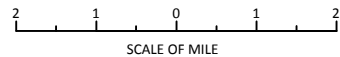
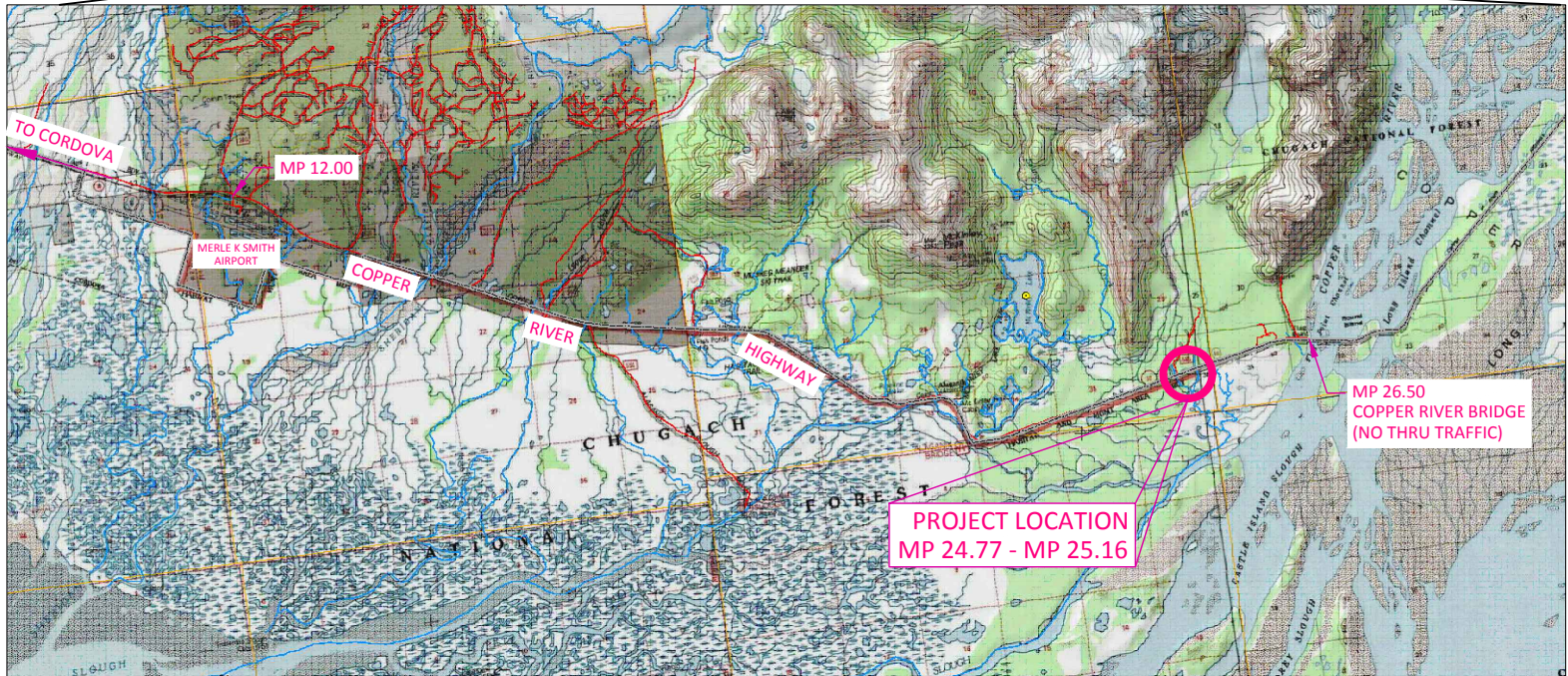
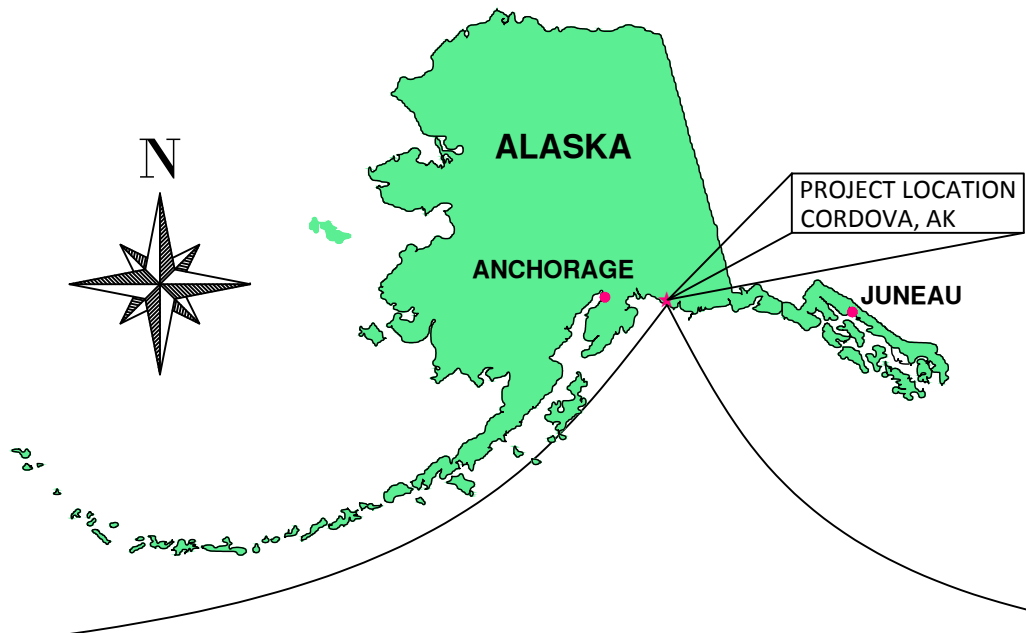
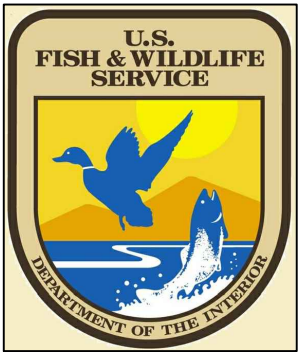


US FISH & WILDLIFE SERVICE (USFWS)
COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT
CORDOVA EVOS SITES COP 43, 44, AND 45
CORDOVA, ALASKA
OCTOBER 25, 2019



VICINITY MAP
(COPPER RIVER HIGHWAY)

PROJECT DESCRIPTION

THE PROPOSED PROJECT INVOLVES REPLACING EXISTING CULVERTS WITH A LARGER STREAM SIMULATION ALUMINUM BOX CULVERTS AT THREE (3) LOCATIONS (SEE TABLE BELOW), 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).

PROJECT LOCATION			
ADF&G SITE NO.	CRWP ID	COPPER RIVER HWY MP	STATION SHOWN ON PLAN
20100508	COP 43	24.85	4+10.82
20100510	COP 44	25.05	14+58.83
20100511	COP 45	25.09	16+81.44

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

DRAWING INDEX	
SHEET NO.	TITLE
G-001	TITLE SHEET
G-002	ESTIMATE OF QUANTITIES, GENERAL NOTES, ABBR. & EROSION & SEDIMENT CONTROL NOTES
G-003	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)

95% SUBMITTAL - OCTOBER 25, 2019

REV. NO.	DATE	REVISIONS

DATE: 10/25/19	DESIGNED: GU	CHECKED: TB	SCALE: AS NOTED	FILE: 1684.18-95%

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

500 W 27th AVE., SUITE A
ANCHORAGE, ALASKA 99503
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mail@bce-ak.com

--

JOB NO. 1684.18

SHEET
G-001

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

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)	BORROW	TON	21456			21456
301(3)	AGGREGATE SURFACE COURSE, GRADING E-1	TON	2514			2514
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, 14ga W/ CONNECTING BAND	LF	6			6
611(2)	RIPRAP, CLASS II	TON	54	63	53	170
613(2)	CULVERT MARKER POST	EA	2	2	2	6
618(1)	SEEDING	ACRE	0.71			0.71
630(3B)	GEOTEXTILE, REINFORCEMENT, TYPE 2	SY	371	371	371	1113
640(1)	MOBILIZATION & DEMOBILIZATION	LS	ALL REQ'D			ALL REQ'D
641(1)	EROSION AND POLLUTION CONTROL ADMINISTRATION	LS	ALL REQ'D			ALL REQ'D
641(3)	TEMPORARY EROSION AND POLLUTION CONTROL	LS	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
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	23	22	36	81
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)-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-TOP SOIL IS SUBSIDIARY TO PAY ITEM 618(1)-SEEDING.
6. GEOTEXTILE, EROSION CONTROL, CLASS 1 IS SUBSIDIARY TO PAY ITEM 611(2)-RIPRAP, CLASS II

ABBREVIATIONS:

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

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 (SSHCH) 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. 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. 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.
11. 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.
12. 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 APOVAL OF ADOT&PF, ALL CULVERTS REPLACED SHALL BE SALVAGED AND TO BE DELIVERED TO CORDOVA STATE ADOT&PF M&O MAINTENANCE YARD .

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.

ESTIMATING FACTORS			
ITEM NO.	ITEM DESCRIPTION	FACTOR	UNITS
203(6)	BORROW	2	TONS/CY
301(3)	AGGREGATE SURFACE COURSE, GRADING E-1	2	TONS/CY
611(2)	RIPRAP, CLASS II	1.7	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

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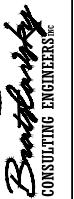
NOTE: FOR 11"x17" DRAWINGS USE HALF THE INDICATED SCALE

REV. NO.	REVISIONS			
	DATE			

DATE: 10/25/19	DESIGNED: GU	CHECKED: TB	SCALE: AS NOTED	FILE: 1684.18-95%
	DRAWN: GU			

PROJECT COPPER RIVER HABITAT ENHANCEMENT PROJECT PROJECT (FISH PASSAGE IMPROVEMENT)	LOCATION CORDOVA, ALASKA		
	CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)		
	DRAWING ESTIMATE OF QUANTITIES, GENERAL NOTES, ABBR. & EROSION & SEDIMENT CONTROL NOTES		

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JOB NO. 1684.18	
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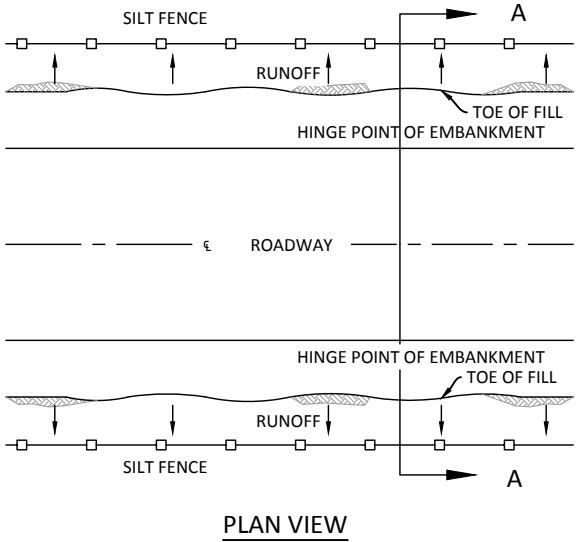
SHEET
G-002

COFFERDAM NOTES:

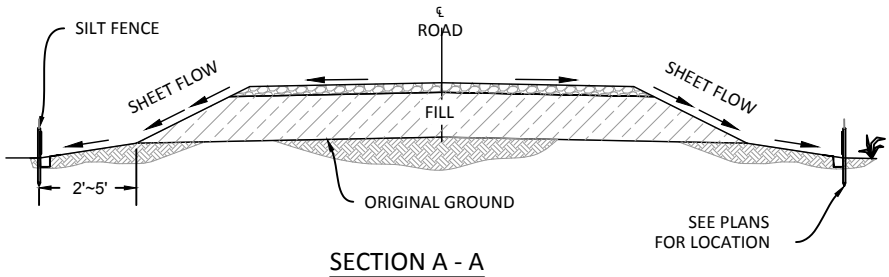
1. COFFERDAM SHALL BE CONSTRUCTED OF MULTIPLE UNITS OF SUPERSACKS FILLED WITH CLEAN GRAVEL OR COBBLE, AND ABUTTED SIDE BY SIDE TO CREATE A WATER TIGHT BARRIER THAT SEPARATES THE CONSTRUCTION SITE FROM THE STREAM.
2. IF WATER DEPTH EXCEEDS 85% OF THE SUPER SACK HEIGHT, AN ADDITIONAL TOP ROW OF BAGS SHALL 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&P 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.

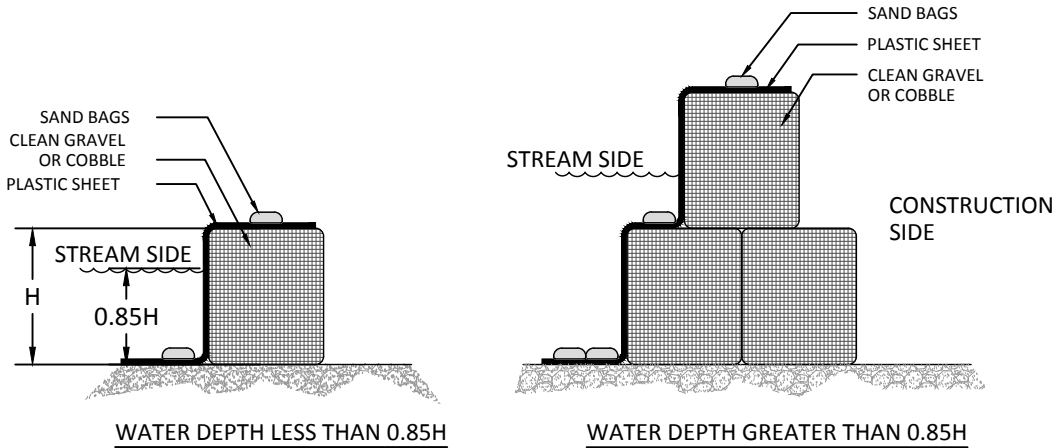


PLAN VIEW

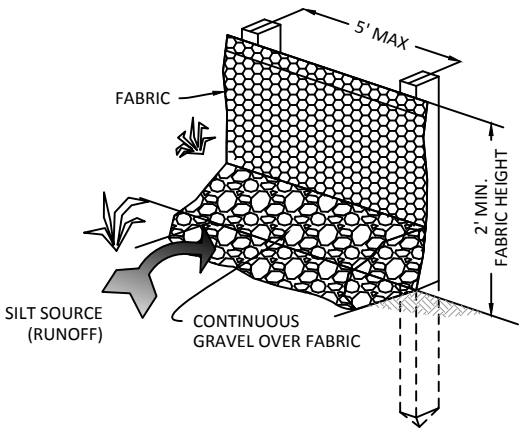


SECTION A - A

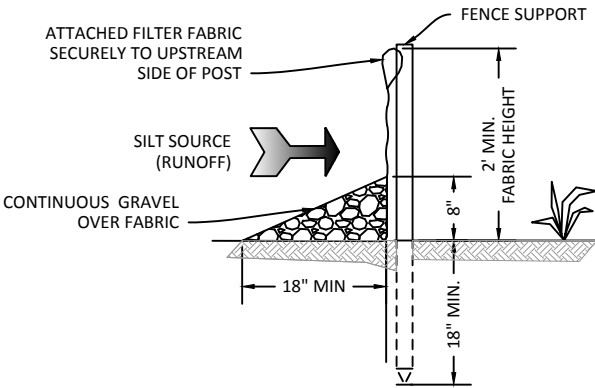
B SILT FENCE DETAILS
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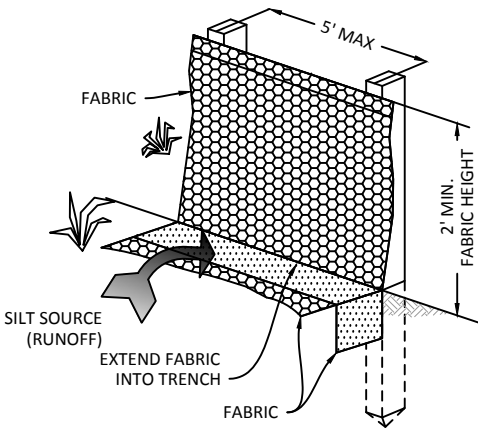
A COFFERDAM DETAILS
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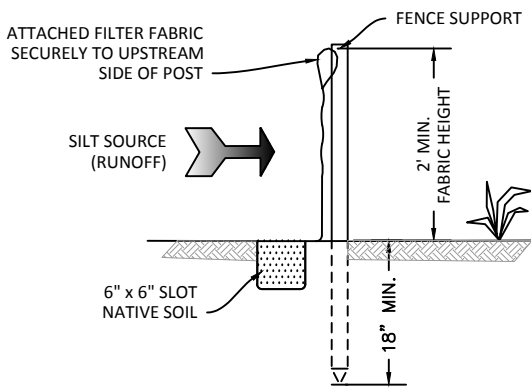
BACKFILL ALTERNATIVE



BACKFILL CROSS SECTION



TRENCH ALTERNATIVE



TRENCH CROSS SECTION

95% SUBMITTAL - OCTOBER 25, 2019

REV. NO.	DATE	REVISIONS

DATE:	10/25/19
DESIGNED:	GU
DRAWN:	GU
CHECKED:	TB
SCALE:	AS NOTED
FILE:	1684.18-95%

PROJECT	COPPER RIVER WATERSHED HABITAT ENHANCEMENT
LOCATION	CORDOVA, ALASKA
CLIENT	U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING	COFFERDAM & SILT FENCE DETAILS

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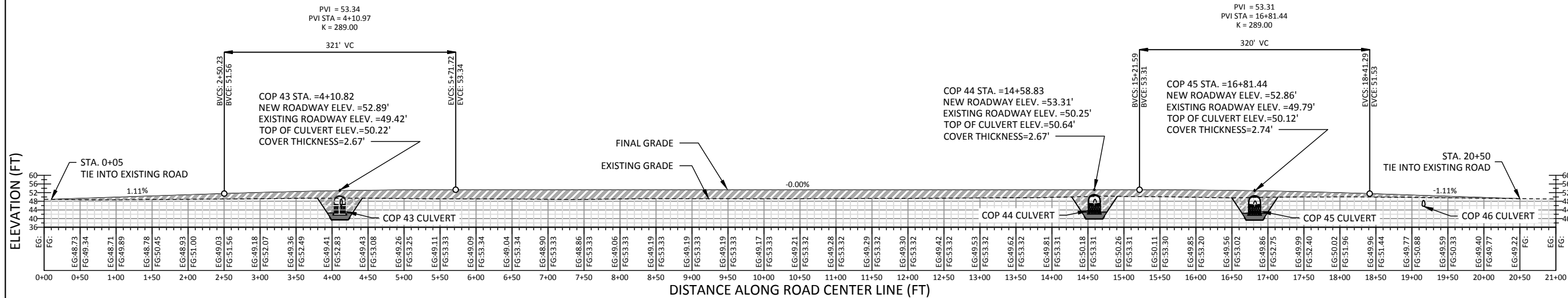
BCE

Burby
CONSULTING ENGINEERS, INC.

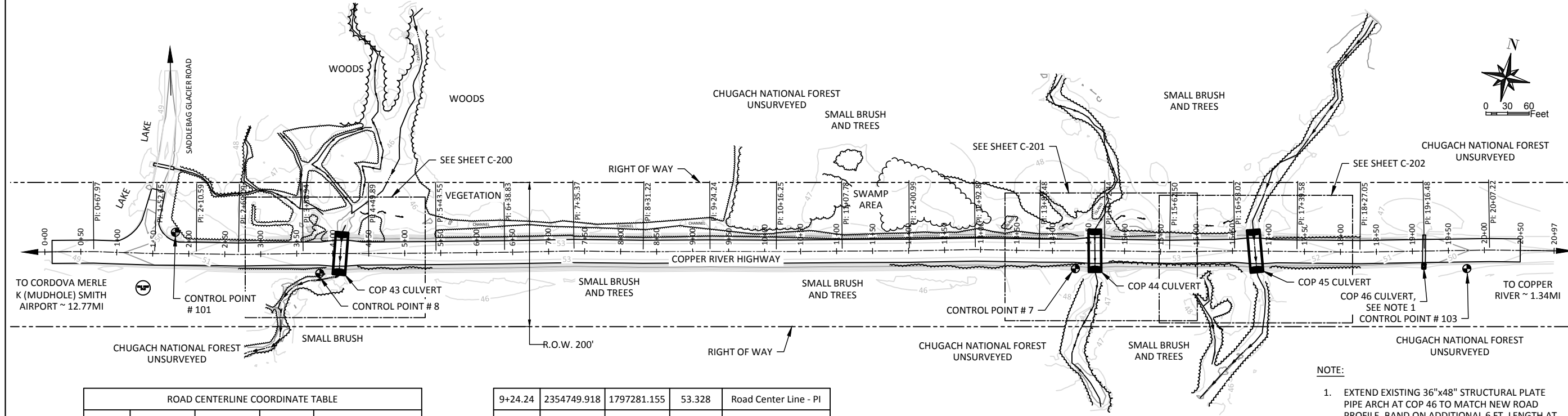
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JOB NO. 1684.18

SHEET
G-003



A COPPER RIVER HIGHWAY PROFILE MP 24.77 - MP 24.16
SCALE: H=1 : 75, V=1:3



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.

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 24.16
SCALE: 1 : 75

CONTROL POINTS				
POINT	NORTH	EAST	ELEVATION	DESCRIPTION
7	2354832.87	1797782.51	49.60	2" ALUMINUM CAP / $\frac{5}{8}$ " REBAR
8	2354606.43	1796757.35	48.00	$\frac{5}{8}$ " REBAR
101	2354620.20	1796549.30	50.50	2" ALUMINUM CAP / $\frac{5}{8}$ " REBAR
103	2355145.43	1799237.76	47.90	2" ALUMINUM CAP / $\frac{5}{8}$ " REBAR

95% SUBMITTAL - OCTOBER 25, 2019

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

REVISIONS	
REV. NO.	DATE

DATE:	10/25/19
DESIGNED:	GOU
DRAWN:	TGB
CHECKED:	AS NOTED
SCALE:	1:684.18
FILE:	1684.18-95%

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 ~ MP 24.16

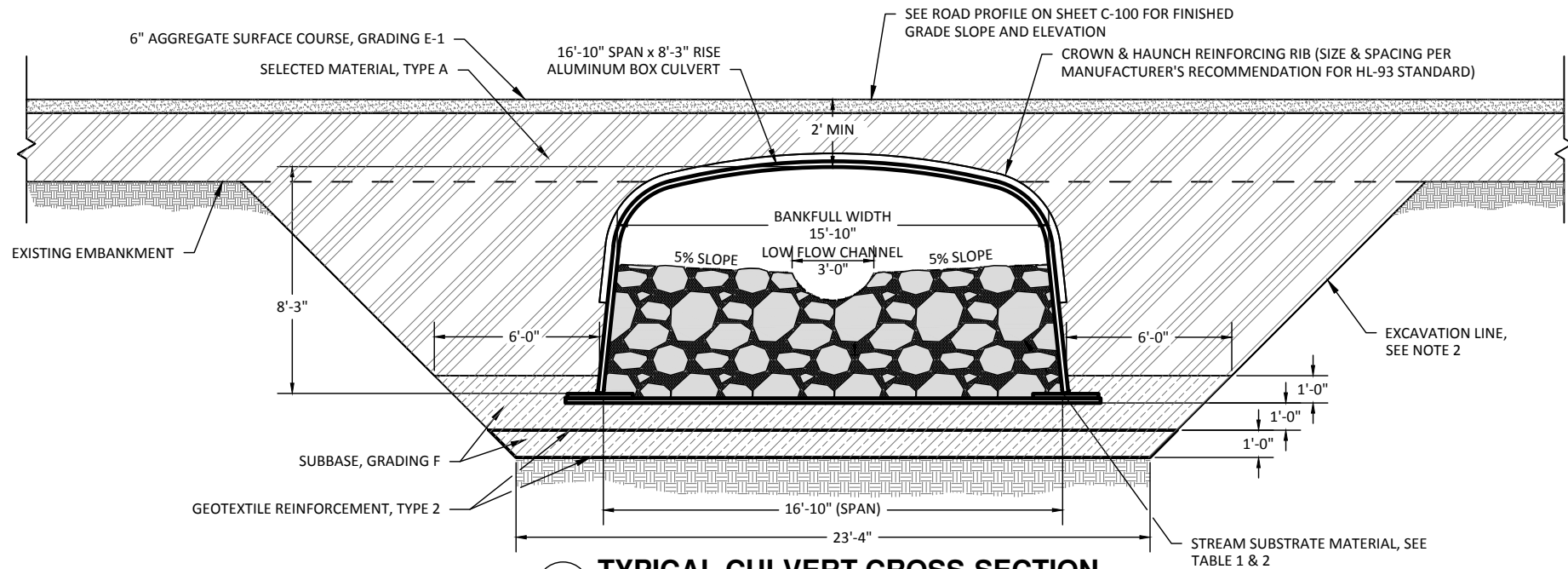
500 W 27th AVE., SUITE A
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PHONE (907) 272-5264
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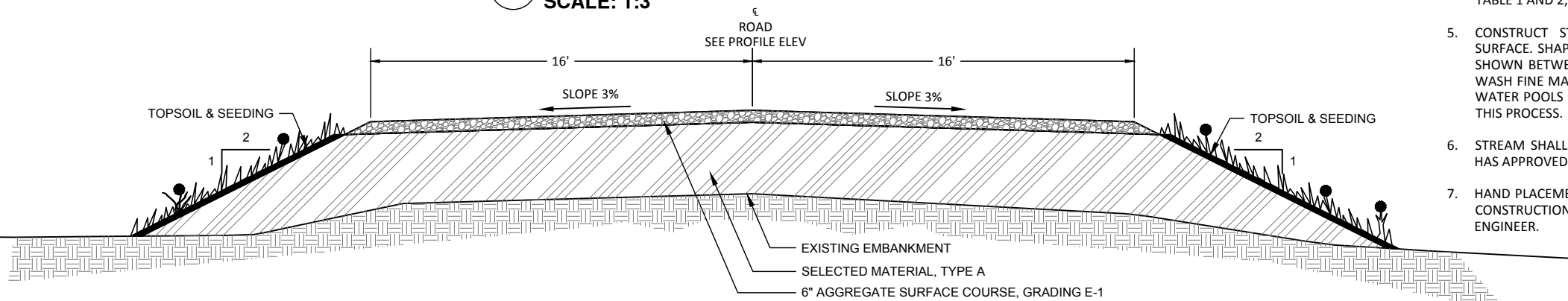
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JOB NO. 1684.18

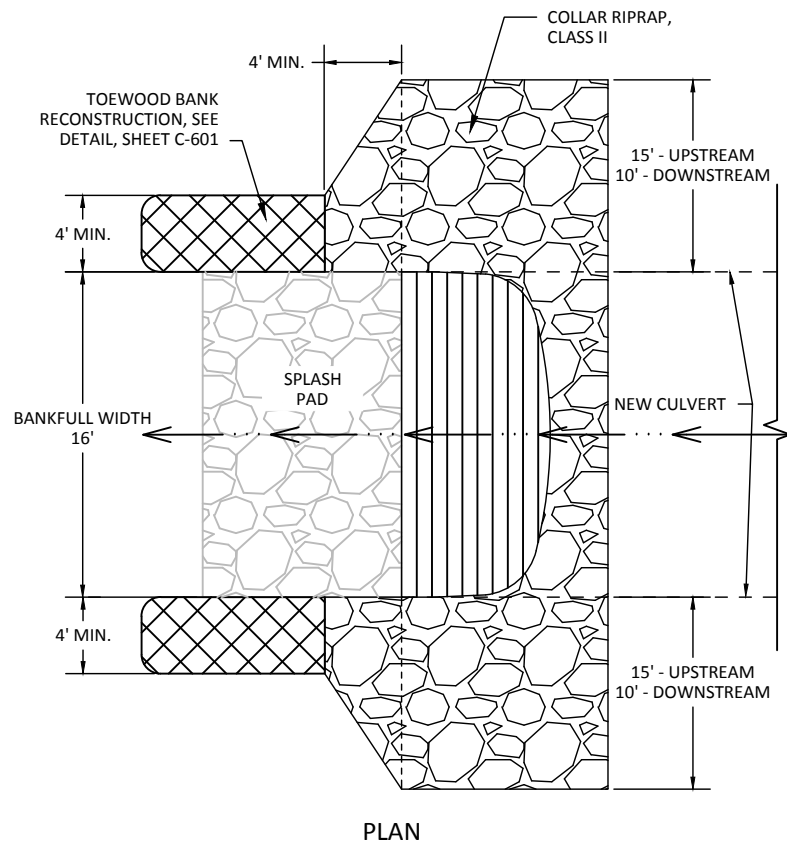
SHEET
C-100



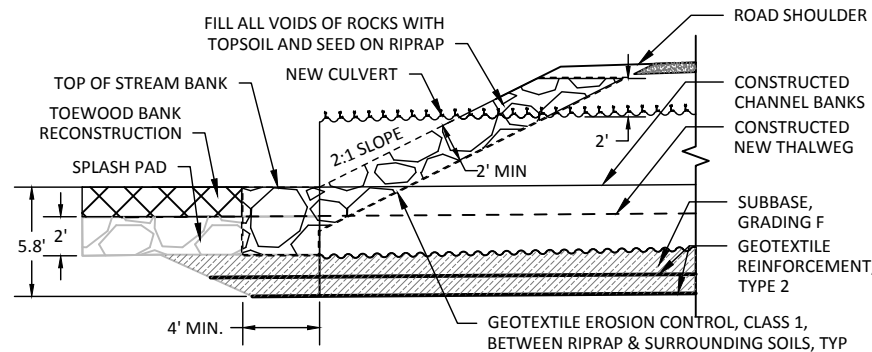
A **TYPICAL CULVERT CROSS-SECTION**
SCALE: 1:3



B **TYPICAL ROAD CROSS-SECTION**
SCALE: 1:3



PLAN



PROFILE

C **TYPICAL COLLAR RIPRAP DETAIL**
SCALE: NTS

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

TABLE 2	
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:

- EXCAVATED MATERIAL MAY BE USED FOR FILL MATERIAL, TYPE A AS APPROVED BY THE ENGINEER, PROVIDED IT CONFORMS TO 703-2.07-2 SELECTED MATERIAL, TYPE B.
- CONTRACTOR SHALL SLOPE TRENCH WALL AND/OR SHORE EXCAVATIONS TO ASSURE SAFETY IN ACCORDANCE WITH CURRENT OSHA ALASKA REQUIREMENTS.
- 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.
- COARSE AND FINE MATERIALS SHALL FOLLOW THE GRADATION NOTED IN TABLE 1 AND 2, RESPECTIVELY.
- 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.
- STREAM SHALL NOT BE RE-DIVERTED INTO CULVERT UNTIL THE ENGINEER HAS APPROVED BED MATERIALS AS SUFFICIENTLY SEALED.
- HAND PLACEMENT OF ROCKS WILL BE REQUIRED FOR LOW FLOW CHANNEL CONSTRUCTION AND WILL BE SUPERVISED AND APPROVED BY THE ENGINEER.

ROADWAY NOTES:

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

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

95% SUBMITTAL - OCTOBER 25, 2019

REV. NO.	DATE	REVISIONS

DATE: 10/25/19	DESIGNED: GDU	CHECKED: TOB	SCALE: AS NOTED	FILE: 1684.18-95%
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PROJECT	COPPER RIVER WATERSHED HABITAT ENHANCEMENT
LOCATION	CORDOVA, ALASKA
CLIENT	U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING	TYPICAL CROSS SECTIONS

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ANCHORAGE, ALASKA 99503
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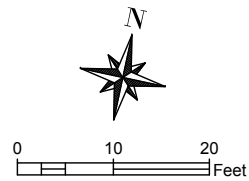
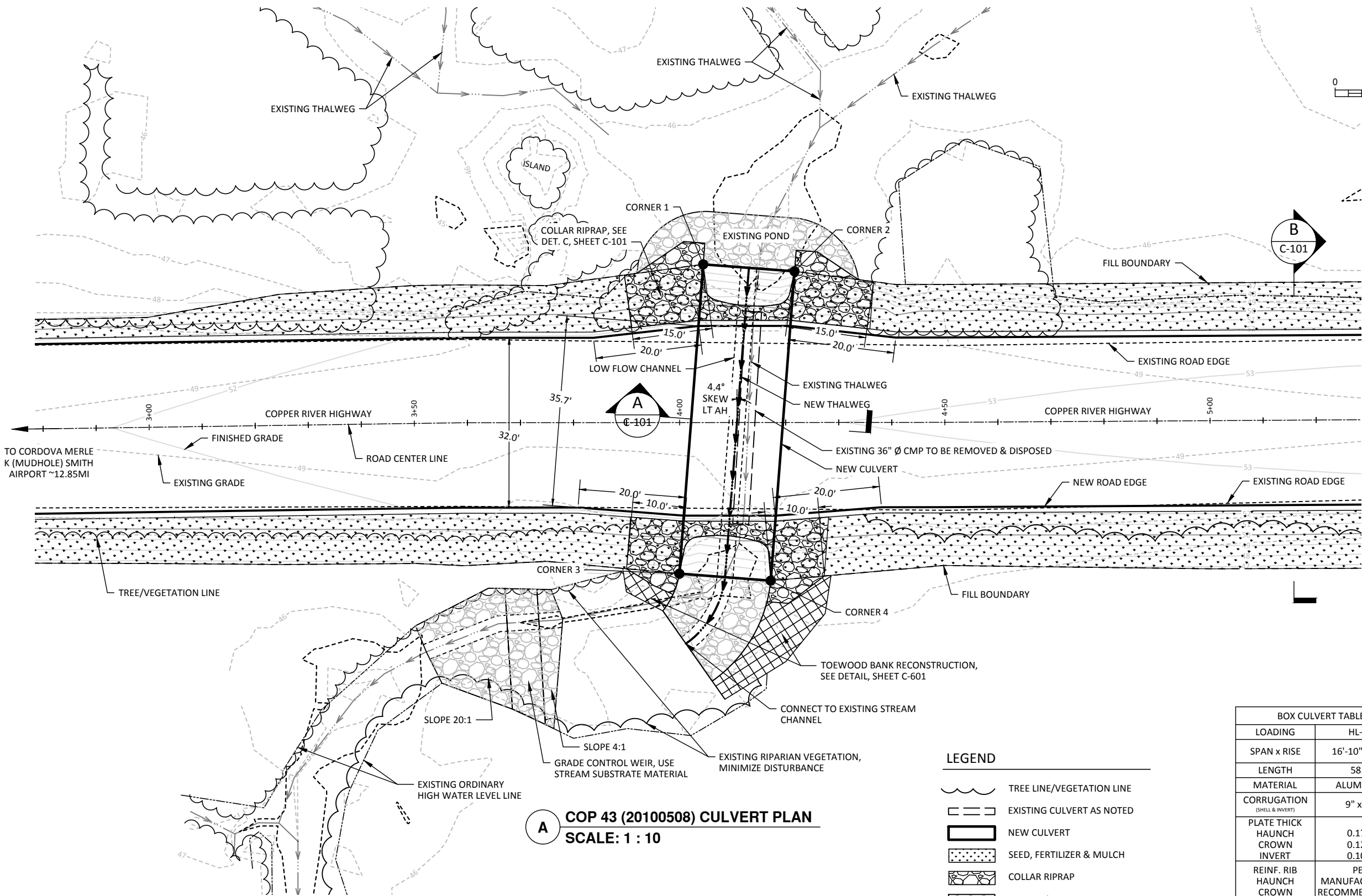
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Burtley Consulting Engineers, Inc.



JOB NO. 1684.18

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C-101



TO CORDOVA MERLE
K (MUDHOLE) SMITH
AIRPORT ~12.85MI

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'

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

LEGEND

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

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'

95% SUBMITTAL - OCTOBER 25, 2019

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

REV. NO.	DATE	REVISIONS

DATE:	10/25/19
DESIGNED:	ODU
DRAWN:	TGB
CHECKED:	AS NOTED
SCALE:	1684.18-95%

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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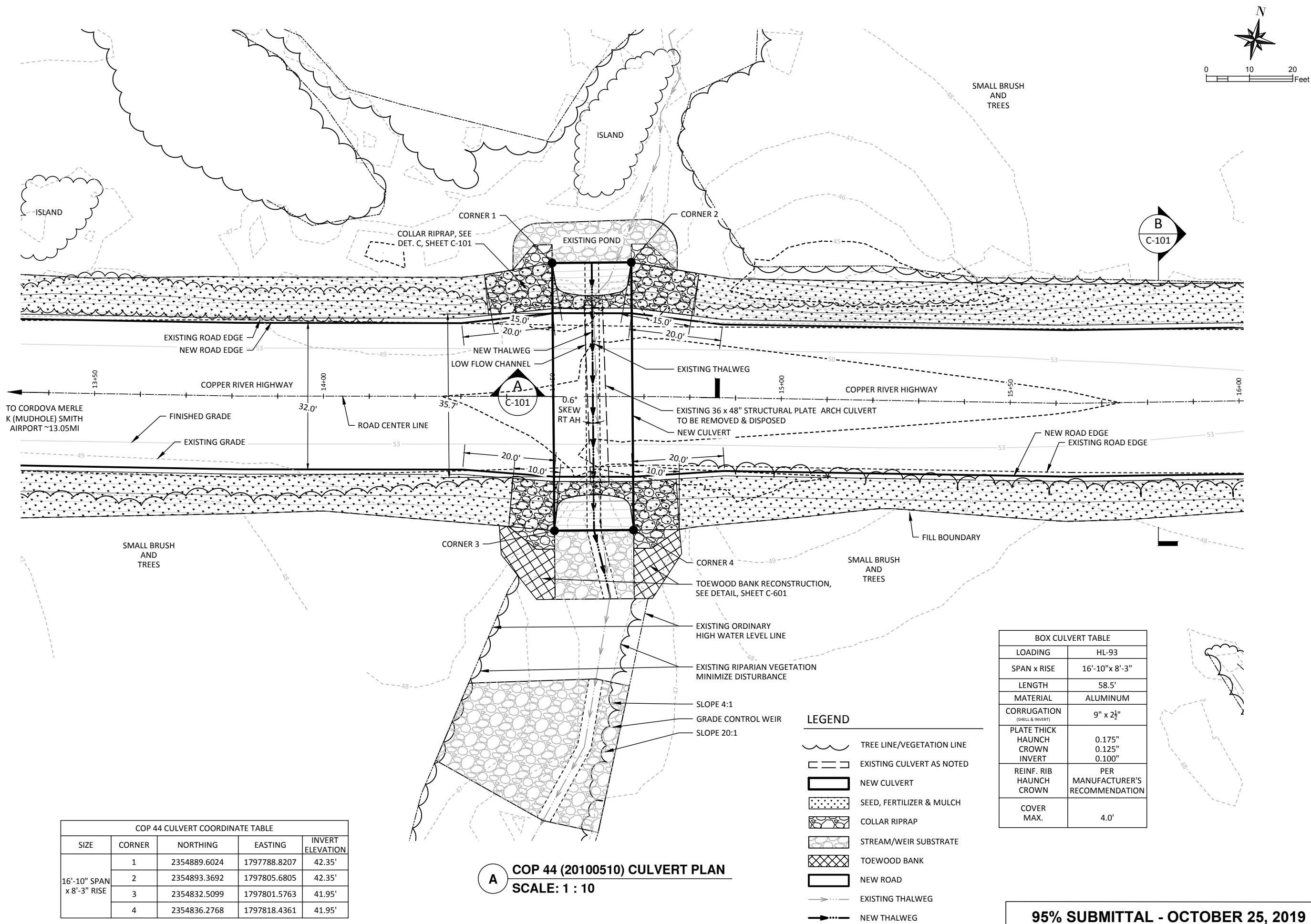
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JOB NO. 1684.18

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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'

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

LEGEND

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

BOX CULVERT TABLE	
LOADING	HL-93
SPAN x RISE	16'-10"x 8'-3"
LENGTH	58.5'
MATERIAL	ALUMINUM
CORRUGATION (SHELL & INVERT)	9" x 2 1/2"
PLATE THICK	0.175"
HAUNCH	0.125"
CROWN	0.100"
INVERT	
REINF. RIB	PER
HAUNCH	MANUFACTURER'S
CROWN	RECOMMENDATION
COVER MAX.	4.0'

95% SUBMITTAL - OCTOBER 25, 2019

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

REV. NO.	DATE	REVISIONS

DATE:	10/25/19
DESIGNED:	GDJ
DRAWN:	TGB
CHECKED:	AS NOTED
SCALE:	1684.18-95%
FILE:	1684.18-95%

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

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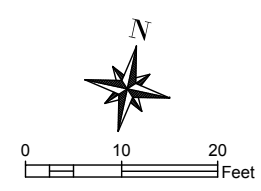
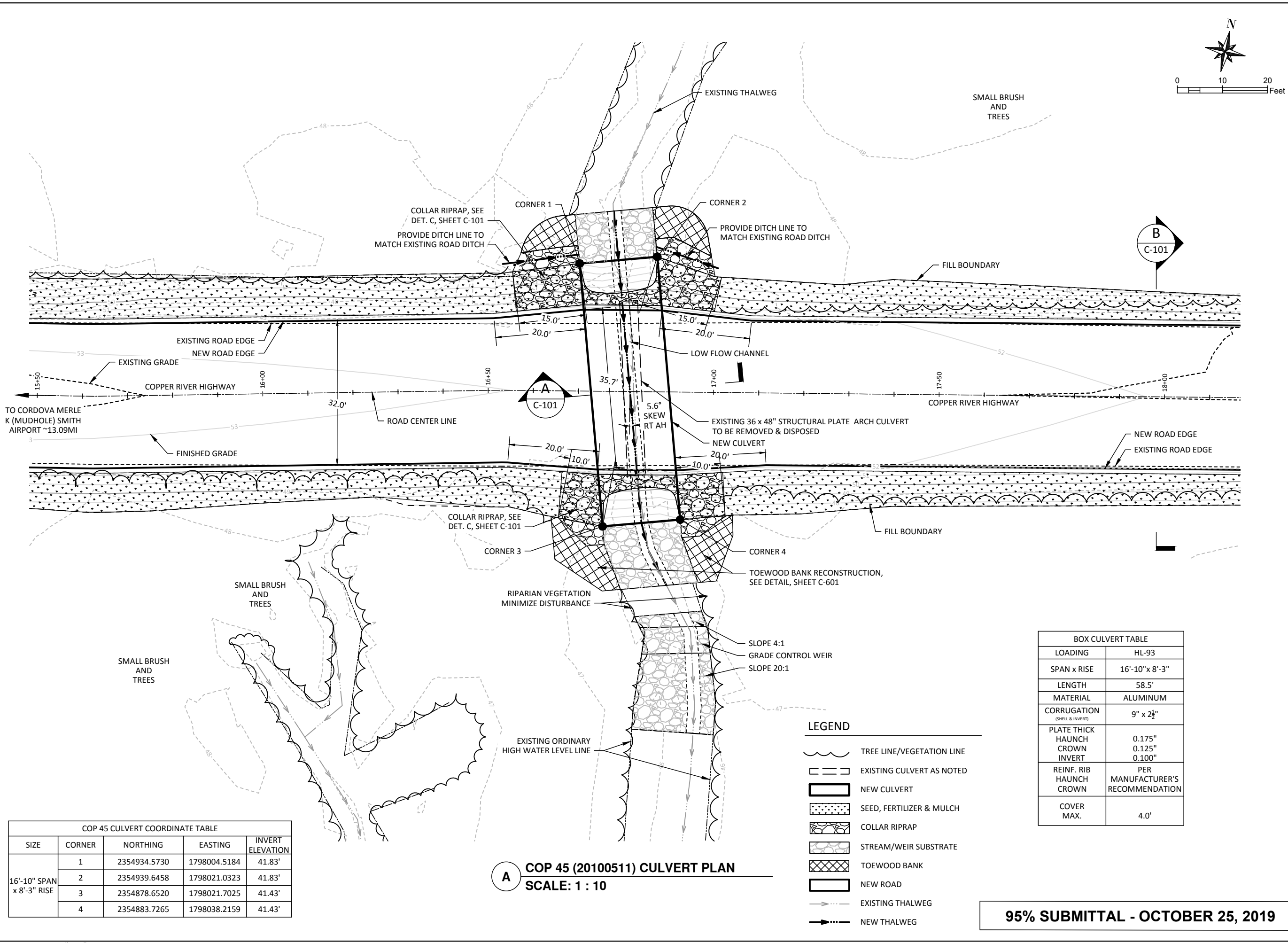
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COP 45 CULVERT COORDINATE TABLE				
SIZE	CORNER	NORTHING	EASTING	INVERT ELEVATION
16'-10" SPAN x 8'-3" RISE	1	2354934.5730	1798004.5184	41.83'
	2	2354939.6458	1798021.0323	41.83'
	3	2354878.6520	1798021.7025	41.43'
	4	2354883.7265	1798038.2159	41.43'

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

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

BOX CULVERT TABLE	
LOADING	HL-93
SPAN x RISE	16'-10"x 8'-3"
LENGTH	58.5'
MATERIAL	ALUMINUM
CORRUGATION (SHELL & INVERT)	9" x 2 1/2"
PLATE THICK HAUNCH CROWN INVERT	0.175" 0.125" 0.100"
REINF. RIB HAUNCH CROWN	PER MANUFACTURER'S RECOMMENDATION
COVER MAX.	4.0'

95% SUBMITTAL - OCTOBER 25, 2019

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

REV. NO. DATE REVISIONS

DATE: 10/25/19
DESIGNED: GDU
DRAWN: TGB
CHECKED: TGB
SCALE: AS NOTED
FILE: 16841B-95%

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

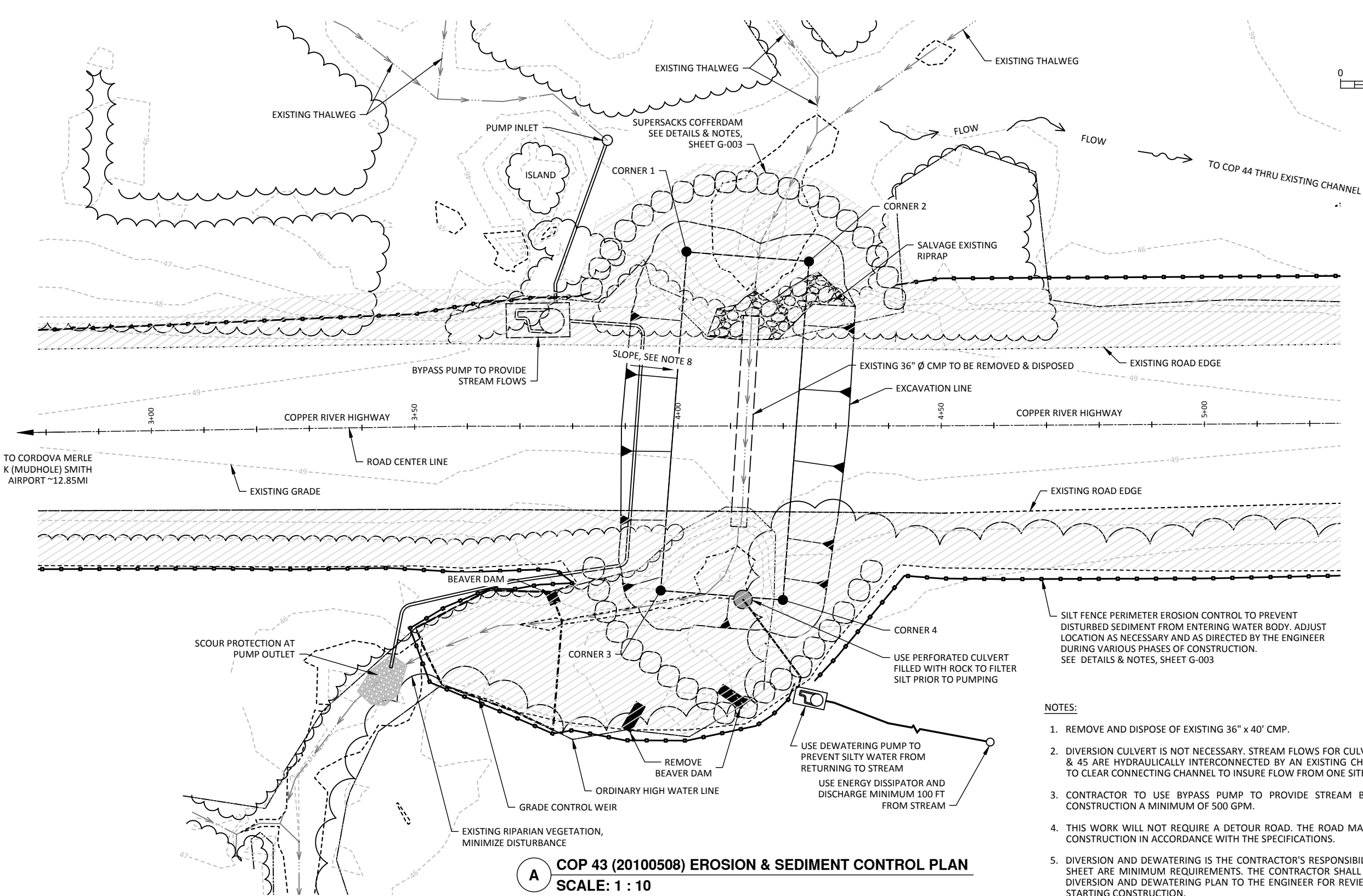
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JOB NO. 1684.18

SHEET
C-202



TO CORDOVA MERLE
K (MUDHOLE) SMITH
AIRPORT ~12.85MI

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'

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

LEGEND

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

- NOTES:**
- REMOVE AND DISPOSE OF EXISTING 36" x 40' CMP.
 - 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.
 - CONTRACTOR TO USE BYPASS PUMP TO PROVIDE STREAM BASE FLOWS DURING CONSTRUCTION A MINIMUM OF 500 GPM.
 - THIS WORK WILL NOT REQUIRE A DETOUR ROAD. THE ROAD MAY BE CLOSED DURING CONSTRUCTION IN ACCORDANCE WITH THE SPECIFICATIONS.
 - 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.
 - PROVIDE SPARE (EXTRA) PUMPS FOR BOTH THE STREAM BYPASS PUMP AND DEWATERING PUMP.
 - EXISTING RIPARIAN VEGETATION SHOULD BE PROTECTED TO MINIMIZE DISTURBANCE. USE CRANE MAT TO PROVIDE TEMPORARY ROAD TO CONSTRUCT THE GRADE CONTROL WEIR.
 - EXCAVATION BACK SLOPES SHALL BE PERFORMED IN COMPLIANCE WITH ALL LOCAL AND FEDERAL (OSHA) REGULATIONS AND REQUIREMENTS.

95% SUBMITTAL - OCTOBER 25, 2019

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

REV. NO.	DATE	REVISIONS

DATE:	10/25/19
DESIGNED:	GOJ
DRAWN:	TGB
CHECKED:	AS NOTED
SCALE:	1684.18-95%
FILE:	1684.18-95%

PROJECT	COPPER RIVER WATERSHED HABITAT ENHANCEMENT
PROJECT (FISH PASSAGE)	CORDOVA, ALASKA
LOCATION	U.S. FISH & WILDLIFE SERVICE (FWS)
CLIENT	
DRAWING	COP 43 (20100508) EROSION & SEDIMENT CONTROL
PLAN	

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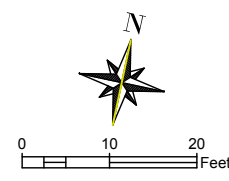
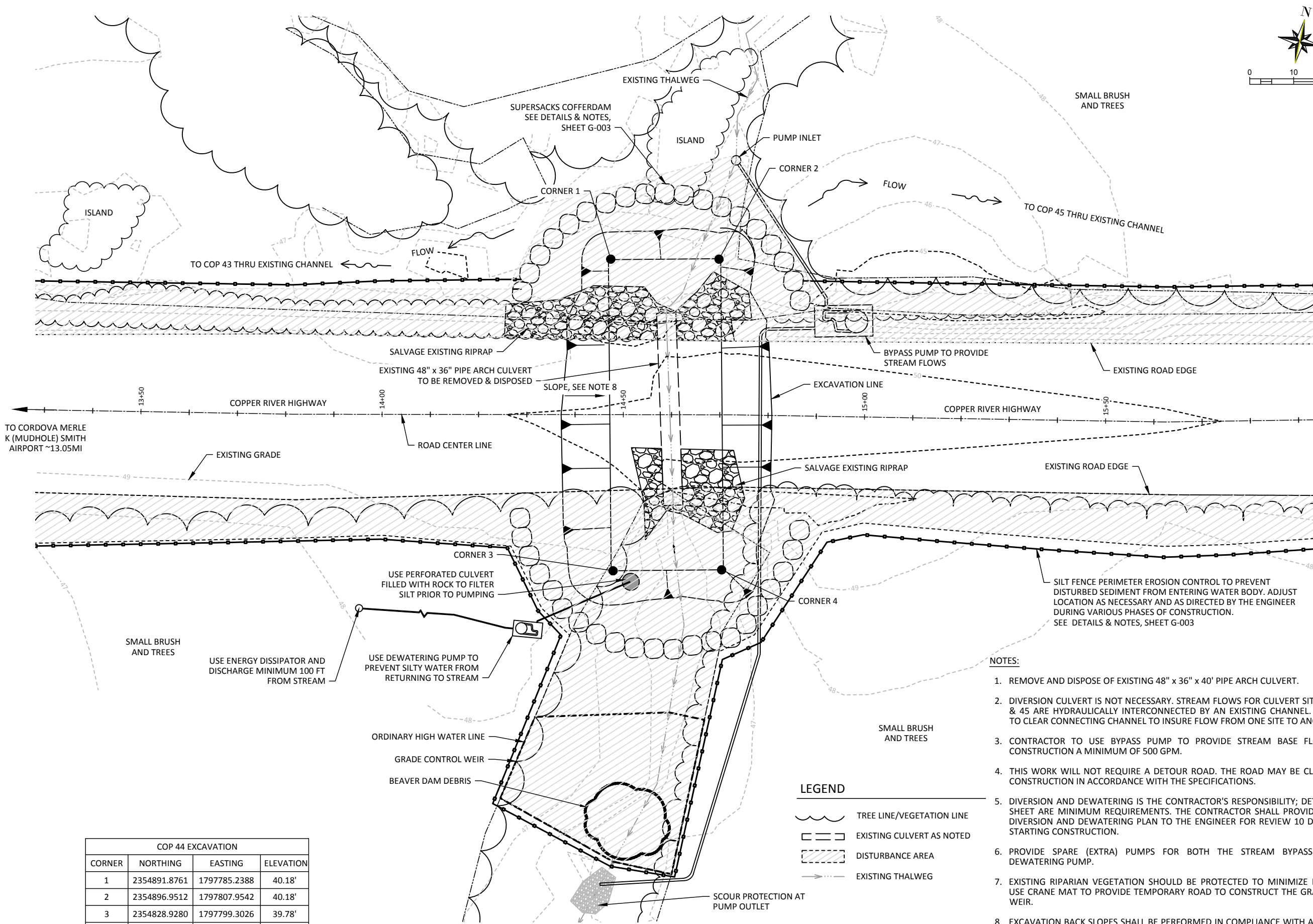
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C-300



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

- NOTES:**
- REMOVE AND DISPOSE OF EXISTING 48" x 36" x 40' PIPE ARCH CULVERT.
 - 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.
 - CONTRACTOR TO USE BYPASS PUMP TO PROVIDE STREAM BASE FLOWS DURING CONSTRUCTION A MINIMUM OF 500 GPM.
 - THIS WORK WILL NOT REQUIRE A DETOUR ROAD. THE ROAD MAY BE CLOSED DURING CONSTRUCTION IN ACCORDANCE WITH THE SPECIFICATIONS.
 - 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.
 - PROVIDE SPARE (EXTRA) PUMPS FOR BOTH THE STREAM BYPASS PUMP AND DEWATERING PUMP.
 - EXISTING RIPARIAN VEGETATION SHOULD BE PROTECTED TO MINIMIZE DISTURBANCE. USE CRANE MAT TO PROVIDE TEMPORARY ROAD TO CONSTRUCT THE GRADE CONTROL WEIR.
 - EXCAVATION BACK SLOPES SHALL BE PERFORMED IN COMPLIANCE WITH ALL LOCAL AND FEDERAL (OSHA) REGULATIONS AND REQUIREMENTS.

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

95% SUBMITTAL - OCTOBER 25, 2019

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

REVISIONS	
REV. NO.	DATE

DATE:	10/25/19
DESIGNED:	GOJ
DRAWN:	TGB
CHECKED:	AS NOTED
FILE:	16841B-95%

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

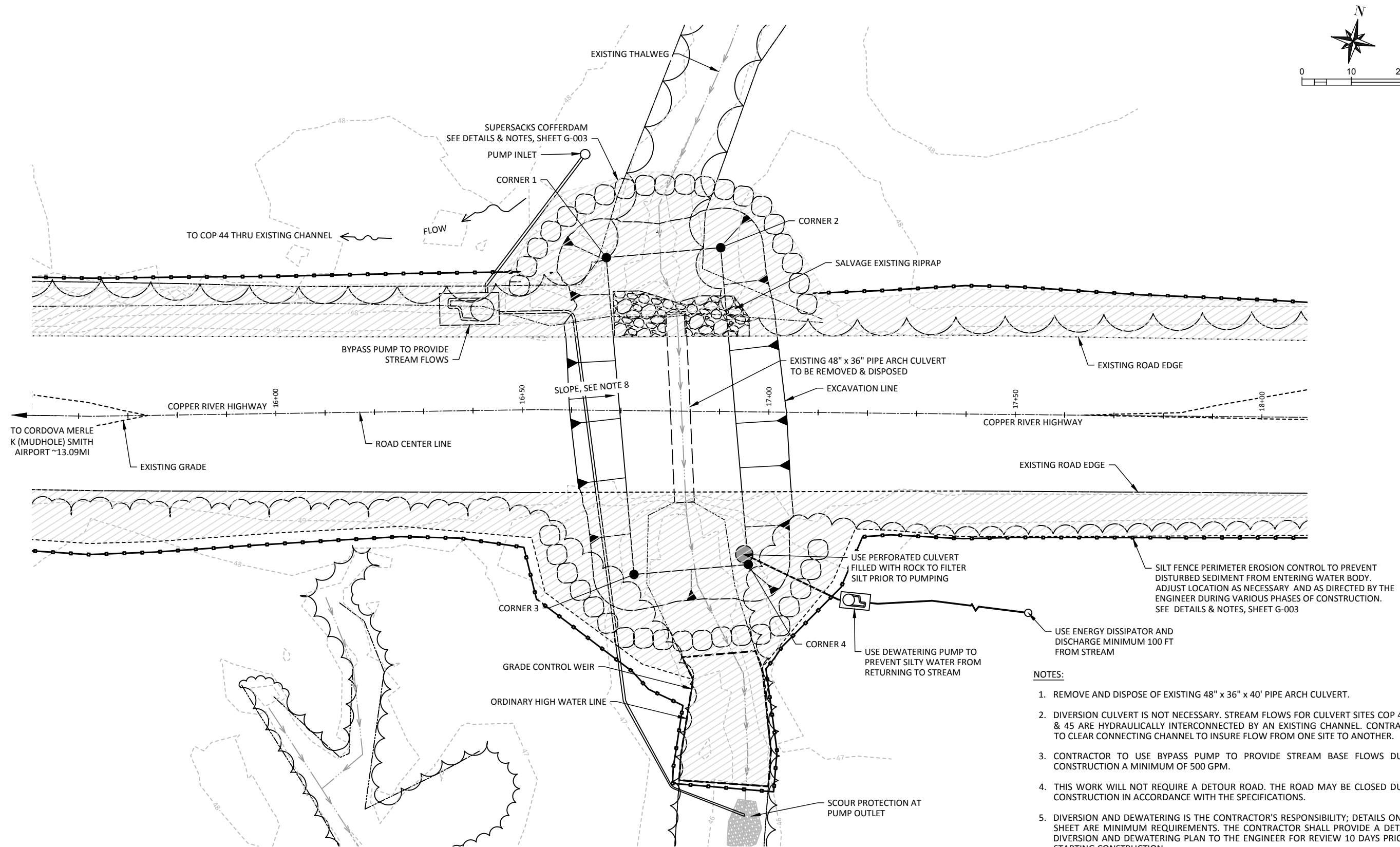
DRAWING: COP 44 (20100510) EROSION & SEDIMENT CONTROL
PLAN

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JOB NO. 1684.18

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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

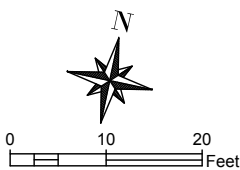
- TREE LINE/VEGETATION LINE
- EXISTING CULVERT AS NOTED
- DISTURBANCE AREA
- EXISTING THALWEG

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.
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.

95% SUBMITTAL - OCTOBER 25, 2019

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



REVISIONS	
REV. NO.	DATE

DATE: 10/25/19
DESIGNED: GDU
DRAWN: TGB
CHECKED: TGB
SCALE: AS NOTED
FILE: 168418-95%

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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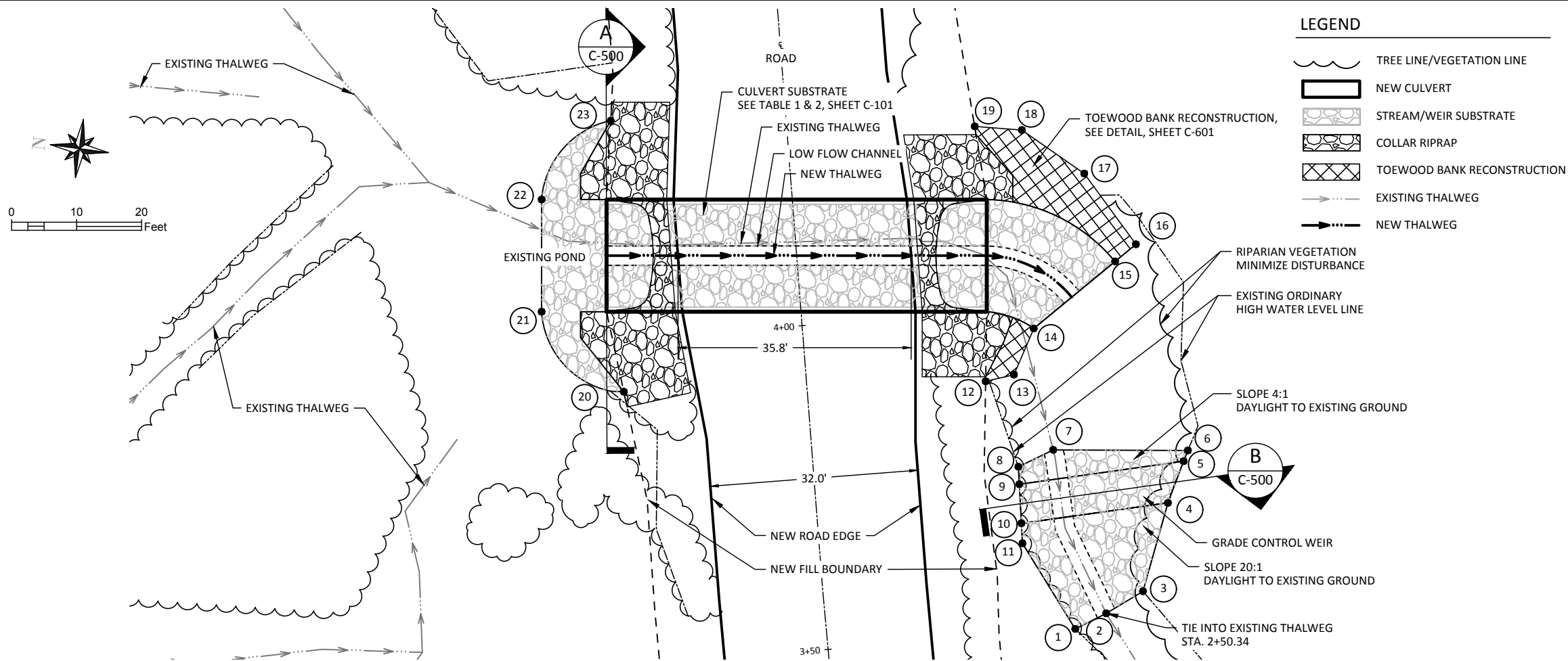
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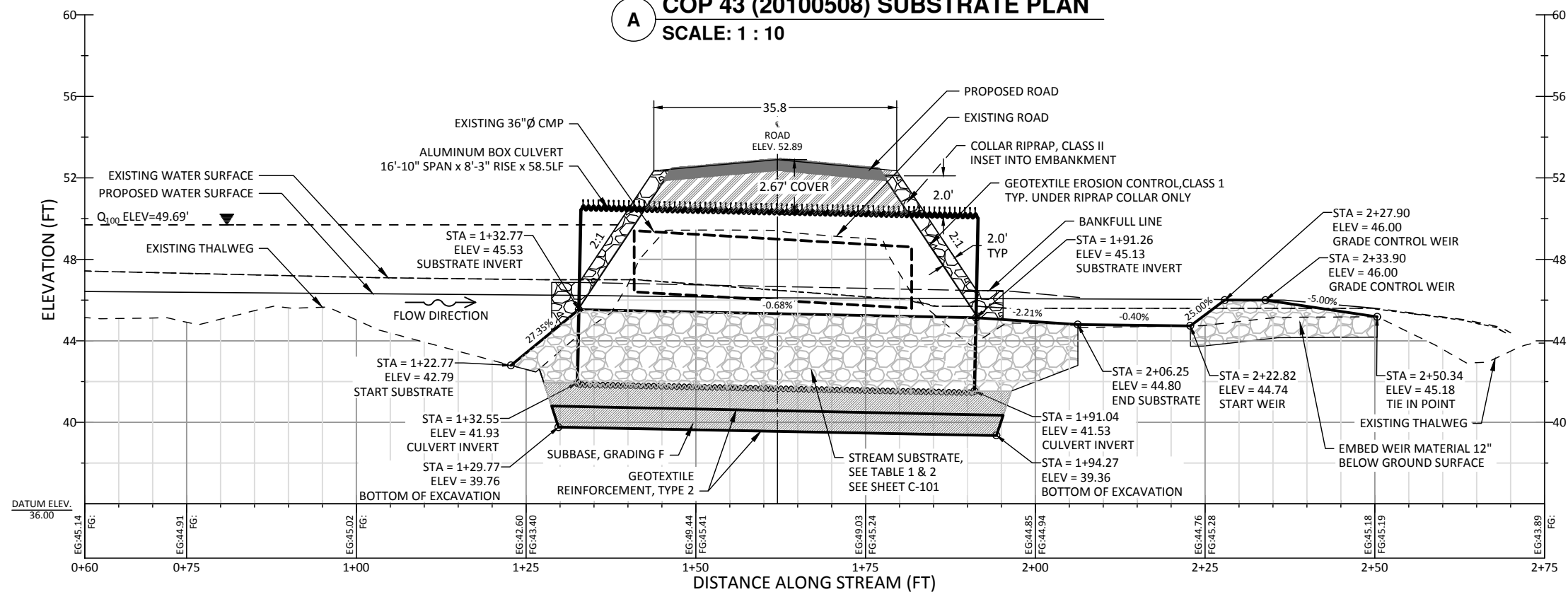
JOB NO. 1684.18

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C-302



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

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



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

95% SUBMITTAL - OCTOBER 25, 2019

REV. NO.	DATE	REVISIONS

DATE: 10/25/19
DESIGNED: GDU
DRAWN: TGB
CHECKED: JGB
SCALE: AS NOTED
FILE: 168418-958

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

500 W 27TH AVE., SUITE A
ANCHORAGE, ALASKA 99503
WWW.BCE-AL.COM

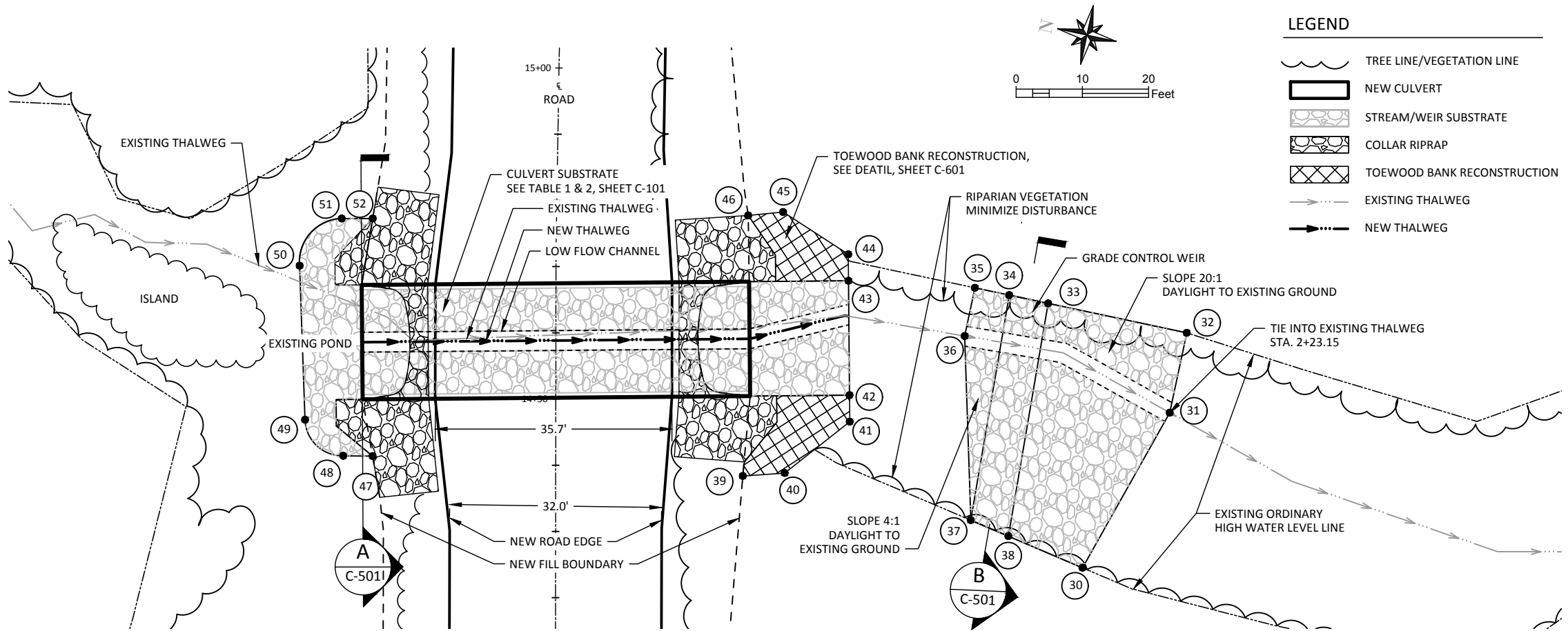
PHONE (907) 272-5264
FAX (907) 272-5214
mailto:bce@bce-al.com

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Building
CONSULTING ENGINEERS INC.

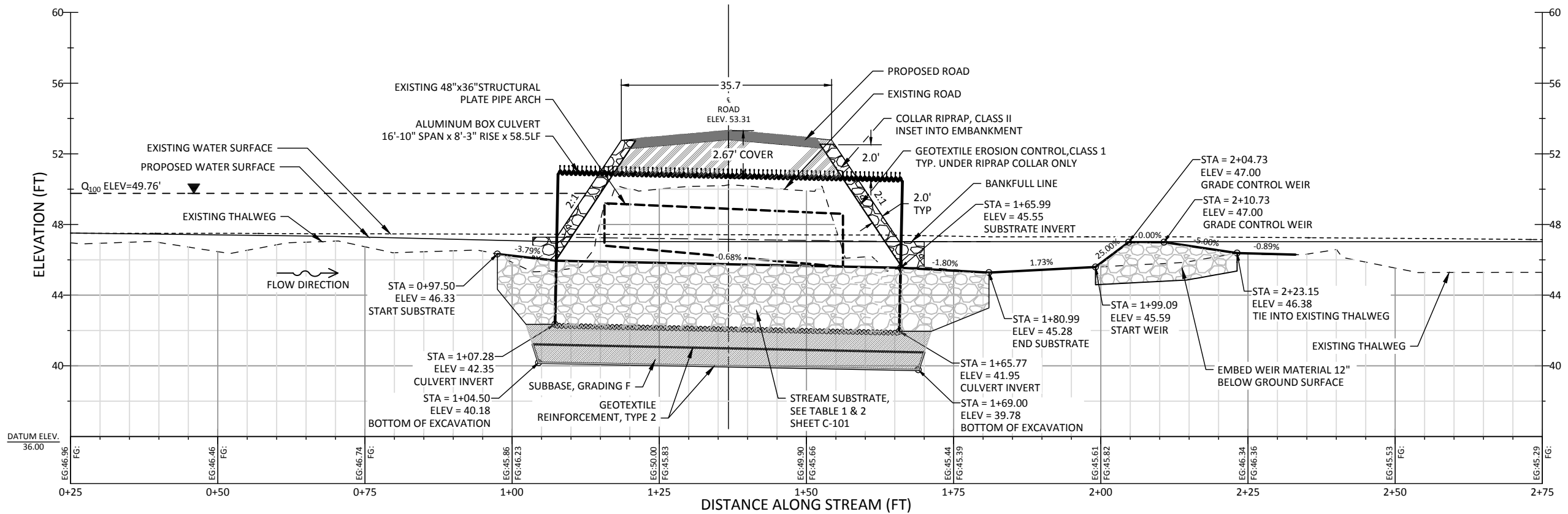
JOB NO. 1684.18

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

95% SUBMITTAL - OCTOBER 25, 2019

REVISIONS		DATE	REV. NO.

DATE:	10/25/19
DESIGNED:	
DRAWN:	
CHECKED:	
SCALE:	AS NOTED
FILE:	168418-955

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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WWW.BCE-AL.COM

PHONE (907) 272-5264
FAX (907) 272-5214
mailto:bce@bce-al.com

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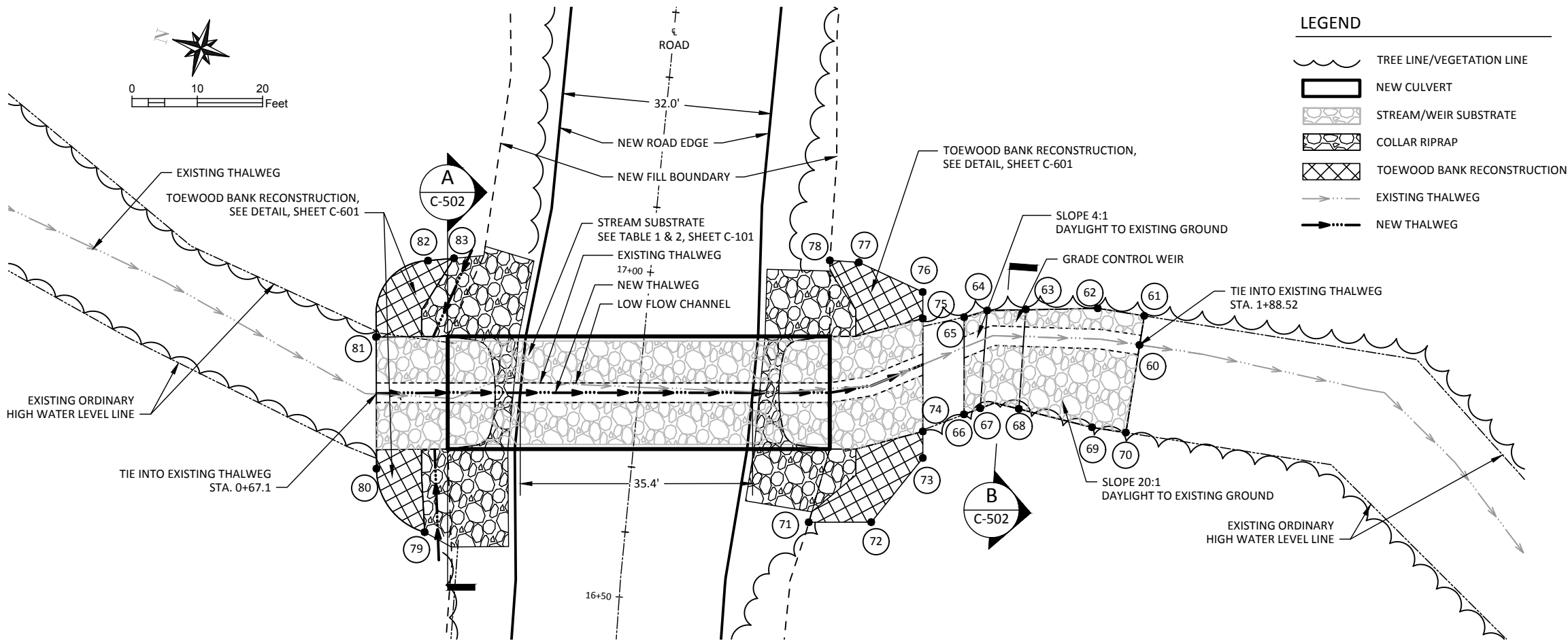
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JOB NO. 1684.18

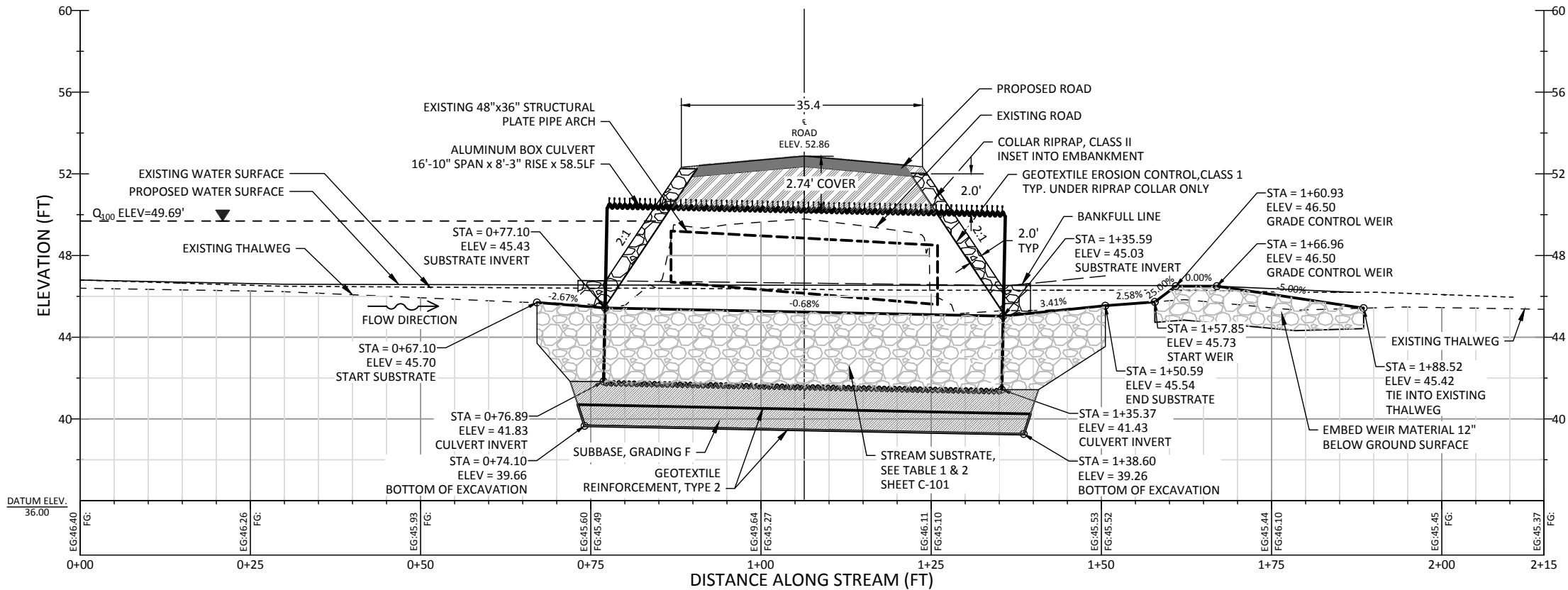
SHEET

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



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



B COP 45 (20100511) CULVERT PROFILE
SCALE: H=1 : 10 V=1:3

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REV. NO.	DATE	REVISIONS

DATE:	10/25/19
DESIGNED:	GDU
DRAWN:	TGB
CHECKED:	AS NOTED
SCALE:	1:684.18-95%
FILE:	1684.18-95%

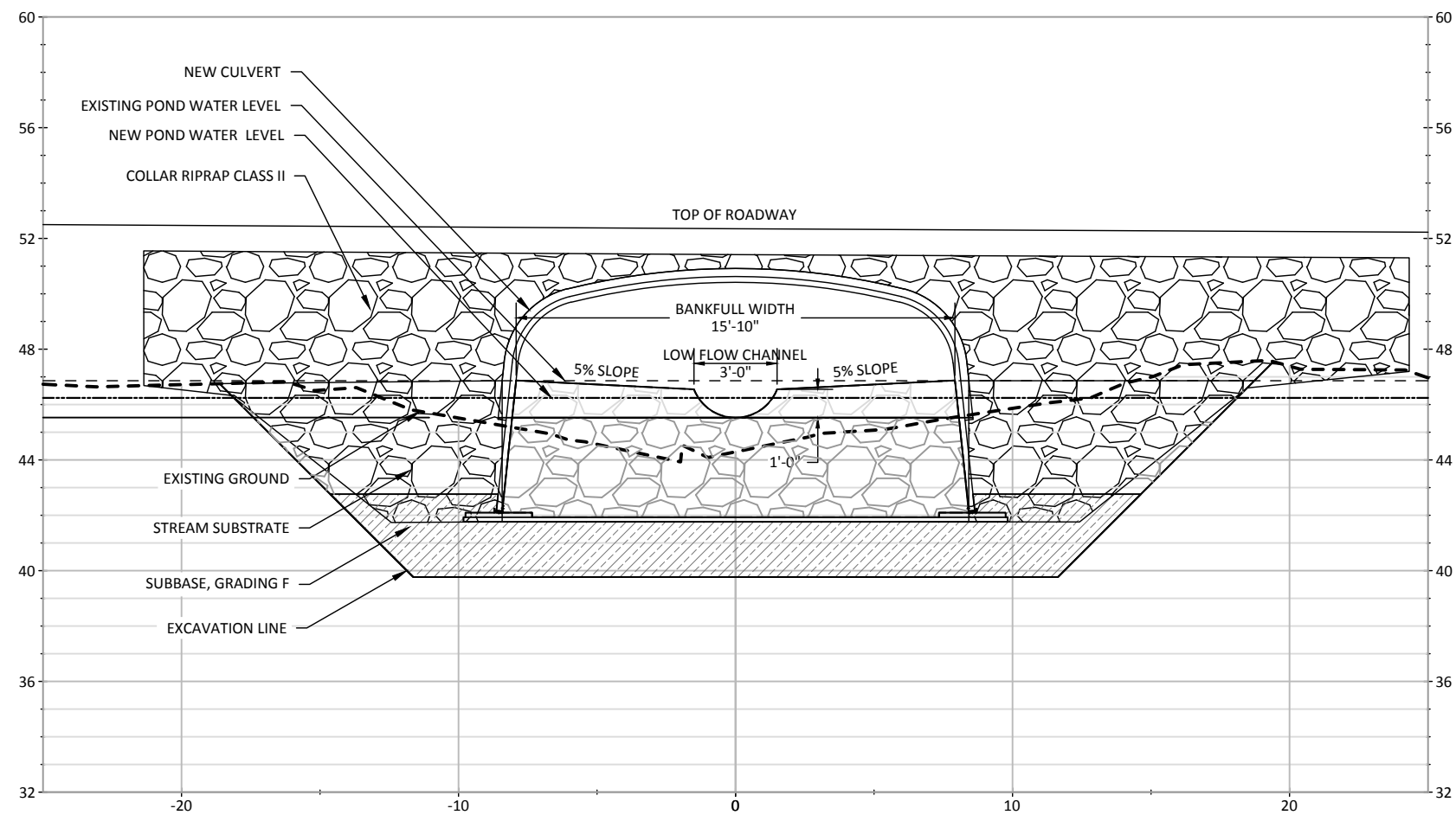
PROJECT:	COPPER RIVER WATERSHED HABITAT ENHANCEMENT
PROJECT (FISH PASSAGE):	COP 45 (20100511) SUBSTRATE PLAN & PROFILE
LOCATION:	CORDOVA, ALASKA
CLIENT:	U.S. FISH & WILDLIFE SERVICE (FWS)

500 W 27TH AVE., SUITE A
ANCHORAGE, ALASKA 99503
WWW.BCE-AL.COM

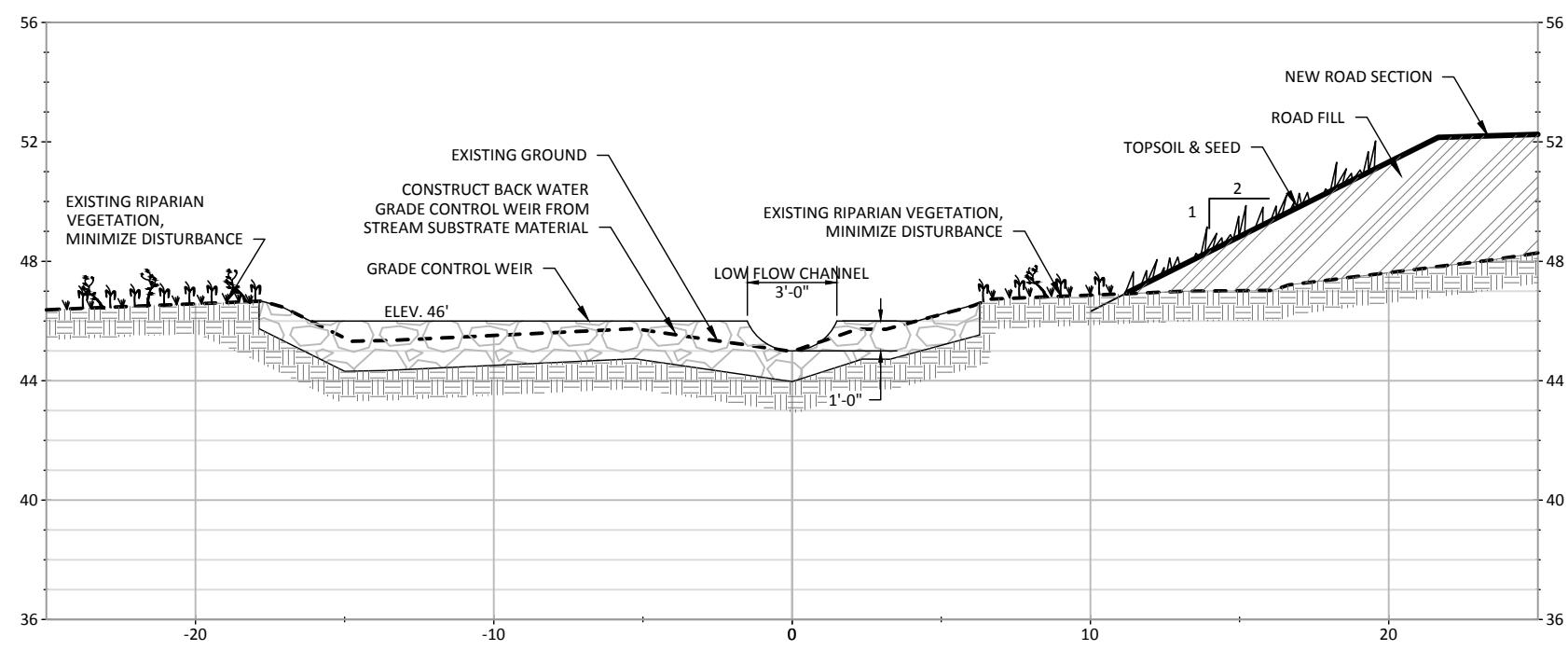
PHONE (907) 272-5264
FAX (907) 272-5214
mailto:bce@bce-al.com

JOB NO. 1684.18

SHEET
C-402



A SECTION A
C-400 SCALE: 1 : 3



B SECTION B
C-400 SCALE: 1 : 3

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

95% SUBMITTAL - OCTOBER 25, 2019

REV. NO.	DATE	REVISIONS

DATE: 10/25/19
DESIGNED: GDU
DRAWN: TGB
CHECKED: TGB
SCALE: AS NOTED
FILE: 1684.18-95%

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

500 W 27th AVE., SUITE A
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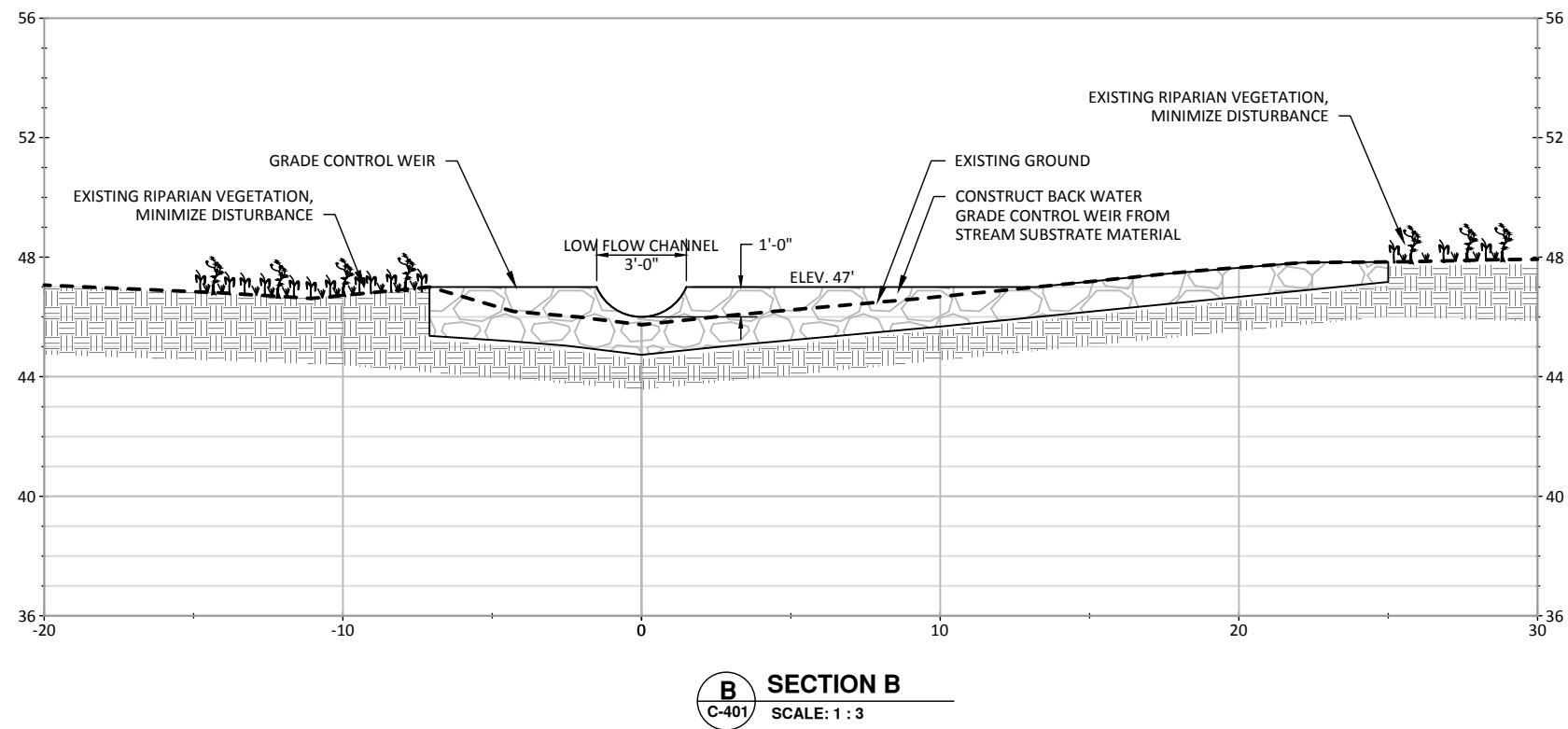
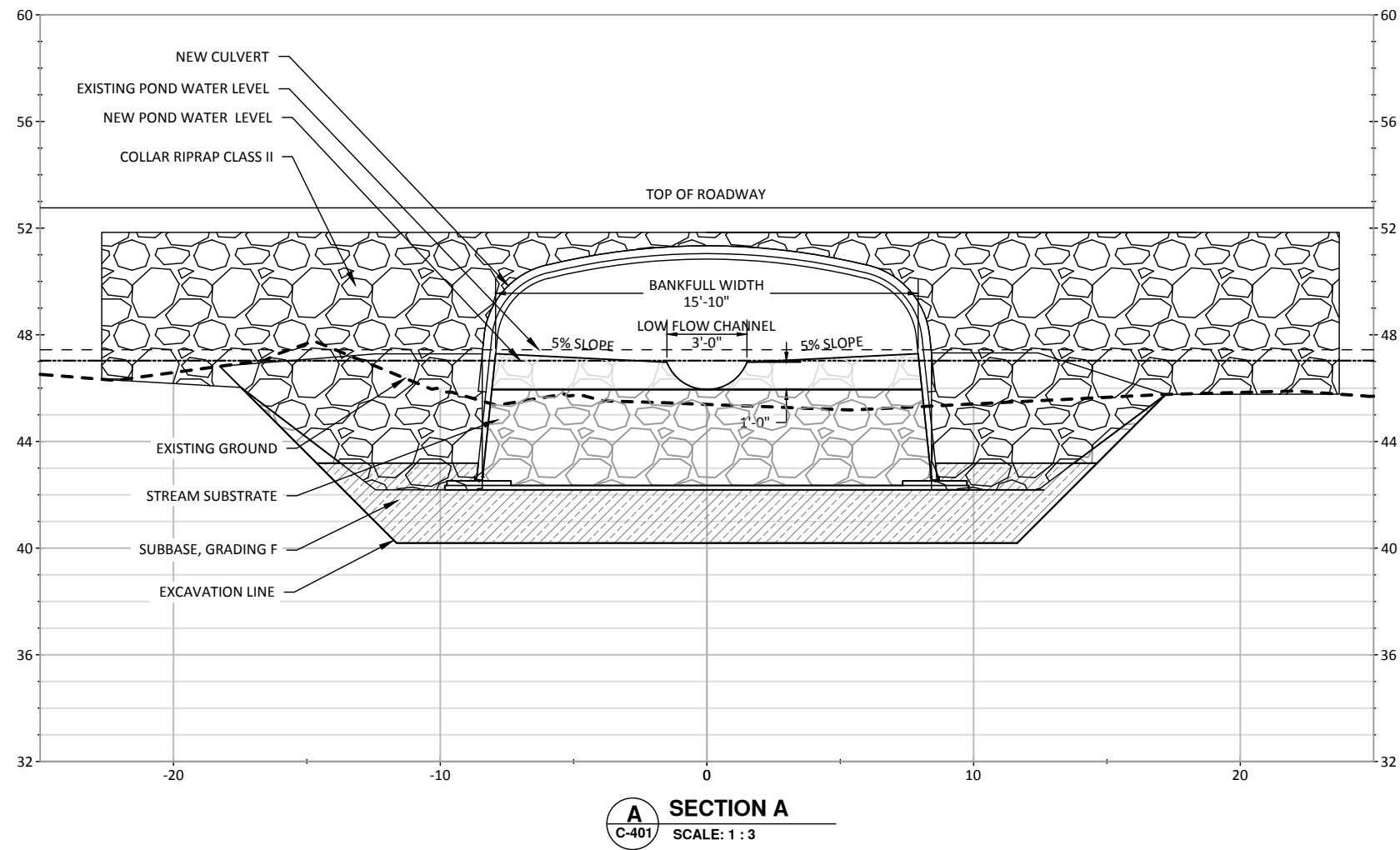
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JOB NO. 1684.18

SHEET
C-500



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REV. NO.	DATE	REVISIONS

DATE: 10/25/19
DESIGNED: GDU
DRAWN: TGB
CHECKED: TGB
SCALE: AS NOTED
FILE: 168418-95%

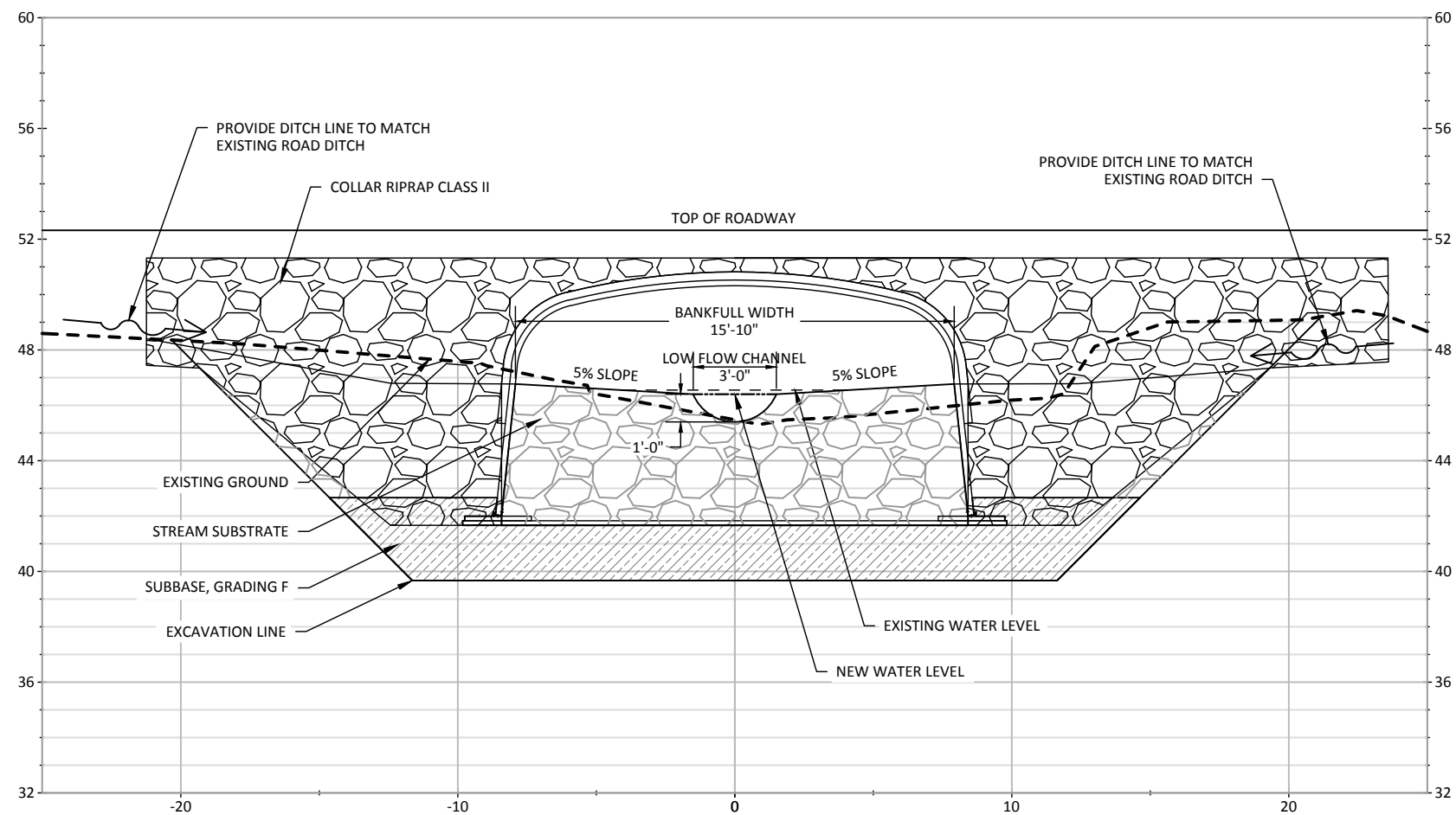
PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT
PROJECT (FISH PASSAGE)
LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING: COP 44 (20100510) STREAM SECTIONS

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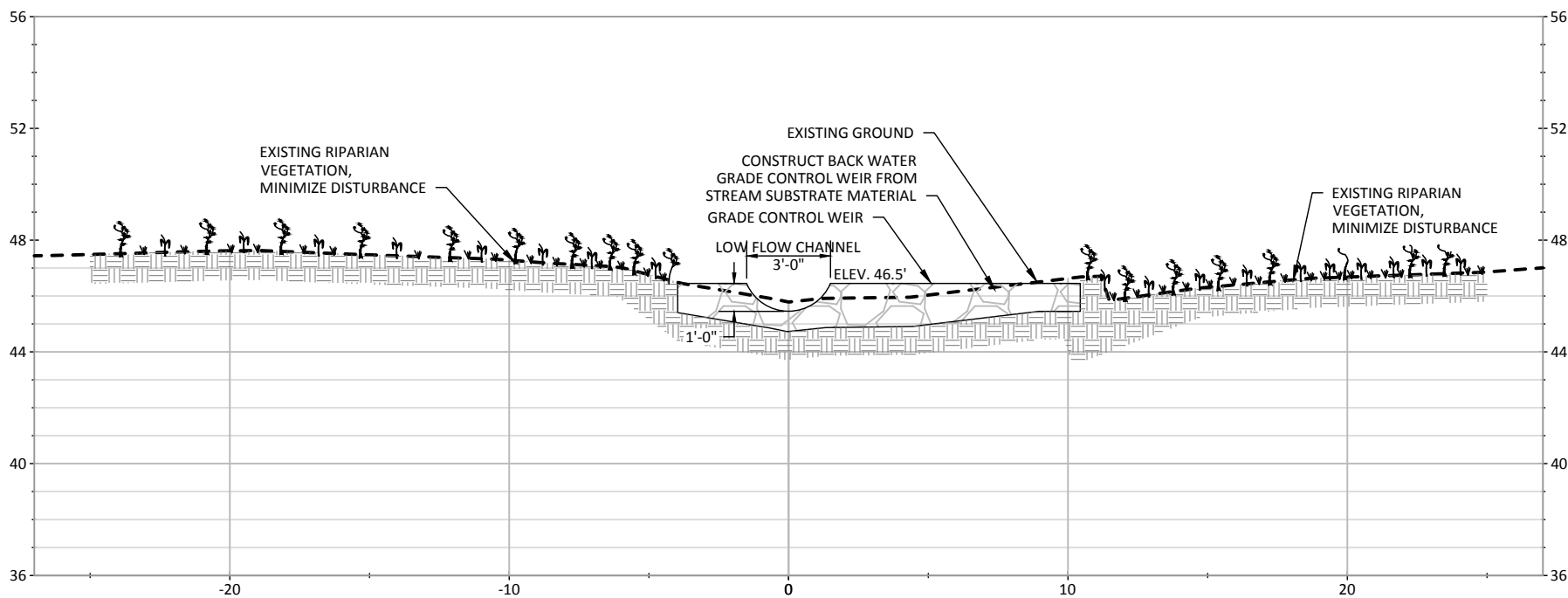
JOB NO. 1684.18

SHEET

C-501



A SECTION A
C-402 SCALE: 1 : 3



B SECTION B
C-402 SCALE: 1 : 3

95% SUBMITTAL - OCTOBER 25, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 10/25/19
DESIGNED: GDU
DRAWN: TGB
CHECKED: TGB
SCALE: AS NOTED
FILE: 1684.18-95%

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

500 W 27TH AVE., SUITE A
ANCHORAGE, ALASKA 99503
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FAX (907) 272-5214
mail@bce-al.com



JOB NO. 1684.18

SHEET

C-502

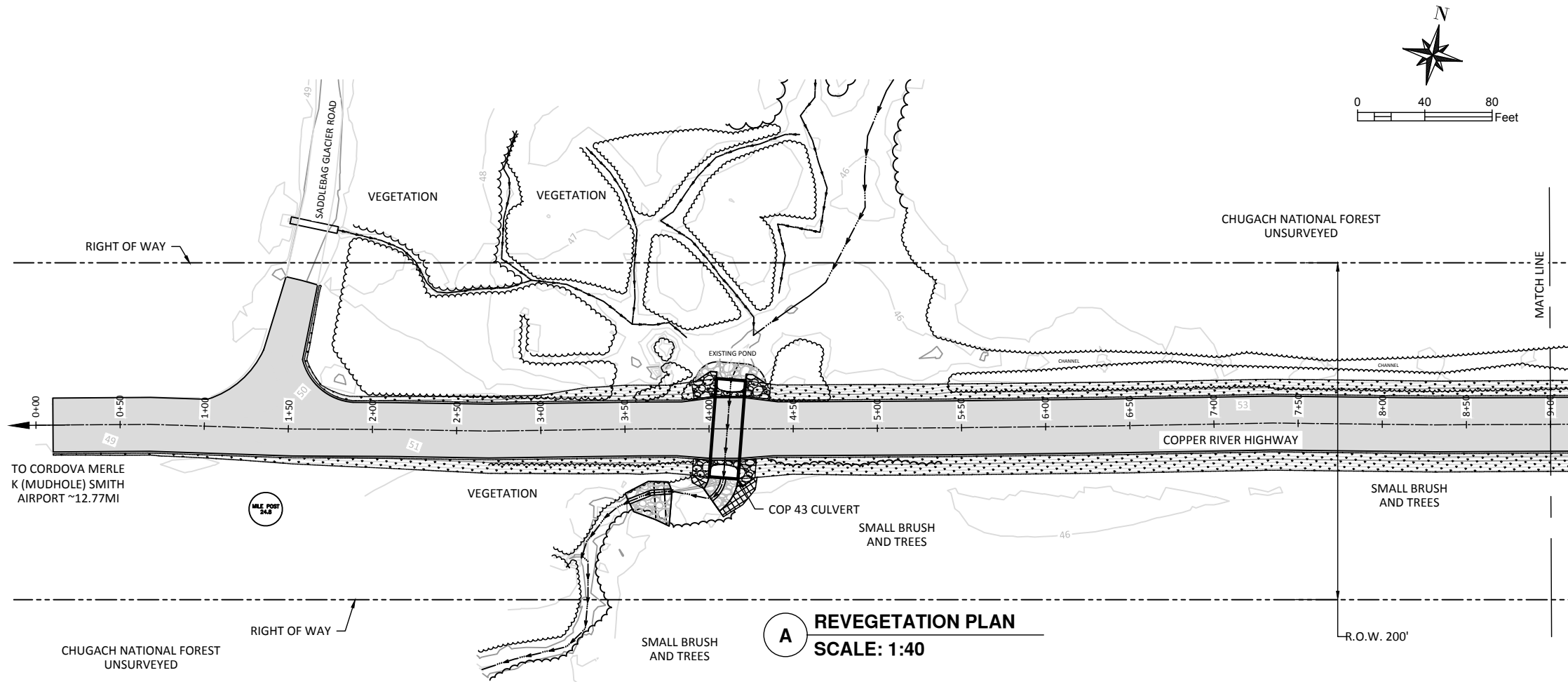
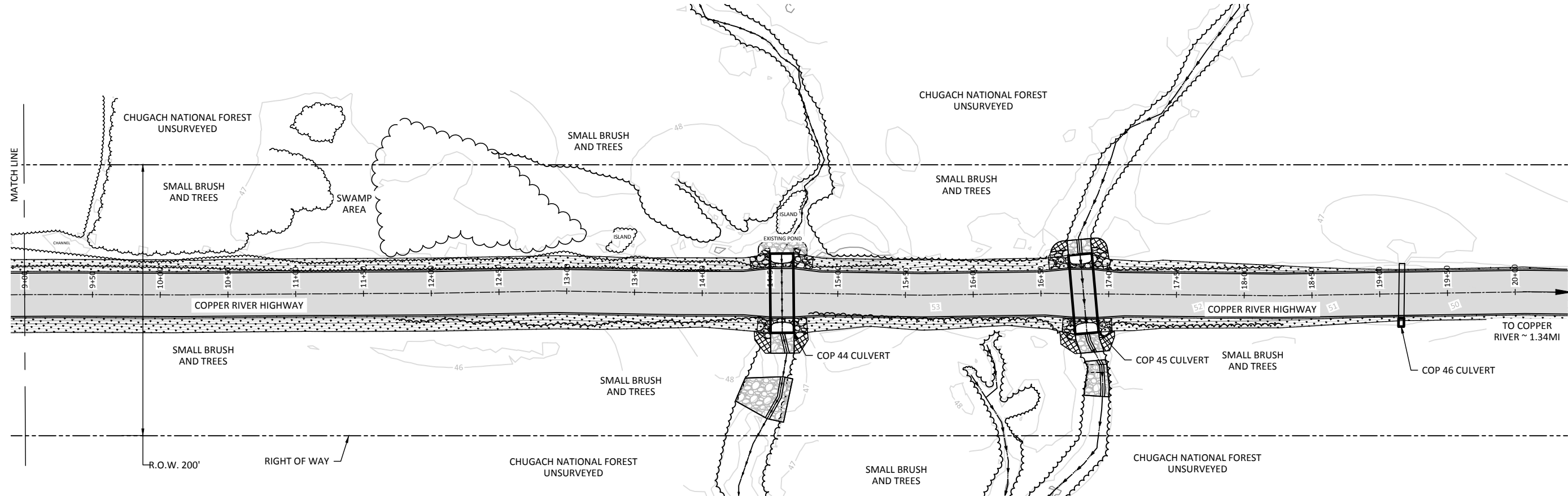


TABLE 1-HYDROSEED		
COMPONENT	INGREDIENTS	APPLICATION RATE (PER MSF)
SEED MIX, TYPE A	'SOURDOUGH' BLUEJOINT REDGRASS, TRADE NAME: "ARCTIC MULCH" CALAMAGROSTIS CANADENSIS	2 LBS (5% BY WEIGHT)
	ANNUAL RYEGRASS LOLIUM PERENNE SSP. MULTIFLORUM	0.8 LBS (20% BY WEIGHT)
	BERING HAIRGRASS "NORCOAST" DESCHAMPSIA BERINGENSIS	3 LBS (75% BY WEIGHT)
	TOTAL	4 LBS
SOIL STABILIZER	MULCH	46 LBS
	MULCH WITH TACKIFIER	45-58 LBS
FERTILIZER	4-6-4 ORGANIC	3.0 LBS

LEGEND

- TREE LINE/VEGETATION LINE
- EXISTING CULVERT
- NEW CULVERT
- SEED, FERTILIZER & MULCH, A=3424 SY
- COLLAR RIPRAP
- STREAM/WEIR SUBSTRATE
- TOEWOOD BANK
- NEW ROAD EMBANKMENT
- THALWEG



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

REVISIONS	
REV. NO.	DATE

DATE: 10/25/19	DESIGNED: GDU	CHECKED: TGB	SCALE: AS NOTED	FILE: 1684.18-95%

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

DRAWING: REVEGETATION PLAN

500 W 27th AVE., SUITE A
ANCHORAGE, ALASKA 99503
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FAX (907) 272-5214
mail@bce-al.com

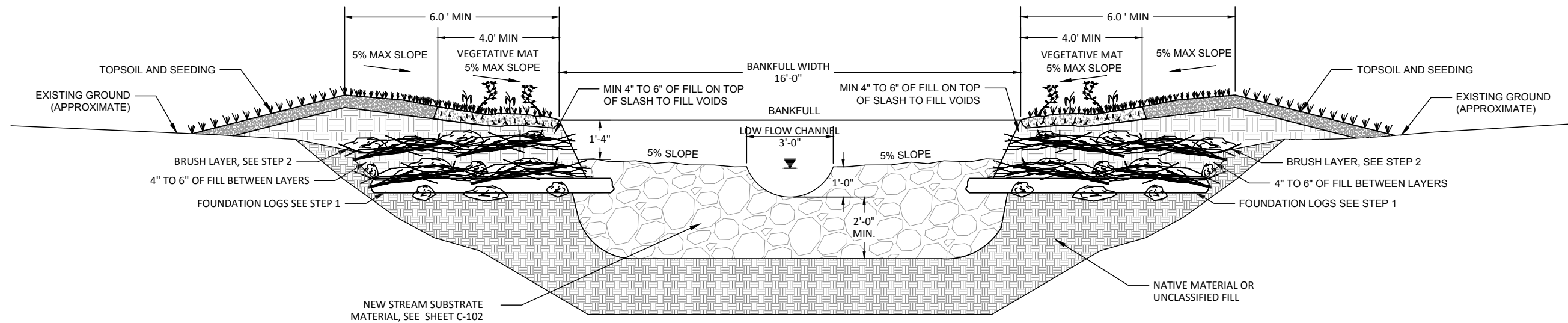
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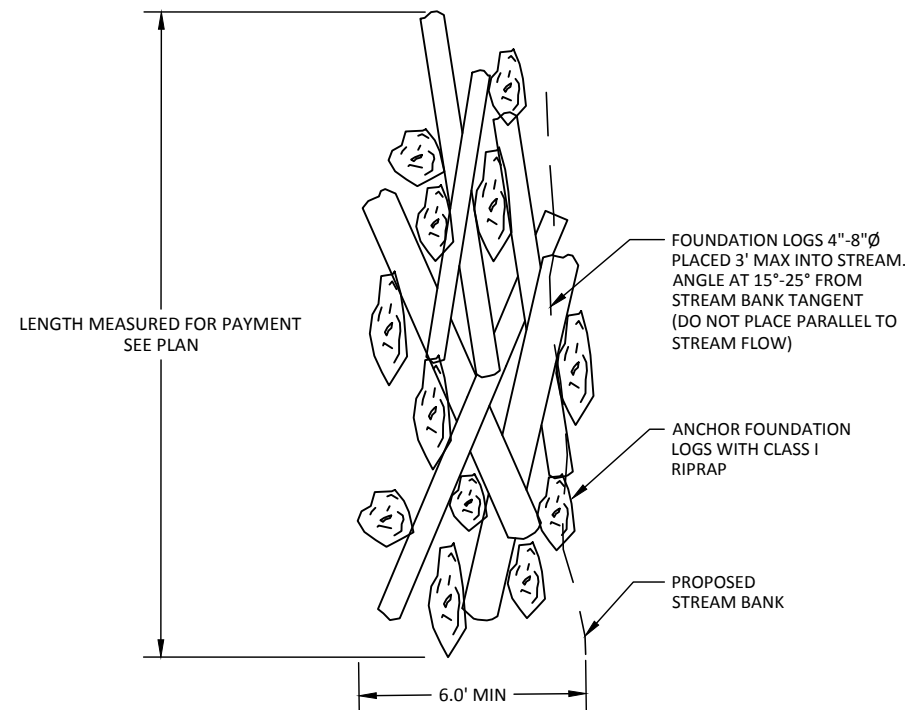
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JOB NO. 1684.18

SHEET C-600

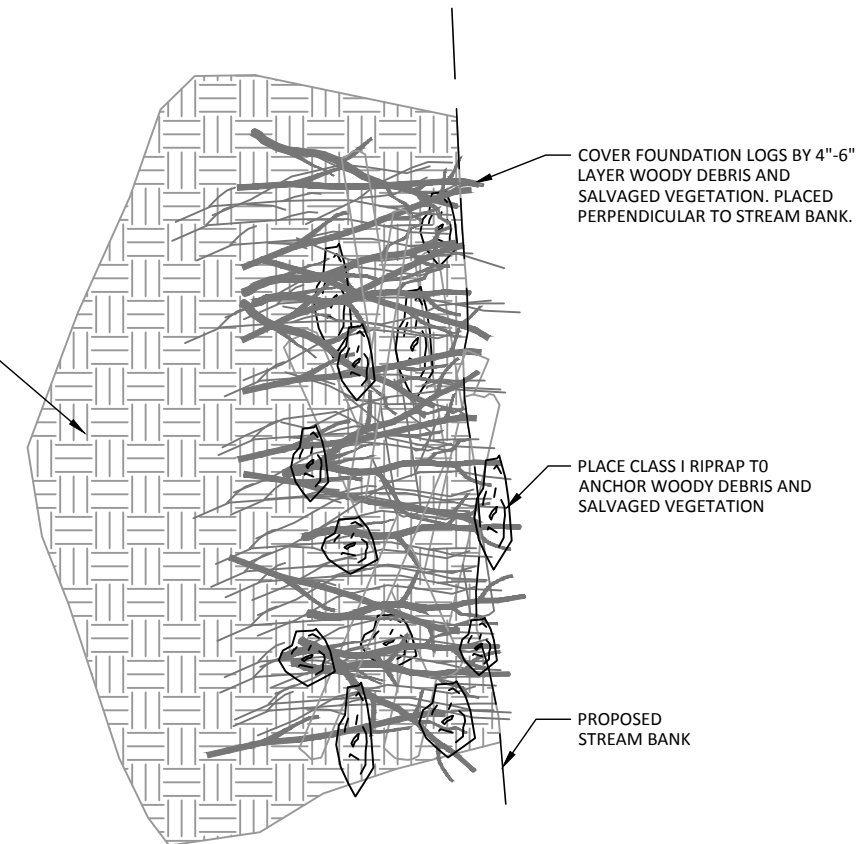


STREAM CROSS SECTION



STEP 1: TOEWOOD BANK RECONSTRUCTION FOUNDATION

SHALLOW 4"-6" LAYER OF
SALVAGED BACKFILL PLACED ON
TOP TO FILL VOIDS



STEP 2: TOEWOOD BANK RECONSTRUCTION BRUSH LAYERS

A TOEWOOD BANK RECONSTRUCTION DETAILS
SCALE : NTS

95% SUBMITTAL - OCTOBER 25, 2019

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

REV. NO.	DATE	REVISIONS

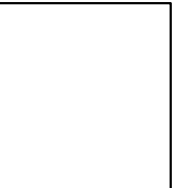
DATE: 10/25/19	DESIGNED: GDU	CHECKED: TOB	SCALE: AS NOTED	FILE: 1684.18-95%

PROJECT	COPPER RIVER WATERSHED HABITAT ENHANCEMENT
LOCATION	CORDOVA, ALASKA
CLIENT	U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING	TOEWOOD BANK RECONSTRUCTION DETAILS

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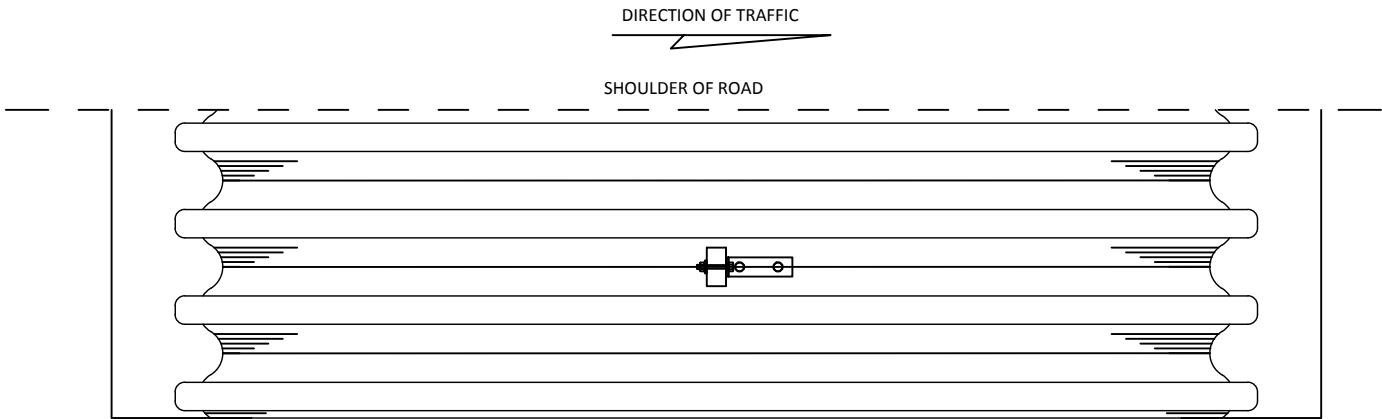
PHONE (907) 272-5284
FAX (907) 272-5214
mailto:bce@bce-al.com

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CONSULTING ENGINEERS INC.

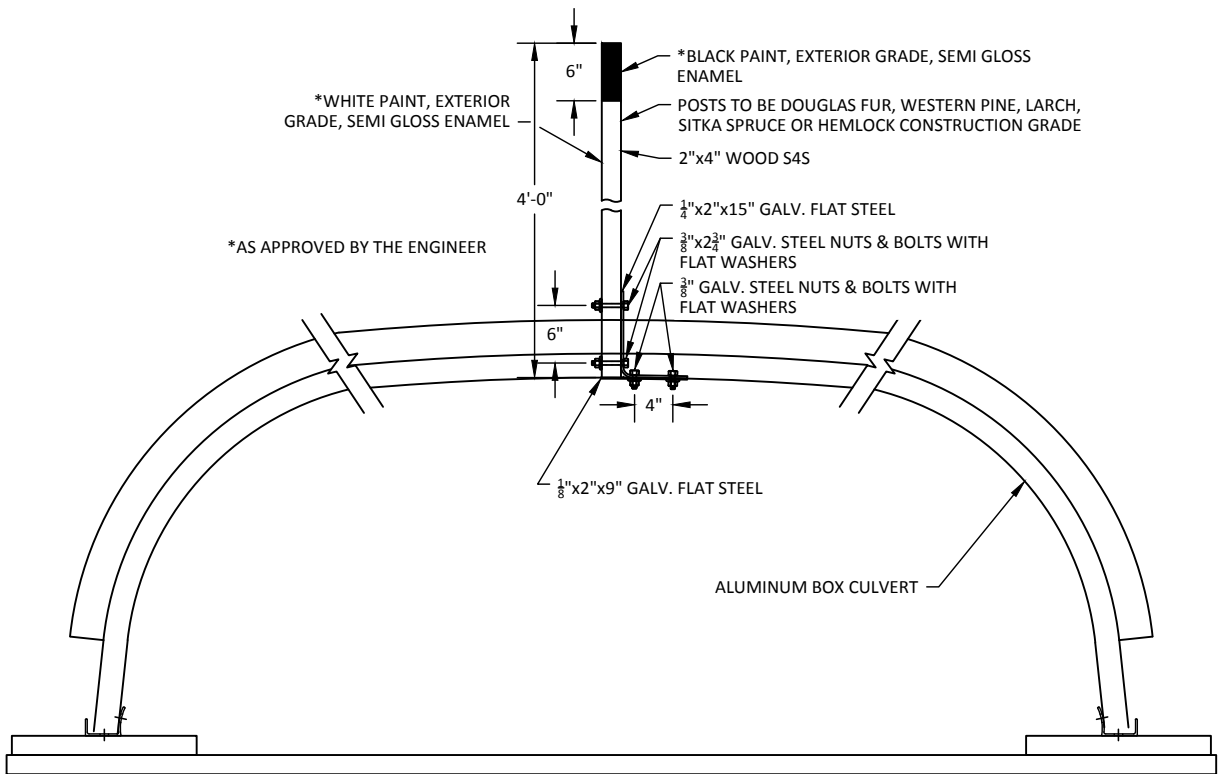


JOB NO.	1684.18
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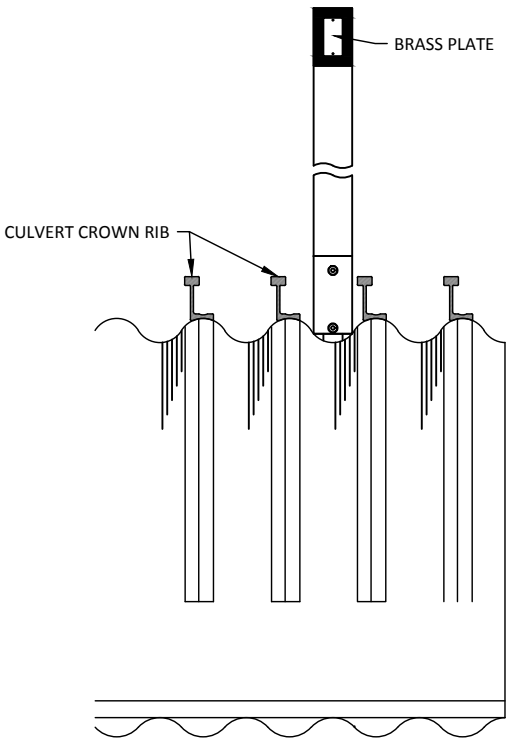
SHEET	C-601
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TOP VIEW



END VIEW



SIDE VIEW

GENERAL NOTES:

- 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-26915A, OR ASTM A-153, CLASS C.
- DRILL ALL BOLT HOLES. FLAME CUTTING SHALL NOT BE PERMITTED.
- GASKET MATERIAL SHALL BE PLACED BETWEEN DISSIMILAR METALS. GASKET MATERIAL SHALL BE APPROVED PRIOR TO INSTALLATION.
- 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'

SITE 20100508 SITE 20100510 SITE 20100511

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

95% SUBMITTAL - OCTOBER 25, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 10/25/19	DESIGNED: _____
DRAWN: GDU	CHECKED: TOB
SCALE: AS NOTED	FILE: 1684.18-95%

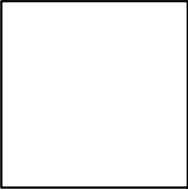
PROJECT	COPPER RIVER WATERSHED HABITAT ENHANCEMENT
LOCATION	CORDOVA, ALASKA
CLIENT	U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING	CULVERT MARKER POST

500 W 27th AVE., SUITE A
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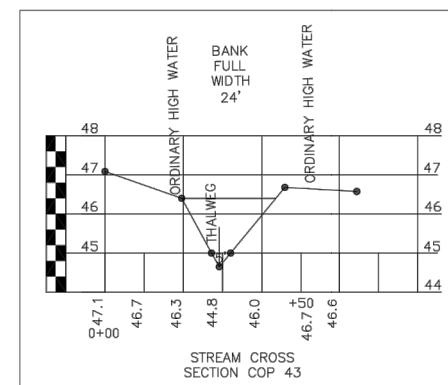
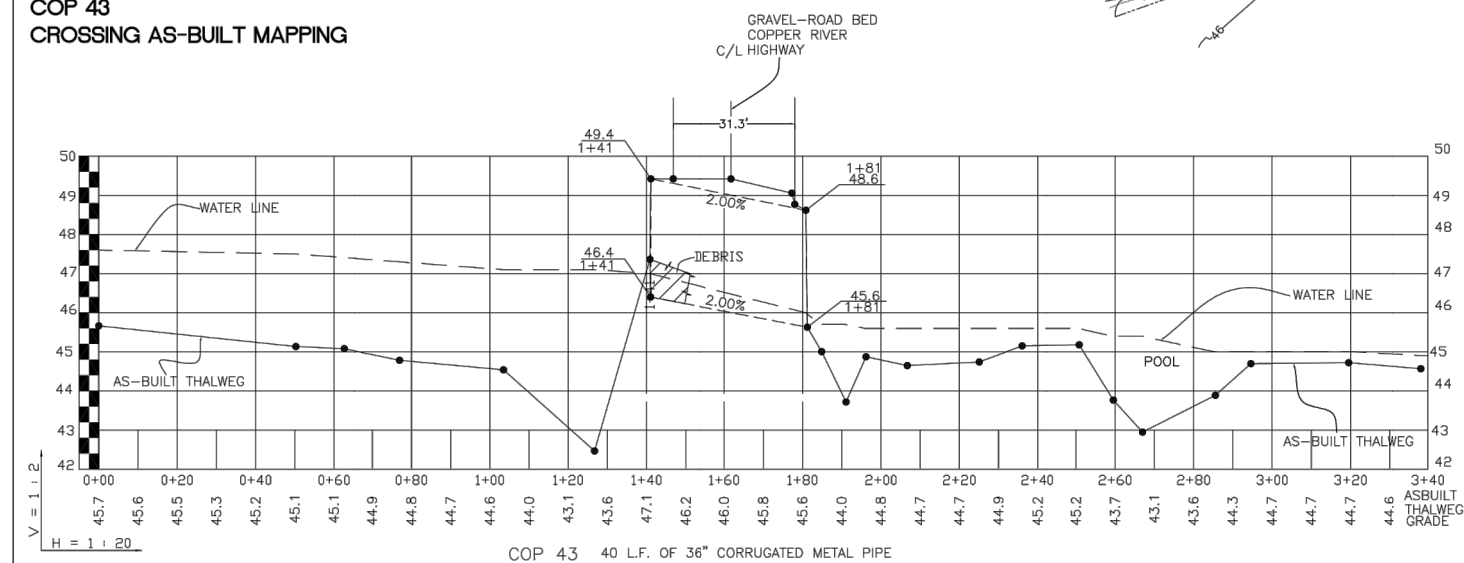
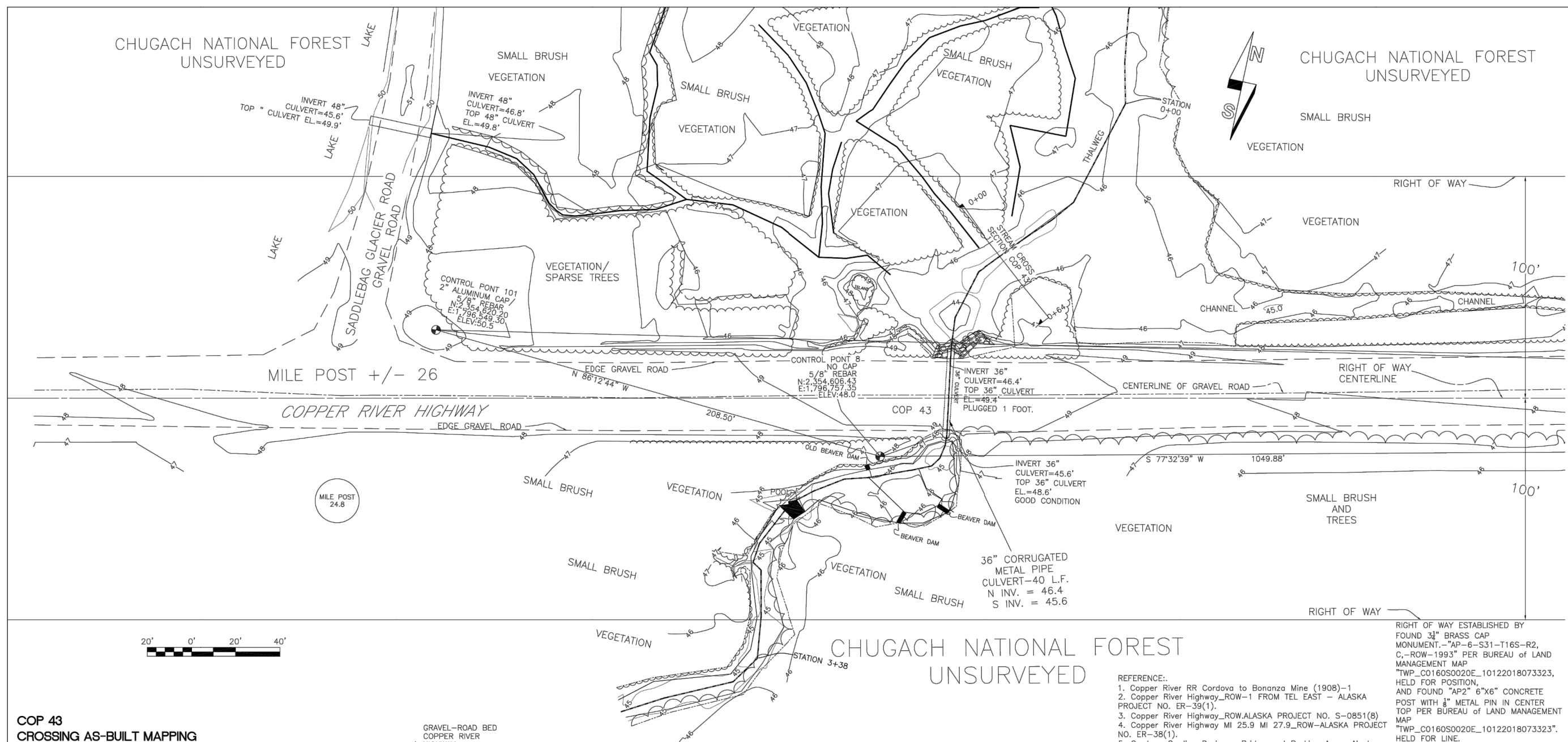
Buttlerby
CONSULTING ENGINEERS INC.

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FAX (907) 272-5214
mailto:bce@bce-ak.com



JOB NO.	1684.18
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SHEET	C-700
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REFERENCE:

1. Copper River RR Cordova to Bonanza Mine (1908)-1
2. Copper River Highway_ROW-1 FROM TEL EAST - ALASKA PROJECT NO. ER-389(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-389(1).
5. Cordova Grading Drainage Bridge and Parking Areas Alaska-Forest Highways Cordova Copper River Highway.
6. Chugach National Forest Alaska AsBuilt-ALASKA PROJECT NO. FH4-E_B5 & FH3 32-2(1).
7. TWP_C01605002OE_10122018073323-BLM.

RIGHT OF WAY ESTABLISHED BY
FOUND $\frac{3}{4}$ " 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 $\frac{1}{8}$ " 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		ALASKA
CORDOVA				
DRAWN BY MSTD	DATE 10-18-18	SECTIONS 36, T16S-R1E, COPPER RIVER MERIDIAN, ALASKA		
SCALE 1" = 40'	HEET OF 1	ST. DENNY PROJECT NO. 18-010A		
COPPER RIVER WATERSEED PROJECT FISH PASSAGE RESTORATION				
ST. DENNY SURVEYING INC. P.O. BOX 888 CHILKAT, ALASKA 99501				

500 W 27th AVE., SUITE A
ANCHORAGE, ALASKA 99503
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FAX (907) 272-5214
mail@bce-ak.com

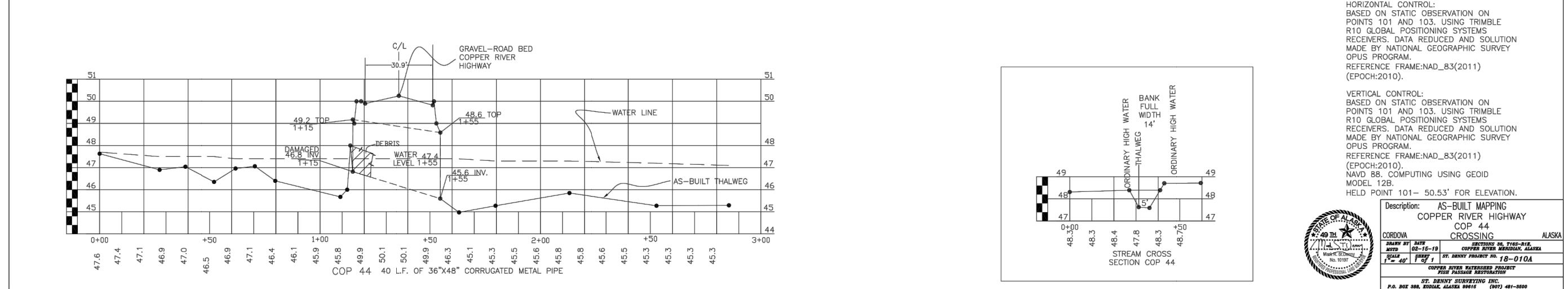
JOB NO. 1684.18

SHEET

V-100

95% SUBMITTAL - OCTOBER 25, 2019

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



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

[illegible]

DATE: 10/25/19
DESIGNED: _____
DRAWN: GU
CHECKED: TB
SCALE: AS NOTED
FILE: 1684.18-95%

PROJECT	COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT (FISH PASSAGE IMPROVEMENT)
LOCATION	CORDOVA, ALASKA
CLIENT	U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING	EXISTING CONDITION - COP 44 ADF&G # 20100510

500 W 27th AVE., SUITE A
ANCHORAGE, ALASKA 99503
WWW.BCE-AK.COM

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FAX (907) 272-5214
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JOB NO. 1684.18

SHEET

V-101

