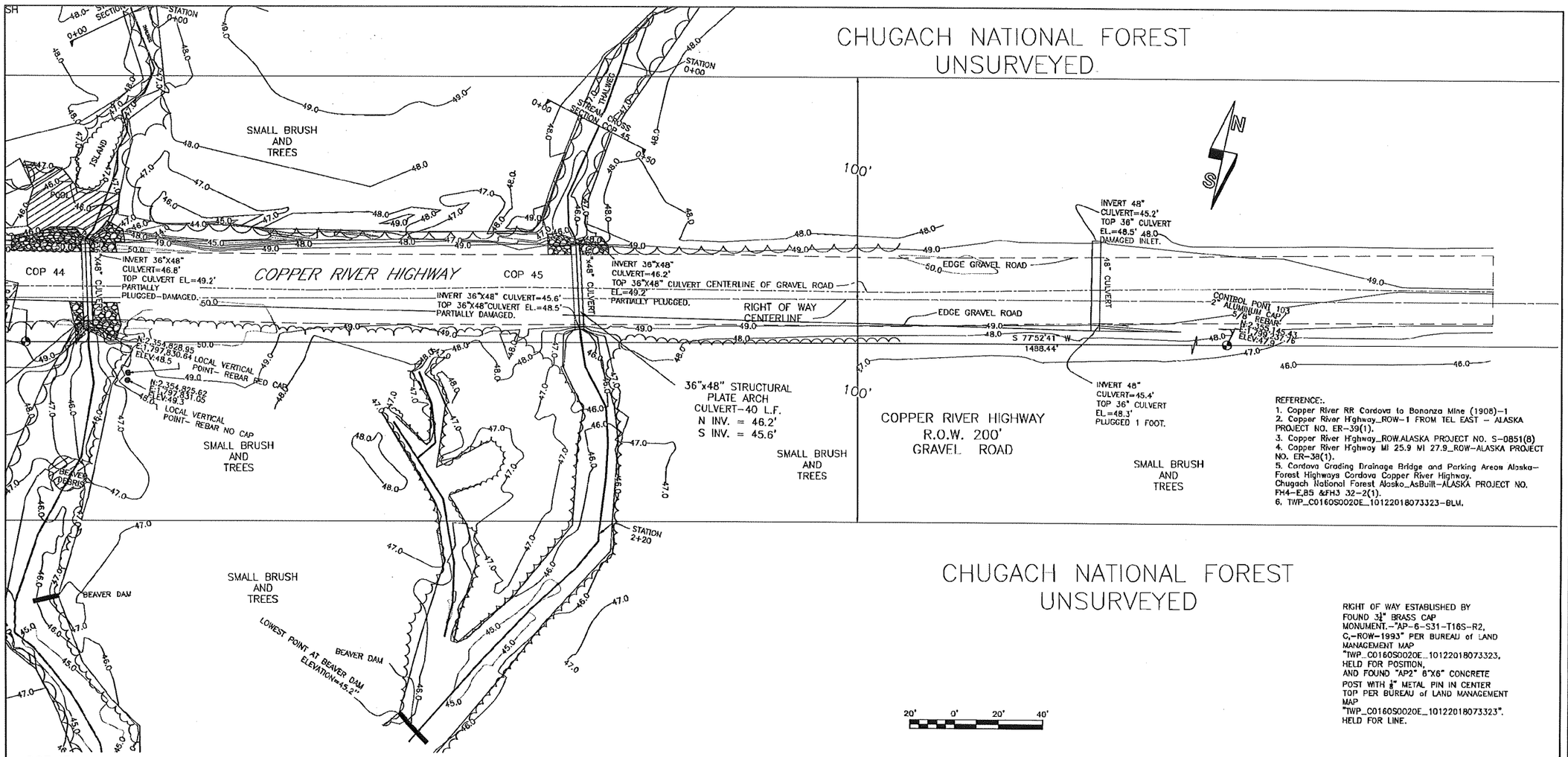
Bartlett & Company
CONSULTING ENGINEERS

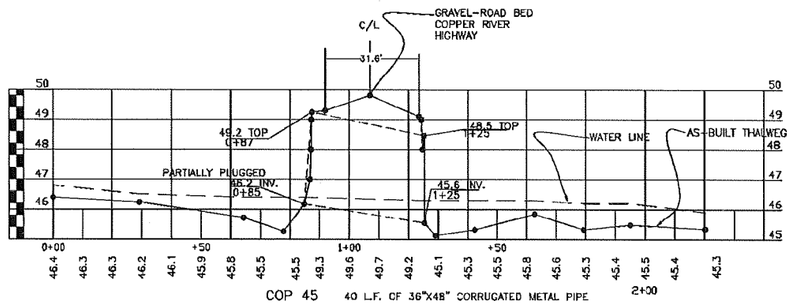
PANNONE ENGINEERING SERVICES, LLC
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE
AECL 1088

JOB NO. 1684.18

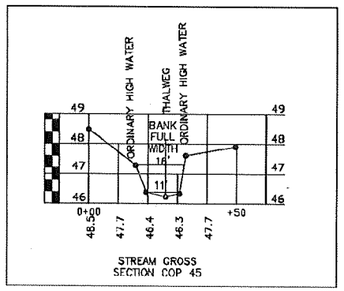
SHEET
V-101



COP 45
CROSSING AS-BUILT MAPPING



COP 45 40 L.F. OF 36"X48" CORRUGATED METAL PIPE



STREAM CROSS SECTION COP 45

Description: AS-BUILT MAPPING COPPER RIVER HIGHWAY COP 45 CROSSING	
CORDOVA	ALASKA
DRAWN BY: DATE 02-16-19	CONTRACT NO. FH32-2(1), COPPER RIVER BRIDGE, ALASKA
SCALE 1"=40' SHEET 1 of 1	PT. BERRY PROJECT NO. 18-010A
COPPER RIVER WATERSHED PROJECT FISH PASSAGE RESTORATION	
PT. BERRY SURVEYING INC. P.O. BOX 468, EAGLE, ALASKA 99738 (907) 691-3600	

100% SUBMITTAL - DECEMBER 23, 2019

NOTE: FOR 11"x17" DRAWINGS, USE HALF THE INDICATED SCALE.

REV. NO.	DATE	REVISIONS

DATE: 12/23/19
DESIGNED:
DRAWN: GU
CHECKED: SP
SCALE: AS NOTED
FILE: 1684.18-10025

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING EXISTING CONDITION - COP 45 ADF&G # 20100511

BCE Bettinger Consulting Engineering
500 W 27th AVE, SUITE A ANCHORAGE ALASKA 99503 www.bce-ak.com
PHONE (907) 272-5264 FAX (907) 272-5314 mail@bce-ak.com

PANNONE ENGINEERING SERVICES, LLC
P.O.BOX 1807
PALMER, AK 9645
CORPORATE LICENSE AECL 1088

JOB NO. 1684.18

SHEET
V-102