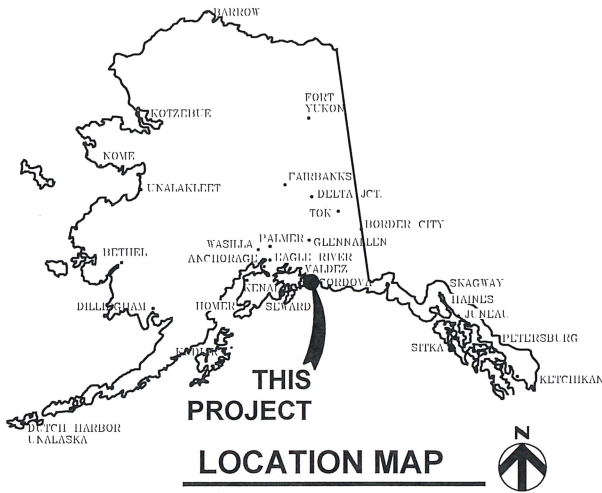


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Contract Drawings For

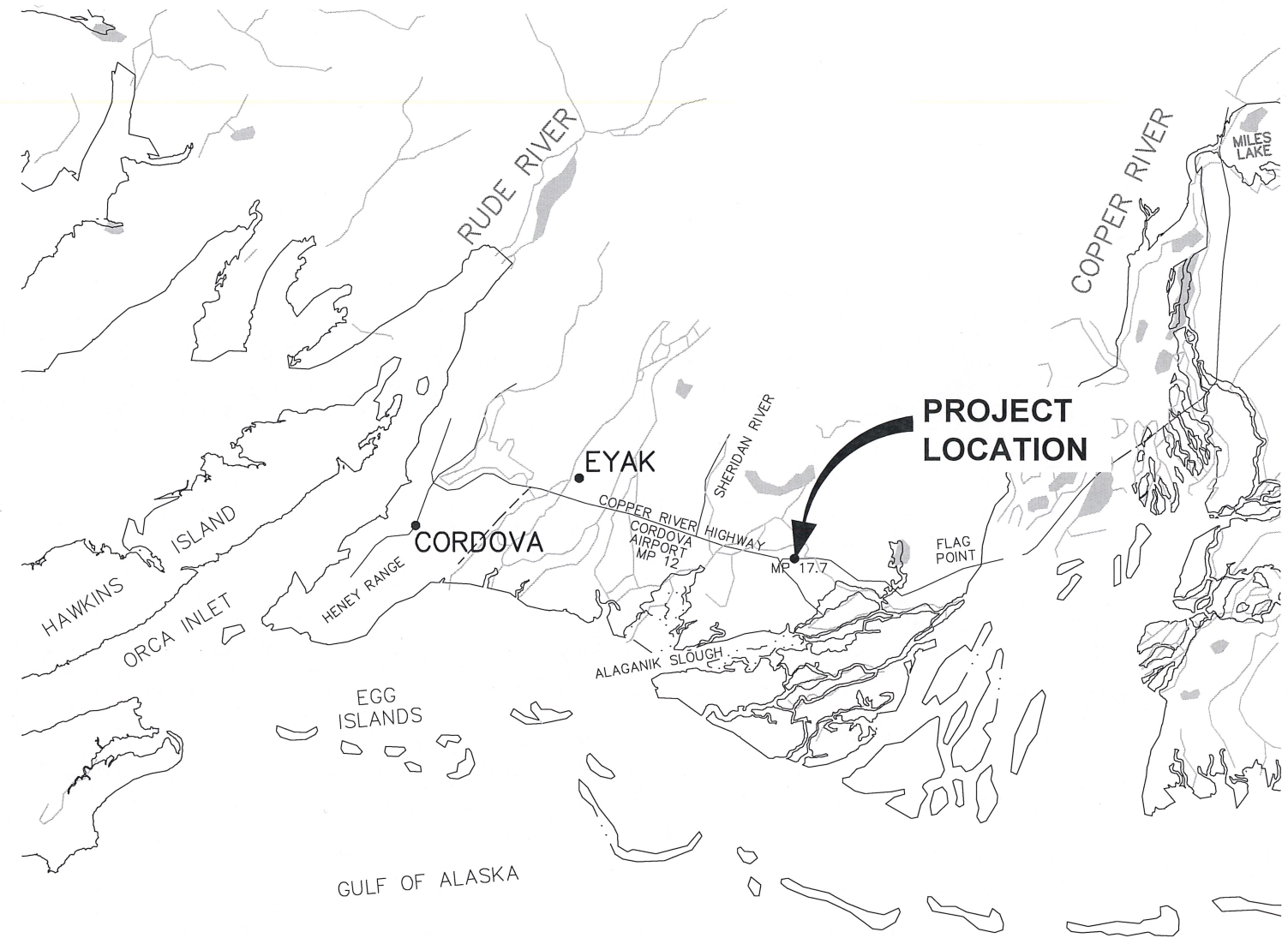
CORDOVA FISH PASSAGE IMPROVEMENT PROJECTS
COPPER RIVER HIGHWAY - MP 17.7
18 MILE CREEK CROSSING - COP 20
U.S. FISH AND WILDLIFE SERVICE

SECTION 24, TOWNSHIP 16 SOUTH, RANGE 1 WEST, COPPER RIVER MERIDIAN, ALASKA
DECEMBER 2020



PROJECT LOCATION		
ADF&G SITE NO.	CRWP ID	COPPER RIVER HWY MP
20100486	COP 20	17.7

DESIGN DESIGNATIONS	
AADT 2015	244



VICINITY MAP
NTS

DRAWING INDEX

- C1 COVER SHEET
- C2 GENERAL NOTES AND QUANTITIES
- C3 SURVEY CONTROL
- C4 EXISTING STREAM PLAN AND PROFILE
- C5 STREAM PLAN AND PROFILE
- C6 ROADWAY PLAN AND PROFILE
- C7 STREAM DESIGN DETAILS
- C8 STREAM SECTIONS AND DETAILS
- C9 ESCP, STREAM DIVERSION & ROADWAY DIVERSION PLAN
- C10 REVEGETATION PLAN





















PREPARED BY:



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ESTIMATE OF QUANTITIES			
ITEM NO.	ITEM DESCRIPTION	PAY UNIT	QUANTITY
201(9)	CLEARING AND GRUBBING	LUMP SUM	ALL REQUIRED
202(4)	REMOVAL OF CULVERT PIPE	LINEAR FOOT	57
203(3)	UNCLASSIFIED EXCAVATION	CUBIC YARD	1100
203(5A)	BORROW, SELECTED MATERIAL, TYPE A	CUBIC YARD	869
203(5B)	SUBBASE, GRADING F	CUBIC YARD	374
301(4)	AGGREGATE SURFACE COURSE, GRADING E-1	CUBIC YARD	44
602(2)	STRUCTURAL PLATE ALUMINUM PIPE ARCH, 57" SPAN, 38" RISE	LINEAR FOOT	66
602(4)	STRUCTURAL PLATE ALUMINUM BOX CULVERT, 15'-6" SPAN, 7'-3" RISE	LINEAR FOOT	75
611(1A)	RIPRAP, CLASS I	CUBIC YARD	132
613(2)	CULVERT MARKER POST	EACH	4
618(2)	SEEDING	POUND	2
620(1)	TOPSOIL (4")	SQUARE YARD	180
630(3B)	GEOTEXTILE, REINFORCEMENT, TYPE 2	SQUARE YARD	681
631(2)	GEOTEXTILE, EROSION CONTROL, CLASS 1	SQUARE YARD	70
640(1)	MOBILIZATION AND DEMOBILIZATION	LUMP SUM	ALL REQUIRED
641(3)	TEMPORARY EROSION, SEDIMENT AND POLLUTION CONTROL	LUMP SUM	ALL REQUIRED
642(1)	CONSTRUCTION SURVEYING	LUMP SUM	ALL REQUIRED
642(14)	AS-BUILT PLANS	LUMP SUM	ALL REQUIRED
643(2)	TRAFFIC MAINTENANCE	LUMP SUM	ALL REQUIRED
644(15)	NUCLEAR TESTING EQUIPMENT STORAGE SHED	LUMP SUM	ALL REQUIRED
672(1)	STREAM DIVERSION & DEWATERING	LUMP SUM	ALL REQUIRED
690(10)	WATERWAY BED FILL	LINEAR FOOT	117
690(12)	WATERWAY BANK REVEGETATION AND PROTECTION	LUMP SUM	ALL REQUIRED
690(13)	ROUNDED RIVER ROCK	CUBIC YARD	66

LEGEND

DESCRIPTION
 APPROXIMATE RIGHT-OF-WAY
 CONTROL POINT
 ORDINARY HIGH WATER
 EXISTING CULVERT
 EDGE OF PAVEMENT
 EDGE OF GRAVEL/SHOULDER
 EDGE OF VEGETATION
 EXISTING THALWEG
 TOP OF BANK
 TOE OF SLOPE
 PROPOSED CULVERT
 WATERWAY BED FILL
 WATERWAY BANK REVEGETATION AND PROTECTION
 RIPRAP
 ROUNDED RIVER ROCK
 AGGREGATE SURFACE COURSE, E-1
 SELECTED MATERIAL, TYPE A
 SUBBASE, GRADING F
 SEED
 BULK BAG COFFERDAM

ABBREVIATIONS	
ALCAP	ALUMINUM CAP
AVASP	AS VERTICAL AS SAFELY POSSIBLE
BFW	BANKFULL WIDTH
BOF	BOTTOM OF FOOTING
CFS	CUBIC FEET PER SECOND
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CRH	COPPER RIVER HIGHWAY
ELEV	ELEVATION
ESCP	EROSION AND SEDIMENT CONTROL PLAN
HW/D	HEADWATER TO DEPTH RATIO
INV	INVERT ELEVATION
MIN	MINIMUM
MP	MILEPOST
NTS	NOT TO SCALE
OHW	ORDINARY HIGH WATER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
Q	FLOW
ROW	RIGHT-OF-WAY
STA	STATION
TYP	TYPICAL
VAP	VERTICAL ADJUSTMENT POTENTIAL

TABLE 1		
COARSE MATERIAL: RIPRAP, CLASS I		
APPROX. SIZE	MASS (LBS)	% PASSING
10"	50	100
8"	25	50

TABLE 2	
FINE MATERIAL: POROUS BACKFILL	
SIZE/SIEVE	% PASSING
3"	100
1"	65
0.75"	50
#4	25
#10	15

TABLE 3	
WATERWAY BED FILL	
SIZE/SIEVE	% PASSING
12"	100
9"	85
6"	58
3"	49
1"	32
0.75"	23
#4	10
#10	6

TABLE 4	
ROUNDED RIVER ROCK	
SIZE/SIEVE	% PASSING
12"	100
9"	75
6"	30
3"	15
1"	10
0.75"	5
#4	0
#10	0

GENERAL NOTES

- THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL SITE FEATURES. IF THE CONTRACTOR DISCOVERS CONDITIONS OTHER THAN THOSE SHOWN ON THE PLANS, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATIVE.
- COORDINATE CONSTRUCTION STAGING AND MOBILIZATION AREAS AND ACTIVITIES WITH OWNER'S REPRESENTATIVE.
- COORDINATE WITH OTHER CONTRACTORS WHO MAY BE PRESENT.
- EXERCISE CAUTION AND COMPLY WITH ALL APPLICABLE OSHA REQUIREMENTS FOR WORKING IN CONFINED AREAS.
- STATIONING IS ALONG CENTERLINE OF STREAM OR ROADWAY.
- VERIFY ELEVATIONS OF ALL PROPOSED STRUCTURES PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCIES FROM PLANS IMMEDIATELY TO OWNER'S REPRESENTATIVE.
- CULVERT DESIGN LOAD: AASHTO LOADING HL-93, MINIMUM SOIL BEARING CAPACITY: 3,900 PSF.
- EXCAVATION AND COMPACTION:
 - REMOVE AND DISPOSE OF ALL ORGANIC OR OVER SATURATED SOFT MATERIAL, WHICH CANNOT BE COMPACTED.
 - BACKFILL SHALL BE PLACED AND COMPACTED WITH CARE AND SHALL BE BROUGHT UP EVENLY AND SIMULTANEOUSLY ON BOTH SIDES OF PIPE. MATERIAL TO BE COMPACTED TO 95% MAXIMUM DENSITY.
- CULVERT INSTALLATION:
 - CULVERT JOINTS SHALL NOT LEAK.
 - CULVERT INFILL MATERIAL SHALL BE INSTALLED IN PIPE ACCORDING TO PLANS. MANUAL INSTALLATION IS REQUIRED.
- ALL VEGETATION IN THE AREAS NOT AFFECTED BY WORK SHALL BE PRESERVED AND PROTECTED BY THE CONTRACTOR. RESEED ALL DISTURBED AREAS.
- TWO CULVERT MARKERS WILL BE INSTALLED AT EACH CULVERT PER STD D-09.00.

THE FOLLOWING DOT&PF STANDARD DRAWING APPLIES TO THIS PROJECT:
D-09.00 CULVERT MARKER POST



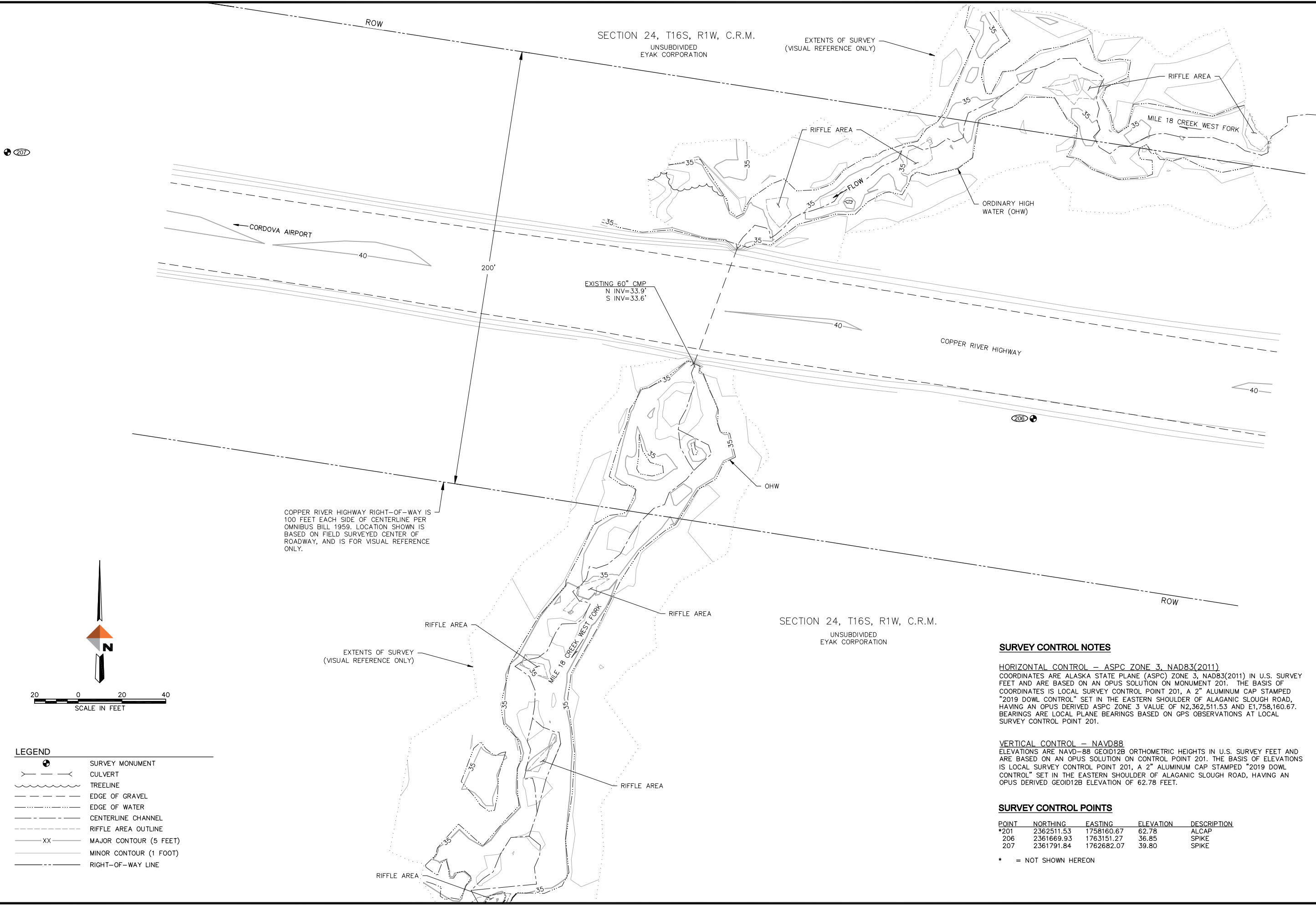
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CORDOVA FISH PASSAGE IMPROVEMENTS
WEST FORK 18 MILE CREEK - COP 20
GENERAL NOTES AND QUANTITIES

PROJECT 1136.63087.01
DATE DECEMBER 2020

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LEGEND	
	SURVEY MONUMENT
	CULVERT
	TREELINE
	EDGE OF GRAVEL
	EDGE OF WATER
	CENTERLINE CHANNEL
	RIFFLE AREA OUTLINE
	MAJOR CONTOUR (5 FEET)
	MINOR CONTOUR (1 FOOT)
	RIGHT-OF-WAY LINE

SURVEY CONTROL NOTES				
HORIZONTAL CONTROL -- ASPC ZONE 3, NAD83(2011)				
COORDINATES ARE ALASKA STATE PLANE (ASPC) ZONE 3, NAD83(2011) IN U.S. SURVEY FEET AND ARE BASED ON AN OPUS SOLUTION ON MONUMENT 201. THE BASIS OF COORDINATES IS LOCAL SURVEY CONTROL POINT 201, A 2" ALUMINUM CAP STAMPED "2019 DOWL CONTROL" SET IN THE EASTERN SHOULDER OF ALAGANIC SLOUGH ROAD, HAVING AN OPUS DERIVED ASPC ZONE 3 VALUE OF N2,362,511.53 AND E1,758,160.67. BEARINGS ARE LOCAL PLANE BEARINGS BASED ON GPS OBSERVATIONS AT LOCAL SURVEY CONTROL POINT 201.				
VERTICAL CONTROL -- NAVD88				
ELEVATIONS ARE NAVD-88 GEOID12B ORTHOMETRIC HEIGHTS IN U.S. SURVEY FEET AND ARE BASED ON AN OPUS SOLUTION ON CONTROL POINT 201. THE BASIS OF ELEVATIONS IS LOCAL SURVEY CONTROL POINT 201, A 2" ALUMINUM CAP STAMPED "2019 DOWL CONTROL" SET IN THE EASTERN SHOULDER OF ALAGANIC SLOUGH ROAD, HAVING AN OPUS DERIVED GEOID12B ELEVATION OF 62.78 FEET.				
SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
*201	2362511.53	1758160.67	62.78	ALCAP
206	2361669.93	1763151.27	36.85	SPIKE
207	2361791.84	1762682.07	39.80	SPIKE
* = NOT SHOWN HEREON				

REV

DATE

DESCRIPTION

BY

STATE OF ALASKA

40TH

A. WILLIAM STOLL

DEC 03, 2020

REGISTERED PROFESSIONAL

DOWL

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CORDOVA FISH PASSAGE IMPROVEMENTS

WEST FORK 18 MILE CREEK -- COP 20

SURVEY CONTROL

SECTION 24, T16S, R1W, C.R.M. ALASKA

CORDOVA RECORDING DISTRICT, ALASKA

PROJECT

1136.63087.01

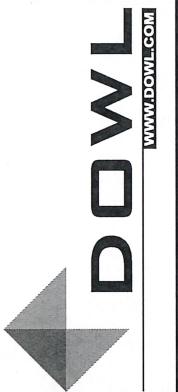
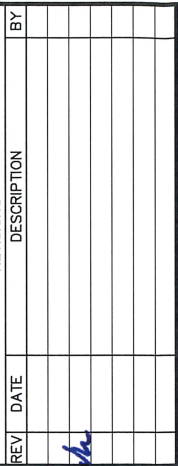
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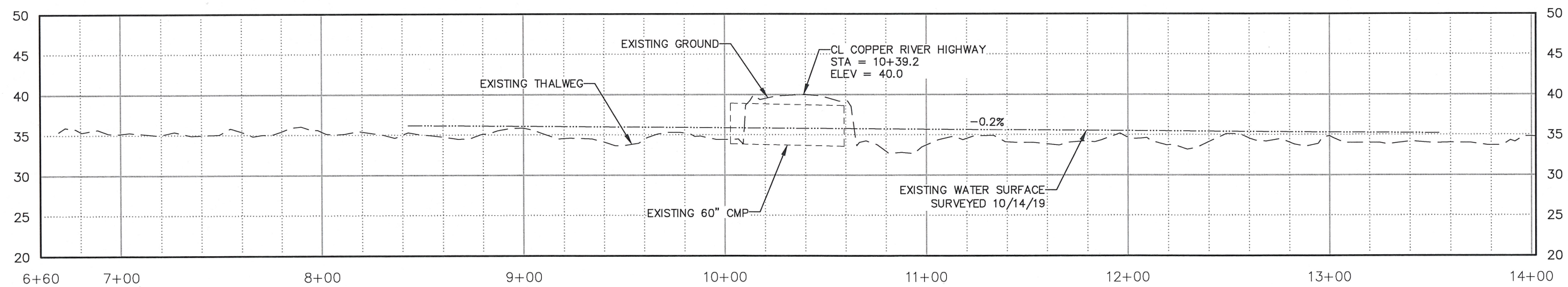


CORDOVA FISH PASSAGE IMPROVEMENTS
WEST FORK 18 MILE CREEK – COP 20
EXISTING STREAM PLAN AND PROFILE

PROJECT 1136.63087.01
DATE DECEMBER 2020

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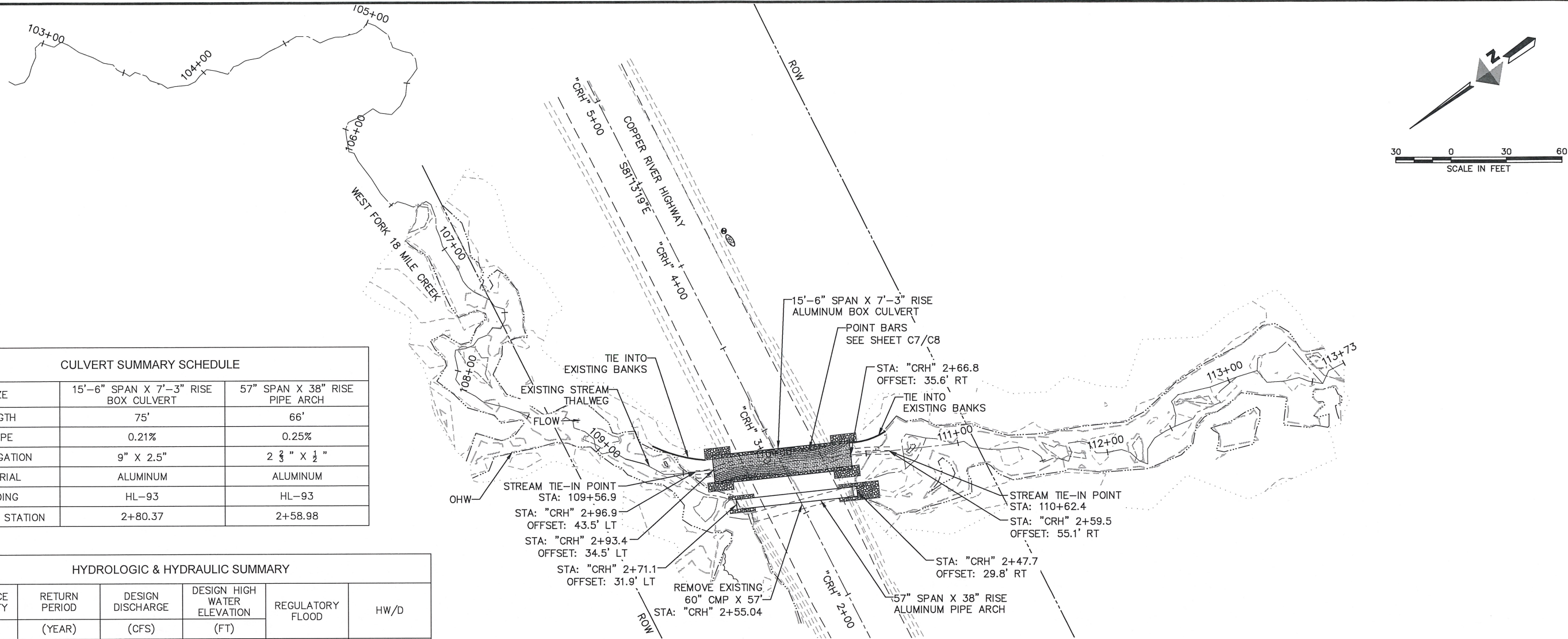
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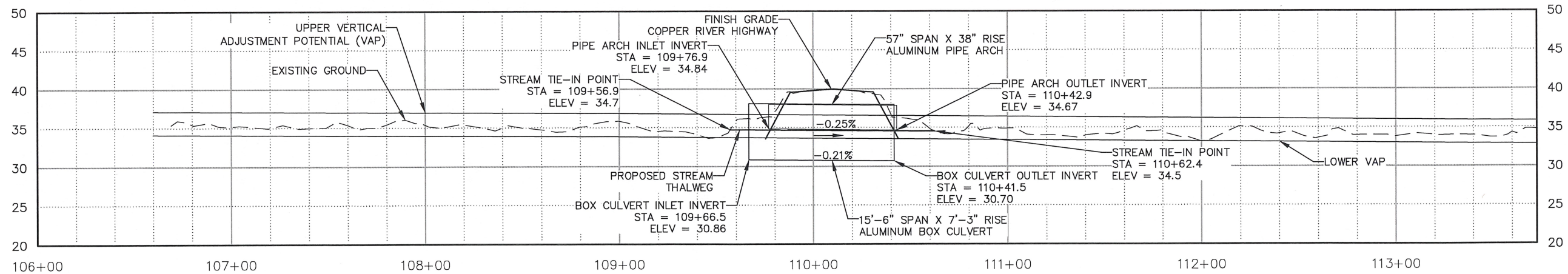
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CULVERT SUMMARY SCHEDULE		
SIZE	15'-6" SPAN X 7'-3" RISE BOX CULVERT	57" SPAN X 38" RISE PIPE ARCH
LENGTH	75'	66'
SLOPE	0.21%	0.25%
CORRUGATION	9" X 2.5"	2 3/8" X 1/2"
MATERIAL	ALUMINUM	ALUMINUM
LOADING	HL-93	HL-93
"CRH" CL STATION	2+80.37	2+58.98

HYDROLOGIC & HYDRAULIC SUMMARY					
EXCEEDANCE PROBABILITY	RETURN PERIOD (YEAR)	DESIGN DISCHARGE (CFS)	DESIGN HIGH WATER ELEVATION (FT)	REGULATORY FLOOD	HW/D
50%	2	128	37.07	N/A	0.69
2%	50	168	37.51	N/A	0.82
1%	100	174	37.57	N/A	0.84
DRAINAGE AREA = 0.54 SQUARE MILES					
ANTICIPATED ADDITIONAL BACKWATER = 0 FEET					
ROADWAY OVERTOPPING Q = 276.14 CFS					



CULVERT COORDINATE TABLE				
SIZE	POINT	NORTHING	EASTING	ELEVATION
15'-6" SPAN X 7'-3" RISE BOX CULVERT	INLET INV.	2361750.03	1763049.35	30.86
	OUTLET INV.	2361684.78	1763012.36	30.70
57" SPAN X 38" RISE PIPE ARCH	INLET INV.	2361750.88	1763026.84	34.84
	OUTLET INV.	2361693.46	1762994.29	34.67



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BY

STATE OF ALASKA

BRADLEY A. HESTON

4911

MECHANICAL ENGINEERING

REGISTERED PROFESSIONAL

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CORDOVA FISH PASSAGE IMPROVEMENTS

WEST FORK 18 MILE CREEK - COP 20

STREAM PLAN AND PROFILE

CORDOVA, ALASKA

PROJECT 1136.63087.01

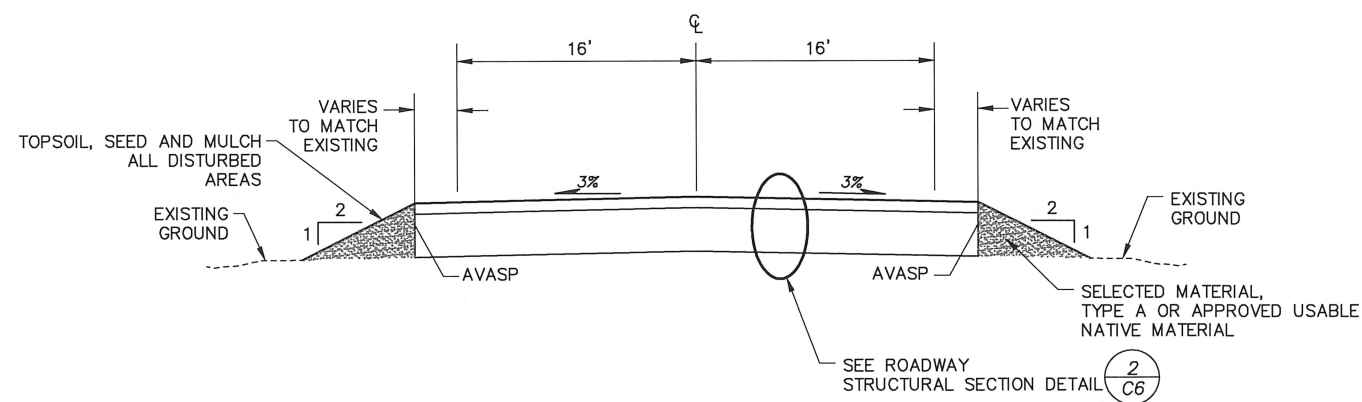
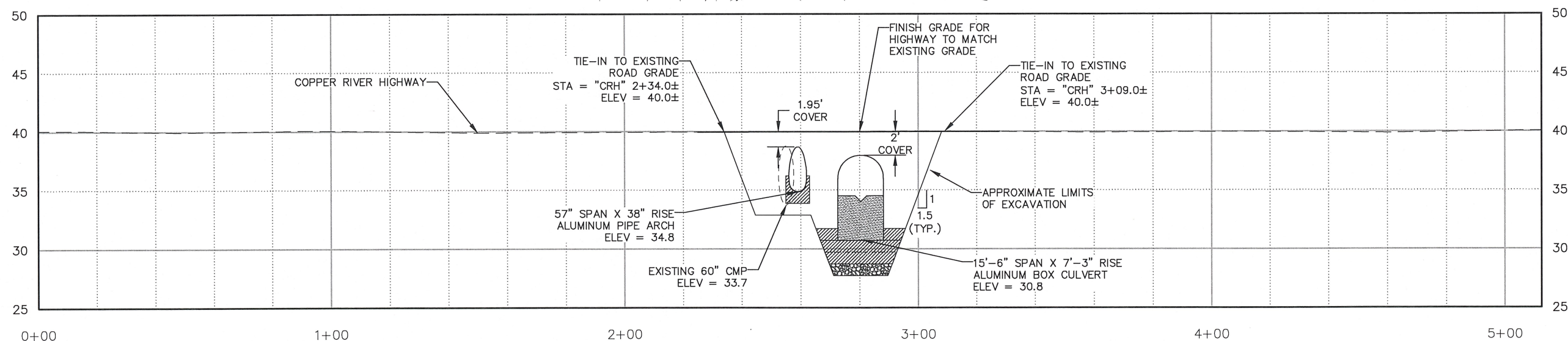
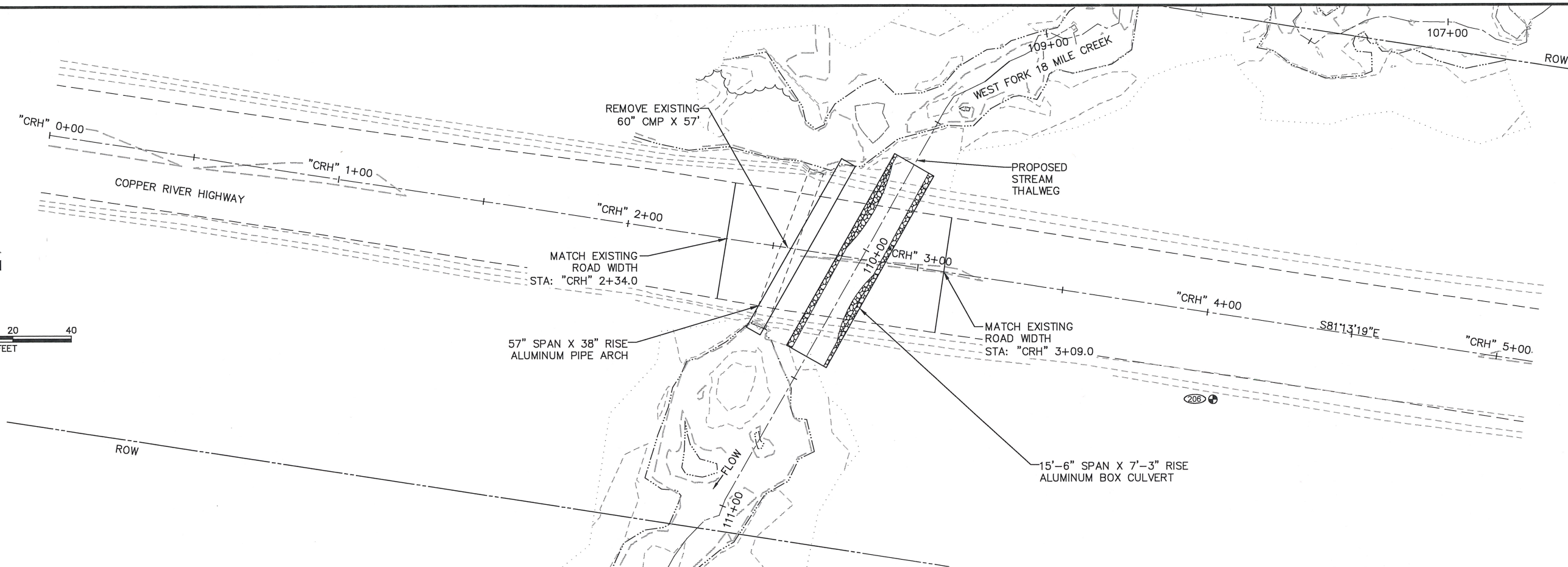
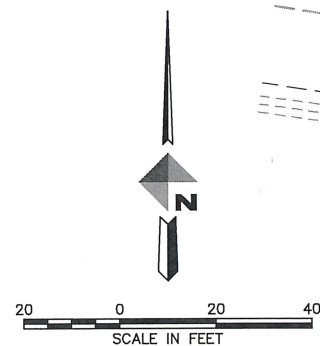
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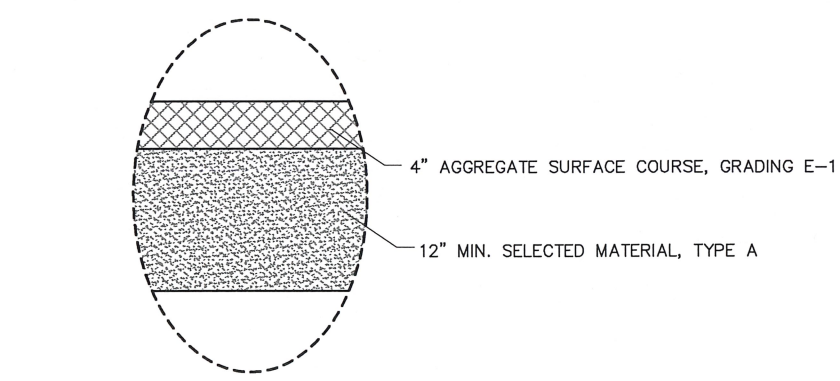
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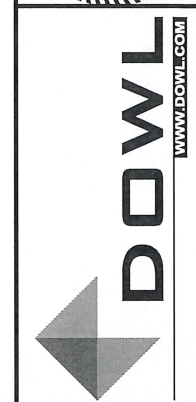


1 ROADWAY SECTION
NTS



2 ROADWAY STRUCTURAL SECTION
NTS

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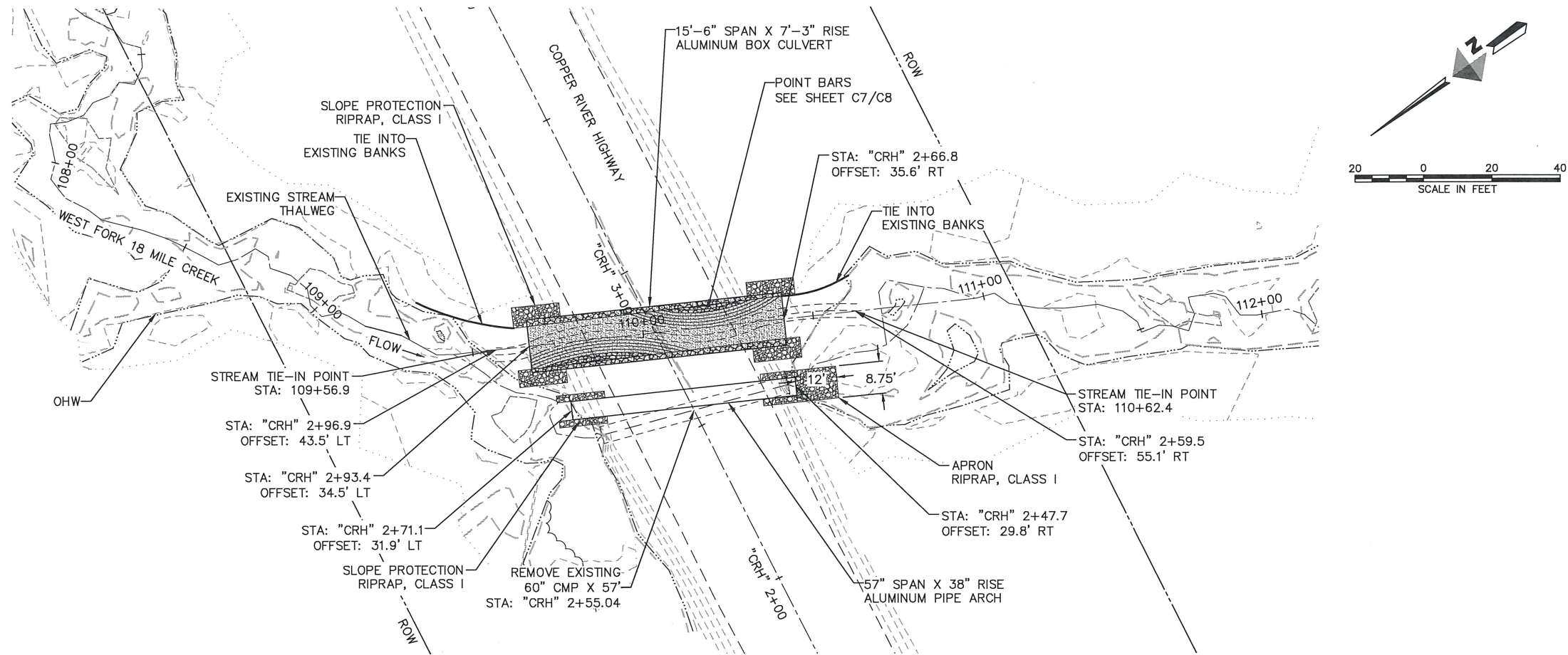
CORDOVA FISH PASSAGE IMPROVEMENTS
WEST FORK 18 MILE CREEK - COP 20
ROADWAY PLAN AND PROFILE
CORDOVA, ALASKA

PROJECT 1136.63087.01
DATE DECEMBER 2020

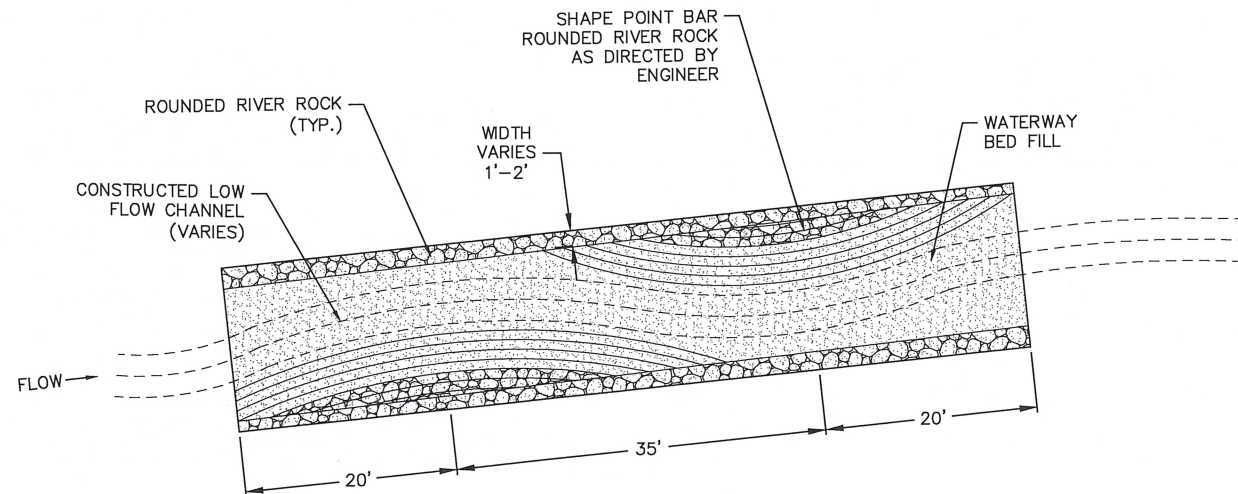
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1
C7
STREAM SIMULATION DETAIL - PLAN VIEW



2
C7
CULVERT STREAM DETAIL
NTS

REV	DATE	DESCRIPTION	BY



CORDOVA FISH PASSAGE IMPROVEMENTS
WEST FORK 18 MILE CREEK - COP 20
STREAM DESIGN DETAILS

PROJECT 1136.63087.01
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C7 OF C10

Diagram illustrating the cross-section of a box culvert structure, showing various components and dimensions:

- BOX CULVERT**: The main structure shown in cross-section.
- SHAPE POINT BAR ROUNDED RIVER ROCK AS DIRECTED BY ENGINEER**: The material used for the point bar.
- CONSTRUCTED LOW FLOW CHANNEL**: The channel formed by the point bar.
- WIDTH VARIES 1'-2'**: Dimension indicating the width of the channel.
- 5% (TYP.)**: Slope percentage for the channel.
- 3.8'**: Vertical dimension of the channel depth.
- 4'**: Horizontal dimension of the channel width.
- 2.5:1**: Slope ratio for the channel.
- 6'**: Horizontal dimension of the waterway bed fill.
- WATERWAY BED FILL**: The material used for the bed fill.
- 15'-6"**: Total horizontal dimension of the structure.

4' MIN

RIPRAP, CLASS I

ROAD SHOULDER

CULVERT

PLAN

Diagram illustrating the profile view of a constructed channel. The channel is filled with riprap (Class I) and covered with geotextile/erosion control (Class I). The channel is bordered by a road shoulder on the right and a stream bank on the left. Key dimensions and labels include:

- SEE NOTE 1**: Points to the top surface of the riprap.
- ROAD SHOULDER**: The top edge of the channel on the right.
- 1**: A vertical dimension line indicating a 1-foot height from the road shoulder to the top of the riprap.
- 2' MIN**: A vertical dimension line indicating a minimum 2-foot height from the stream bed to the top of the riprap.
- CULVERT**: Points to the structure within the channel.
- TOP OF STREAM BANK**: The top edge of the channel on the left.
- 4'**: A horizontal dimension line indicating a 4-foot width at the top of the riprap.
- 2'**: A vertical dimension line indicating a 2-foot height from the stream bed to the bottom of the riprap.
- 2' MIN.**: A vertical dimension line indicating a minimum 2-foot height from the stream bed to the bottom of the riprap.
- GEOTEXTILE, EROSION CONTROL, CLASS I**: Points to the material covering the channel bed.
- CONSTRUCTED CHANNEL STREAM THALWEG**: The bottom center line of the channel.
- RIPRAP, CLASS I**: Points to the stone material in the channel.
- PROFILE**: The title of the diagram.

NOTES:

1. FILL VOIDS IN RIPRAP WITH SELECTED MATERIAL, TYPE A OR USABLE EXCAVATION MEETING SELECTED MATERIAL, TYPE C AND PLACE SALVAGED ORGANIC TOPSOIL AND SEED.

- [illegible]



CORDOVA FISH PASSAGE IMPROVEMENTS
WEST FORK 18 MILE CREEK – COP 20
STREAM SECTIONS AND DETAILS

PROJECT	1136.63087.01
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ROADWAY DIVERSION NOTES:

REFER TO SPECIFICATIONS FOR ROAD CLOSURE AND TRAFFIC CONTROL INFORMATION.

STREAM DIVERSION NOTES:

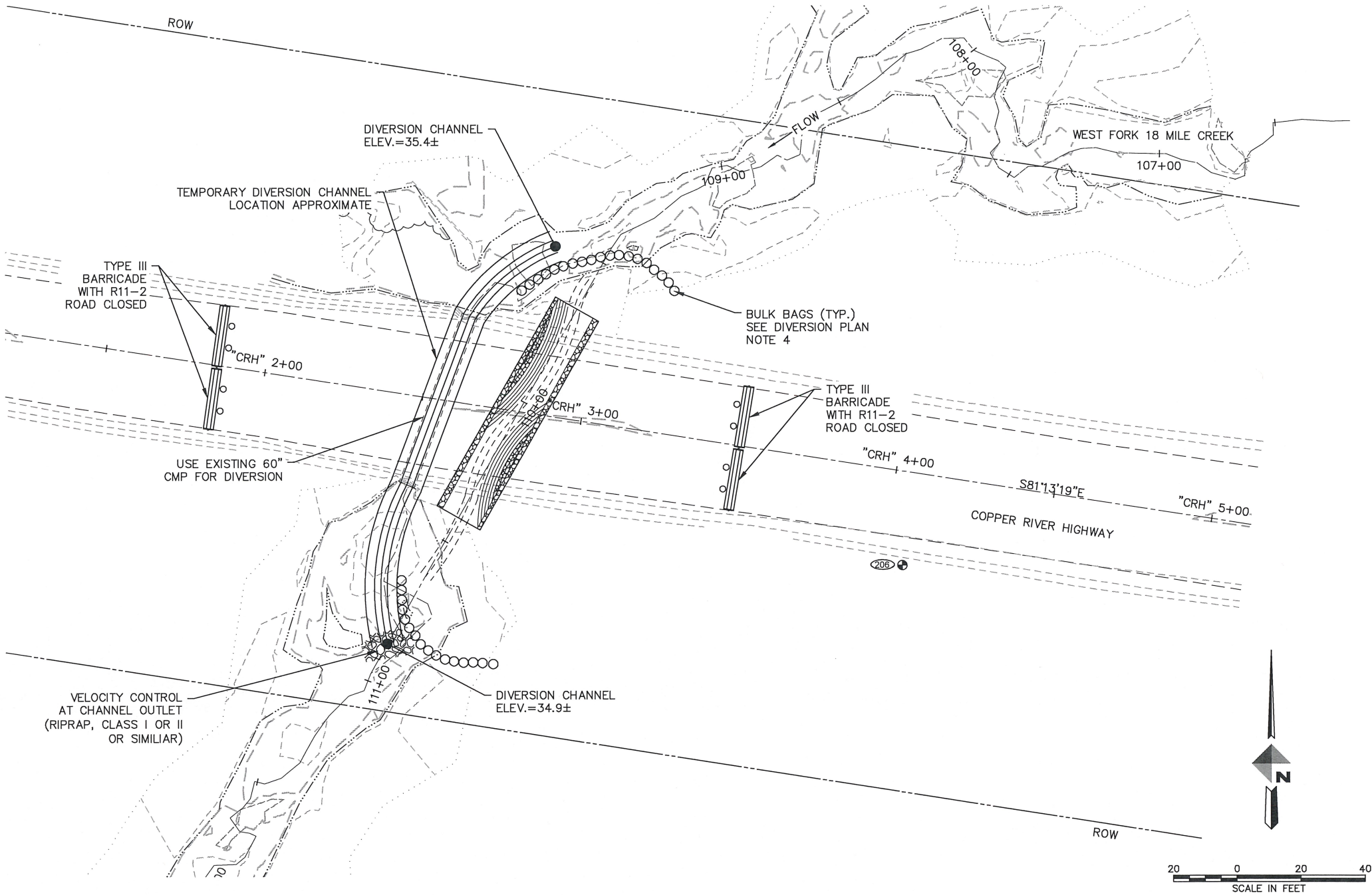
DUE TO PERMISSIVITY OF GRAVELS IN THE 18 MILE AREA, A COFFERDAM MADE OF SHEET PILE MAY BE NEEDED TO REDUCE GROUNDWATER FLOW INTO EXCAVATED AREA. TEMPORARY DIKES OR BERMS MAY BE USED TO ISOLATE THE WORK AREA FROM WATERS OF THE SURROUNDING AREA. THIS WORK MAY REQUIRE A DIVERSION OF STREAM WATER. THE DESIGNERS RECOGNIZE THAT DIFFERENT CONTRACTORS WILL HAVE VARIOUS APPROACHES FOR CONTROLLING WATER AND CONSTRUCTION SEQUENCING. THIS DIVERSION PLAN HAS BEEN DEVELOPED TO CHECK FOR CONSTRUCTABILITY AND AS A STARTING POINT FOR A CONTRACTOR-GENERATED PLAN. CONTRACTOR MUST SUBMIT DIVERSION PLANS TO ENGINEER FOR APPROVAL PRIOR TO IMPLEMENTATION.

DIVERSION PLAN:

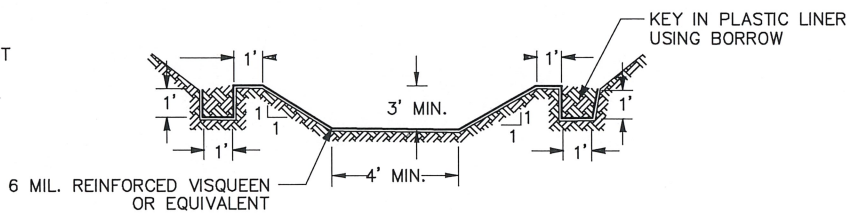
1. PLACE BARRICADES, SIGNS, AND TEMPORARY ROAD DETOUR IN COMPLIANCE WITH SPECIFICATIONS, ADOT&PF, AND MUTCD. COORDINATE WITH OTHER CONTRACTORS WHO MAY BE PRESENT.
2. CONSTRUCT VISQUEEN LINED DIVERSION CHANNEL WEST OF THE EXISTING CROSSING LOCATION.
3. USE EXISTING 60" CMP IN DIVERSION CHANNEL TO PROVIDE VEHICULAR ACCESS. CONSTRUCT DIVERSION CHANNEL BANKS TO BE MINIMUM 1' HIGHER THAN THE TOP OF THE DIVERSION PIPE, IF USED.
4. USE BULK BAGS (SUPERSACKS) TO DIVERT STREAM FLOW THROUGH DIVERSION CHANNEL. LOCATION OF DIVERSION CHANNEL IS APPROXIMATE AND SUBJECT TO SITE CONDITIONS.
5. CONSTRUCT THE NEW ALUMINUM BOX CULVERT.
6. INFILL CULVERT AND RECONSTRUCT CREEK CHANNEL AS SHOWN IN PLANS.
7. DIVERT CREEK FLOW THROUGH THE NEW ALUMINUM BOX CULVERT.
8. REMOVE EXISTING 60" CMP, FILL DIVERSION CHANNEL, AND INSTALL ALUMINUM PIPE ARCH OVERFLOW CULVERT.
9. RECONSTRUCT CREEK CHANNEL AND BANKS AS SHOWN IN PLANS.
10. RECONSTRUCT COPPER RIVER HIGHWAY OVER THE NEWLY INSTALLED CULVERTS.
11. STABILIZE AND REVEGETATE ALL REMAINING DISTURBED AREAS.
12. RETURN VEHICULAR TRAFFIC TO COPPER RIVER HIGHWAY.

ESCP AND DEWATERING NOTES:

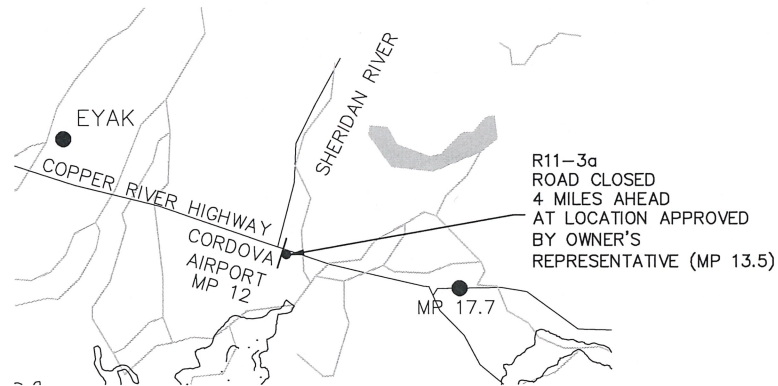
1. DEWATER TRENCH AND WORK AREA WITH PUMP HOSE IF REQUIRED.
2. ALL DISCHARGE POINTS REQUIRE PERMANENT OR TEMPORARY VELOCITY CONTROLS.
3. PROVIDE FOR SEDIMENT REMOVAL FOR ALL DEWATERING ACTIVITY PRIOR TO DISCHARGE FROM THE PROJECT INTO ANY WATER OF THE U.S.
4. PROVIDE SPARE (EXTRA) PUMPS FOR BOTH THE STREAM BYPASS PUMP AND DETWATERING PUMP.
5. EXISTING RIPARIAN VEGETATION SHOULD BE PROTECTED TO MINIMIZE DISTURBANCE.
6. SILT FENCING TO BE USED TO PREVENT DISTURBED SEDIMENT FROM ENTERING THE WATERBODY. ADJUST LOCATION AS NECESSARY AND AS DIRECTED BY THE ENGINEER DURING CONSTRUCTION.
7. 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.
8. 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. FINAL STABILIZATION SHALL BE AS APPROVED BY THE ENGINEER.



1
C9
ESCP, STREAM DIVERSION & ROADWAY DIVERSION PLAN



2
C9
DIVERSION CHANNEL
NTS



3
C9
ROADWAY DIVERSION SIGNS
NTS

REV	DATE	DESCRIPTION	BY



CORDOVA FISH PASSAGE IMPROVEMENTS
WEST FORK 18 MILE CREEK - COP 20
ESCP, STREAM DIVERSION & ROADWAY
DIVERSION PLAN
CORDOVA, ALASKA

PROJECT 1136.63087.01
DATE DECEMBER 2020

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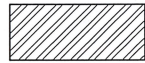
NOTES:

1. VEGETATIVE MAT SHALL BE PLACED ON ALL DISTURBED AREAS OUTSIDE OF THE EMBANKMENT SLOPES.
2. SALVAGED VEGETATIVE MAT MUST HAVE A MINIMUM THICKNESS OF 12 INCHES AND BE SOURCED FROM THE DISTURBED AREA OR LOCAL AREA AS DIRECTED BY THE ENGINEER.

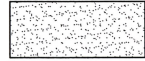
SITE REVEGETATION



SEED, FERTILIZER, AND MULCH



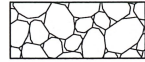
VEGETATIVE MAT



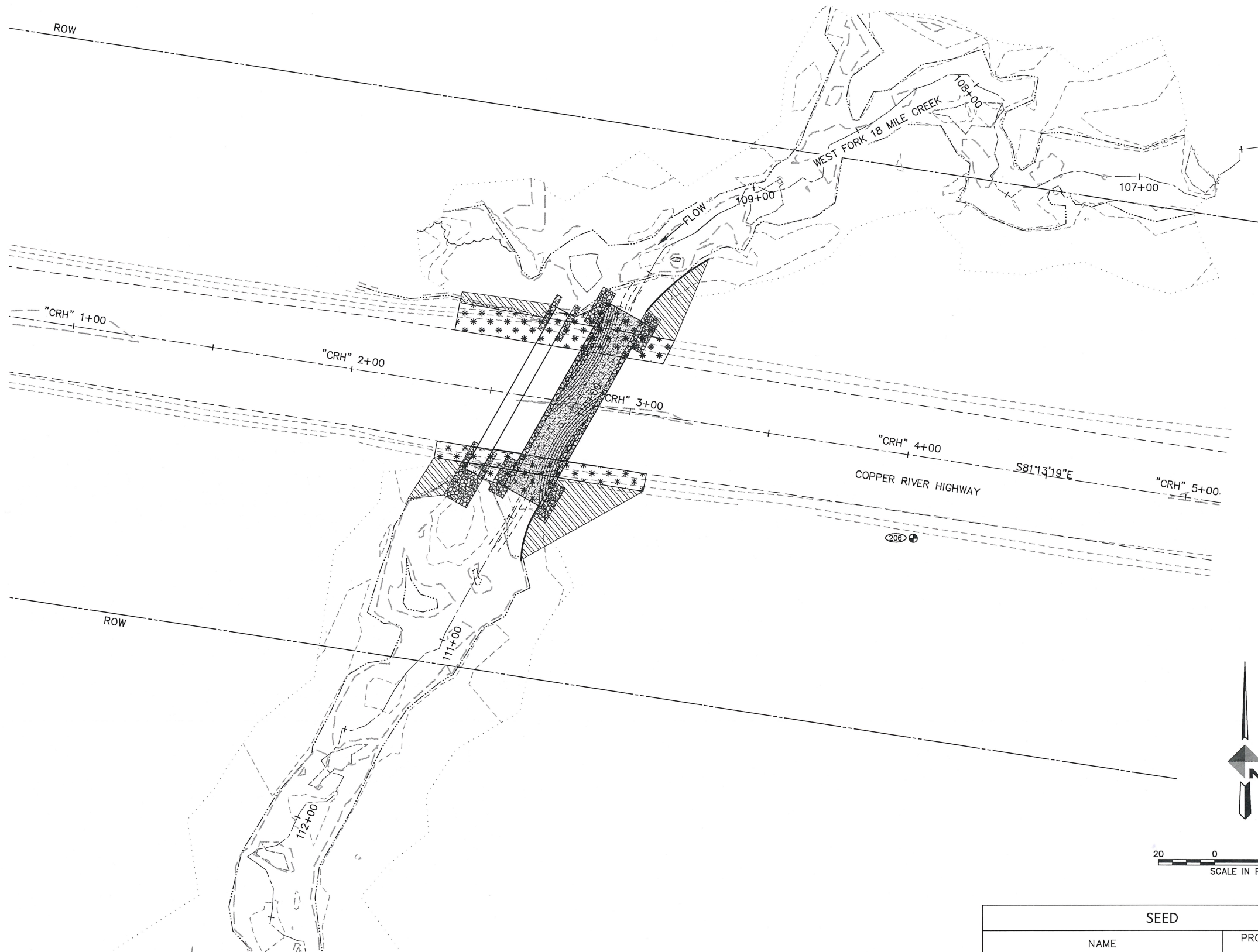
CONSTRUCTED STREAM CHANNEL
WATERWAY BED FILL



RIPRAP



ROUNDED RIVER ROCK



1
C10

REVEGETATION PLAN

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

REV	DATE	DESCRIPTION	BY

STATE OF ALASKA
4911
Bradley A. Dowl
REGISTERED PROFESSIONAL ENGINEER
1446



CORDOVA FISH PASSAGE IMPROVEMENTS
WEST FORK 18 MILE CREEK - COP 20
REVEGETATION PLAN
CORDOVA, ALASKA

PROJECT 1136.63087.01
DATE DECEMBER 2020

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SHEET

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