

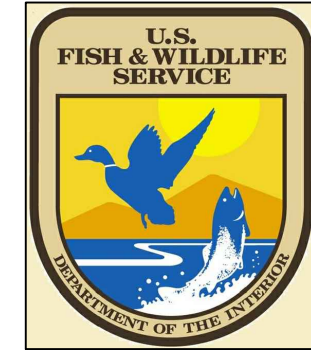
US FISH & WILDLIFE SERVICE (USFWS)

COPPER RIVER WATERSHED HABITAT ENHANCEMENT PROJECT

CORDOVA EVOS SITES COP 43, 44, AND 45

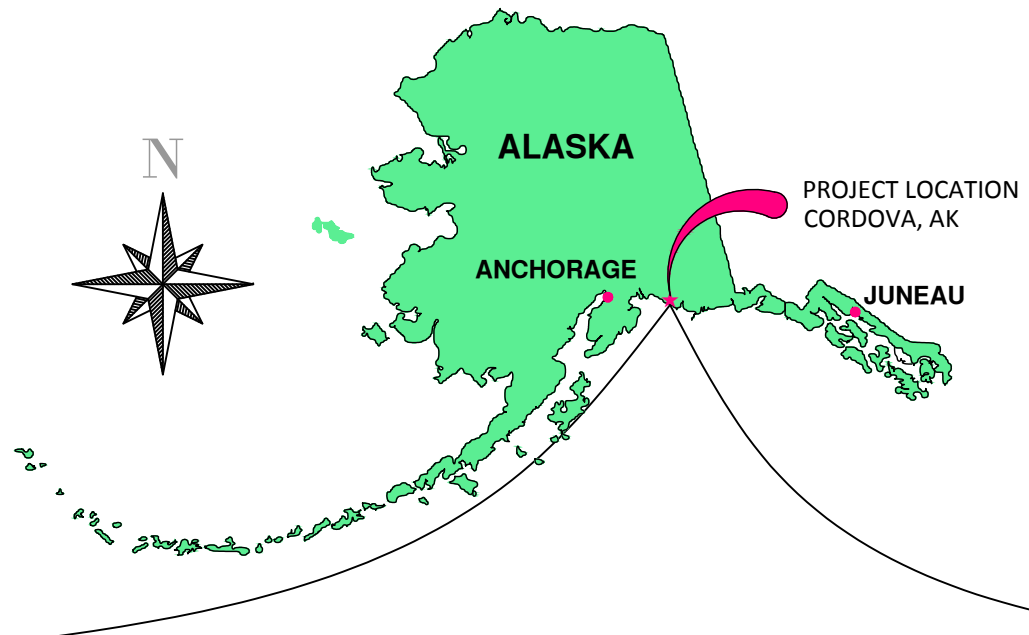
CORDOVA, ALASKA

SEPTEMBER 3, 2019



REV. NO.	DATE	REVISIONS

DATE: 02/19
 DESIGNED: _____
 DRAWN: CU
 CHECKED: TB
 SCALE: AS NOTED
 FILE: 1684.18-65%

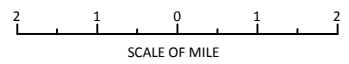
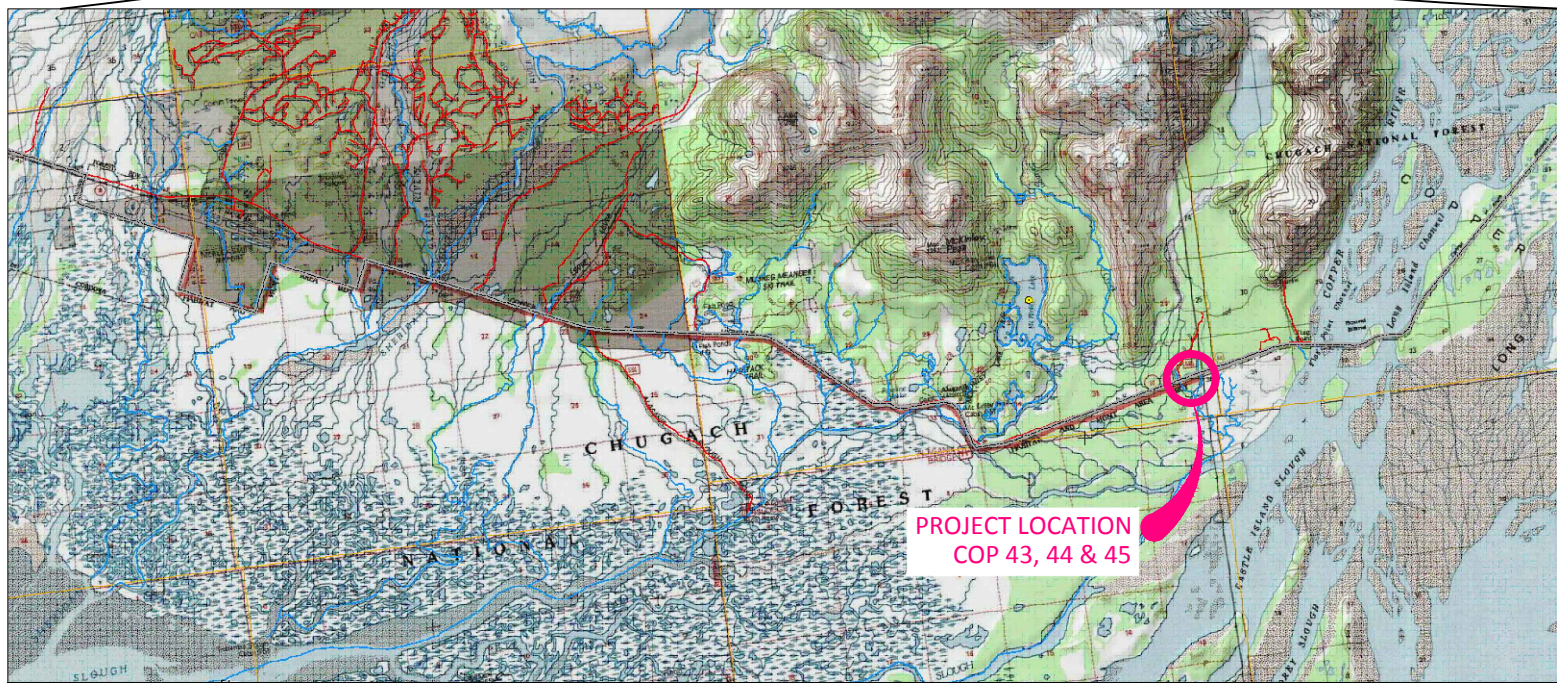


PROJECT DESCRIPTION

THE PROPOSED PROJECT INVOLVES REPLACING EXISTING CULVERTS WITH A LARGER STREAM SIMULATION ALUMINUM BOX CULVERTS AT THREE (3) LOCATIONS (COP 43, 44 & 45), ALONG COPPER RIVER HIGHWAY IN CORDOVA, ALASKA.

THE CONTRACTOR MUST PROVIDE ALL CULVERT MATERIALS, MANPOWER, EQUIPMENT, ASSEMBLY AND INSTALLATION OF THE NEW CULVERT (SEE SPECIFICATIONS).

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G-004	EROSION, SEDIMENT CONTROL NOTES & SILT FENCE DETAILS
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V-102	COP 45 EXISTING CONDITION (SURVEY)
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C-501	COP 44 STREAM CROSS SECTIONS
C-502	COP 45 STREAM CROSS SECTIONS
C-600	REVEGETATION PLAN



VICINITY MAP

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

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BCE
Building
 CONSULTING ENGINEERS, INC.

JOB NO. 1684.18

SHEET
G-001

65% SUBMITTAL - SEPTEMBER 3, 2019

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

ESTIMATE OF QUANTITIES*

ITEM NO.	WORK DESCRIPTION	PAY UNIT	ESTIMATED QUANTITIES		
			SITE 20100508 (COP 43)	SITE 20100510 (COP 44)	SITE 20100511 (COP 45)
201(1)	CLEARING AND GRUBBING	SY	2940		
202(4)	REMOVAL OF CULVERT PIPE	LF	40	40	40
203(3)	UNCLASSIFIED EXCAVATION	CY	512	546	564
203(5)	BORROW SELECT FILL MATERIAL, TYPE A	CY	2760		
204(1)	BORROW SELECT FILL MATERIAL, TYPE B	CY	197	197	197
204(1)	BORROW SELECT FILL MATERIAL, TYPE F	CY	182	182	182
301(2)	AGGREGATE BASE COURSE, GRADING E-1	CY	1031		
602(2)	STRUCTURAL PLATE ALUMINUM BOX CULVERT 16'-6" SPAN x 6'-8" RISE W/ SOLID INVERT	LF	58.5	58.5	58.5
611(1)	RIPRAP, CLASS II (COLLAR & WEIR)	CY	23	28	22
618(1)	SEEDING (SCHEDULE A)	SY	1709		
620(1)	TOPSOIL, 4"	SY	1709		
630(1)	GEOTEXTILE, SEPARATION	SY	339	339	339
640(1)	MOBILIZATION & DEMOBILIZATION	LS	ALL REQ'D		
641(1)	EROSION AND POLLUTION CONTROL ADMINISTRATION	LS	ALL REQ'D		
641(3)	TEMPORARY EROSION AND POLLUTION CONTROL	LS	ALL REQ'D		
642(1)	CONSTRUCTION SURVEYING	LS	ALL REQ'D		
643(2)	TRAFFIC MAINTENANCE	LS	ALL REQ'D		
672(1)	STREAM DIVERSION & DEWATERING	LS	ALL REQ'D		
690(1)	CULVERT/STREAM SUBSTRATE - FINE MATERIALS	CY	86	42	41
690(1)	CULVERT/STREAM SUBSTRATE - COARSE MATERIALS	CY	171	85	81
690(4)	VEGETATIVE MAT	SY	81	59	26

* ESTIMATE OF QUANTITIES IS IN PLACE, AND DO NOT ACCOUNT FOR SWELL OR WASTE PRIOR TO COMPACTION

ABBREVIATIONS:

AC	ASPHALT CONCRETE	N	NORTHING
AKDOT&PF	ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES	NTS	NOT TO SCALE
ALBC	ALUMINUM BOX CULVERT	OHW	ORDINARY HIGH WATER
BMP	BEST MANAGEMENT PRACTICE	PC	POINT OF CURVATURE
BR	BEDROCK	PCC	POINT OF COMPOUND CURVATURE
CFS	CUBIC FEET PER SECOND	PI	POINT OF INTERSECTION
CMP	CORRUGATED METAL PIPE	PRC	POINT OF REVERSE CURVATURE
CO	CONTRACTING OFFICER	PT	POINT OF TANGENCY
COR	CONTRACTING OFFICER REPRESENTATIVE	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
FT	FEET	S	SOUTH
GALV	GALVANIZED	SM	SILTY SAND WITH GRAVEL
HR	HOURLY	SP	POORLY GRADED SAND
IE	INVERT ELEVATION	STA	STATION
IN	INCH	SY	SQUARE YARDS
LF	LINEAL FEET	TYP	TYPICAL
LS	LUMP SUM	USFS	U.S. FOREST SERVICE
MI	MILES	USFWS	U.S. FISH AND WILDLIFE SERVICE
MID	MIDPOINT	USGS	U.S. GEOLOGICAL SURVEY
MIN	MINIMUM	VAP	VERTICAL ADJUSTMENT POTENTIAL
ML	SILT WITH SAND		
MSF	THOUSAND SQUARE FEET		

GENERAL NOTES

- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CURRENT ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES (AKDOT&PF) STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (SSHC) 2017 EDITION, EXCEPT AS AMENDED OR SUPERSEDED BY THE SPECIAL PROVISIONS IN THESE PROJECT SPECIFICATIONS.
- 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.
- 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 AS CONTRACTOR'S GUIDE. CONTRACTOR SHALL MODIFY PLAN AT HIS/HER EXPENSE IF WORK SEQUENCE CALLS FOR A MODIFIED ESCP.
- 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.
- 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.
- 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.
- 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.
- ALL FILL, USABLE EXCAVATION, AND TRENCH BACKFILL SHALL BE COMPACTED TO NINETY-FIVE PERCENT (95%) OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT, BASED ON MODIFIED PROCTOR TEST VALUES. ALL FILL SHALL BE PLACED IN LIFTS NOT EXCEEDING 12 INCHES.
- EXCAVATION SHALL BE PERFORMED IN COMPLIANCE WITH ALL LOCAL AND FEDERAL (OSHA) SAFETY REGULATIONS AND REQUIREMENTS.
- FILL AND BEDDING MATERIAL SHALL BE PLACED AND COMPACTED WITH CARE UNDER HAUNCHES OF PIPE AND SHALL BE BROUGHT UP EVENLY AND SIMULTANEOUSLY BELOW AND ON BOTH SIDES OF PIPE TO 1 FOOT ABOVE THE TOP OF THE FULL LENGTH OF THE PIPE.
- CONTRACTOR MUST NOTIFY THE CONTRACTING OFFICER (CO) OR CONTRACTING OFFICER REPRESENTATIVE (COR), AKDOT&PF REPRESENTATIVE AND UTILITY COMPANIES AT LEAST 10 DAYS PRIOR TO STARTING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PREVENTING DAMAGE TO THE UTILITIES. IF DAMAGE OCCURS, CONTRACTOR SHALL REPAIR UTILITY AT NO ADDITIONAL COST TO THE GOVERNMENT.
- SOIL CLASSIFICATION AND DEPTHS OF GROUNDWATER IN THE PROJECT LOCATION ARE DESCRIBED IN DETAILS ON THE GEOTECH REPORT BY NORTHERN GEOTECHNICAL ENGINEERING, INC. .
- ALUMINUM BOX
 - THE BOX CULVERT SHALL BE FABRICATED 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).
 - THE BOX CULVERT SHALL BE ASSEMBLED IN ACCORDANCE WITH THE SHOP DRAWINGS PROVIDED BY THE MANUFACTURER, AND PER THE MANUFACTURER'S RECOMMENDATIONS. BOLTS SHALL BE TIGHTENED PER MANUFACTURER'S RECOMMENDATIONS.
 - THE BEDDING SHALL BE CONSTRUCTED TO A UNIFORM LINE AND GRADE USING MATERIAL OUTLINED IN THE SPECIFICATIONS.
 - ALL CULVERTS REPLACED SHALL BE LEGALLY DISPOSED OF IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS AND REMOVED FROM THE PROJECT SITE.

EROSION AND SEDIMENT CONTROL NOTES

- THE CONTRACTOR IS RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL AND SHALL OBTAIN ALL NECESSARY APPROVAL AND PERMITS REQUIRED. MINIMAL BMP'S ARE SHOWN ON DRAWING.
- USE SUPERSACKS TO DEWATER WORK AREA DURING STREAM DIVERSION. 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.
- 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.
- 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.
- 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.
- 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.
- STOCKPILE AND STAGING AREAS SHALL BE CLEANED AND FINAL GRADED TO THEIR ORIGINAL CONDITION.
- WHEN VEGETATION IS ESTABLISHED AND ALLOWED BY ENGINEER, REMOVE AND DISPOSE OF SILT FENCES AND OTHER TEMPORARY BARRIERS IN A LEGAL MANNER.

65% SUBMITTAL - SEPTEMBER 3, 2019


REV. NO.	DATE	REVISIONS

DATE: 03/19
 DESIGNED: _____
 DRAWN: GU
 CHECKED: TB
 SCALE: AS NOTED
 FILE: 1684.18-65%

PROJECT: KODIAK ISLAND HABITAT ENHANCEMENT PROJECT
 (FISH PASSAGE)
 LOCATION: KODIAK, ALASKA
 CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)
 DRAWING: MAP OF CULVERT SITES

500 W 27th AVE., SUITE A
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BCE
 Consulting Engineers, Inc.

JOB NO. 1684.18

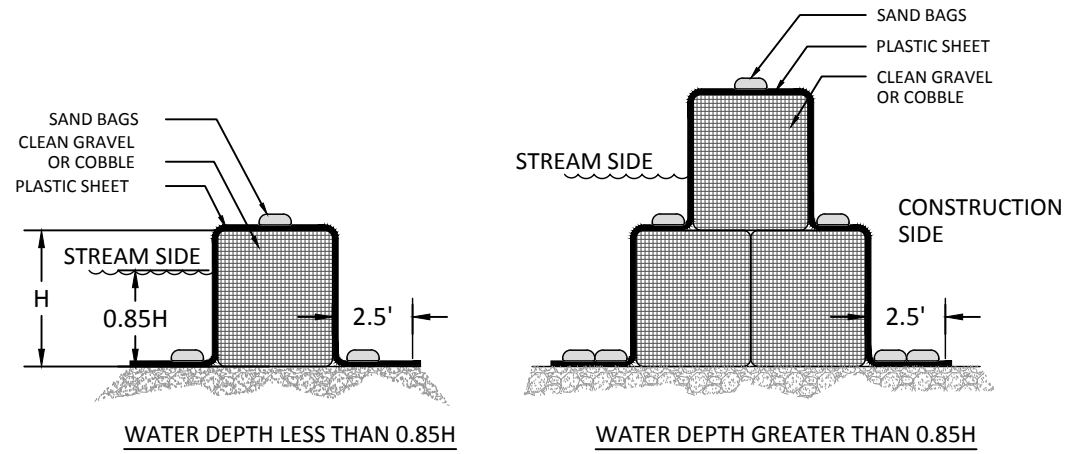
SHEET
G-002

COFFERDAM NOTES:

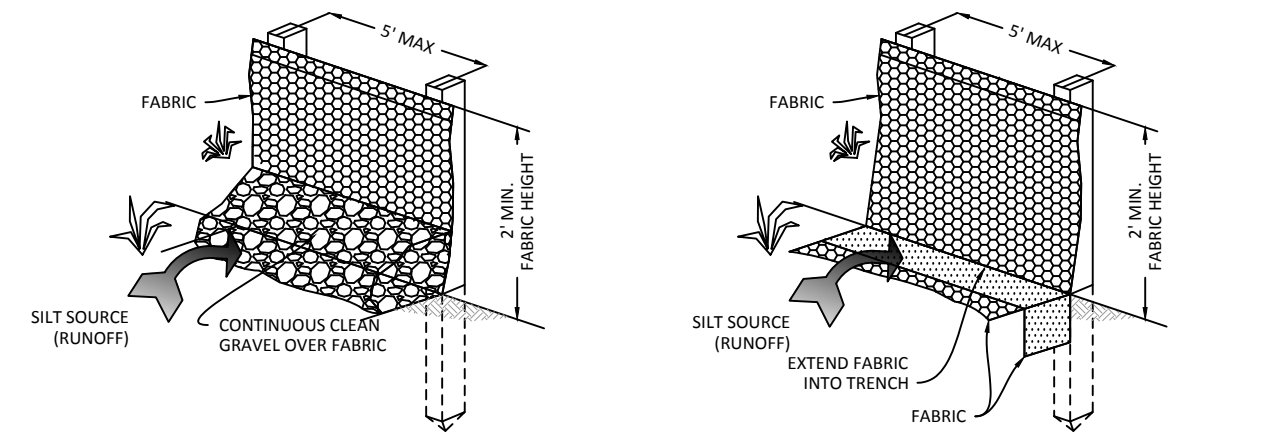
1. SUPERSACK COFFERDAM SHALL BE CONSTRUCTED OF MULTIPLE UNITS OF SUPERSACKS FILLED WITH CLEAN GRAVEL OR COBBLE, AND ABUTTED SIDE BY SIDE TO CREATE A WATER TIGHT BARRIER THAT SEPARATES THE CONSTRUCTION SITE FROM THE STREAM.
2. IF WATER DEPTH EXCEEDS 85% OF THE SUPER SACK HEIGHT, AN ADDITIONAL TOP ROW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

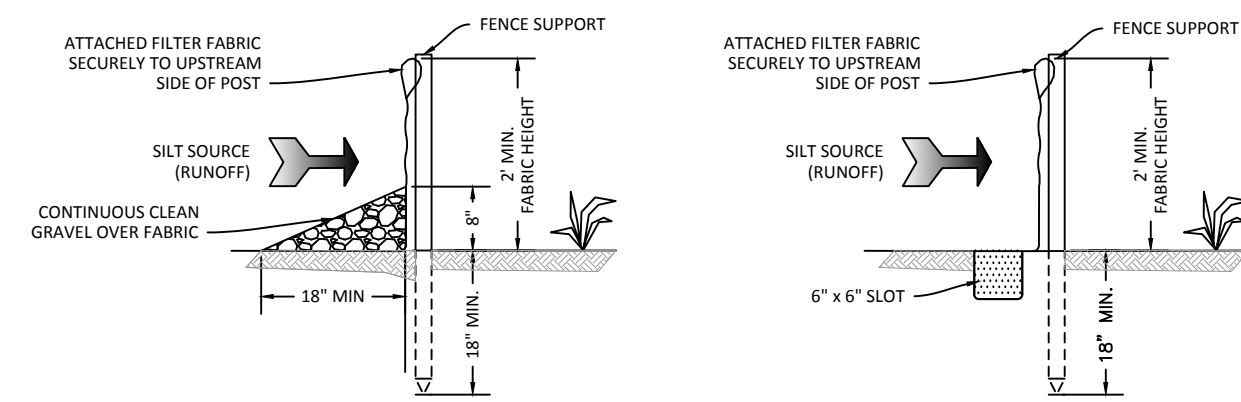
1. INSTALLATION AND APPLICATION SHALL BE IN ACCORDANCE WITH THE ADOT/PF SEDIMENT AND EROSION CONTROL MANUAL (<http://www.dot.state.ak.us>).
2. SILT FENCE FABRIC SHALL BE OVERLAPPED 6" AT FENCE SUPPORT.
3. SILT FENCE FABRIC SHALL BE TAUT, NOT LOOSE OR FOLDED.
4. THE CONTRACTOR SHALL INSPECT AND REPAIR 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.



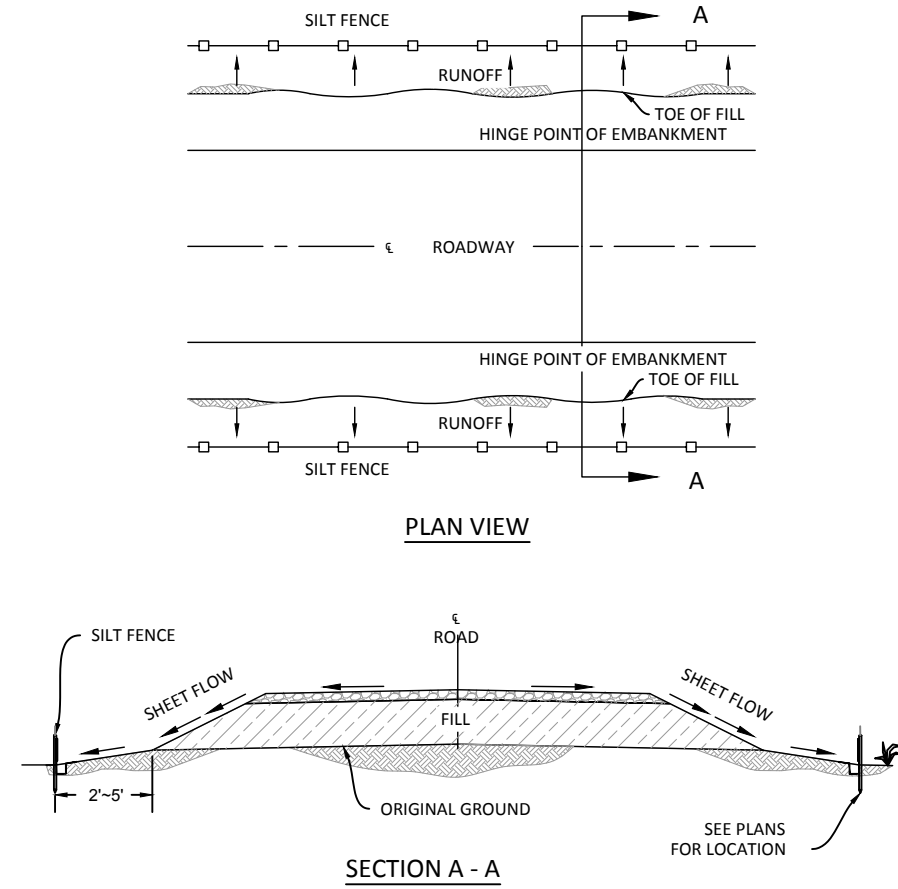
A COFFERDAM DETAILS
SCALE: NTS



BACKFILL ALTERNATIVE **TRENCH ALTERNATIVE**



BACKFILL CROSS SECTION **TRENCH CROSS SECTION**



B SILT FENCE DETAILS
SCALE: NTS

65% SUBMITTAL - SEPTEMBER 3, 2019

REV. NO.	DATE	REVISIONS

DATE: 9/3/19
 DESIGNED: CU
 DRAWN: CU
 CHECKED: TB
 SCALE: AS NOTED
 FILE: 1684.18-65%

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

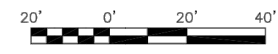
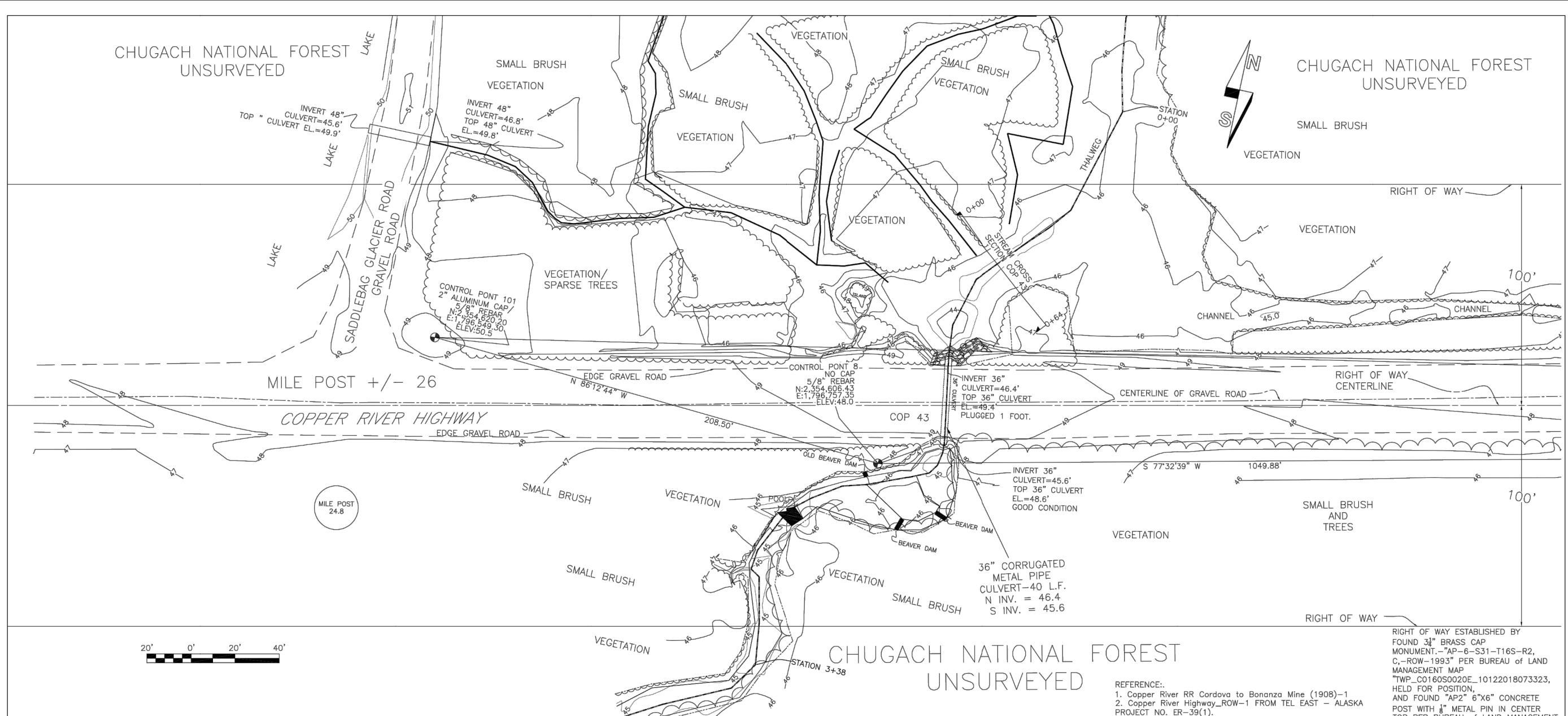
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 FAX (907) 272-5214
 mail@bce-ak.com

BCE
 BUILDINGS
 CONSULTING ENGINEERS, INC.

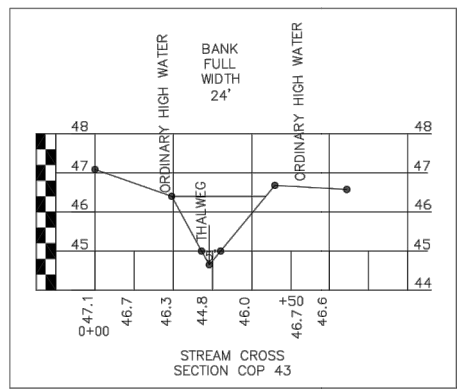
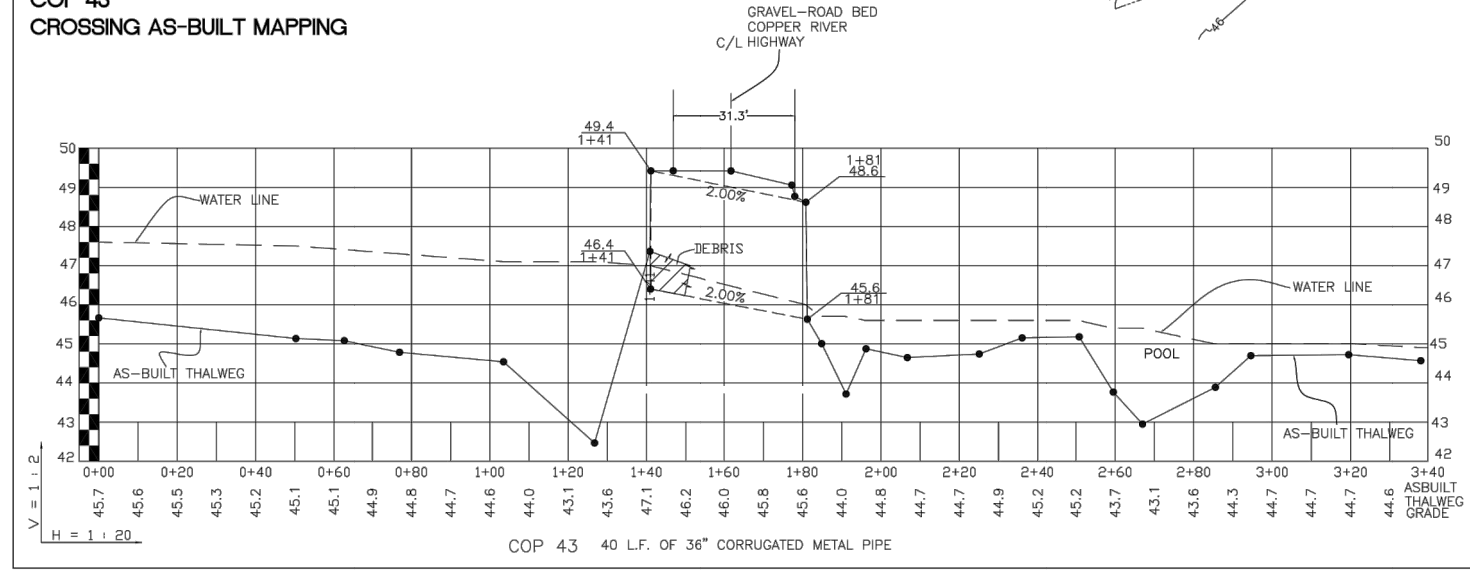
JOB NO. 1684.18

SHEET
G-003

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



**COP 43
CROSSING AS-BUILT MAPPING**



RIGHT OF WAY ESTABLISHED BY FOUND 3 1/2" 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 3/8" 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	
Cordova	ALASKA
DATE: 10-18-18	SECTION: 06, 116S-R1E,
BY: ST. DENNY SURVEYING INC.	COPPER RIVER WATERSHED, ALASKA
SCALE: 1" = 40'	ST. DENNY PROJECT NO. 18-010A
COPPER RIVER WATERSHED PROJECT	
FISH PASSAGE RESTORATION	
ST. DENNY SURVEYING INC.	
P.O. BOX 888, KODIAK, ALASKA 99501 (907) 481-8800	

REV. NO.	DATE	REVISIONS

DATE: 09/19
DESIGNED: CU
DRAWN: CU
CHECKED: TB
SCALE: AS NOTED
FILE: 1684.18-65%

PROJECT: KODIAK ISLAND HABITAT ENHANCEMENT PROJECT
LOCATION: KODIAK, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING: SURVEY - COP 43

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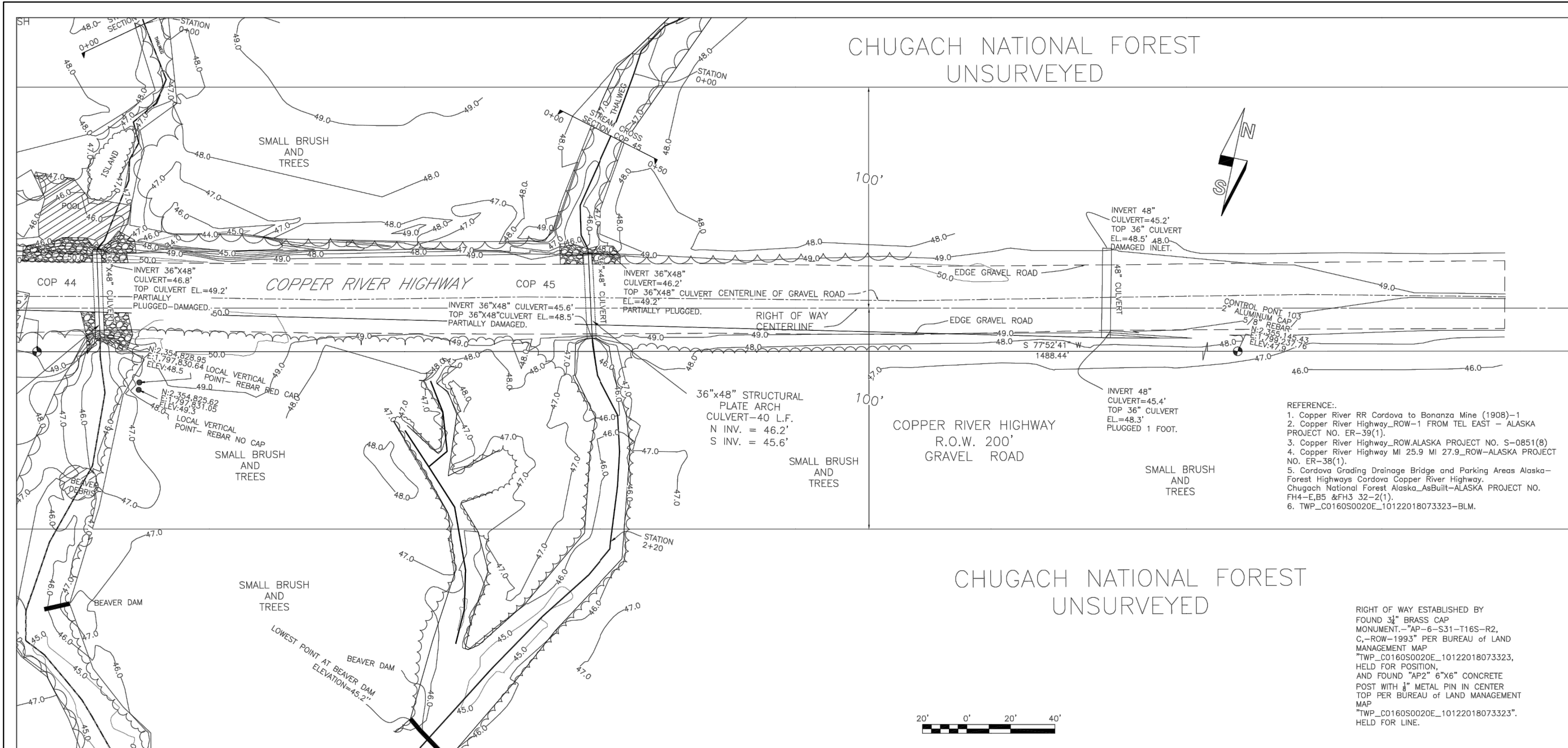


JOB NO. 1684.18

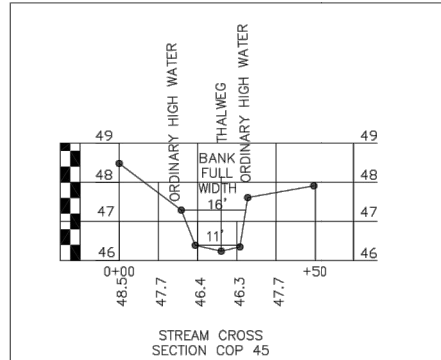
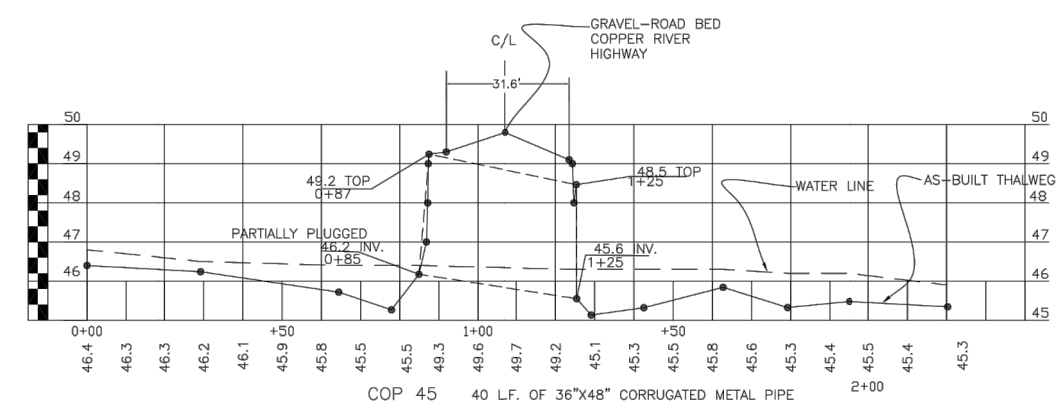
SHEET
V-100

65% SUBMITTAL - SEPTEMBER 3, 2019

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



COP 45
CROSSING AS-BUILT MAPPING



- 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_AsBuilt-ALASKA PROJECT NO. FH4-E.B5 & FH3 32-2(1).
 6. TWP_C0160S0020E_10122018073323-BLM.

RIGHT OF WAY ESTABLISHED BY FOUND 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 3/8" 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 45	
CROSSING	
ALASKA	
CORDOVA	SECTION NO. 1160-01A
DESIGNED BY: DATE: 02-15-19	COPPER RIVER RESTORATION, ALASKA
SCALE: 1" = 40'	ST. DENNY PROJECT NO. 18-010A
COPPER RIVER RESTORATION PROJECT	
FISH PASSAGE RESTORATION	
ST. DENNY SURVEYING INC.	
P.O. BOX 886, KODIAK, ALASKA 99516 (907) 481-8600	

REV. NO.	DATE	REVISIONS

DATE: 02/19	DESIGNED: CU	CHECKED: TB	SCALE: AS NOTED	FILE: 1684.18-65%
	DRAWN: CU			

PROJECT: KODIAK ISLAND HABITAT ENHANCEMENT PROJECT
(FISH PASSAGE)
LOCATION: KODIAK, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING: SURVEY - COP 45

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

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

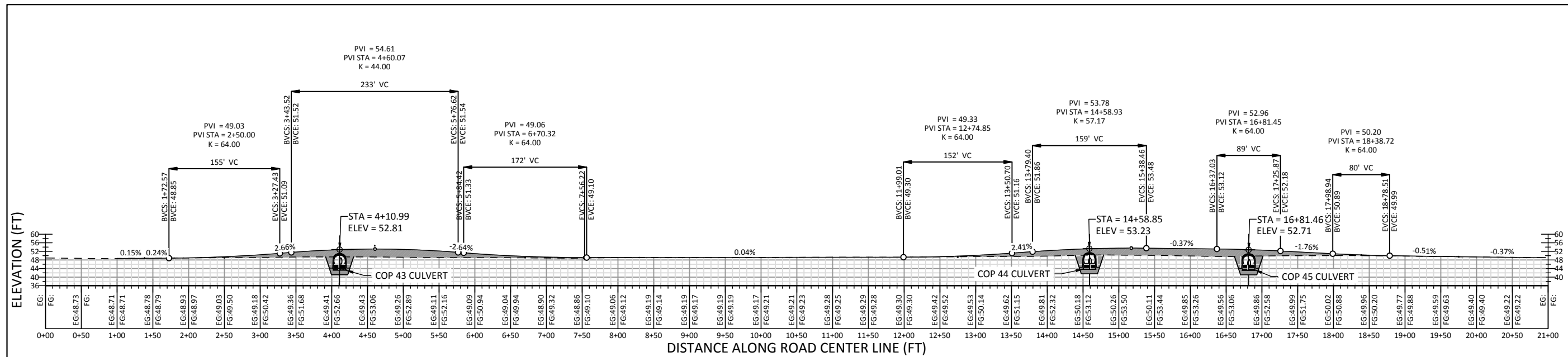


JOB NO. 1684.18

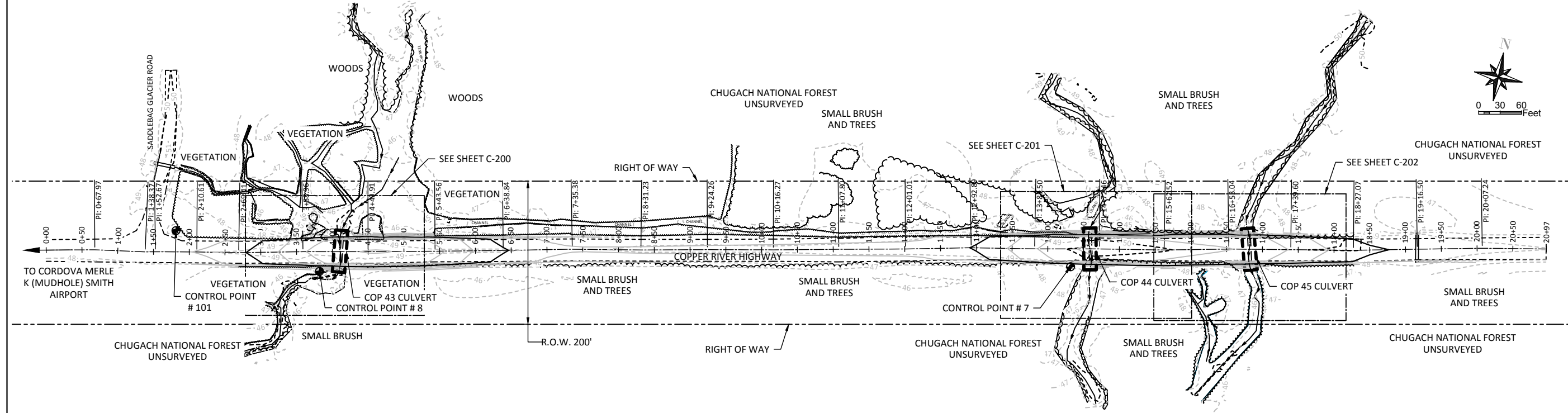
SHEET
V-102

65% SUBMITTAL - SEPTEMBER 3, 2019

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



B COPPER RIVER HIGHWAY PROFILE
SCALE: H=1 : 75, V=1:3



B COPPER RIVER HIGHWAY PLAN
SCALE: 1 : 75

ROAD CENTERLINE COORDINATE TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
11000	2354555.583	1796377.673	48.93	Road Center Line - 0+00 - BOA
11001	2354570.303	1796444.026	48.74	Road Center Line - 0+67.97 - PI
11002	2354582.189	1796513.416	48.77	Road Center Line - 1+38.37 - PI
11003	2354585.346	1796527.363	48.80	Road Center Line - 1+52.67 - PI
11004	2354597.202	1796584.079	49.05	Road Center Line - 2+10.61 - PI
11005	2354608.531	1796641.474	49.81	Road Center Line - 2+69.11 - PI
11006	2354628.640	1796729.043	51.91	Road Center Line - 3+58.96 - PI
11007	2354647.779	1796817.956	53.10	Road Center Line - 4+49.91 - PI
11008	2354667.980	1796909.405	52.36	Road Center Line - 5+43.56 - PI
11009	2354689.011	1797002.336	50.22	Road Center Line - 6+38.84 - PI
11010	2354710.925	1797096.356	49.22	Road Center Line - 7+35.38 - PI
11011	2354729.958	1797190.298	49.19	Road Center Line - 8+31.23 - PI
11012	2354749.918	1797281.155	49.19	Road Center Line - 9+24.26 - PI

ROAD CENTERLINE COORDINATE TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
11013	2354768.929	1797371.177	49.24	Road Center Line - 10+16.27 - PI
11014	2354788.859	1797460.512	49.29	Road Center Line - 11+07.80 - PI
11015	2354808.849	1797551.555	49.30	Road Center Line - 12+01.01 - PI
11016	2354829.770	1797641.024	50.03	Road Center Line - 12+92.89 - PI
11017	2354846.832	1797727.972	51.84	Road Center Line - 13+81.50 - PI
11018	2354865.773	1797816.938	53.18	Road Center Line - 14+72.46 - PI
11019	2354883.194	1797905.301	53.28	Road Center Line - 15+62.52 - PI
11020	2354903.479	1797993.517	53.00	Road Center Line - 16+53.04 - PI
11021	2354920.747	1798078.338	51.94	Road Center Line - 17+39.60 - PI
11022	2354938.252	1798164.037	50.46	Road Center Line - 18+27.07 - PI
11023	2354958.476	1798251.149	49.80	Road Center Line - 19+16.50 - PI
11024	2354978.792	1798339.589	49.38	Road Center Line - 20+07.24 - PI
11025	2354996.544	1798427.407	49.05	Road Center Line - 20+96.83 - EOA

CONTROL POINTS				
POINT	NORTH	EAST	ELEVATION	DESCRIPTION
7	2354832.87	1797782.51	49.60	2" ALUMINUM CAP / 5" REBAR
8	2354606.43	1796757.35	48.00	5" REBAR
101	2354620.20	1796549.30	50.50	2" ALUMINUM CAP / 5" REBAR

65% SUBMITTAL - SEPTEMBER 3, 2019

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

REV. NO.	DATE	REVISIONS

DATE:	9/03/19
DESIGNED:	GDU
DRAWN:	TGB
CHECKED:	TGB
SCALE:	AS NOTED
FILE:	1684.1B-15E

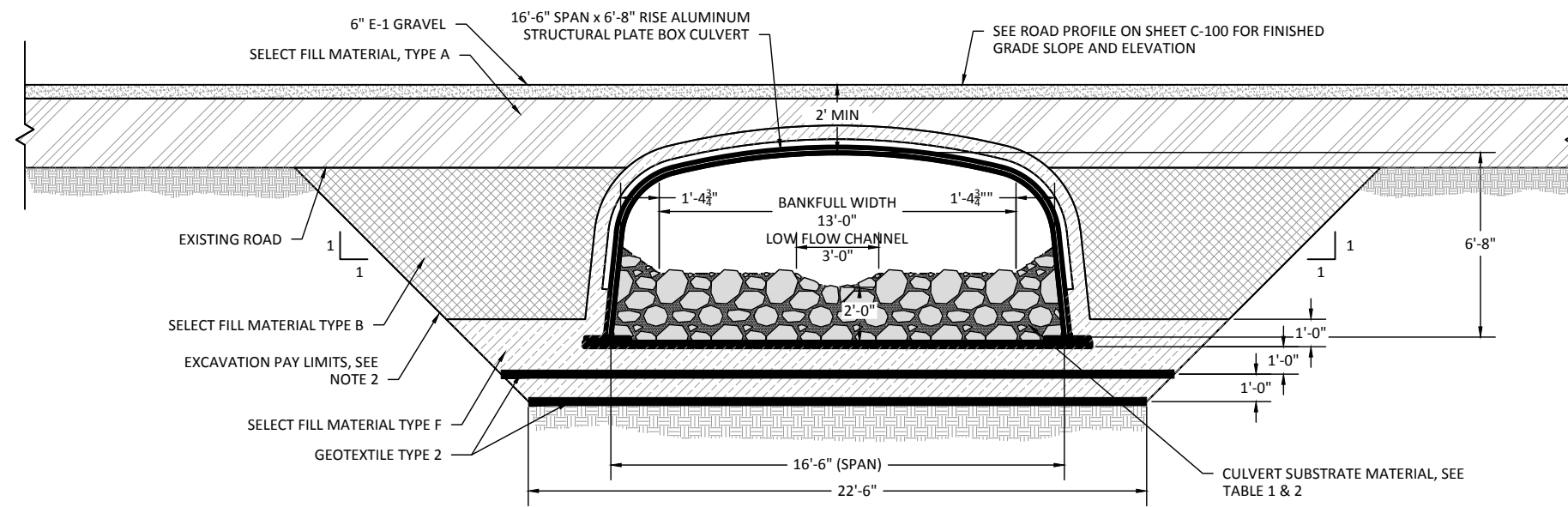
PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT
PROJECT (FISH PASSAGE)
LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING: COPPER RIVER HIGHWAY PLAN & PROFILE

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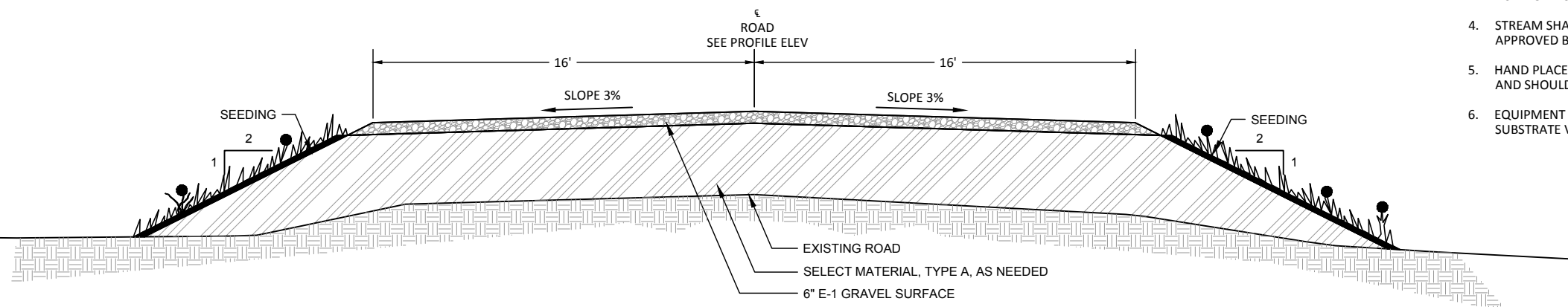


JOB NO.	1598.17
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SHEET
C-100



A TYPICAL CULVERT SECTION
SCALE: 1:3



B TYPICAL ROAD SECTION
SCALE: 1:3

NOTES:

- EXCAVATED MATERIAL MAY BE USED FOR FILL MATERIAL, TYPE A AS APPROVED BY ENGINEER.
- DEPICTED PAY LIMITS ARE FOR DETERMINING PAY QUANTITIES ONLY. CONTRACTOR SHALL SLOPE TRENCH WALL AND/OR SHORE EXCAVATIONS TO ASSURE SAFETY IN ACCORDANCE WITH CURRENT OSHA ALASKA REQUIREMENTS.

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

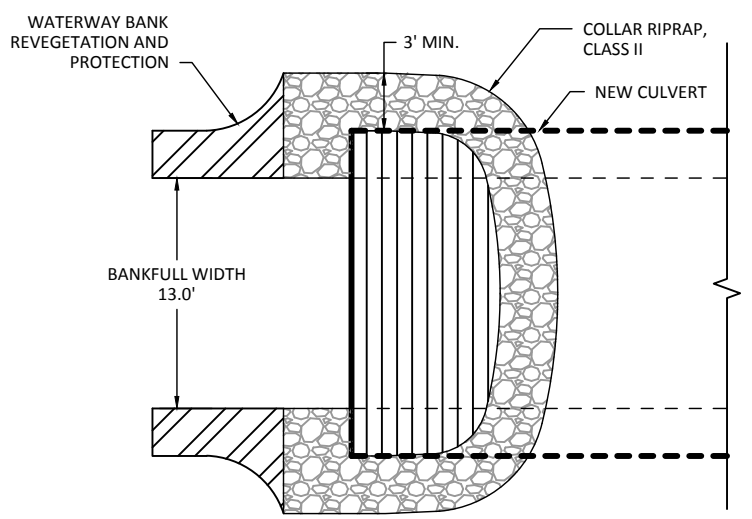
TABLE 2	
FINE MATERIAL (1 PART)	
SIZE	% PASSING
5"	100%
3.5"	75-85%
2.5"	65-75%
1.25"	45-55%
0.5"	20-30%
# 10	10%
# 40	5%

NOTES:

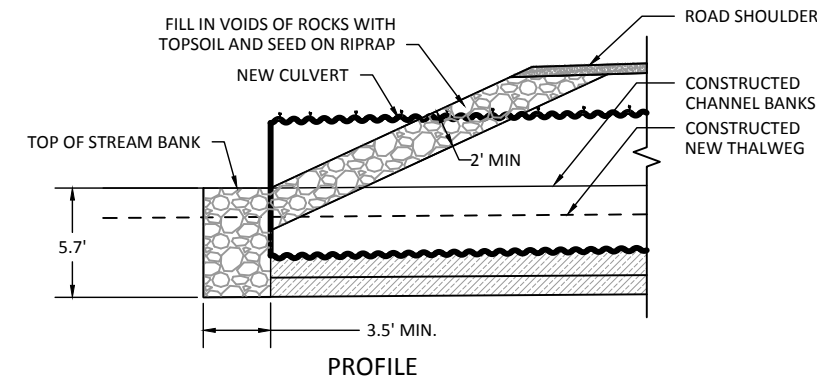
- STREAM AND CULVERT SUBSTRATE MATERIAL SHALL BE MIXED AT SITE USING 2 PARTS COARSE MATERIAL TO 1 PART FINE.
- COARSE AND FINE MATERIALS SHALL FOLLOW THE GRADATION NOTED IN TABLE 1 AND 2, RESPECTIVELY.
- CONSTRUCT STREAM SUBSTRATE LEAVING A NON-UNIFORM, ROUGH SURFACE. CONTRACTOR SHALL WASH FINE MATERIALS 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 ENGINEER HAS APPROVED BED MATERIALS ARE SUFFICIENTLY SEALED.
- HAND PLACEMENT OF ROCKS WILL BE REQUIRED FOR CHANNEL CONSTRUCTION AND SHOULD BE SUPERVISED AND APPROVED BY THE ENGINEER.
- EQUIPMENT SMALL ENOUGH TO FIT INTO CULVERT MAY BE USED TO FILL IN THE SUBSTRATE VOIDS.

ROADWAY NOTES:

- ROAD GRADES AND ALIGNMENTS, AS SHOWN ON PLANS, MAYBE SUBJECT TO REVISION AS REQUIRED.
- PROFILE ELEVATIONS ARE TO FINISH 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.



C TYPICAL COLLAR RIPRAP DETAIL
SCALE: NTS



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

65% SUBMITTAL - SEPTEMBER 3, 2019

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
DESIGNED: GDU
DRAWN: GDU
CHECKED: JTB
SCALE: AS NOTED
FILE: 1886.18-158

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

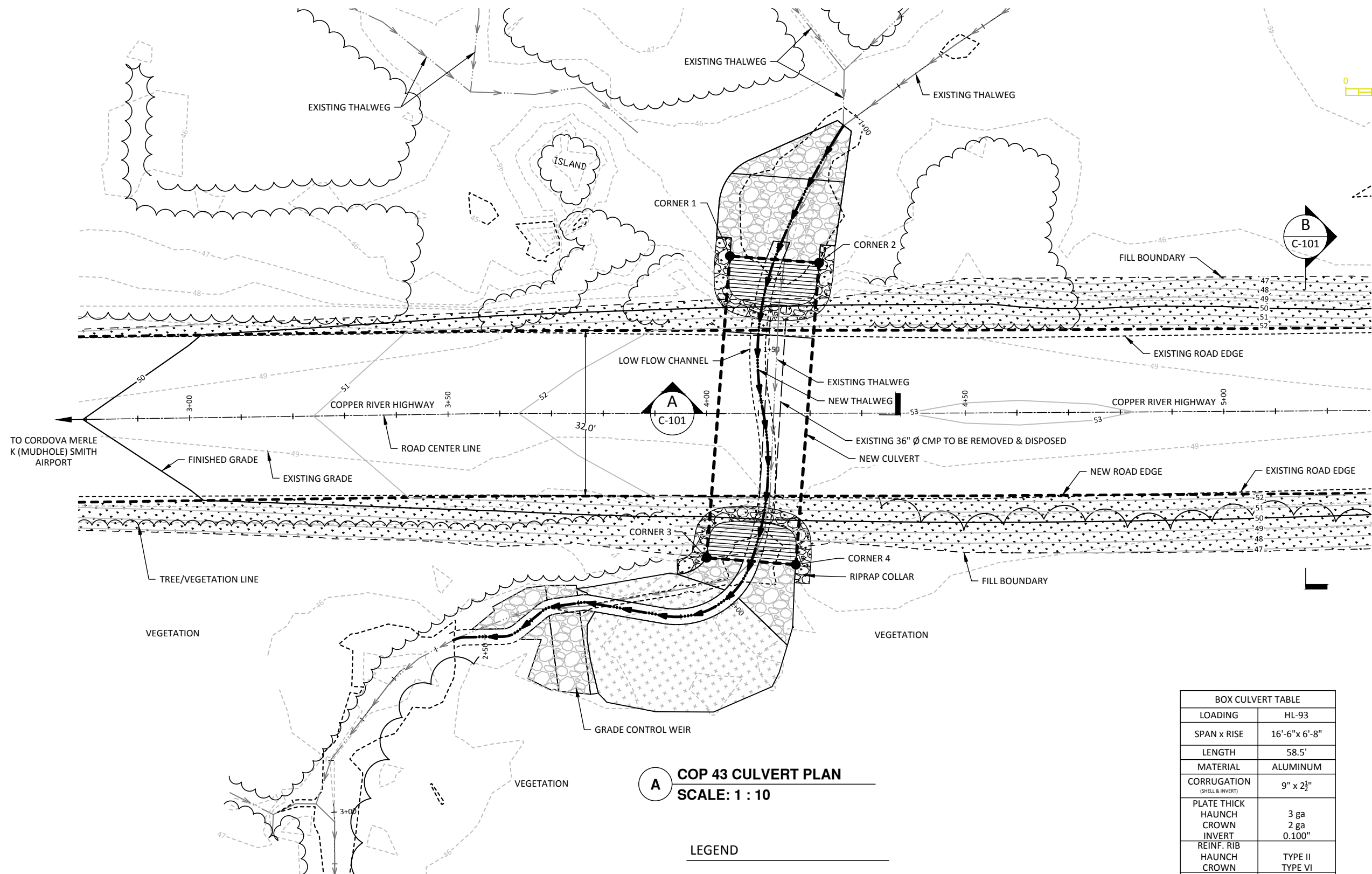
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JOB NO. 1598.17

SHEET
C-101



TO CORDOVA MERLE
K (MUDHOLE) SMITH
AIRPORT

COP 43 CULVERT COORDINATE TABLE				
SIZE	CORNER	NORTHING	EASTING	INVERT ELEVATION
16'-6" SPAN x 6'-8" RISE	1	2354667.9444	1796767.2037	43.53'
	2	2354670.2585	1796784.3235	43.53'
	3	2354609.9716	1796775.0398	43.13'
	4	2354612.2857	1796792.1596	43.13'

A COP 43 CULVERT PLAN
SCALE: 1 : 10

- LEGEND**
- TREE LINE/VEGETATION LINE
 - EXISTING CULVERT AS NOTED
 - NEW CULVERT
 - SEED, FERTILIZER & MULCH
 - VEGETATIVE MAT & SEED
 - CULVERT/STREAM/WEIR SUBSTRATE
 - EXISTING THALWEG
 - NEW THALWEG

BOX CULVERT TABLE	
LOADING	HL-93
SPAN x RISE	16'-6"x 6'-8"
LENGTH	58.5'
MATERIAL	ALUMINUM
CORRUGATION (SHELL & INVERT)	9" x 2 1/2"
PLATE THICK	3 ga
HAUNCH	2 ga
CROWN	0.100"
INVERT	
REINF. RIB	
HAUNCH	TYPE II
CROWN	TYPE VI
COVER	
MIN.	1.4'
MAX.	4.0'

65% SUBMITTAL - SEPTEMBER 3, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
 DRAWN: TGB
 CHECKED: TGB
 SCALE: AS NOTED
 FILE: 1684.LB-65E

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

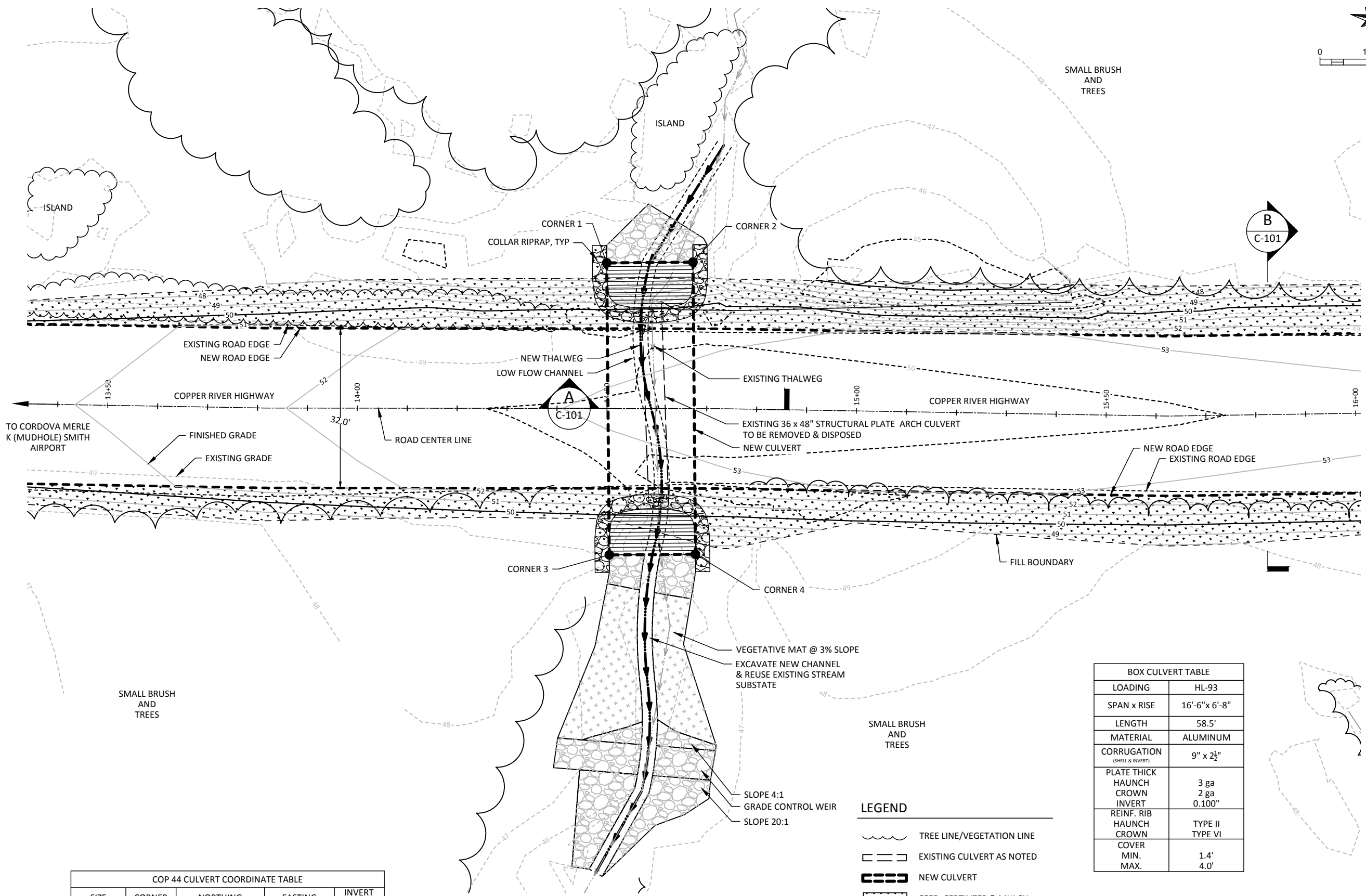
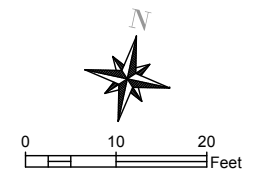
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JOB NO. 1684.18

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C-200



COP 44 CULVERT COORDINATE TABLE				
SIZE	CORNER	NORTHING	EASTING	INVERT ELEVATION
16'-6" SPAN x 6'-8" RISE	1	2354889.6024	1797788.8207	43.95'
	2	2354893.3692	1797805.6805	43.95'
	3	2354832.5100	1797801.5763	43.55'
	4	2354836.2768	1797818.4361	43.55'

BOX CULVERT TABLE	
LOADING	HL-93
SPAN x RISE	16'-6" x 6'-8"
LENGTH	58.5'
MATERIAL	ALUMINUM
CORRUGATION (SHELL & INVERT)	9" x 2 1/2"
PLATE THICK	3 ga
HAUNCH	2 ga
CROWN	0.100"
INVERT	
REINF. RIB	TYPE II
HAUNCH	TYPE VI
CROWN	
COVER	
MIN.	1.4'
MAX.	4.0'

- LEGEND**
- TREE LINE/VEGETATION LINE
 - EXISTING CULVERT AS NOTED
 - NEW CULVERT
 - SEED, FERTILIZER & MULCH
 - VEGETATIVE MAT & SEED
 - CULVERT/STREAM/WEIR SUBSTRATE
 - EXISTING THALWEG
 - NEW THALWEG

A COP 44 CULVERT PLAN
SCALE: 1 : 10

65% SUBMITTAL - SEPTEMBER 3, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
 DRAWN: TGB
 CHECKED: TGB
 SCALE: AS NOTED
 FILE: 1684.18-65E

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

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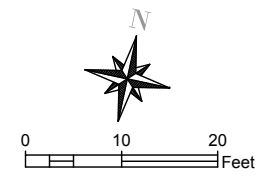
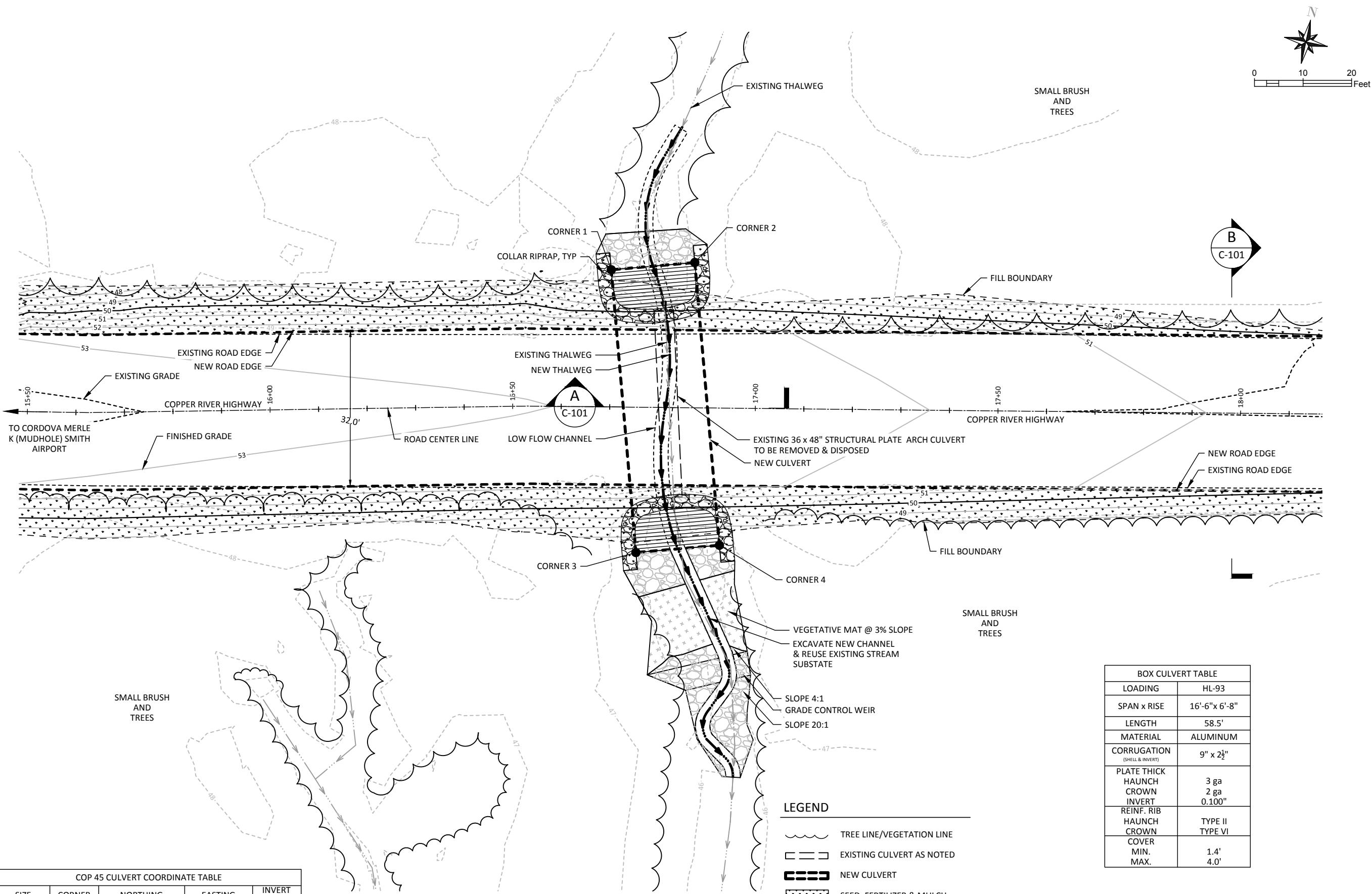
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SHEET

C-201



SIZE	CORNER	NORTHING	EASTING	INVERT ELEVATION
16'-6" SPAN x 6'-8" RISE	1	2354934.5714	1798004.5189	43.43'
	2	2354939.6458	1798021.0323	43.43'
	3	2354878.6520	1798021.7025	43.03'
	4	2354883.7265	1798038.2159	43.03'

A COP 45 CULVERT PLAN
SCALE: 1 : 10

- LEGEND**
- TREE LINE/VEGETATION LINE
 - EXISTING CULVERT AS NOTED
 - NEW CULVERT
 - SEED, FERTILIZER & MULCH
 - VEGETATIVE MAT & SEED
 - CULVERT/STREAM/WEIR SUBSTRATE
 - EXISTING THALWEG
 - NEW THALWEG

LOADING	HL-93
SPAN x RISE	16'-6" x 6'-8"
LENGTH	58.5'
MATERIAL	ALUMINUM
CORRUGATION (SHELL & INVERT)	9" x 2 1/2"
PLATE THICK	
HAUNCH	3 ga
CROWN	2 ga
INVERT	0.100"
REINF. RIB	
HAUNCH	TYPE II
CROWN	TYPE VI
COVER	
MIN.	1.4'
MAX.	4.0'

65% SUBMITTAL - SEPTEMBER 3, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
 DRAWN: TGB
 CHECKED: TGB
 SCALE: AS NOTED
 FILE: 1684.18-65E

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

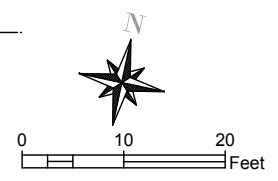
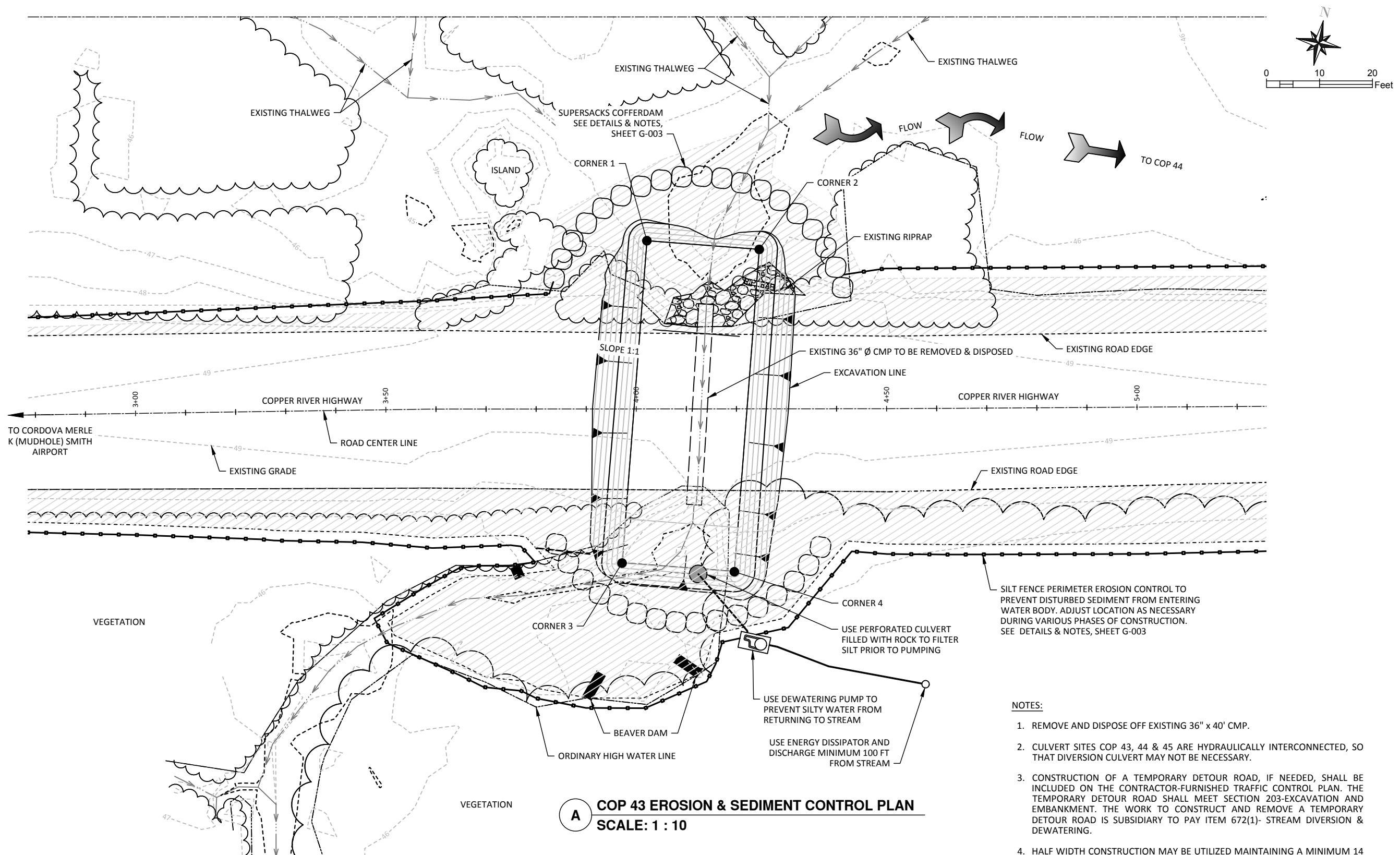
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SHEET
C-202



COP 43 EXCAVATION			
CORNER	NORTHING	EASTING	ELEVATION
1	2354670.5671	1796764.2104	41.38'
2	2354673.5817	1796786.5130	41.38'
3	2354606.6484	1796772.8502	40.94'
4	2354609.6630	1796795.1529	40.94'

A COP 43 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 OFF EXISTING 36" x 40' CMP.
 2. CULVERT SITES COP 43, 44 & 45 ARE HYDRAULICALLY INTERCONNECTED, SO THAT DIVERSION CULVERT MAY NOT BE NECESSARY.
 3. CONSTRUCTION OF A TEMPORARY DETOUR ROAD, IF NEEDED, SHALL BE INCLUDED ON THE CONTRACTOR-FURNISHED TRAFFIC CONTROL PLAN. THE TEMPORARY DETOUR ROAD SHALL MEET SECTION 203-EXCAVATION AND EMBANKMENT. THE WORK TO CONSTRUCT AND REMOVE A TEMPORARY DETOUR ROAD IS SUBSIDIARY TO PAY ITEM 672(1)- STREAM DIVERSION & DEWATERING.
 4. HALF WIDTH CONSTRUCTION MAY BE UTILIZED MAINTAINING A MINIMUM 14 FOOT TRAVEL LANE FOR TRAFFIC DIVERSION.
 5. TRAFFIC DETOUR ROAD PROFILE SHALL NOT EXCEED 10% GRADE, PR HAVE TWO GRADES WITH AN ALGEBRAIC DIFFERENCE GREATER THAN 8% WITHIN A DISTANCE OF 20'.
 6. MAINTAIN MINIMUM 3 FOOT COVER OVER CULVERT FOR TRAFFIC DIVERSION DRIVING SURFACE.

65% SUBMITTAL - SEPTEMBER 3, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
 DRAWN: TGB
 CHECKED: TGB
 SCALE: AS NOTED
 FILE: 1684.LB-65E

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

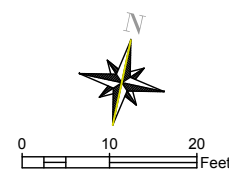
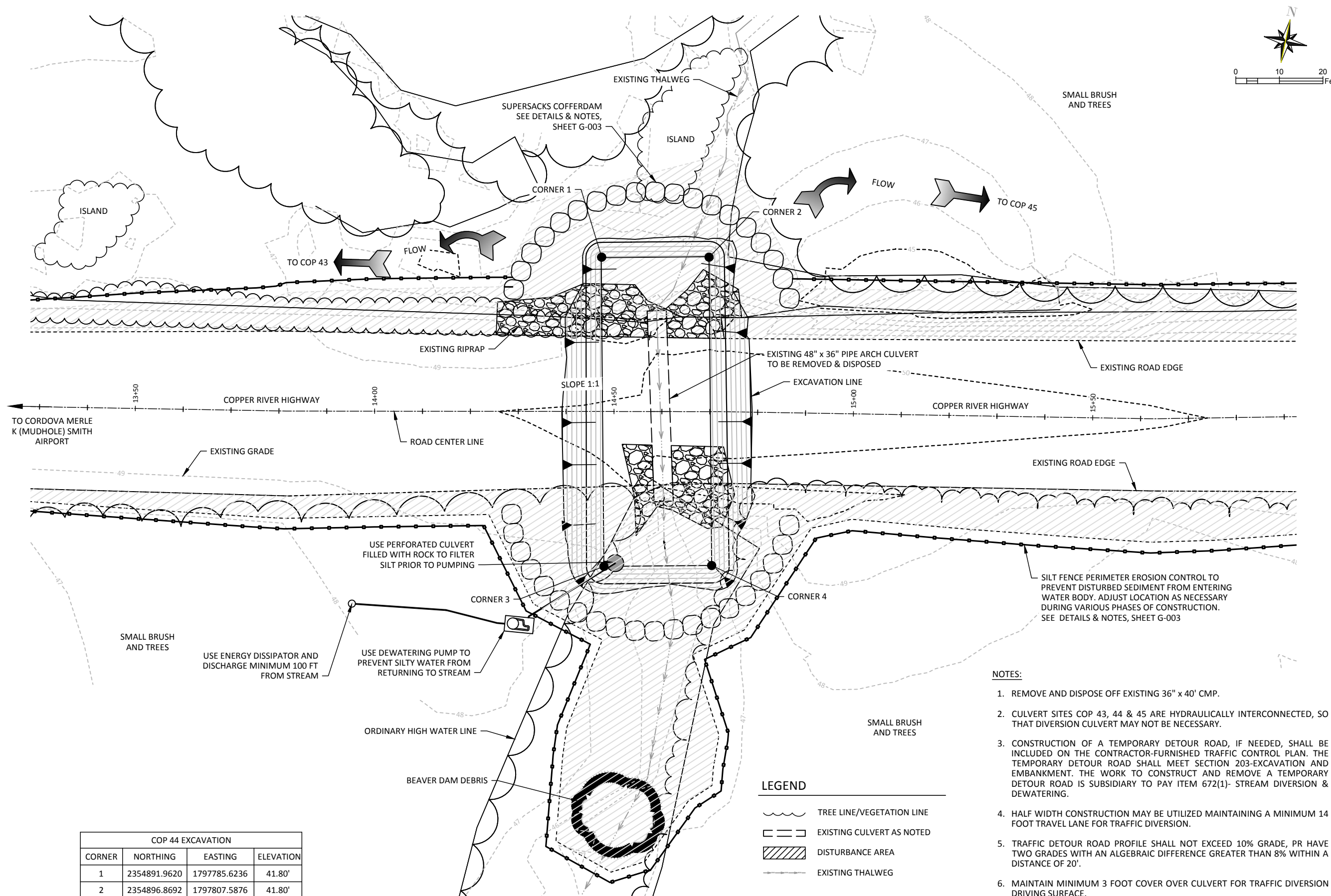
500 W 27TH AVE., SUITE A
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BCE
 Consulting Engineers, Inc.

JOB NO. 1684.18

SHEET
C-300



COP 44 EXCAVATION			
CORNER	NORTHING	EASTING	ELEVATION
1	2354891.9620	1797785.6236	41.80'
2	2354896.8692	1797807.5876	41.80'
3	2354829.0140	1797799.6876	41.36'
4	2354833.9212	1797821.6515	41.36'

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

- NOTES:**
- REMOVE AND DISPOSE OFF EXISTING 36" x 40' CMP.
 - CULVERT SITES COP 43, 44 & 45 ARE HYDRAULICALLY INTERCONNECTED, SO THAT DIVERSION CULVERT MAY NOT BE NECESSARY.
 - CONSTRUCTION OF A TEMPORARY DETOUR ROAD, IF NEEDED, SHALL BE INCLUDED ON THE CONTRACTOR-FURNISHED TRAFFIC CONTROL PLAN. THE TEMPORARY DETOUR ROAD SHALL MEET SECTION 203-EXCAVATION AND EMBANKMENT. THE WORK TO CONSTRUCT AND REMOVE A TEMPORARY DETOUR ROAD IS SUBSIDIARY TO PAY ITEM 672(1)- STREAM DIVERSION & DEWATERING.
 - HALF WIDTH CONSTRUCTION MAY BE UTILIZED MAINTAINING A MINIMUM 14 FOOT TRAVEL LANE FOR TRAFFIC DIVERSION.
 - TRAFFIC DETOUR ROAD PROFILE SHALL NOT EXCEED 10% GRADE, PR HAVE TWO GRADES WITH AN ALGEBRAIC DIFFERENCE GREATER THAN 8% WITHIN A DISTANCE OF 20'.
 - MAINTAIN MINIMUM 3 FOOT COVER OVER CULVERT FOR TRAFFIC DIVERSION DRIVING SURFACE.

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

65% SUBMITTAL - SEPTEMBER 3, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
 DRAWN: TGB
 CHECKED: TGB
 SCALE: AS NOTED
 FILE: 1684.LB-65E

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT
PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING COP 44 EROSION & SEDIMENT CONTROL PLAN

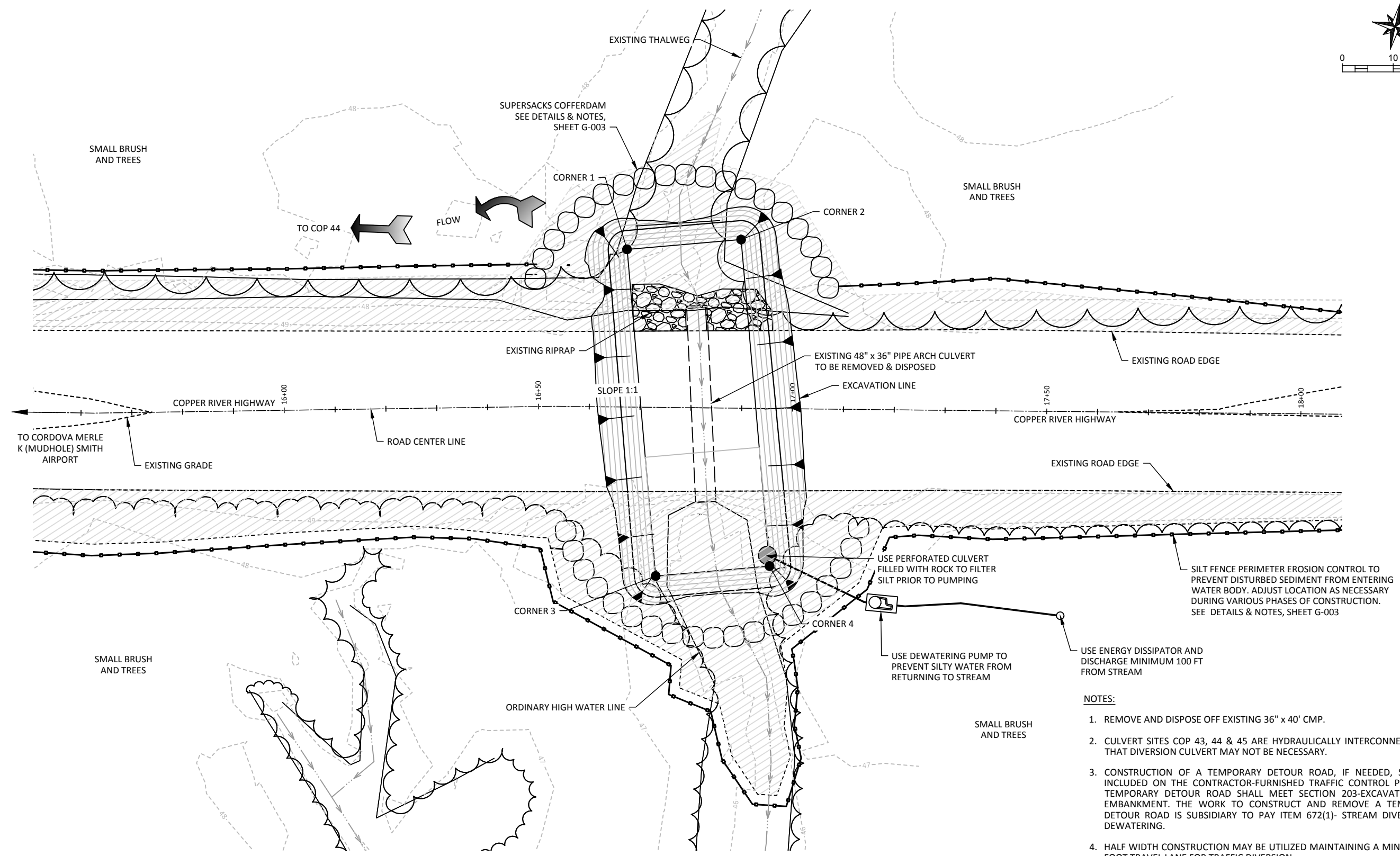
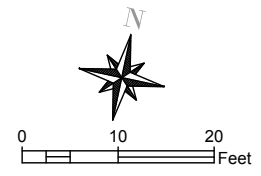
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JOB NO. 1684.18

SHEET
C-301



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

COP 45 EXCAVATION			
CORNER	NORTHING	EASTING	ELEVATION
1	2354936.6709	1798001.1380	41.28'
2	2354943.2816	1798022.6507	41.28'
3	2354875.0163	1798020.0841	40.84'
4	2354881.6270	1798041.5968	40.84'

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

- NOTES:**
- REMOVE AND DISPOSE OFF EXISTING 36" x 40' CMP.
 - CULVERT SITES COP 43, 44 & 45 ARE HYDRAULICALLY INTERCONNECTED, SO THAT DIVERSION CULVERT MAY NOT BE NECESSARY.
 - CONSTRUCTION OF A TEMPORARY DETOUR ROAD, IF NEEDED, SHALL BE INCLUDED ON THE CONTRACTOR-FURNISHED TRAFFIC CONTROL PLAN. THE TEMPORARY DETOUR ROAD SHALL MEET SECTION 203-EXCAVATION AND EMBANKMENT. THE WORK TO CONSTRUCT AND REMOVE A TEMPORARY DETOUR ROAD IS SUBSIDIARY TO PAY ITEM 672(1)- STREAM DIVERSION & DEWATERING.
 - HALF WIDTH CONSTRUCTION MAY BE UTILIZED MAINTAINING A MINIMUM 14 FOOT TRAVEL LANE FOR TRAFFIC DIVERSION.
 - TRAFFIC DETOUR ROAD PROFILE SHALL NOT EXCEED 10% GRADE, PR HAVE TWO GRADES WITH AN ALGEBRAIC DIFFERENCE GREATER THAN 8% WITHIN A DISTANCE OF 20'.
 - MAINTAIN MINIMUM 3 FOOT COVER OVER CULVERT FOR TRAFFIC DIVERSION DRIVING SURFACE.

65% SUBMITTAL - SEPTEMBER 3, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
 DRAWN: TGB
 CHECKED: TGB
 SCALE: AS NOTED
 FILE: 1684.18-65E

PROJECT COPPER RIVER WATERSHED HABITAT ENHANCEMENT
PROJECT (FISH PASSAGE)
LOCATION CORDOVA, ALASKA
CLIENT U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING COP 45 EROSION & SEDIMENT CONTROL PLAN

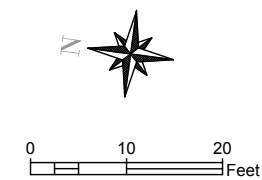
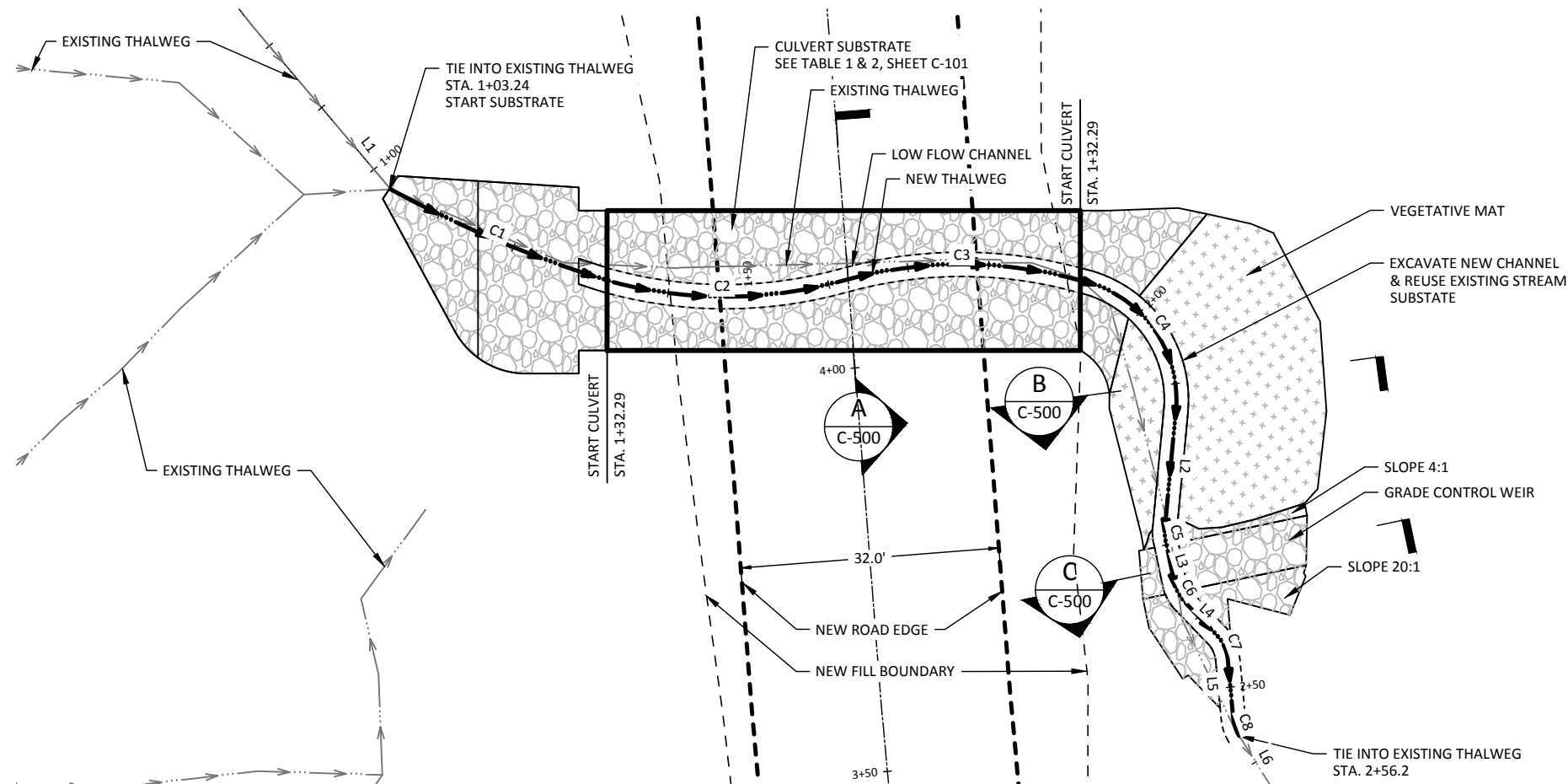
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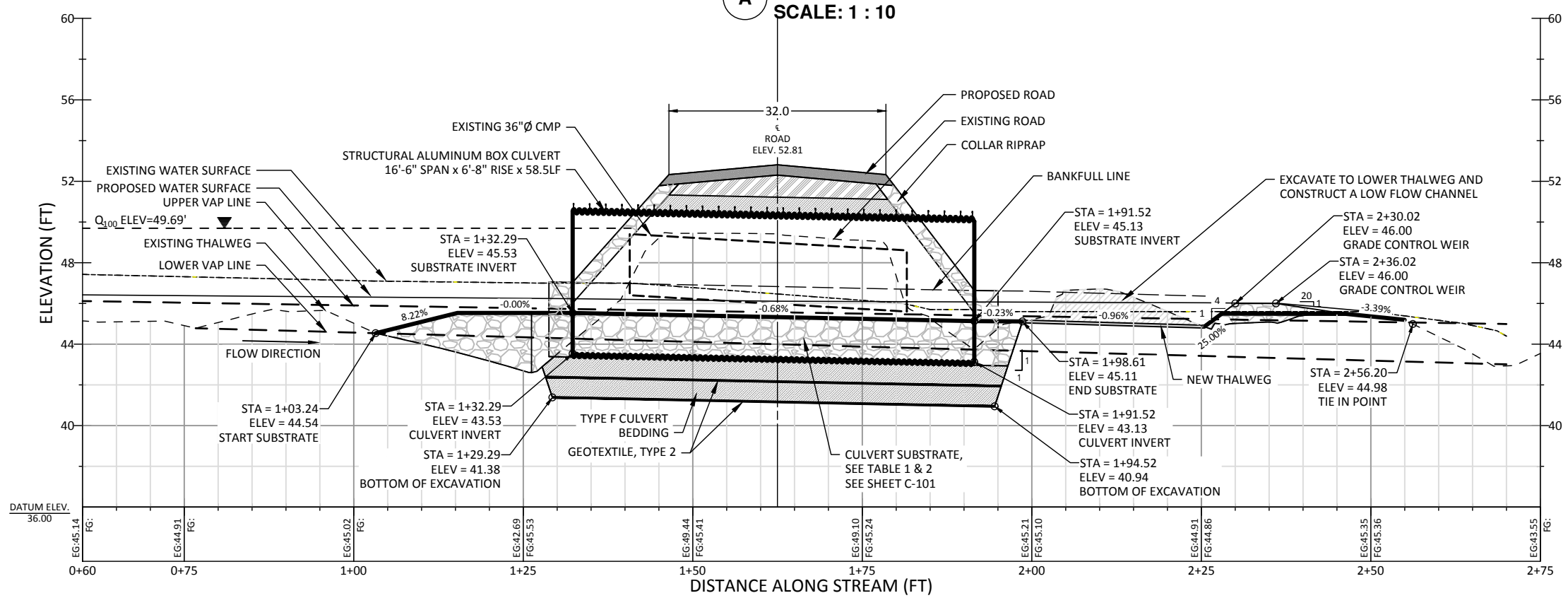
SHEET
C-302



COP 43 STREAM ALIGNMENT

NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION
C1	145.87	29.08	S15° 08' 39.67"W
C2	54.47	29.61	S7° 41' 52.59"E
C3	54.47	29.61	S7° 41' 52.59"E
C4	15.04	21.86	S46° 02' 11.16"W
C5	7.84	2.37	S79° 04' 57.08"W
C6	5.00	2.79	S54° 27' 18.61"W
C7	5.00	3.36	S57° 42' 30.29"W
C8	5.00	2.34	S63° 33' 35.59"W
L1		26.53	S42° 02' 37.38"W
L2		14.12	S87° 43' 30.37"W
L3		4.87	S70° 26' 23.79"W
L4		5.71	S38° 28' 13.44"W
L5		7.27	S76° 56' 47.15"W
L6		7.51	S50° 10' 24.03"W

A COP 43 SUBSTRATE PLAN
SCALE: 1 : 10



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

65% SUBMITTAL - SEPTEMBER 3, 2019

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
DESIGNED: GDU
DRAWN: JGB
CHECKED: JGB
SCALE: AS NOTED
FILE: 1884L18-15X

PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT
PROJECT (FISH PASSAGE)
LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)
DRAWING: COP 43 SUBSTRATE PLAN & PROFILE

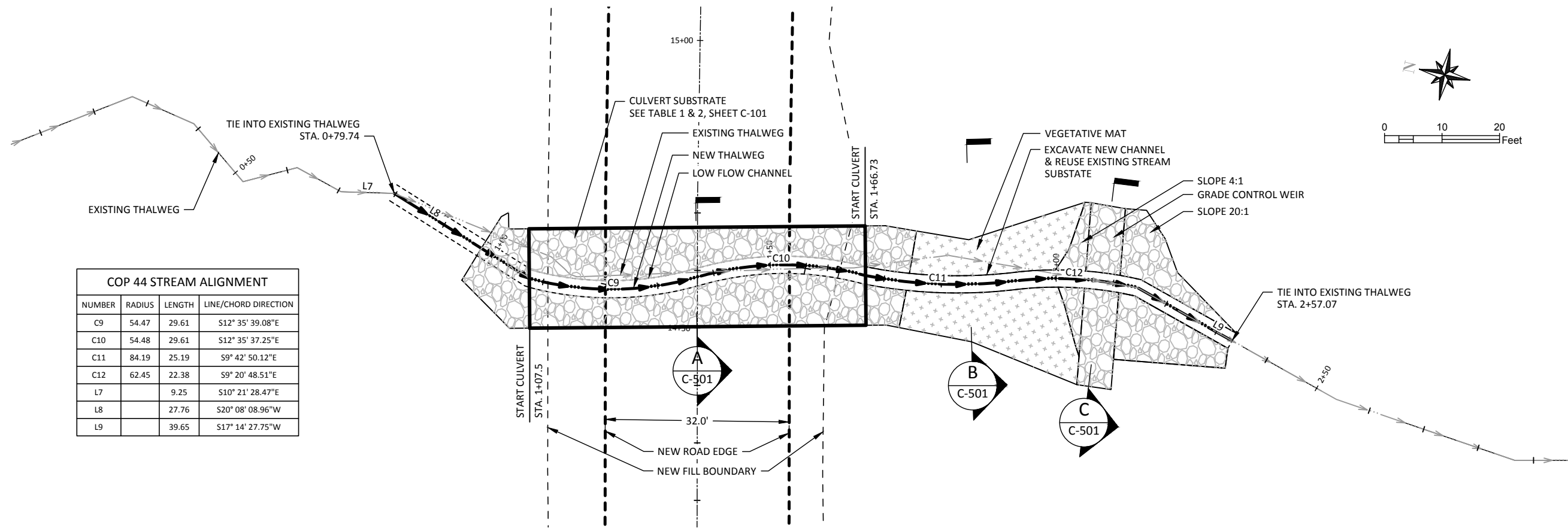
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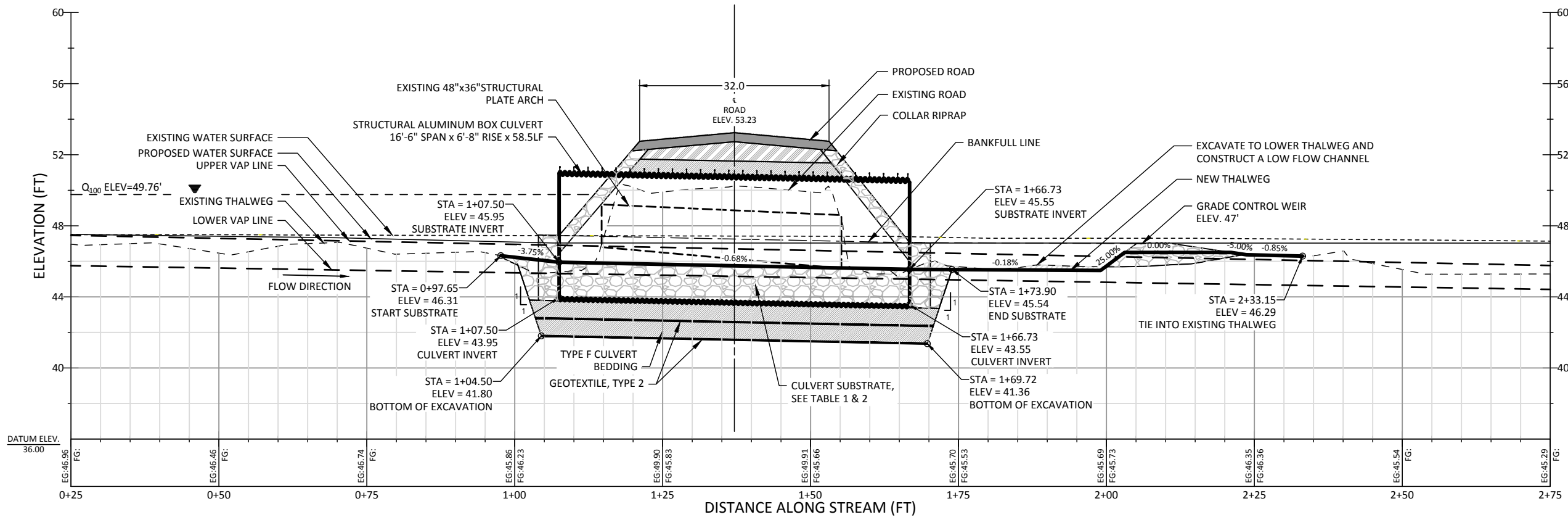
SHEET
C-400

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



COP 44 STREAM ALIGNMENT			
NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION
C9	54.47	29.61	S12° 35' 39.08"E
C10	54.48	29.61	S12° 35' 37.25"E
C11	84.19	25.19	S9° 42' 50.12"E
C12	62.45	22.38	S9° 20' 48.51"E
L7		9.25	S10° 21' 28.47"W
L8		27.76	S20° 08' 08.96"W
L9		39.65	S17° 14' 27.75"W

A COP 44 SUBSTRATE PLAN
SCALE: 1 : 10



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

65% SUBMITTAL - SEPTEMBER 3, 2019

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
 DRAWN: JGB
 CHECKED: JGB
 SCALE: AS NOTED
 FILE: 1884L.B-15X

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

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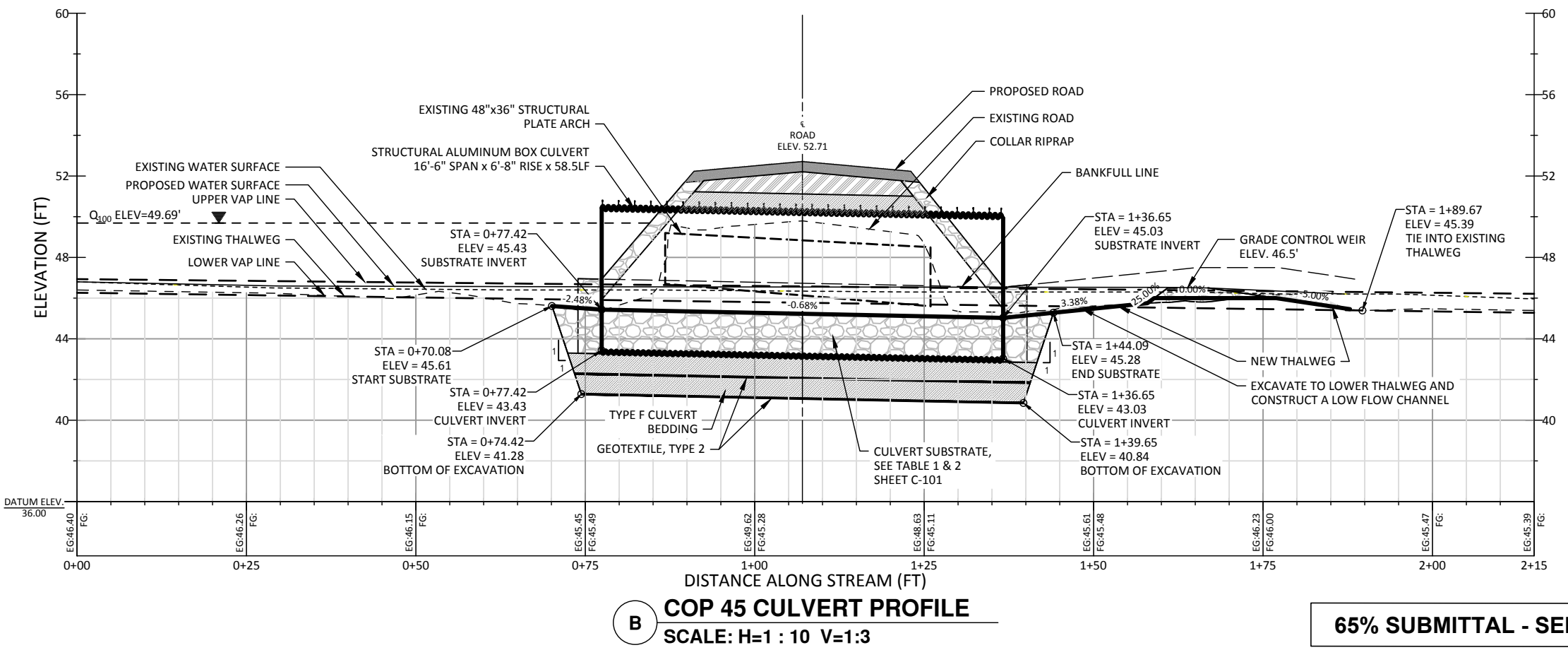
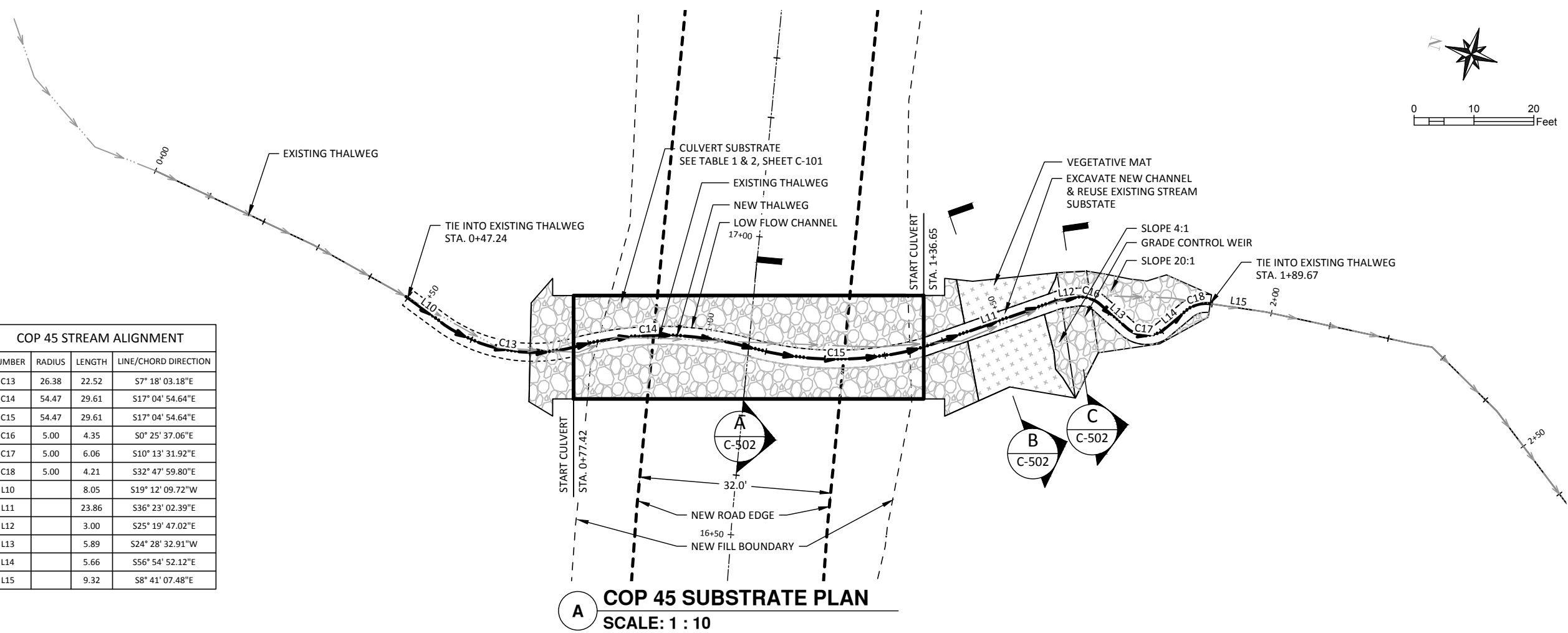
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COP 45 STREAM ALIGNMENT			
NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION
C13	26.38	22.52	S7° 18' 03.18"E
C14	54.47	29.61	S17° 04' 54.64"E
C15	54.47	29.61	S17° 04' 54.64"E
C16	5.00	4.35	S0° 25' 37.06"E
C17	5.00	6.06	S10° 13' 31.92"E
C18	5.00	4.21	S32° 47' 59.80"E
L10		8.05	S19° 12' 09.72"W
L11		23.86	S36° 23' 02.39"E
L12		3.00	S25° 19' 47.02"E
L13		5.89	S24° 28' 32.91"W
L14		5.66	S56° 54' 52.12"E
L15		9.32	S8° 41' 07.48"E



REV. NO.	DATE	REVISIONS

DATE: 9/03/19	DESIGNED: GDU	CHECKED: JGB	SCALE: AS NOTED	FILE: 1884L1B-15X
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PROJECT: COPPER RIVER WATERSHED HABITAT ENHANCEMENT	DRAWING: COP 45 SUBSTRATE PLAN & PROFILE
PROJECT (FISH PASSAGE)	LOCATION: CORDOVA, ALASKA
CLIENT: U.S. FISH & WILDLIFE SERVICE (FWS)	

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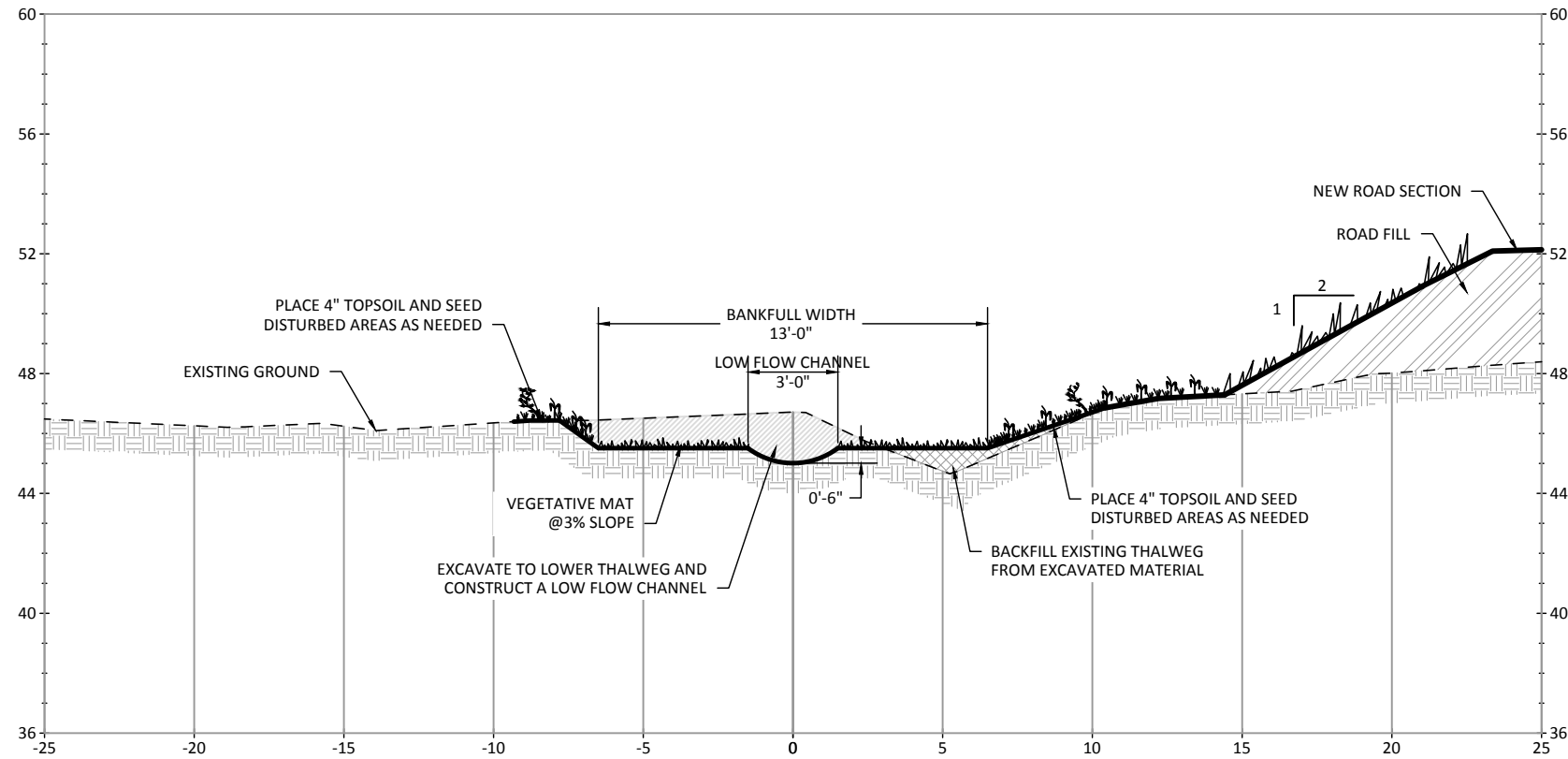
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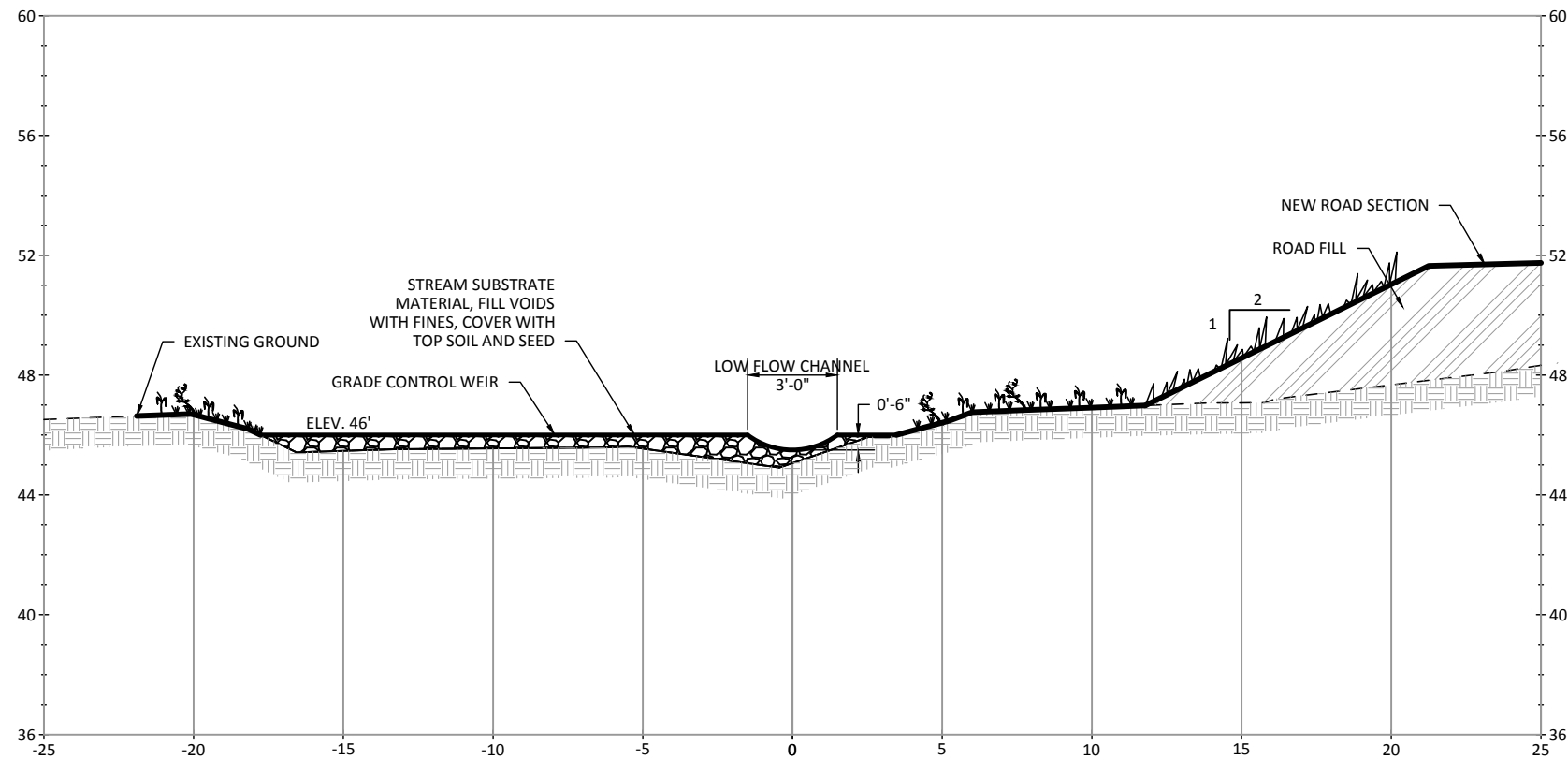
SHEET C-402

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

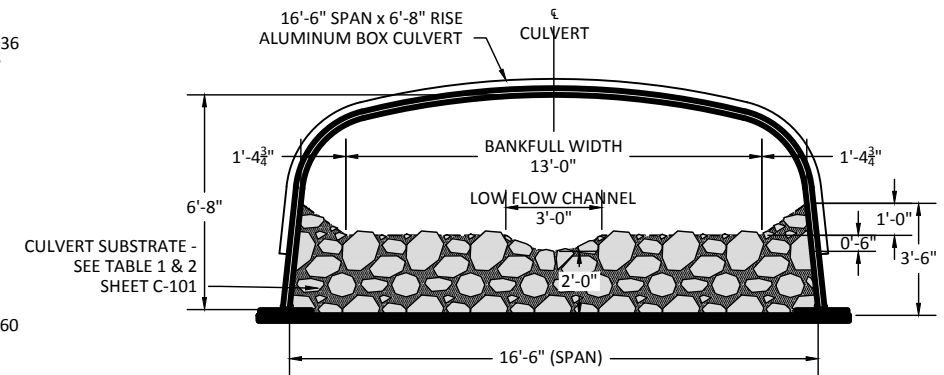
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B SECTION B
C-400 SCALE: 1 : 3



C SECTION C
C-400 SCALE: 1 : 3



A SECTION A
C-400 SCALE: 1 : 3

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
DESIGNED: GDU
DRAWN: JGB
CHECKED: JGB
SCALE: AS NOTED
FILE: 1884.LB-15X

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

DRAWING: COP 43 STREAM SECTIONS

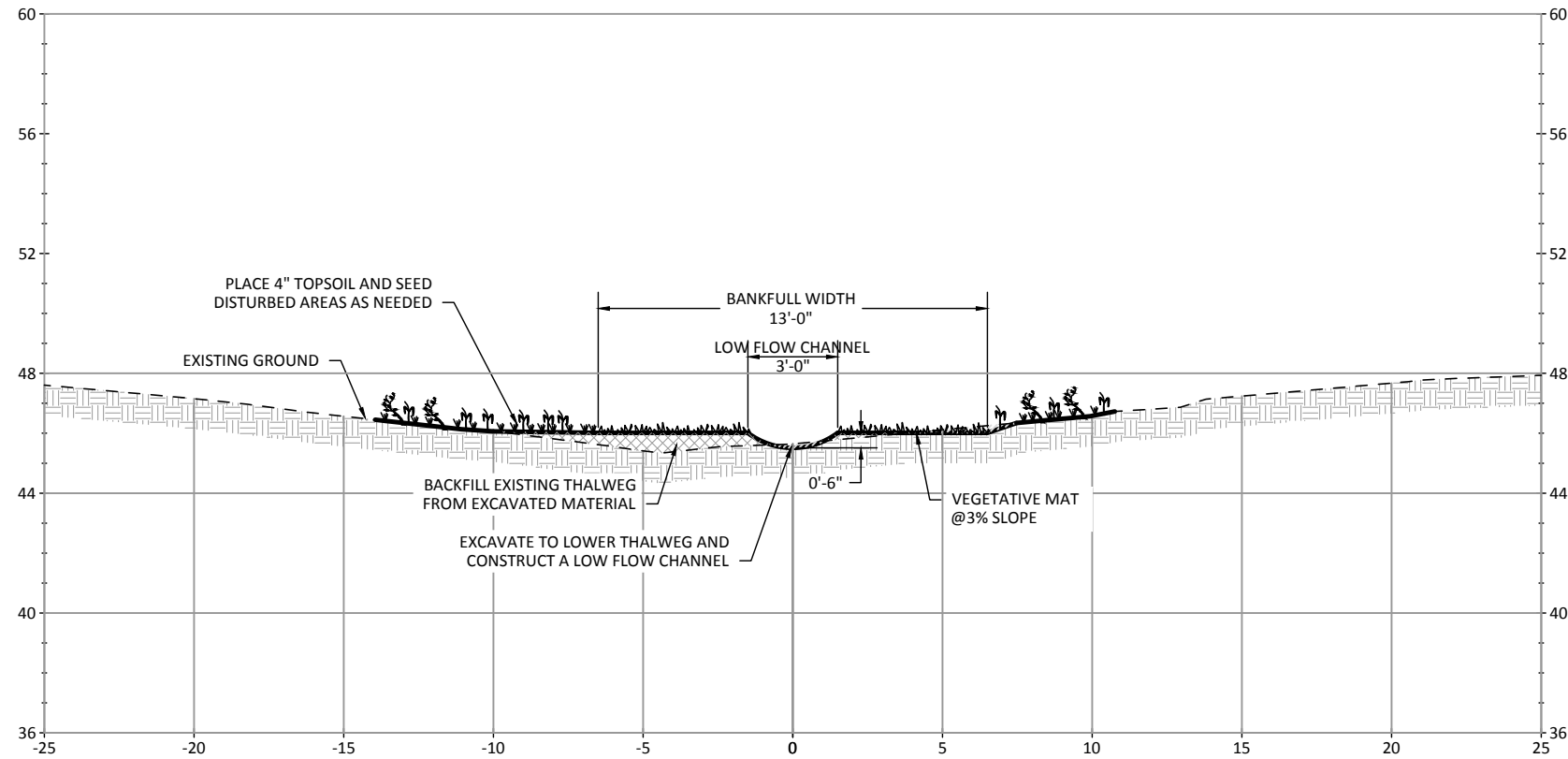
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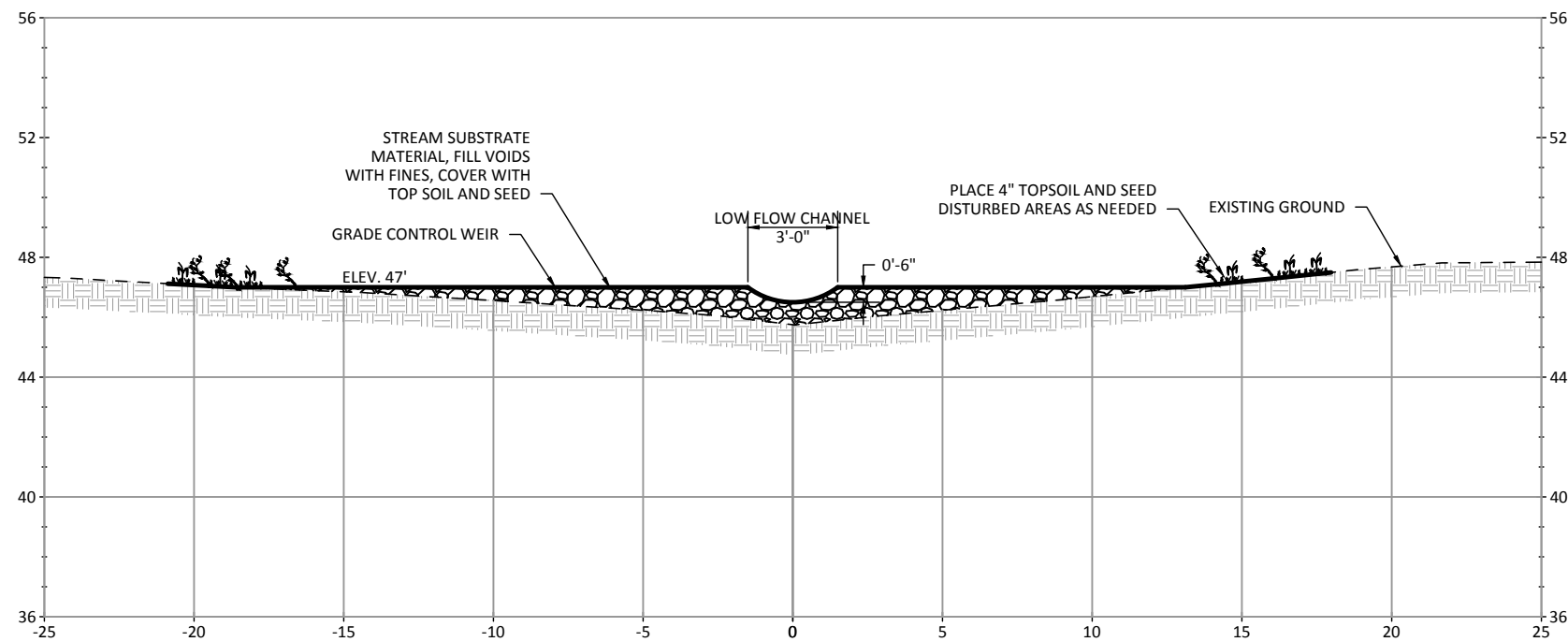
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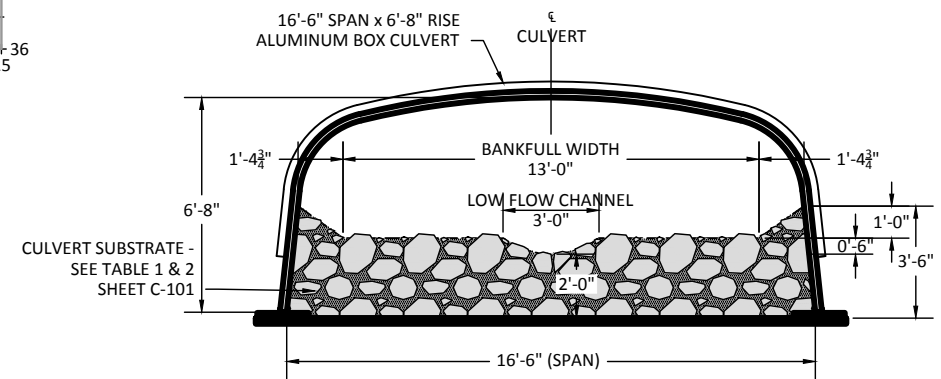
C-500



B SECTION B
C-401 SCALE: 1 : 3



C SECTION C
C-401 SCALE: 1 : 3



A SECTION A
C-401 SCALE: 1 : 3

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REV. NO.	DATE	REVISIONS

DATE: 9/03/19
DESIGNED: GDU
DRAWN: TGB
CHECKED: TGB
SCALE: AS NOTED
FILE: 1884.LB-15X

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

DRAWING: COP 44 STREAM SECTIONS

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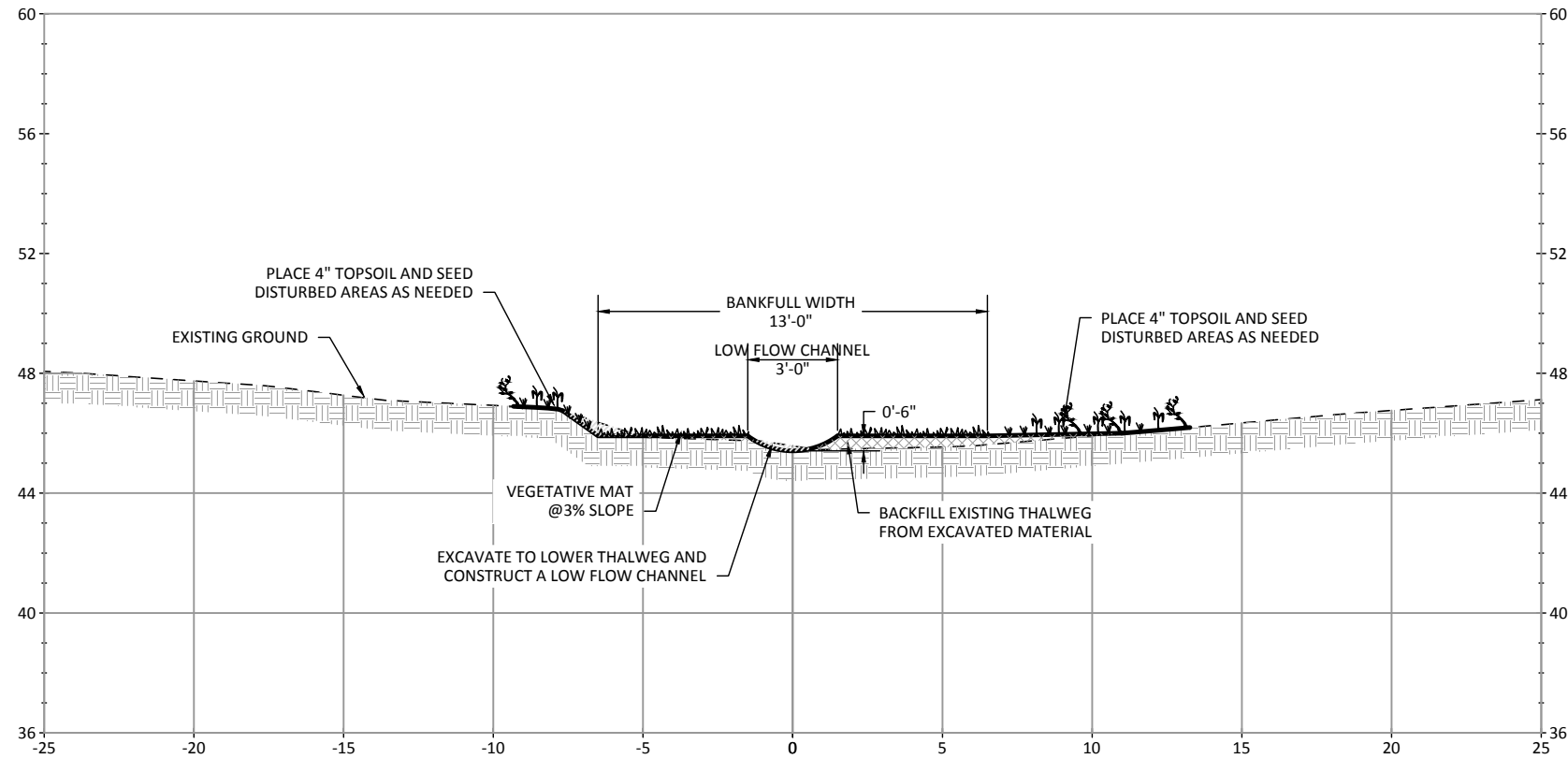


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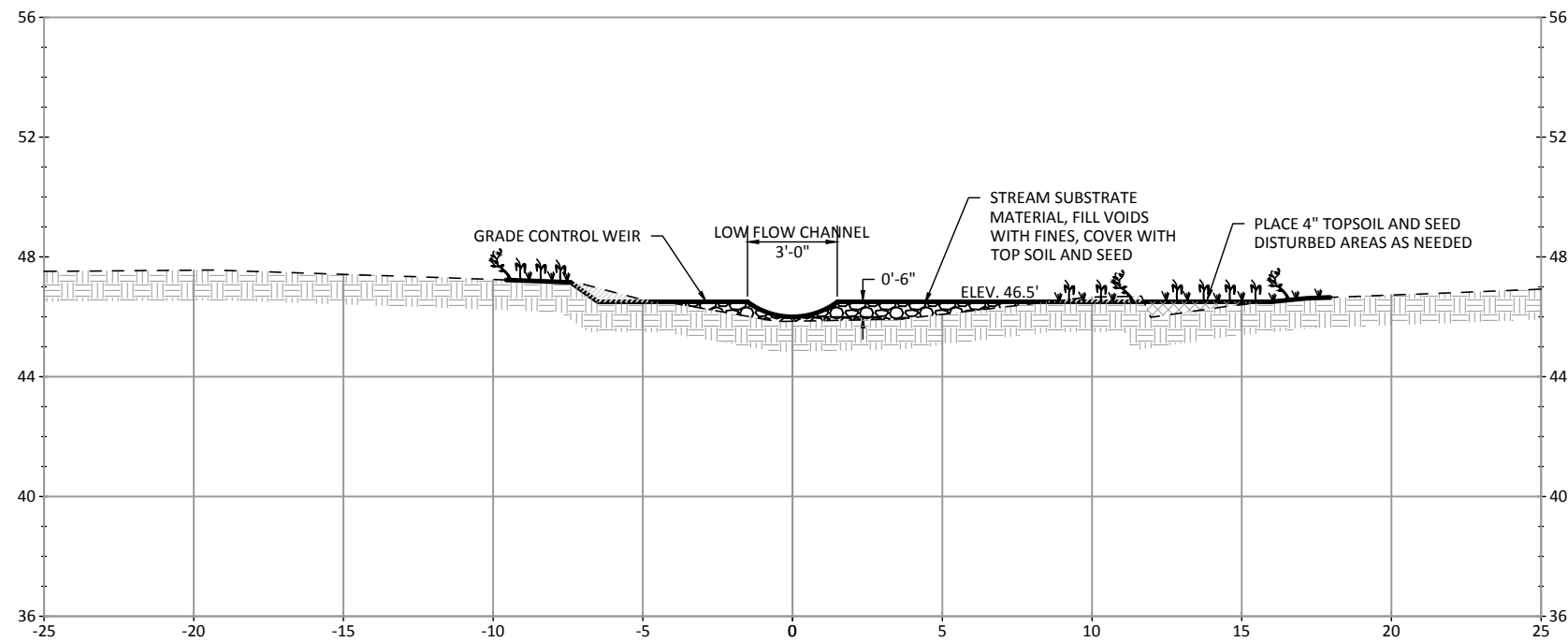
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C-501

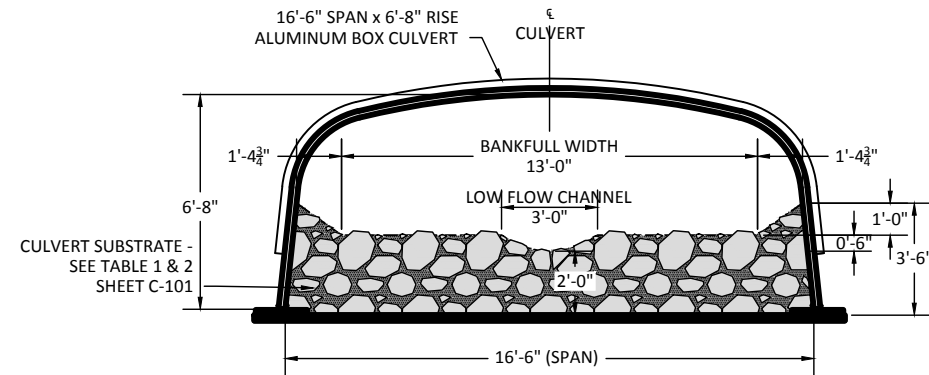
NOTE: FOR 11"x17" DRAWINGS. USE HALF THE INDICATED SCALE.



B SECTION B
C-402 SCALE: 1 : 3



C SECTION C
C-402 SCALE: 1 : 3



A SECTION A
C-402 SCALE: 1 : 3

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
 DRAWN: TGB
 CHECKED: TGB
 SCALE: AS NOTED
 FILE: 1884.B-15X

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

DRAWING: COP 45 STREAM SECTIONS

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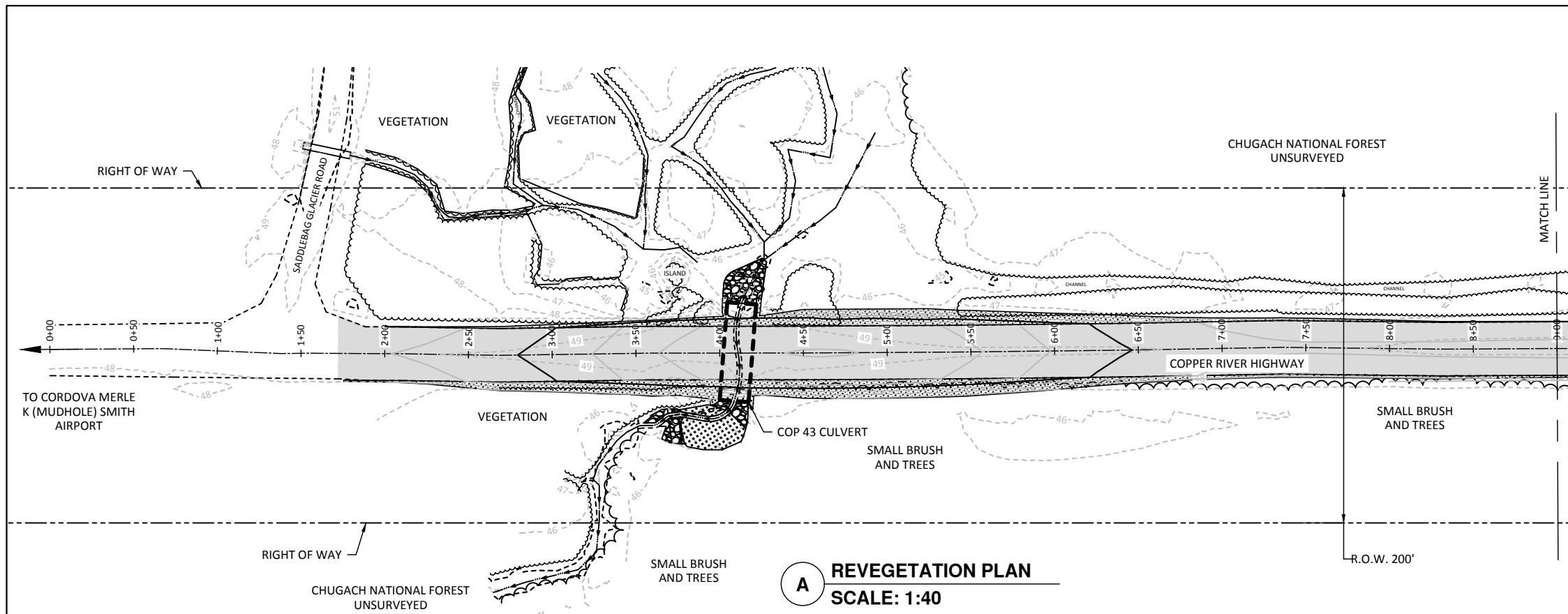


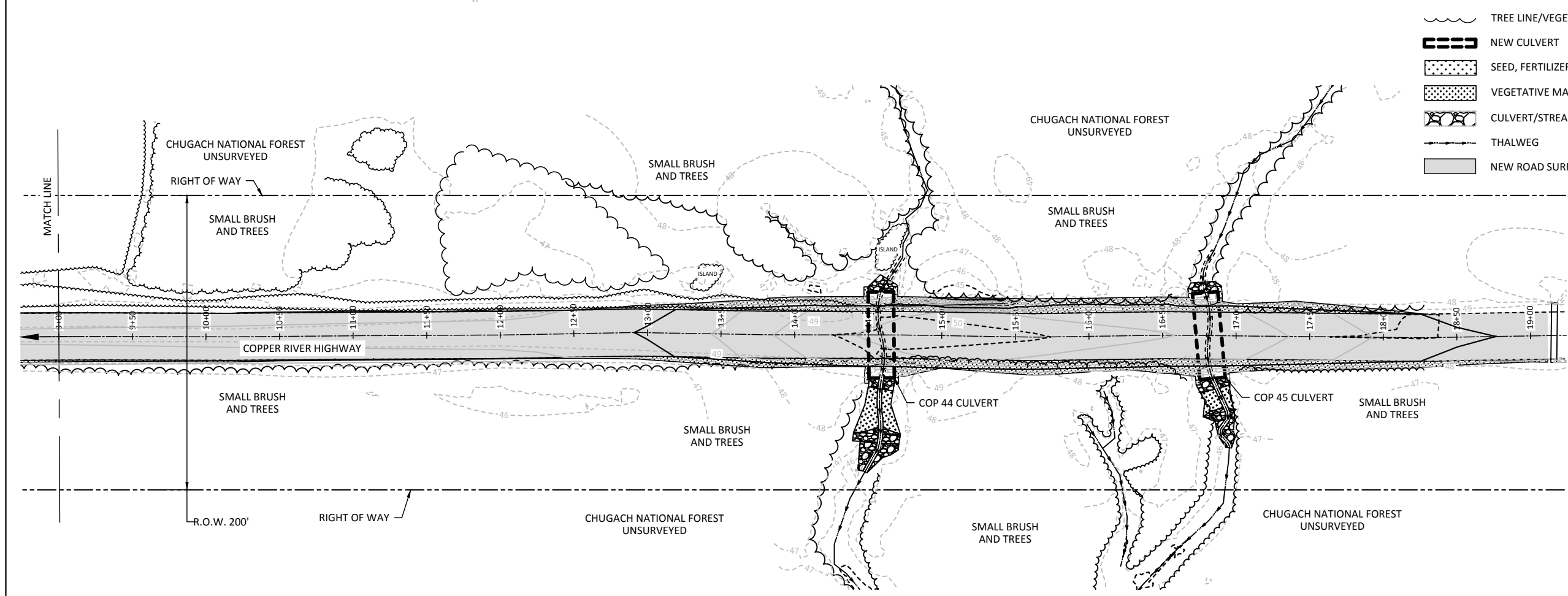
TABLE 1-HYDROSEED

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

* NOTE: FERTILIZER SHALL BE SPREAD BY HAND; DO NOT INCLUDE FERTILIZER IN MECHANICALLY SPREAD HYDROSEED. DO NOT FERTILIZE WITHIN 4' OF WILLOWS.

- LEGEND**
- TREE LINE/VEGETATION LINE
 - NEW CULVERT
 - SEED, FERTILIZER & MULCH, A=1709 SY
 - VEGETATIVE MAT & SEED, A=170 SY
 - CULVERT/STREAM/WEIR SUBSTRATE
 - THALWEG
 - NEW ROAD SURFACE

A REVEGETATION PLAN
SCALE: 1:40



A REVEGETATION PLAN
SCALE: 1:40

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

REV. NO.	DATE	REVISIONS

DATE: 9/03/19
 DESIGNED: GDU
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 CHECKED: TGB
 SCALE: AS NOTED
 FILE: 1684.LB-152

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

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