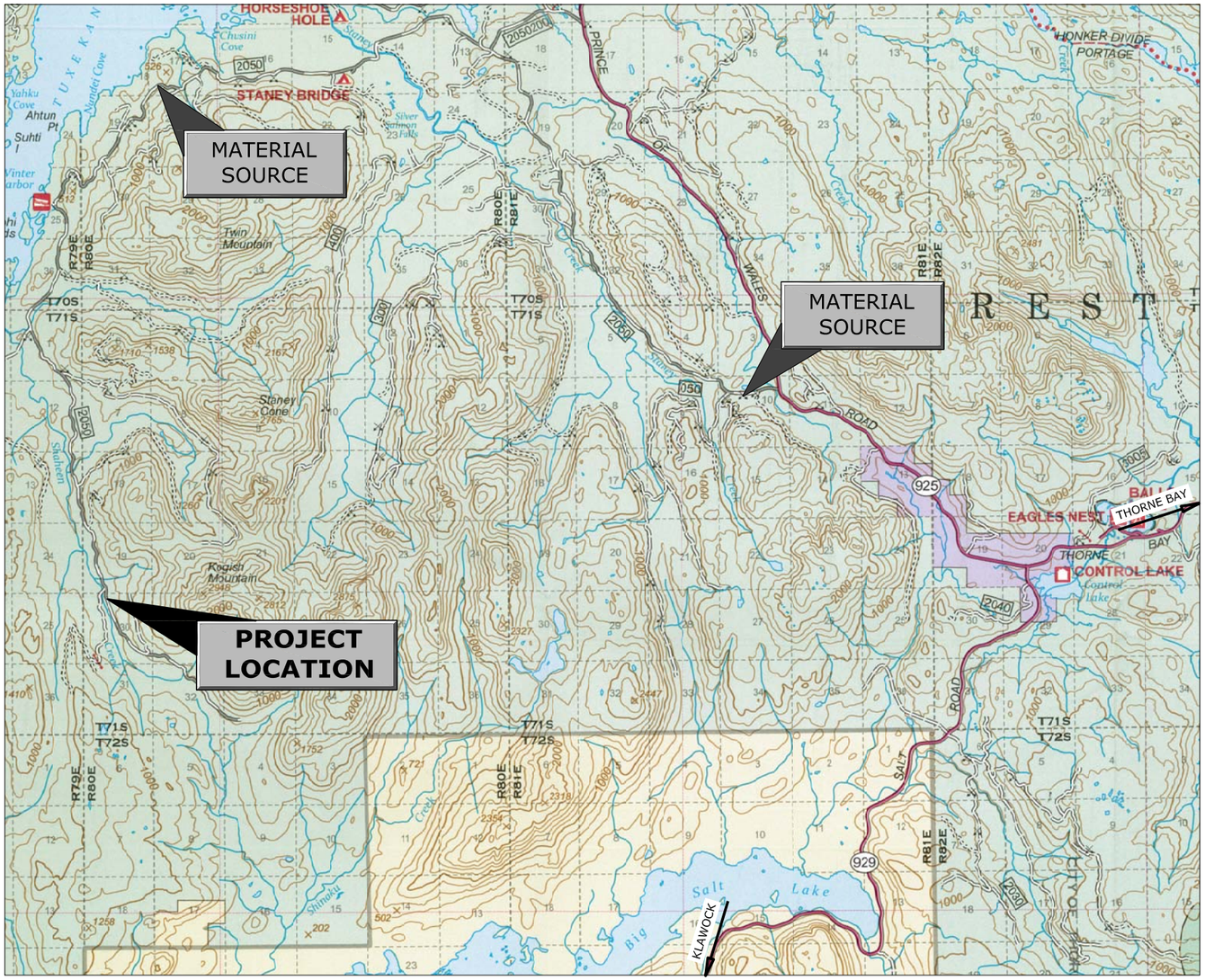
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE, REGION 10

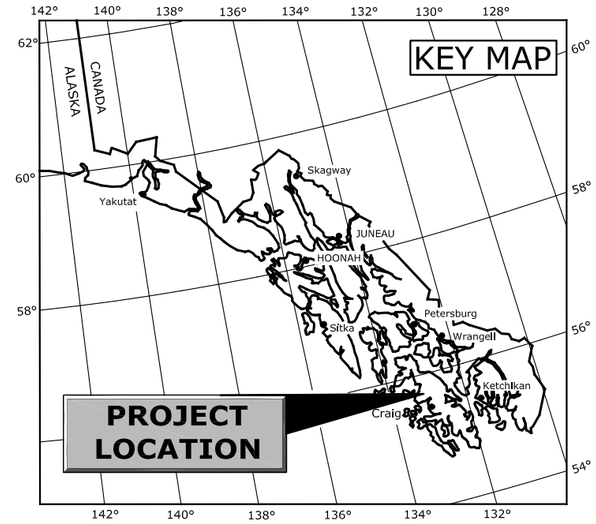
CONSTRUCTION PLANS FOR:

AOP CULVERT REPLACEMENT
NFSR 2050000 MP 22.23

TONGASS NATIONAL FOREST
THORNE BAY RANGER DISTRICT



VICINITY MAP



LOCATION MAP

INDEX TO SHEETS	
NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES & SCHEDULE OF QUANTITIES
3	TYPICAL ROADWAY SECTION & POINT TABLES
4	ROAD PLAN & PROFILE
5	FILL WARPING DETAILS
6	CULVERT GENERAL LAYOUT
7	STRUCTURE EXCAVATION & BACKFILL
8	FOUNDATION DETAILS
9	ROCK WEIR DETAILS
10	STREAM SIMULATION DETAILS
11	DEWATERING REQUIREMENTS
12	PRECAST FOOTING DETAILS (OPTIONAL)
XS1-XS2	ROAD CROSS SECTIONS

MATERIAL SOURCES
GOVERNMENT FURNISHED
CHANNEL ROCK
RIPRAP
UNCLASSIFIED BORROW
WASTE SITE
CONTRACTOR FURNISHED
STREAMBED SIMULATION ROCK
ALL OTHER MATERIALS ARE CONTRACTOR FURNISHED

RECOMMENDED BY:

_____ DATE _____
DISTRICT RANGER
THORNE BAY DISTRICT

APPROVED BY:

_____ DATE _____
FOREST ENGINEER
TONGASS NATIONAL FOREST

DRAFT PLANS
Not for Construction

PREPARED BY:

DJ&A ENGINEERS PLANNERS SURVEYORS

SCHEDULE OF QUANTITIES

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY		REMARKS
15101	MOBILIZATION	LUMP SUM	ALL		TRAFFIC CONTROL, FIRE PROTECTION, EQUIPMENT CLEANING, AND ANY MAINTENANCE OF EXISTING NFS ROADS FOR CONTRACTOR ACCESS IS INDIRECT TO THIS PAY ITEM
15221	CONSTRUCTION SURVEY AND STAKING	LUMP SUM	ALL		
15713	SOIL EROSION & POLLUTION CONTROL	LUMP SUM	ALL		INCLUDES DEWATERING. SEE GENERAL NOTES
20301	REMOVAL OF EXISTING CORRUGATED STEEL PIPE, METHOD A	EACH	1		
20411	UNCLASSIFIED BORROW EXCAVATION, PLACEMENT METHOD 2	CUBIC YARD	115	CQ	GOVERNMENT SOURCE. ASSUMES 20% OF EXCAVATED MATERIAL IS UNSUITABLE. QUANTITY IS IN-PLACE AND NOT ADJUSTED FOR SHRINK/SWELL.
25101	PLACED RIPRAP, CLASS 2	CUBIC YARD	12	CQ	GOVERNMENT SOURCE.
55217	CAST-IN-PLACE CONCRETE MEMBER, CULVERT FOOTING	LINEAR FOOT	158		INCLUDES FURNISHING AND PLACING ALL REINFORCING
60303	12'-0" SPAN x 6'-3" RISE CORRUGATED ALUMINIZED-STEEL STRUCTURAL PLATE ARCH, 0.111" THICKNESS	LINEAR FOOT	78		CORRUGATED ARCH MATERIAL SHALL BE ALUMINIZED STEEL. GALVANIZED STEEL WILL NOT BE ALLOWED. MANUFACTURER TO CERTIFY CULVERT MEETS HL-93 LOADING WITH THE MINIMUM COVER SHOWN ON THESE PLANS.
62504	SEEDING, DRY METHOD	LUMP SUM	ALL		USE TONGASS SEED MIX. SEE FSSS SECTION 625. APPROXIMATELY ~3300 SQ FT
64802	PLACED STREAMBED SIMULATION MATERIAL BED CLASS 22.23, METHOD A	CUBIC YARD	30	CQ	COMMERCIAL SOURCE. SEE SHEET 10 FOR GRADATION REQUIREMENTS. MATERIAL FROM THE EXCAVATION MEETING THE GRADATION FOR BED CLASS 3.79 MAY BE SALVAGED AND INCORPORATED INTO THE SIMULATED STREAMBED.
64804	PLACED STREAMBED CHANNEL ROCK FOR CULVERT BANKS, CLASS CR-2, METHOD A	CUBIC YARD	48	CQ	GOVERNMENT SOURCE. SOME SORTING WILL BE REQUIRED. ROCK SALVAGED FROM THE EXCAVATION MEETING THE GRADATION FOR CLASS CR-2 MAY BE SALVAGED AND INCORPORATED INTO THE SIMULATED STREAMBED.
64806	PLACED STREAMBED CHANNEL ROCK FOR ROCK WEIRS, RIBS, & ISOLATED BOULDERS, CLASS CR-2, METHOD A	CUBIC YARD	14	CQ	GOVERNMENT SOURCE. SOME SORTING WILL BE REQUIRED. ROCK SALVAGED FROM THE EXCAVATION MEETING THE GRADATION FOR CLASS CR-2 MAY BE SALVAGED AND INCORPORATED INTO THE SIMULATED STREAMBED.

CQ= CONTRACT QUANTITY (SEE SECTION 109.02(B) OF THE STANDARD SPECIFICATIONS);

OPTIONAL ITEMS					
20501	ROCK EXCAVATION	CUBIC YARD	10		SUBSURFACE CONDITIONS HAVE NOT BEEN ASSESSED. BEDROCK MAY BE ENCOUNTERED AND ROCK EXCAVATION MAY BE REQUIRED

GENERAL NOTES

DESIGN: This structure is designed for HL-93 live loading in accordance with AASHTO LRFD Bridge Design Specifications, 7th Edition.

HYDROLOGY AND HYDRAULICS: This structure has been designed to pass a Q100 flood event with a headwater depth to culvert rise ratio less than 0.8. Flow data is provided on Sheet 6.

SPECIFICATIONS: Construct the project in compliance with Federal Highway Administration Standard Specifications for Construction of Road and Bridges on Federal Highway Projects (FP-14) and applicable Forest Service Supplemental Specifications.

ROAD WORK: Depths of all materials are given as final compacted depths. Remove all berms, existing or created, unless designated to remain, to allow drainage of water from the traveled way.

DEWATERING & EROSION CONTROL PLAN: Submit a dewatering and soil erosion and sediment control plan to the contracting officer for approval at least seven (7) days prior to beginning work. See Section 157 of the Supplemental Specifications, the notes on Sheet 7, and the general requirements shown on Sheet 11. Construct temporary means to divert the flow of the live stream as necessary to perform work. Do not pump water from excavations directly into the live stream.

DISPOSAL: All materials designated for removal become the property of the contractor and are to be disposed of by removing from the forest in an environmentally safe manner in accordance with all local, state and federal requirements. Dispose of excess or unsuitable material at the location designated in FSSS Section 105. Hauling of excess or unsuitable material is incidental to associated work.

TEMPORARY TRAFFIC CONTROL: Submit a temporary traffic control plan to the Contracting Officer for approval at least 30 days prior to intended use.

IN-STREAM WORK: All in-stream work will be done between June 15th and August 1st. Allowance shall be given to the Forest Service to capture and remove fish and other aquatic organisms from within the construction work area prior to and during work activities.

EQUIPMENT STORAGE: Storage of all equipment on government lands will be at a location approved by the CO.

SEEDING: Seed and mulch all disturbed soil that is not within travel way or stream channel. Use Tongass Seed Mix. See FSSS Section 625.

CONCRETE: Use Class A(AE) Concrete for Precast members. The required 28-day compressive strength (F'c) is 5,000 psi with an entrained air content of 5% ± 1%. Finish all precast elements with an ordinary surface finish. Make all concrete in accordance with an approved mix design. Chamfer all exposed edges of concrete 3/4" and fillet all acute angles 3" unless otherwise noted.

REINFORCING STEEL: Use reinforcing steel of the deformed type conforming to AASHTO M31 (ASTM A615) Grade 60. Concrete cover is as shown; where not shown it must conform to AASHTO. Cut and bend reinforcing steel in conformance with ACI 315. Lap splice bars 2' min.

HARDWARE AND STRUCTURAL STEEL: Use shapes, plates and bars meeting the requirements of ASTM A36, unless otherwise specified in these plans. Use hardware meeting the requirements of ASTM A325, except as noted in the drawings.

WELDING: Weld in accordance with the Structural Welding Code, AWS D1.1.

USDA FOREST SERVICE

United States Department of Agriculture
Forest Service

REGION 10
ALASKAN REGION

PROJECT NAME

AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

GENERAL NOTES & SCHEDULE OF QUANTITIES

DATE
Mar-19

ARCHIVE NO.

DESIGNER
M. JENSEN

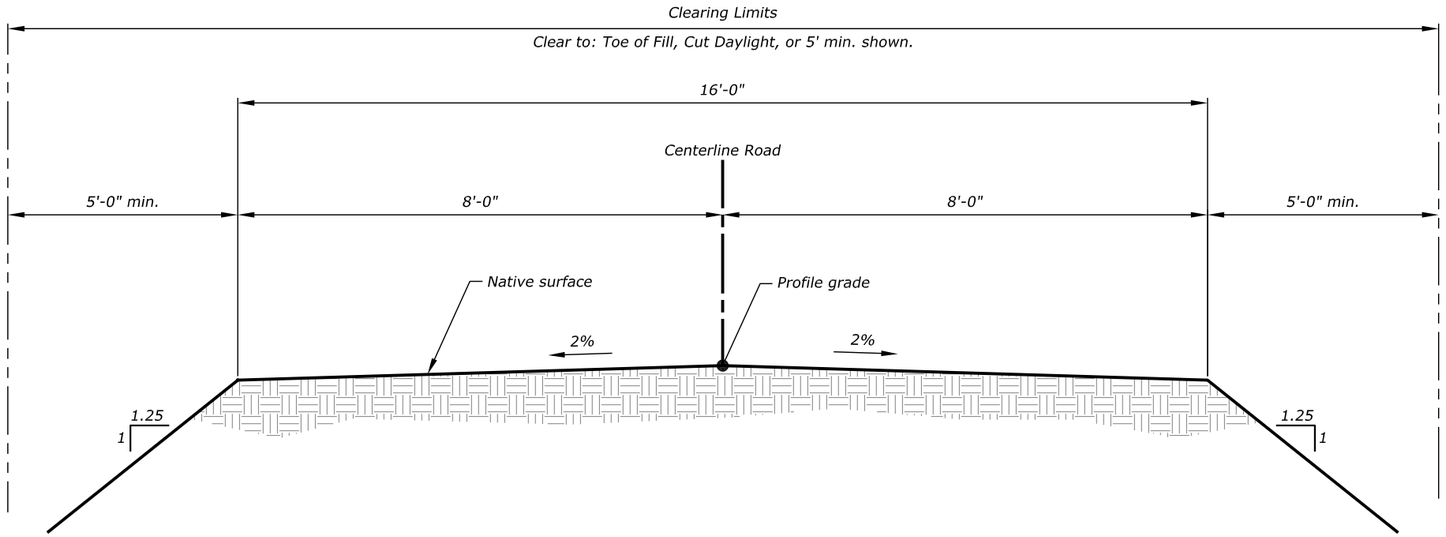
DRAWN
B. MCCRAY

CHECKED
M. JENSEN

PROJECT NO.
6904

DWG SHEET NO.
2

SHEET 2 OF 12



TYPICAL ROAD SECTION

NOT TO SCALE

CONTROL POINT TABLE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-1	1408629.13	2780370.66	287.31	SET-RPC
CP-2	1408748.79	2780344.57	279.71	SET-RPC
CP-3	1409015.76	2780226.38	267.04	SET-RPC

SURVEY CONTROL POINTS

SET-RPC = Red Plastic Cap Control Point set by DJ&A.
See PROJECT CONTROL MAP for location of CONTROL POINTS.

FILL WARPING LAYOUT POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
7005	1408861.2792	2780313.2115	270.96	FILL WARPING RIGHT
7006	1408833.8745	2780283.2436	271.51	FILL WARPING LEFT

FILL WARPING LAYOUT POINTS

See Sheet 5 for location of CULVERT INVERT POINTS

CULVERT LAYOUT POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
7000	1408834.8304	2780334.5276	254.43	BOTTOM OF FOOTING
7001	1408847.8117	2780336.7297	254.43	BOTTOM OF FOOTING
7002	1408848.0407	2780256.6531	252.01	BOTTOM OF FOOTING
7003	1408861.0219	2780258.8552	252.01	BOTTOM OF FOOTING

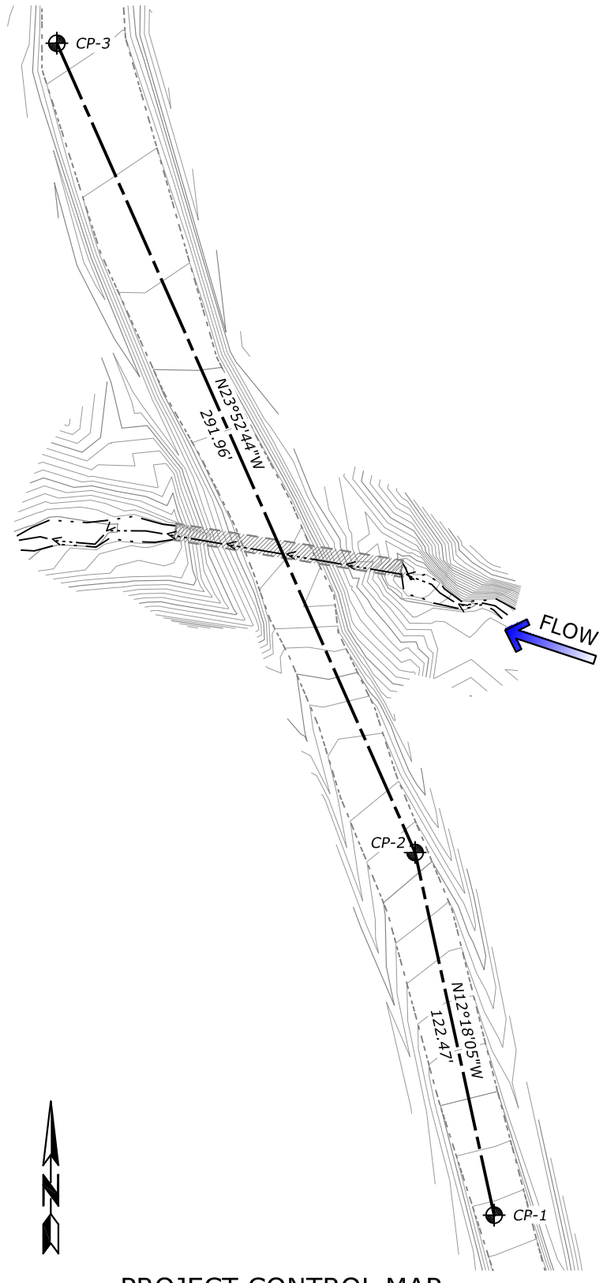
CULVERT LAYOUT POINTS

See Sheet 6 for location of CULVERT INVERT POINTS

CENTERLINE POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
7010	1409127.1252	2780236.5959		STA 10+37.87 CL ROAD/PC CURVE
7011	1408966.7602	2780246.7211	268.14	STA 12+00 CL ROAD/BEGIN CONSTRUCTION
7012	1408938.4616	2780256.6527	269.06	STA 12+30 CL ROAD
7013	1408915.0510	2780267.0222	269.85	STA 12+55.61 CL ROAD/PT CURVE
7014	1408913.2442	2780267.9029	269.91	STA 12+57.62 CL ROAD/PC CURVE
7015	1408893.0654	2780277.5814	270.61	STA 12+80 CL ROAD
7016	1408874.9303	2780286.0141	271.22	STA 13+00 CL ROAD
7017	1408865.7361	2780290.1946	271.56	STA 13+10.17 CL ROAD/BEGIN FILL WARPING LEFT
7018	1408859.0760	2780293.1835	271.84	STA 13+17.4 CL ROAD/BEGIN FILL WARPING RIGHT
7019	1408847.6617	2780298.2296	272.39	STA 13+29.88 CL ROAD/CL CULVERT
7020	1408836.3590	2780303.1318	273.01	STA 13+42.2 CL ROAD/END FILL WARPING LEFT
7021	1408829.4618	2780306.0776	273.43	STA 13+49.7 CL ROAD/END FILL WARPING RIGHT
7022	1408810.7312	2780313.9040	274.72	STA 13+70 CL ROAD
7023	1408782.8892	2780325.0755	276.79	STA 14+00 CL ROAD
7024	1408745.4797	2780339.2337	279.55	STA 14+40 CL ROAD/END CONSTRUCTION
7025	1408649.0702	2780371.3750		STA 15+41.64

ROAD CENTERLINE POINTS



PROJECT CONTROL MAP

Scale: 1" = 50'

USDA FOREST SERVICE

United States Department of Agriculture
Forest Service

REGION 10
ALASKAN REGION

PROJECT NAME

AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

TYPICAL ROAD SECTION & POINT TABLES

DATE: **Mar-19**

ARCHIVE NO.

DESIGNER: **M. JENSEN**

DRAWN: **B. MCCRAY**

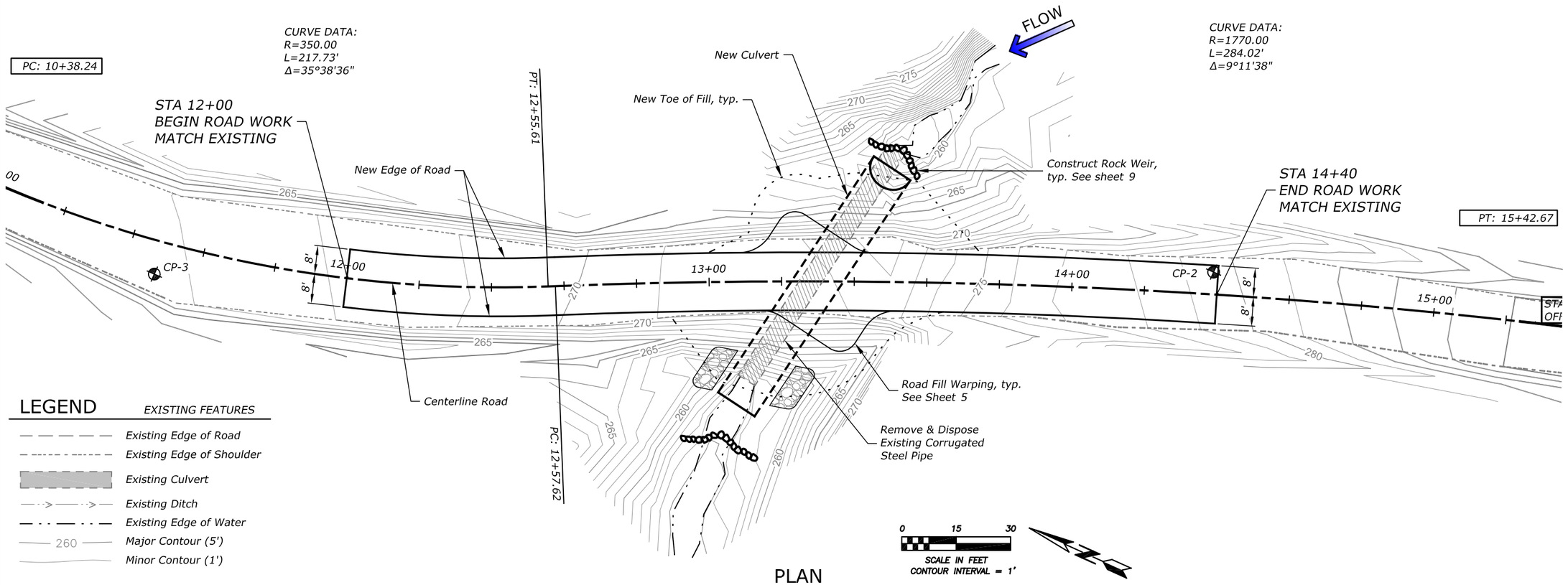
CHECKED: **M. JENSEN**

PROJECT NO.: **6904**

DWG SHEET NO.: **3**

SHEET **3** OF **12**

3/8/19 16:15 MIKEJ F:\6904 USFS - TONGASS NF AOP SITES (14)\DWG\6904-RD2050000-MP22.23-DESIGN-FILL WARPING.DWG;



LEGEND

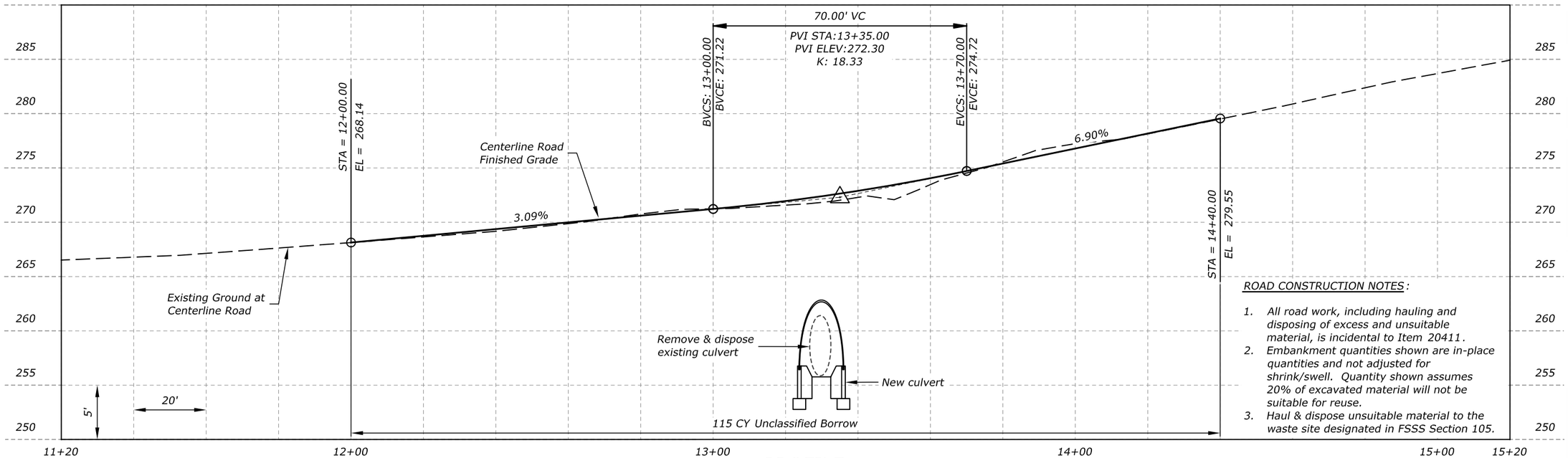
EXISTING FEATURES

- Existing Edge of Road
- Existing Edge of Shoulder
- Existing Culvert
- Existing Ditch
- Existing Edge of Water
- 260 Major Contour (5')
- Minor Contour (1')

0 15 30

SCALE IN FEET
CONTOUR INTERVAL = 1'

PLAN



PROFILE

ROAD CONSTRUCTION NOTES:

1. *All road work, including hauling and disposing of excess and unsuitable material, is incidental to Item 20411.*
2. *Embankment quantities shown are in-place quantities and not adjusted for shrink/swell. Quantity shown assumes 20% of excavated material will not be suitable for reuse.*
3. *Haul & dispose unsuitable material to the waste site designated in FSSS Section 105.*

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AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

ROAD PLAN & PROFILE

DATE
Mar-19

ARCHIVE NO.

DESIGNER
M. JENSEN

DRAWN
B. MCCRAY

CHECKED
M. JENSEN

PROJECT NO.
6904

DWG SHEET NO.
4

SHEET **4** OF **12**

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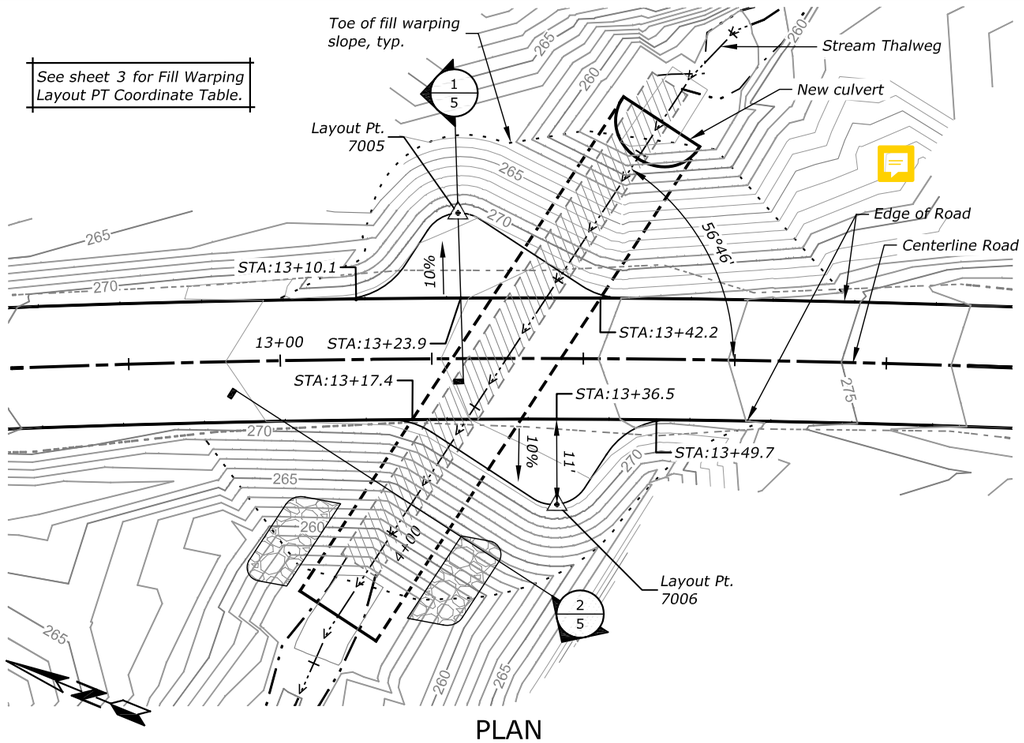
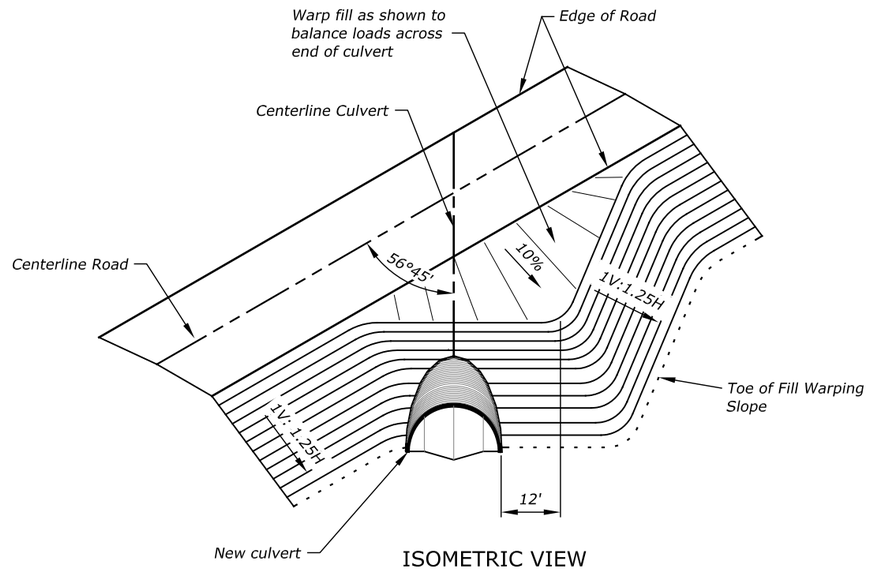
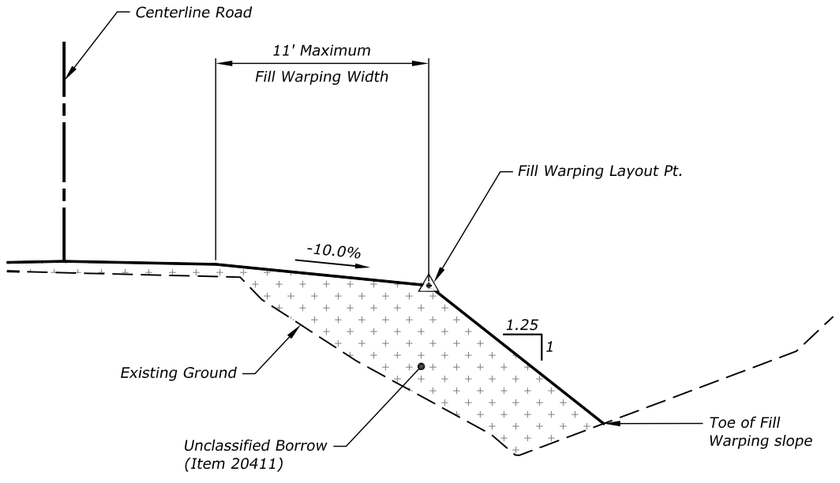


PLAN



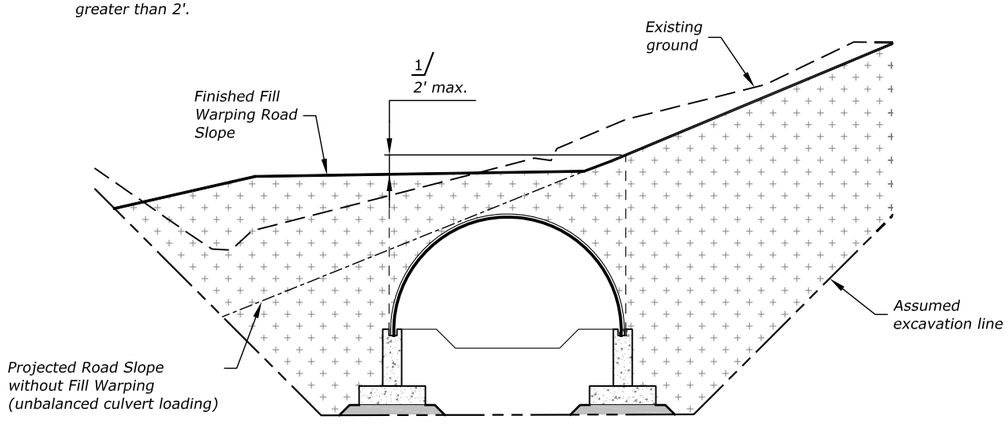
ISOMETRIC VIEW

FILL WARPING LAYOUT POINTS TO BE INCLUDED IN 95% SUBMITTAL



1/5 SECTION
Scale: 1" = 8'

1/ Place culvert backfill such that the difference in fill height between each side of the culvert is no greater than 2'.



2/5 SECTION
Scale: 1" = 8'

USDA FOREST SERVICE
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ALASKAN REGION

PROJECT NAME

AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE
FILL WARPING PLAN & DETAILS

DATE
Mar-19

ARCHIVE NO.

DESIGNER
M. JENSEN

DRAWN
B. MCCRAY

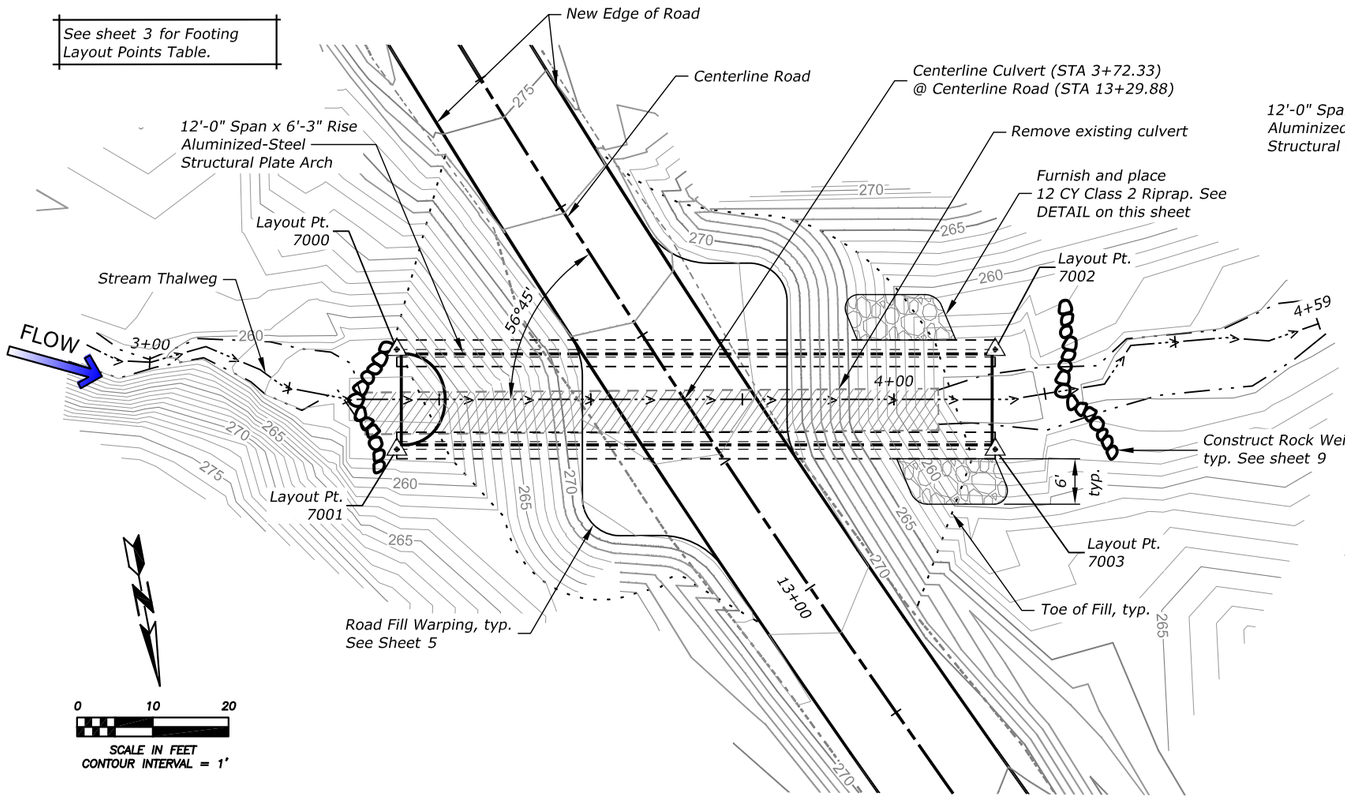
CHECKED
M. JENSEN

PROJECT NO.
6904

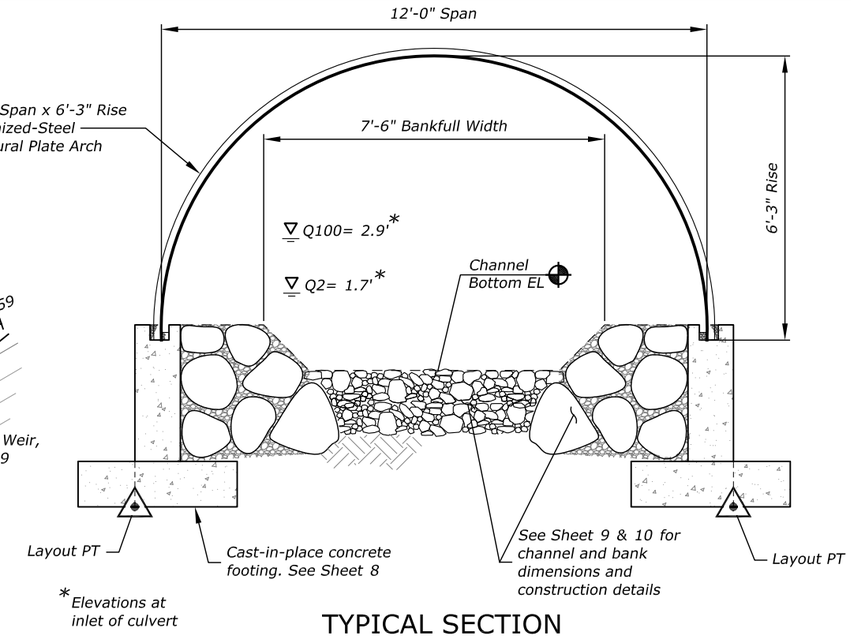
DWG SHEET NO.
5

SHEET 5 OF 12

3/8/19 16:15 MIKEJ F:\6904 USFS - TONGASS NF AOP SITES (14)\DWG\6904-RD2050000-MP22.23-DESIGN-FILL WARPING.DWG;

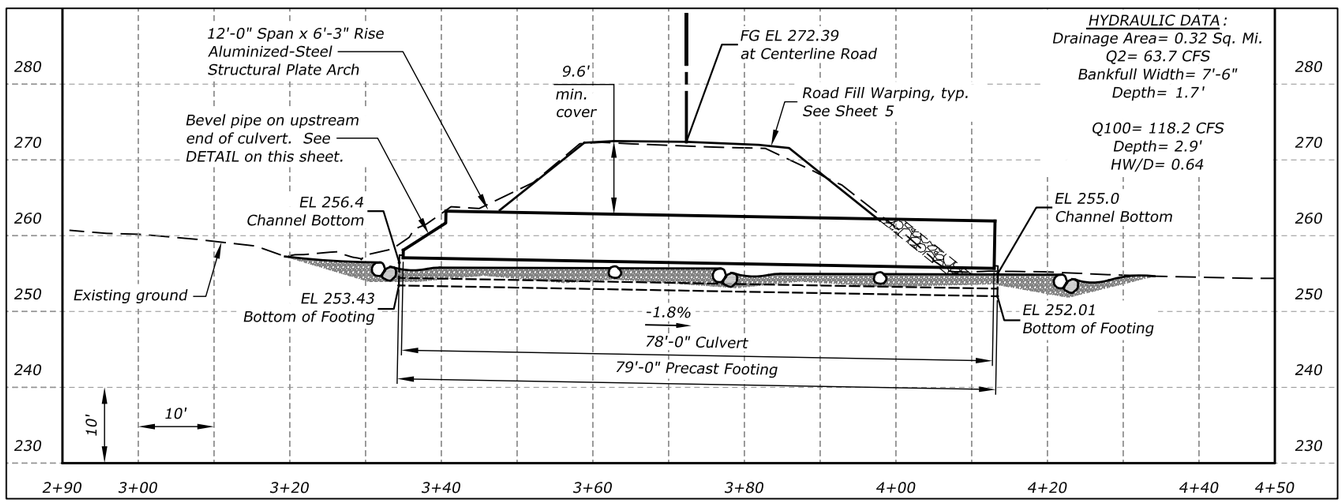


PLAN



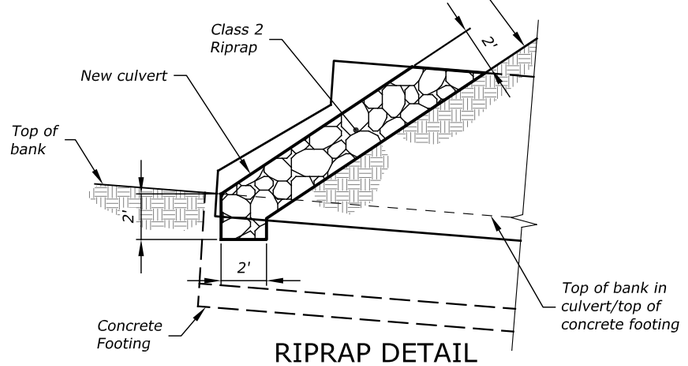
TYPICAL SECTION

Not to Scale



SECTION THRU CENTERLINE CULVERT

Scale: 1" = 20'

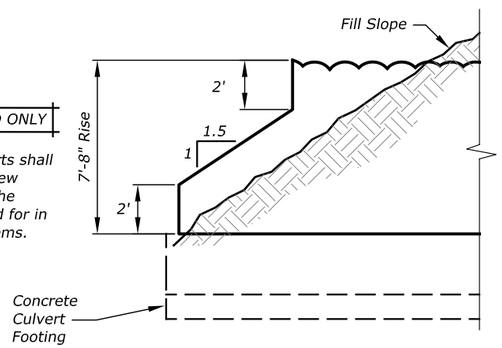


RIPRAP DETAIL

NOT TO SCALE

BEVEL INLET END ONLY

The ends of culverts shall not be cut on a skew unless shown on the drawings, or called for in the schedule of items.



STEP BEVEL END DETAIL

USDA FOREST SERVICE

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ALASKAN REGION

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AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

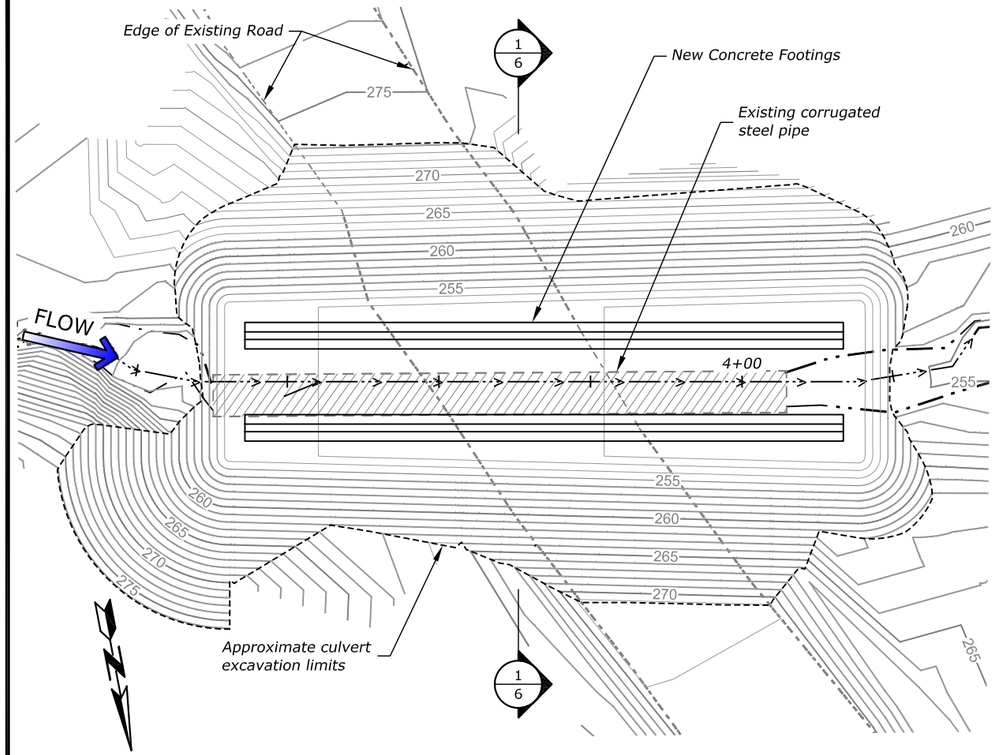
CULVERT GENERAL LAYOUT

DATE: **Mar-19**

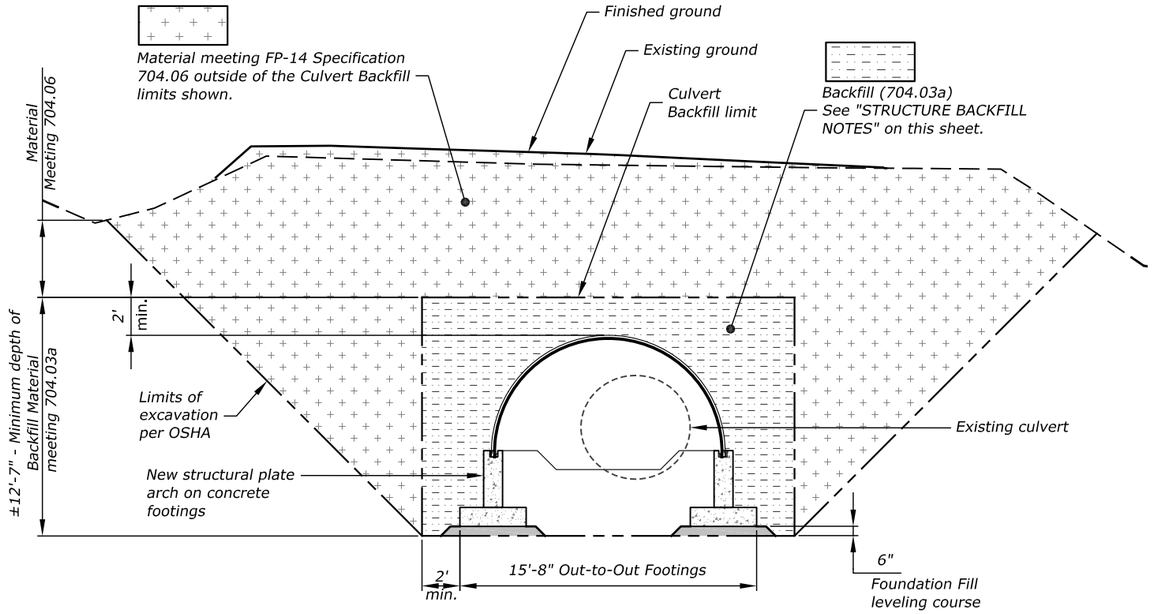
ARCHIVE NO.

DESIGNER	DWG SHEET NO.
M. JENSEN	**6**
DRAWN: **B. MCCRAY**	
CHECKED: **M. JENSEN**	
PROJECT NO.: **6904**	SHEET **6** OF **12**

3/8/19 16:15 MIKEJ F:\6904 USFS - TONGASS NF AOP SITES (14)\DWG\6904-RD2050000-MP22.23-DESIGN-FILL WARPING.DWG;



PLAN



1/6 STRUCTURAL EXCAVATION & BACKFILL SECTION

NOT TO SCALE

DEWATERING AND SOIL EROSION CONTROL NOTES:

1. *Protect against soil erosion and sedimentation during construction in accordance with FP-14 Section 157, the project permits, Forest Service Handbook (FSH) 2509.22, Region 10 BMPs for Erosion Control, and the Guidance for the Invasive Plant Managment Program (Krosse 2017). Prepare and submit a soil erosion and sediment control plan to the CO for approval.*
2. *Dewater the excavation in accordance with FP-14 Sections 208 and 157 and the requirements on sheet 11.*
3. *Contractor should anticipate water infiltrating the excavations.*
4. *Culvert excavation, riprap and rock weir placement, and backfill are to be completed in accordance with the Contract Specifications. Standing or running water in the work area does not relieve the contractor from meeting the specifications.*
5. *Dewatering is the sole responsibility of the contractor. Develop and submit to the CO a project-specific dewatering and sediment control plan with the excavation plan for approval. Sheet 11 illustrates the general dewatering requirements and possible methods and equipment and is not considered adequate or complete for this project. Develop and submit a project-specific dewatering plan including drawings and a written outline illustrating and describing proposed layout, methods, and equipment. See sheet 11 for dewatering flows during construction. Approval of the contractor's dewatering plan does not relieve the contractor from completing the work as required. If the contractor's methods are not producing adequate results, the contractor must re-evaluate and submit another dewatering plan. Re-submittal of the dewatering plan, if required, is incidental to the work.*

STRUCTURE EXCAVATION NOTES:

1. *Complete structure excavation in accordance with FP-14 Section 209.*
2. *The contractor is solely responsible for excavation support and compliance with all applicable OSHA regulations.*
3. *Notify the CO immediately if bedrock or soft, unsuitable soils are encountered.*

STRUCTURE BACKFILL NOTES:

1. *Backfill limits shown here are the minimum requirements. Place backfill in accordance with FP-14 Section 209, and as shown on these Plans, with material meeting the requirements of Subsection 704.03a. Compact backfill material in accordance with FP-14 Subsection 209.10. Any material outside the Backfill limits shown is considered Road Embankment and the material must meet the requirements of FP-14 Subsection 704.06.*
2. *It is assumed that material conserved from the structure excavation at this site will meet the requirement for Backfill (704.03a) or Road Embankment (704.06). Some mixing and sorting may be required to meet the material specification. Haul and dispose unsuitable and excess material to the designated waste site. Haul and disposal of unsuitable and excess material is paid with Item 20411.*

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AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

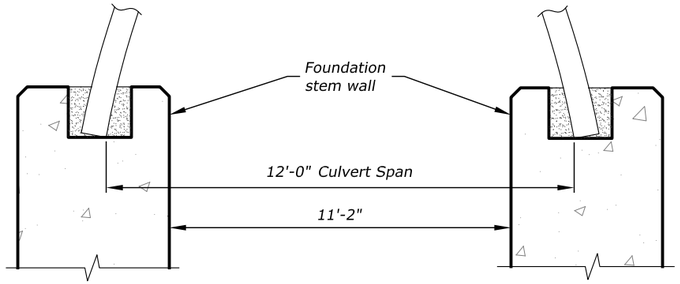
TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

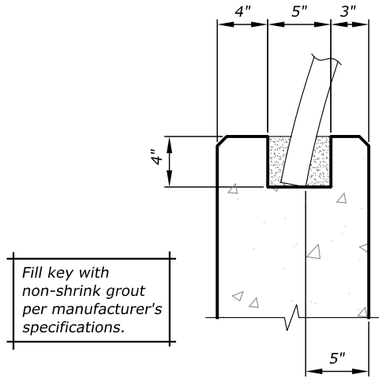
STRUCTURE EXCAVATION & BACKFILL

DATE: Mar-19	
ARCHIVE NO.	
DESIGNER: M. JENSEN	DWG SHEET NO.: 7
DRAWN: B. MCCRAY	
CHECKED: M. JENSEN	SHEET 7 OF 12
PROJECT NO.: 6904	



INSTALLATION DETAIL

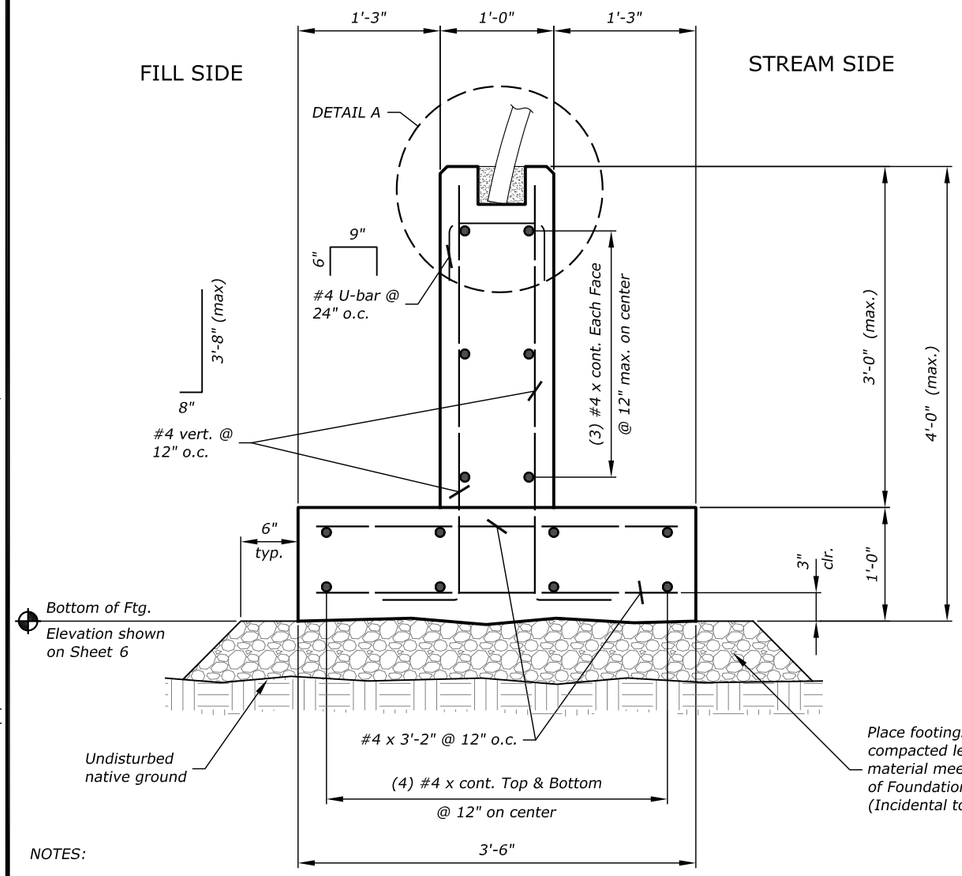
Not to Scale



Fill key with non-shrink grout per manufacturer's specifications.

DETAIL A

Not to Scale



NOTES:

1. *Provide 2" clear cover for all reinforcement unless otherwise shown.*
2. *o.c. = on center.*
3. *Use 24" min. lap splice for all reinf. bars.*

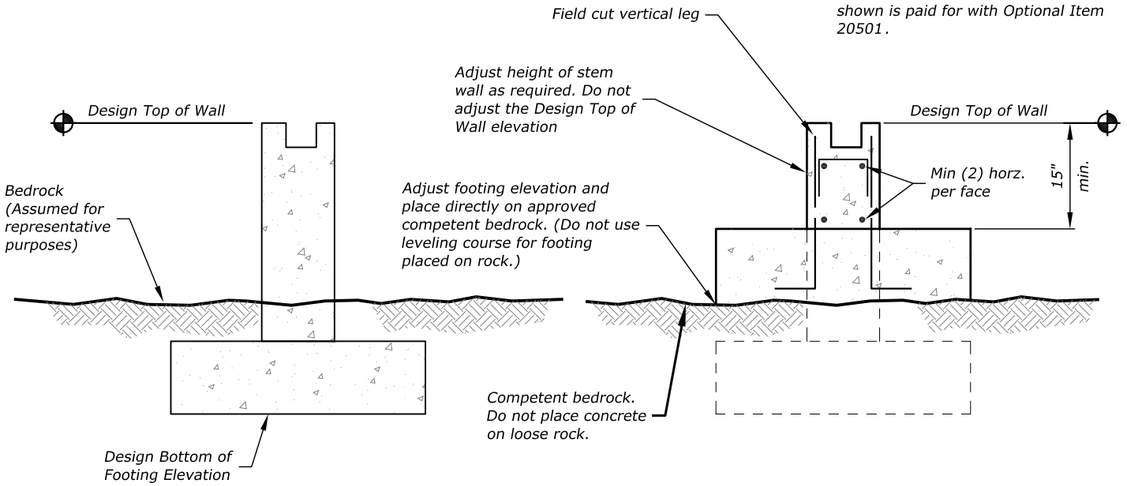
FOOTING DETAIL

Scale: 3/4" = 1'-0"

FOUNDATION NOTES

1. *A foundation investigation has NOT been conducted at this site. Rock outcroppings are visible directly above the inlet of the existing culvert. It is possible that bedrock will be encountered during excavation for the culvert footings. Notify the CO immediately if bedrock is encountered within the limits of the foundations shown in these PLANS. In no case should the footing be placed directly on large boulders, or random outcroppings of bedrock without prior approval. If bedrock is encountered adjust the footing depth and footing stem wall height AS SHOWN ON THIS SHEET.*
2. *Prepare foundation in accordance with Section 208 of the Specifications. Foundation must be approved in writing by the CO prior to placing the concrete.*
3. *The Contractor may elect to precast the culvert footings but is solely responsible for any resulting rock excavation that may be required. Do not place precast footing directly on rock. The 6" minimum leveling course is required for precast footing placement. Precast footing details are provided on Sheet 12.*

NOTE: Provide minimum dimensions shown. Rock excavation required to achieve the minimum dimensions shown is paid for with Optional Item 20501.



ALTERNATE FOUNDATION DETAIL IF BEDROCK ENCOUNTERED ABOVE INTENDED FOOTING ELEVATION

INFORMATIONAL QUANTITIES

ITEM DESCRIPTION	*UNIT*	*QUANTITY*
STRUCTURAL CONCRETE, CLASS A(AE)	*Cubic Yard*	*38.0*
REINFORCING STEEL	*Pounds*	*3250*

Informational Quantities shown above are for the cast-in-place culvert footing and assume maximum stem wall height. Informational Quantities are considered incidental to Item 55217.

USDA FOREST SERVICE

United States Department of Agriculture
Forest Service

REGION 10
ALASKAN REGION

PROJECT NAME

AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

FOUNDATION DETAILS

DATE
Mar-19

ARCHIVE NO.

DESIGNER
M. JENSEN

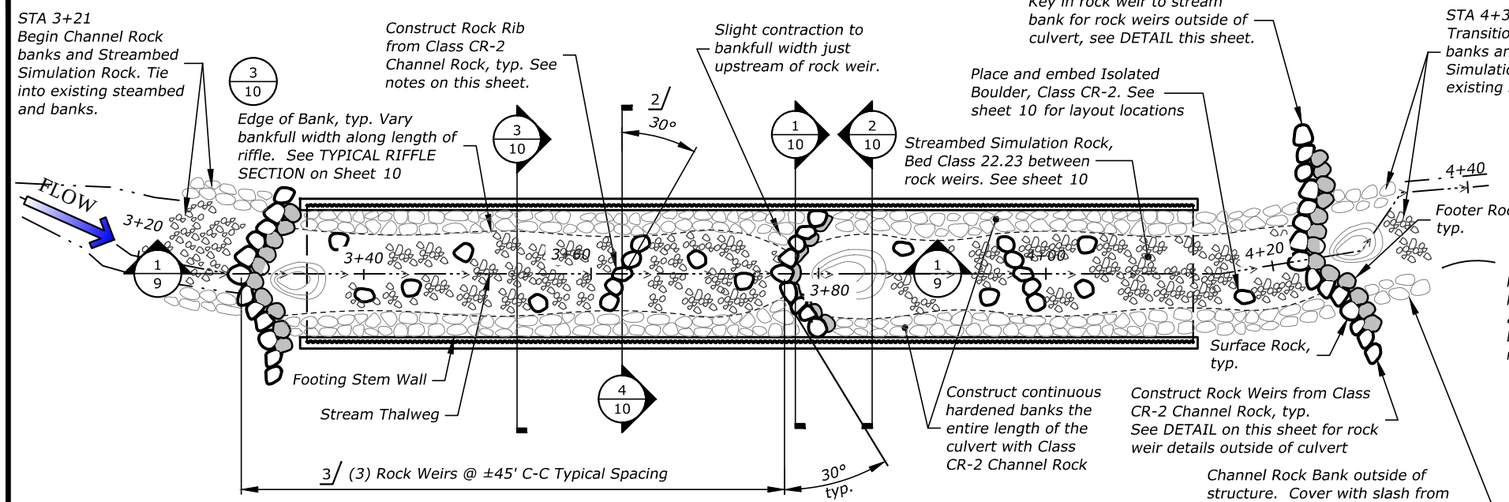
DRAWN
B. MCCRAY

CHECKED
M. JENSEN

PROJECT NO.
6904

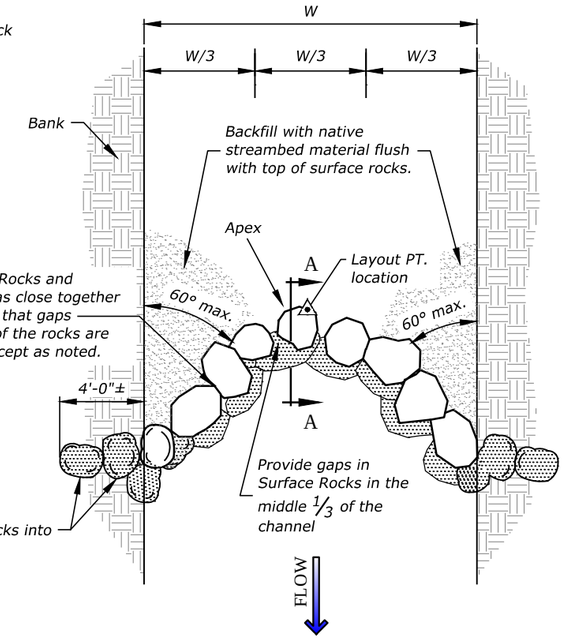
DWG SHEET NO.
8

SHEET **8** OF **12**



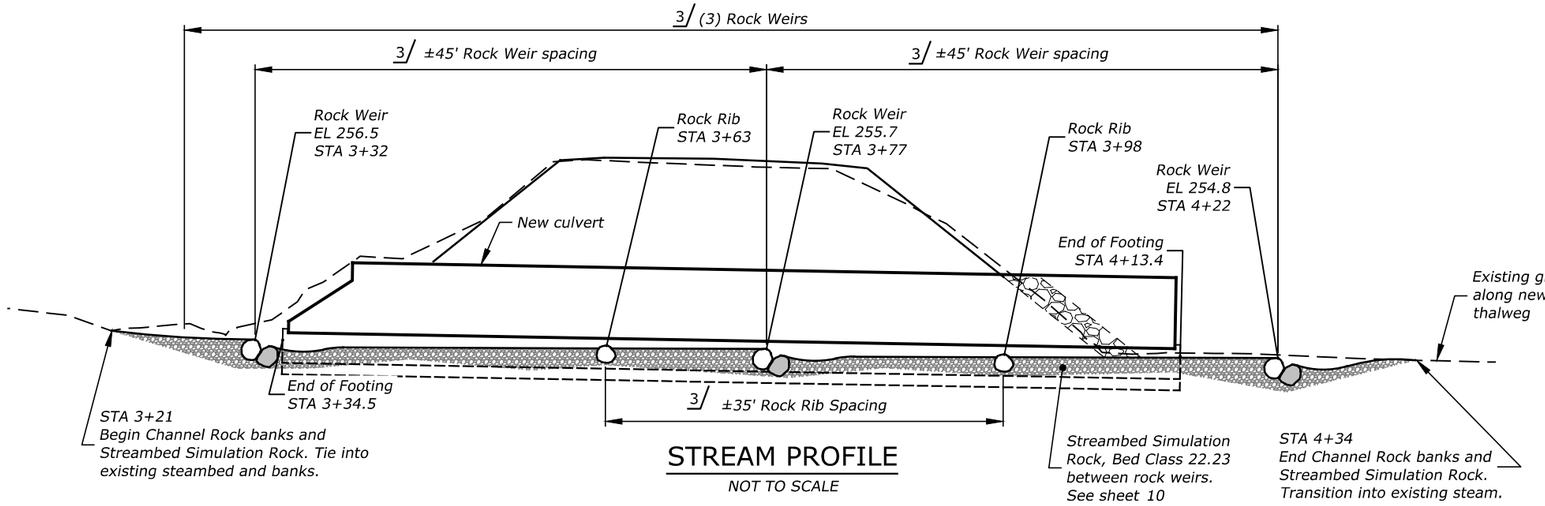
ROCK WEIR PLAN

NOT TO SCALE



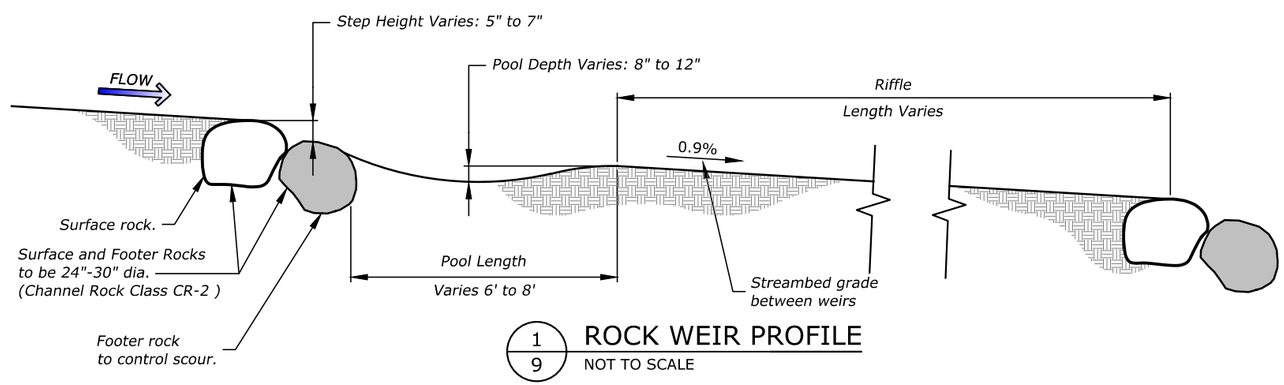
ROCK WEIR PLAN - OUTSIDE CULVERT

Not to Scale



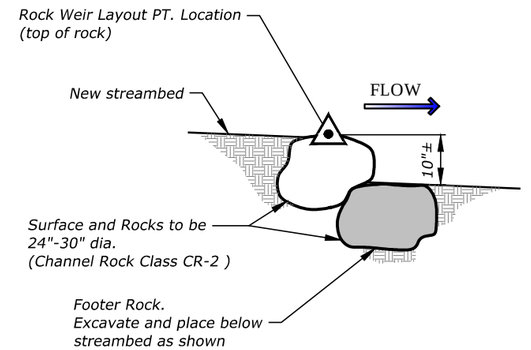
STREAM PROFILE

NOT TO SCALE



1/9 ROCK WEIR PROFILE

NOT TO SCALE



SECTION A-A

Not to Scale

ROCK WEIR & RIB NOTES

1/ *Rib rock will be in contact with the adjacent piece and protrude ±3" from stream bed.*

2/ *Vary direction, shape, and orientation of the ribs. Ribs to be angled 30°± perpendicular to centerline of pipe. Ribs oriented straight across the channel are not desirable*

3/ *Rock Weir & Rib placement is 1'± from designated station shown in profile. The spacing and configuration of rock weirs maybe adjusted in the field by the CO to fit actual streambed conditions.*

USDA FOREST SERVICE

United States Department of Agriculture
Forest Service

REGION 10
ALASKAN REGION

PROJECT NAME

AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

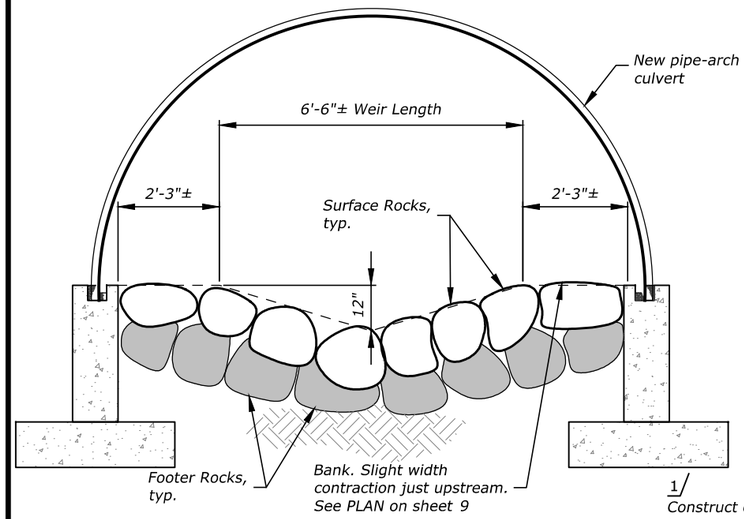
THORNE BAY RANGER DISTRICT

DRAWING TITLE

ROCK WEIR DETAILS

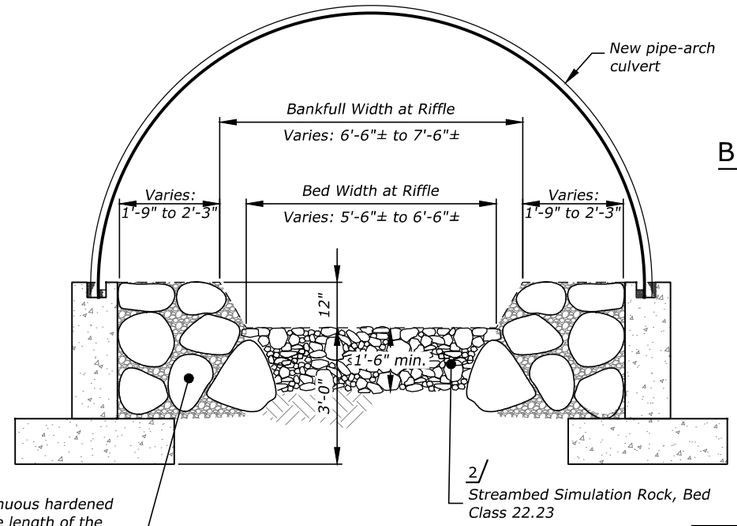
DATE: Mar-19	
ARCHIVE NO.	
DESIGNER: M. JENSEN	DWG SHEET NO. 9
DRAWN: B. MCCRAY	
CHECKED: M. JENSEN	SHEET 9 OF 12
PROJECT NO. 6904	

3/8/19 16:15 BRENDAN F:\6904 USFS - TONGASS NF AOP SITES (14)\DWG\6904-RD2050000-MP22.23-DESIGN-FILL WARPING.DWG;



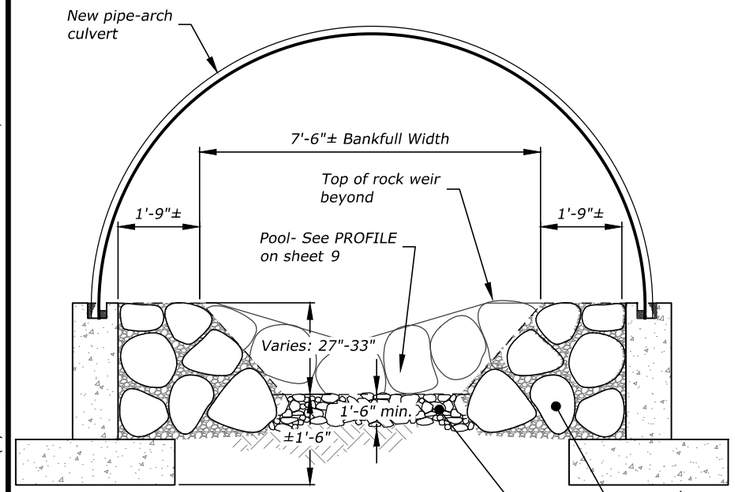
1/ Construct continuous hardened banks the entire length of the culvert with Channel Rock, Class CR-2. Typical both sides (See FSSS 705.08)

1/10 TYPICAL ROCK WEIR SECTION
NOT TO SCALE



2/ Streambed Simulation Rock, Bed Class 22.23

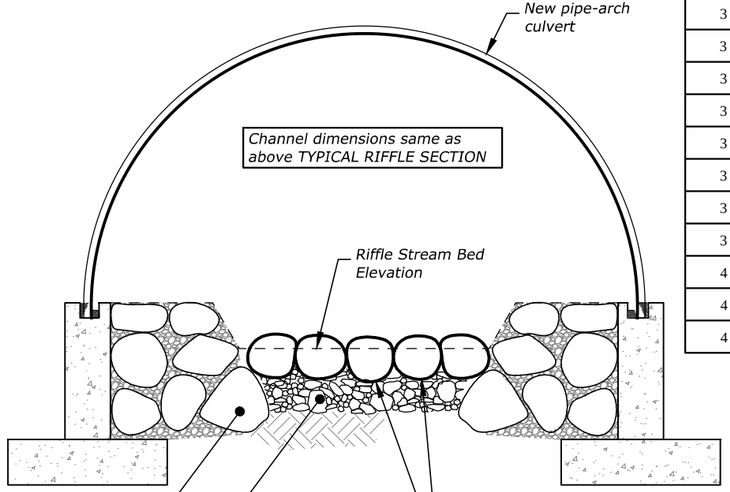
3/10 TYPICAL RIFFLE SECTION
NOT TO SCALE



1/ Construct continuous hardened banks the entire length of the culvert with Channel Rock, Class CR-2. Typical both sides (See FSSS 705.08)

2/ Streambed Simulation Rock, Bed Class 3.79

2/10 TYPICAL POOL SECTION
NOT TO SCALE



Construct Rock Rib with Channel Rock CR-2 to span Bed Width. Rock Rib to protrude 3" above Stream Bed

4/10 TYPICAL ROCK RIB SECTION
NOT TO SCALE

BED CLASS 22.23 STREAMBED SIMULATION ROCK

FIELD MIX GUIDE

PROPORTIONS	CLASS 22.23
1 UNITS	16" - 4"
2 UNITS	4" - 2"
2 UNITS	2" - 1"
1 UNITS	1" - $\frac{1}{2}$"
1/2 UNITS	<No. 10 (FINES)

ISOLATED BOULDER LOCATIONS

STATION	OFFSET DISTANCE FROM CL PIPE (FT)	OFFSET DIRECTION	BOULDER DIAMETER SIZE (IN)	PROTRUSION ABOVE SURFACE (IN)
3+37	2.8'	LEFT	24" - 30" (CLASS CR-2)	6" - 9"
3+40	1.9'	RIGHT	24" - 30" (CLASS CR-2)	6" - 9"
3+44	0.9'	RIGHT	24" - 30" (CLASS CR-2)	6" - 9"
3+49	1.8'	LEFT	24" - 30" (CLASS CR-2)	6" - 9"
3+55	2.6'	RIGHT	24" - 30" (CLASS CR-2)	6" - 9"
3+69	1.2'	LEFT	24" - 30" (CLASS CR-2)	6" - 9"
3+73	0.6	RIGHT	24" - 30" (CLASS CR-2)	6" - 9"
3+87	2.3'	LEFT	24" - 30" (CLASS CR-2)	6" - 9"
3+95	1.9'	RIGHT	24" - 30" (CLASS CR-2)	6" - 9"
4+02	1.5	RIGHT	24" - 30" (CLASS CR-2)	6" - 9"
4+03	2.6'	LEFT	24" - 30" (CLASS CR-2)	6" - 9"
4+11	1.4	RIGHT	24" - 30" (CLASS CR-2)	6" - 9"

FOOTNOTES:

1/ *Inter-mix streambed material as directed by CO during placement of Channel Rock Bank to seal voids throughout the section.*

2/ *The final channel bottom should be a dense, well interlocked streambed with low permeability. Compact each layer and fill surface voids by washing in fine material. Use water pressure, tamping rods, and similar hand operated equipment to force fine material into all surface voids.*

THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THE STREAM FLOW DOES NOT GO SUBSURFACE THROUGH THE CULVERT FOR A 48 HOUR PERIOD AFTER RE-WATERING.

Native material meeting the gradation for the specified Bed Class, and Channel Rock may be salvaged and incorporated into the simulated streambed.

USDA FOREST SERVICE
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REGION 10
ALASKAN REGION

PROJECT NAME

AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

STREAM SIMULATION DETAILS

DATE: **Mar-19**

ARCHIVE NO.

DESIGNER: **M. JENSEN**

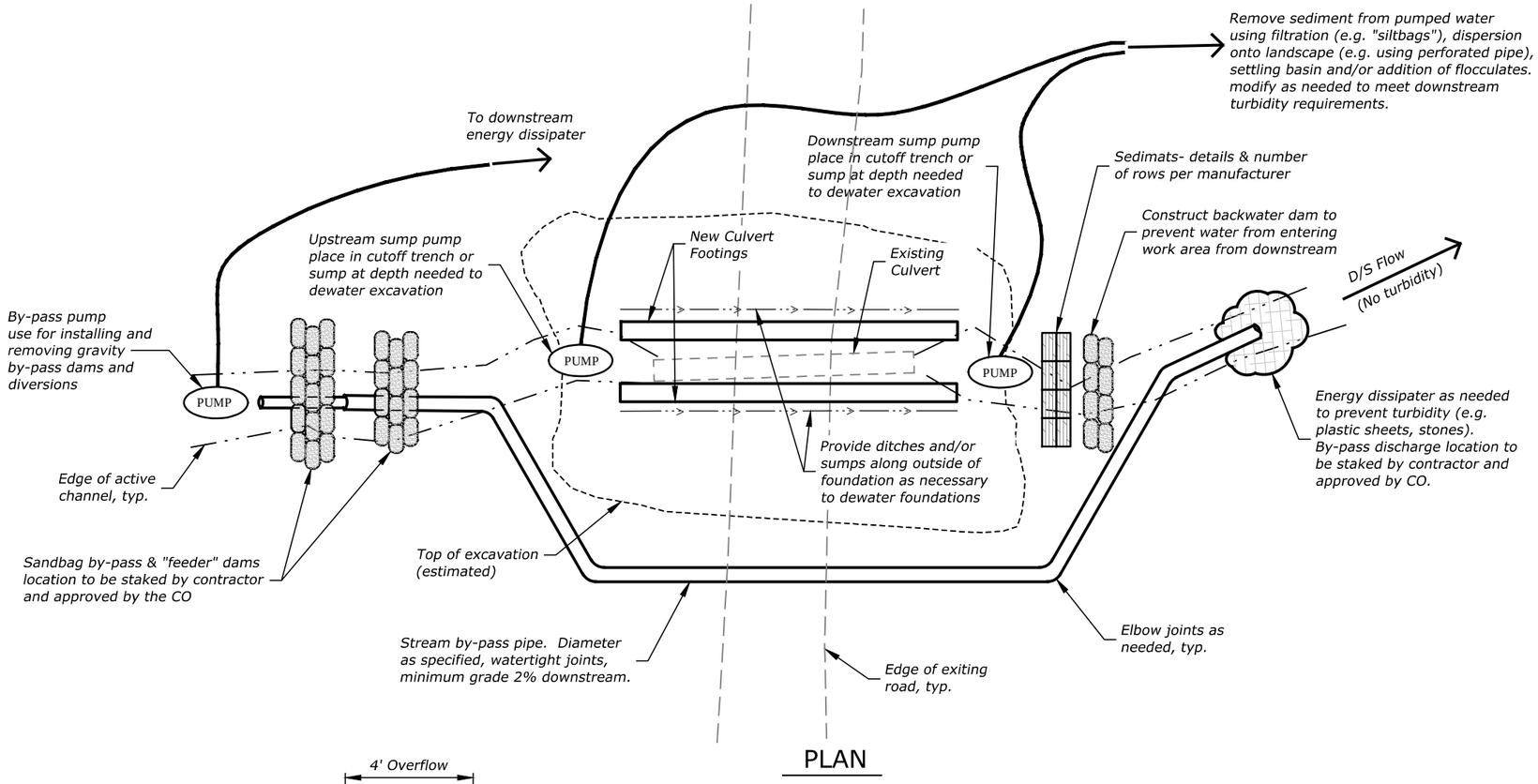
DRAWN: **B. MCCRAY**

CHECKED: **M. JENSEN**

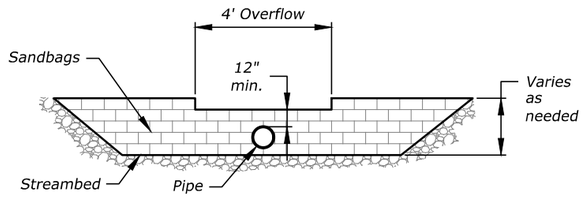
PROJECT NO.: **6904**

DWG SHEET NO.: **10**

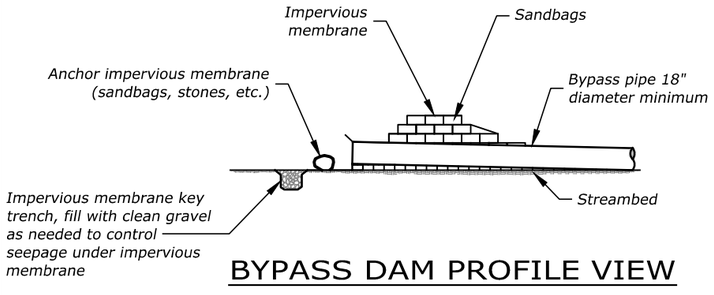
SHEET **10** OF **12**



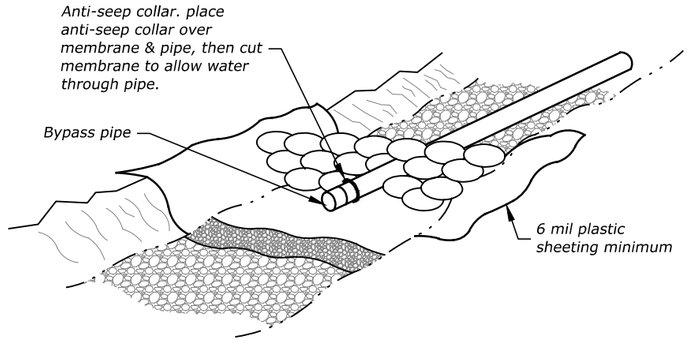
PLAN



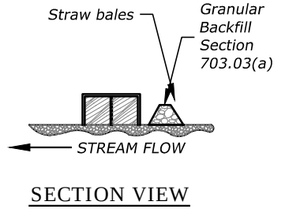
BYPASS DAM ELEVATION VIEW



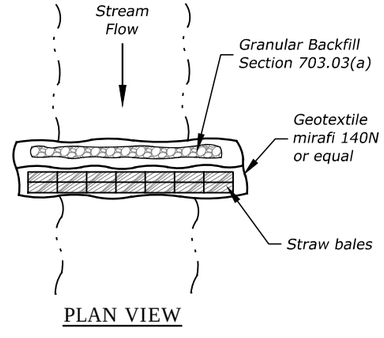
BYPASS DAM PROFILE VIEW



SANDBAG BYPASS DAM DETAILS



SECTION VIEW



PLAN VIEW

GEOTEXTILE-WRAPPED STRAW BALE SEDIMENT CONTROL WEIR

NOTES:

1. Design dewatering flow for construction is 23 CFS.
2. The plan shown here is intended to represent the general dewatering requirements and not applicable to a specific site. submit a plan specific to the site.
3. Contractor to determine the size of the bypass pipe based on the specified flow.
4. Ensure that the bypass pipe and dam are leak-proof. Do not proceed with construction until the implemented dewatering plan has been inspected and accepted by the CO in writing.
5. Ensure pumps are be clean and free of leaks and placed in a containment kit.
6. Excavate draw down pool for sumps a minimum of 2 feet below the bottom of the excavation and a minimum of 5 feet in diameter.
7. Maintain all elements of the operation in order to dewater the foundation, facilitate construction, prevent harm to aquatic organisms (not just fish) and prevent sediment and turbidity from entering the stream. Construct the dewatering system in a manner which enables USFS biologists to collect and transport organisms from the live channel, just before completion of the diversion dam.
8. Operate pumps (preferably electric) downstream of the bypass dam if the dam does not seal thoroughly. Maintain a pump running 24 hours a day in the downstream sediment retention dam to divert water containing sediment to the forest floor where it will be filtered before entering back into the stream. Leave pumps in position on site even if water discharge drops considerably, to be prepared for storm flows.

United States Department of Agriculture
Forest Service

REGION 10
ALASKAN REGION

PROJECT NAME

AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

DEWATERING REQUIREMENTS

DATE
Mar-19

ARCHIVE NO.

DESIGNER
M. JENSEN

DRAWN
B. MCCRAY

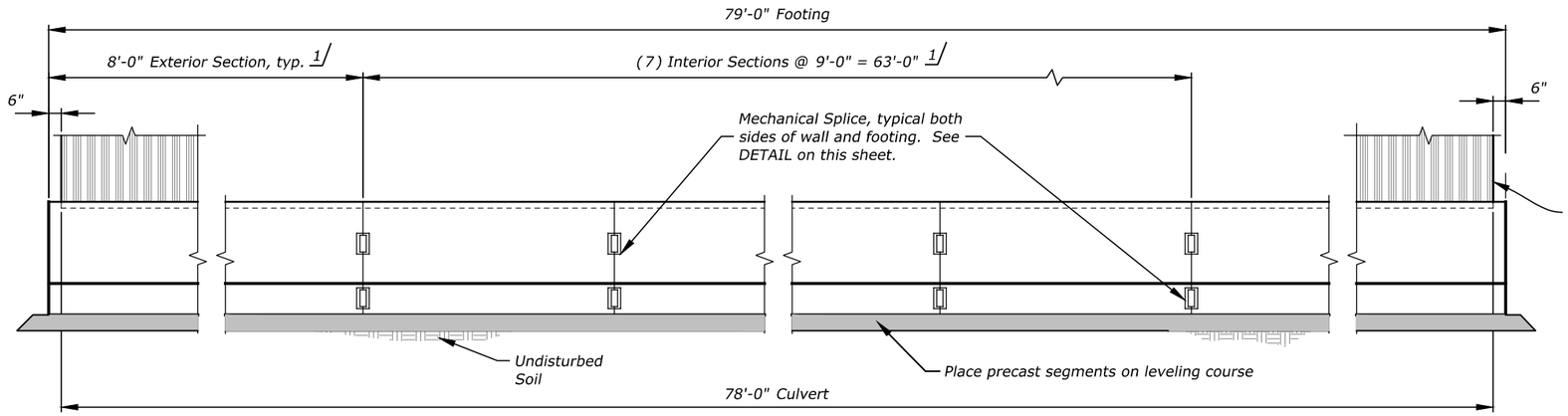
CHECKED
M. JENSEN

PROJECT NO.
6904

DWG SHEET NO.
11

SHEET 11 OF 12

3/8/19 16:15 BRENDAN F:\6904 USFS - TONGASS NF AOP SITES (14)\DWG\6904-RD2050000-MP22.23-DESIGN-FILL WARPING.DWG;



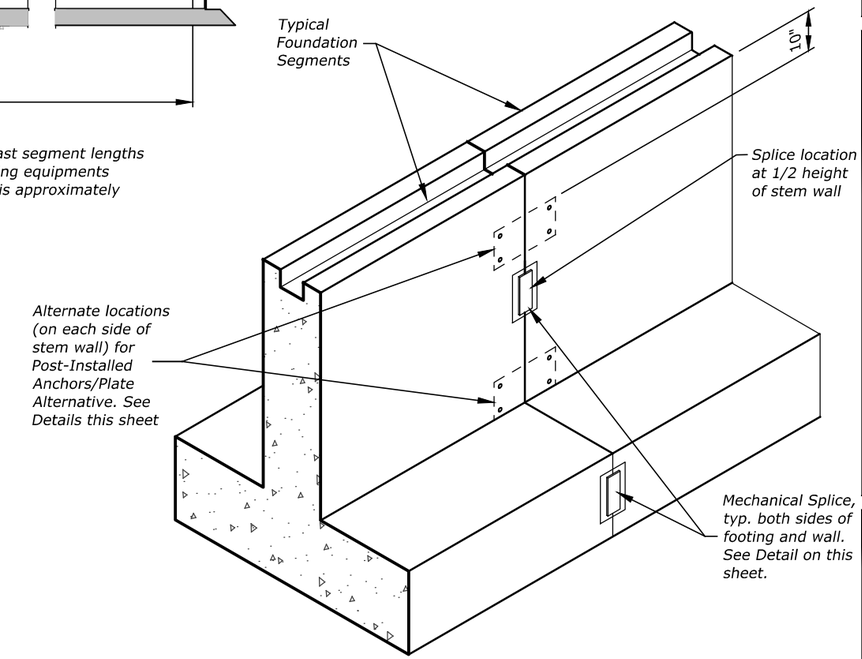
PRECAST FOUNDATION ELEVATION

Not to Scale

1/ *Contractor may adjust precast segment lengths shown depending upon setting equipments capabilities. Footing weight is approximately 1050 lb/ft.*

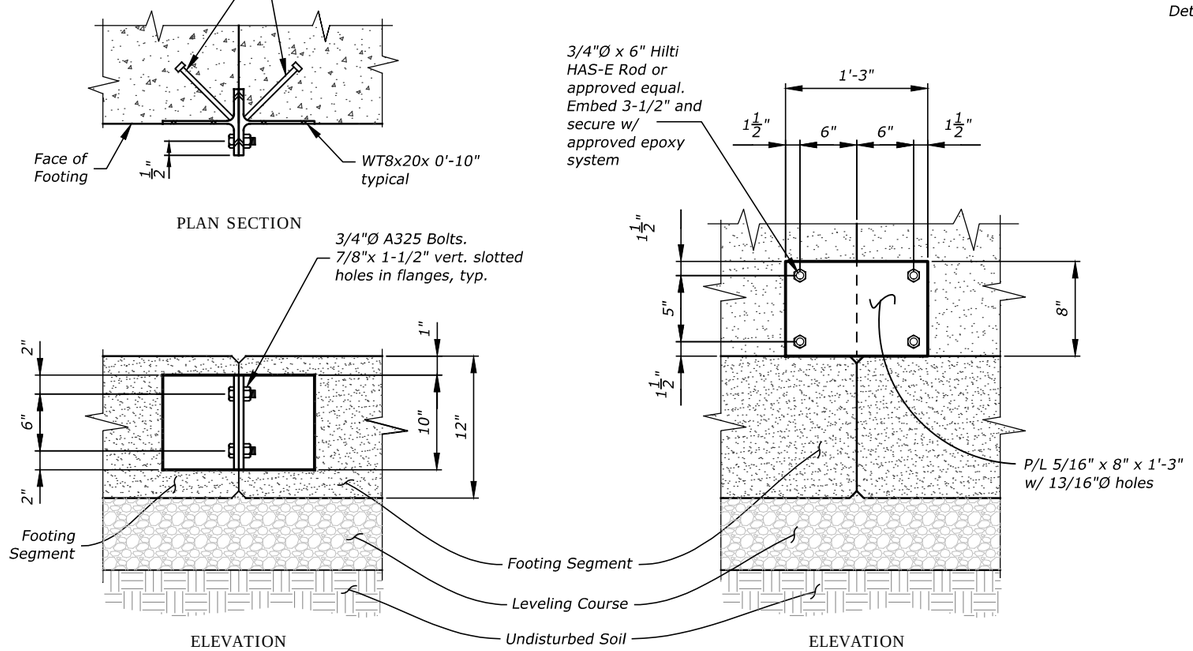
Prior to fabricating precast footings submit for approval shop drawings detailing segment lengths, splice connections, proposed concrete mix design, pick locations, and selected connection for culvert.

Other precast/prefabricated footing options that meet size, strength and functionality of concrete footings shown may be submitted for review and approval.



TYPICAL PRECAST SEGMENT

Not to Scale



Footing splice shown wall splice similar.

MECHANICAL SPLICE DETAIL

Not to Scale

NOTE: THESE DETAILS ARE TO BE USED ONLY IF THE CONTRACTOR ELECTS TO PRECAST THE FOUNDATION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ANY ROCK EXCAVATION REQUIRED TO SET THE PRECAST FOUNDATION AT THE ELEVATIONS SHOWN ON SHEET 8.

USDA FOREST SERVICE — DEPARTMENT OF AGRICULTURE

United States Department of Agriculture
Forest Service

REGION 10
ALASKAN REGION

PROJECT NAME

AOP CULVERT REPLACEMENTS PRINCE OF WALES NFSR 2050000-MP 22.23

TONGASS NATIONAL FOREST

THORNE BAY RANGER DISTRICT

DRAWING TITLE

PRECAST FOOTING DETAILS (OPTIONAL)

DATE: **Mar-19**

ARCHIVE NO.

DESIGNER: **M. JENSEN**

DRAWN: **B. MCCRAY**

CHECKED: **M. JENSEN**

PROJECT NO.: **6904**

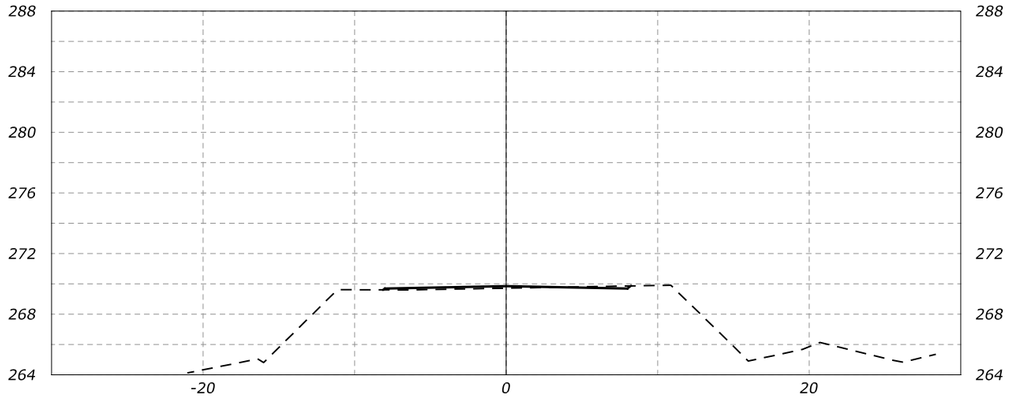
DWG SHEET NO.: **12**

SHEET **12** OF **12**

AOP CULVERT REPLACEMENT
NFSR 2050000 MP 22.23
ROAD CROSS SECTIONS

PREPARED BY : DJ&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-8591
Phone 406/721-4320 Fax 406/549-6371

12+55.61



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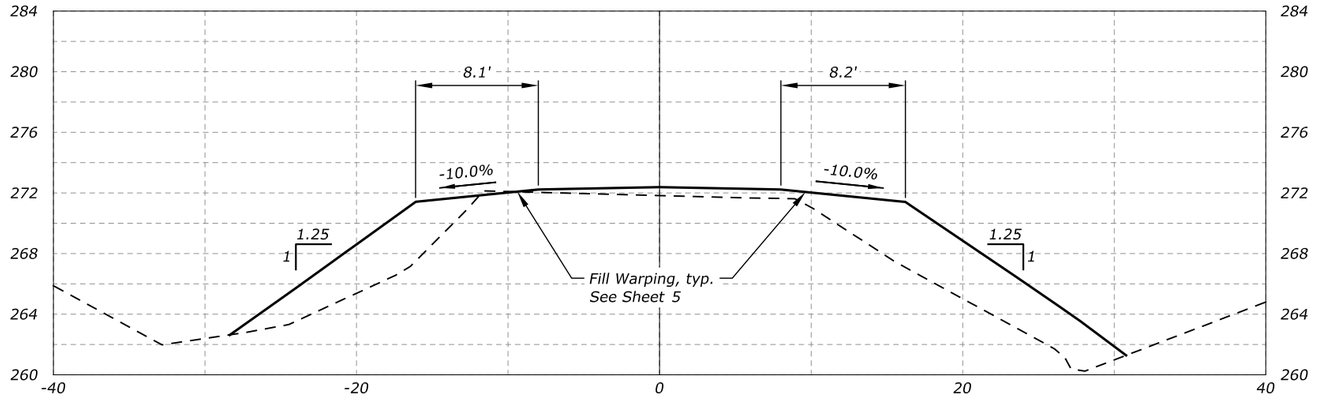

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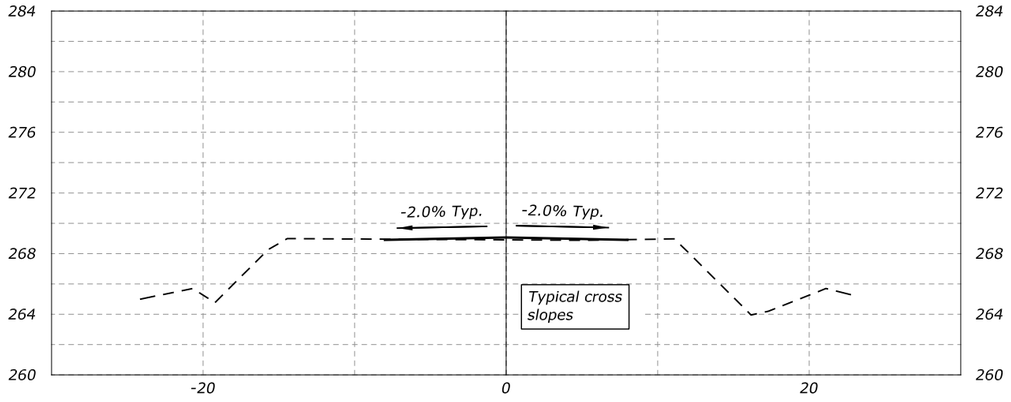

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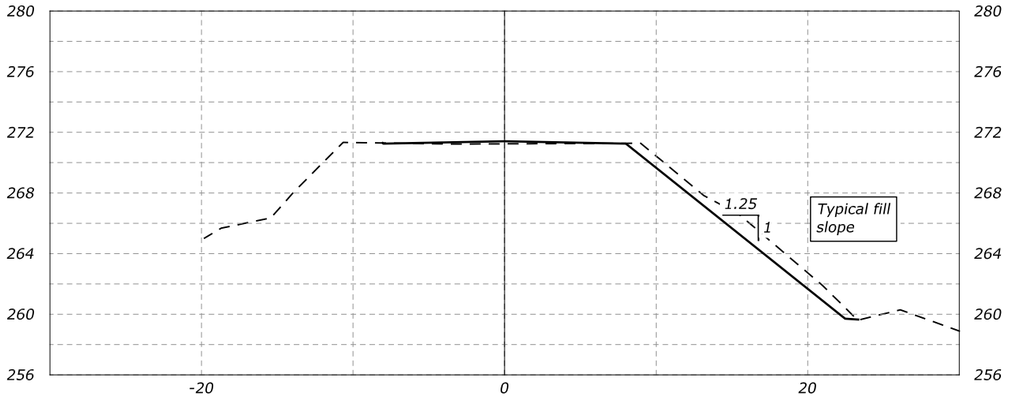

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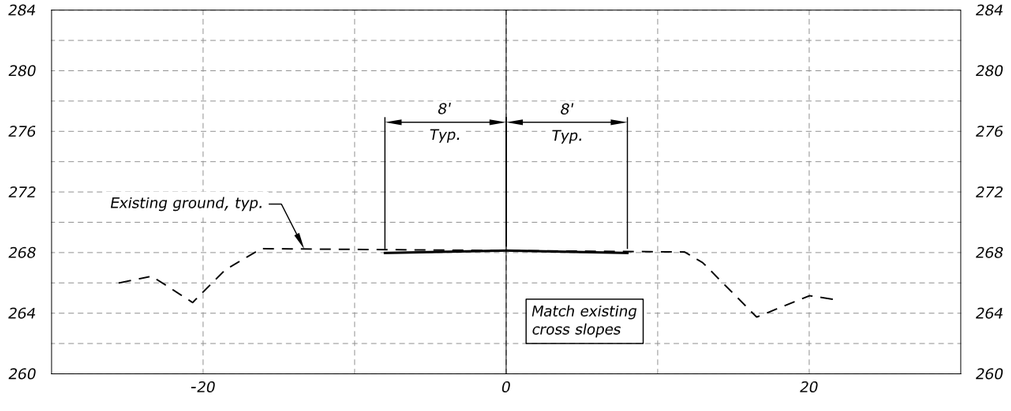

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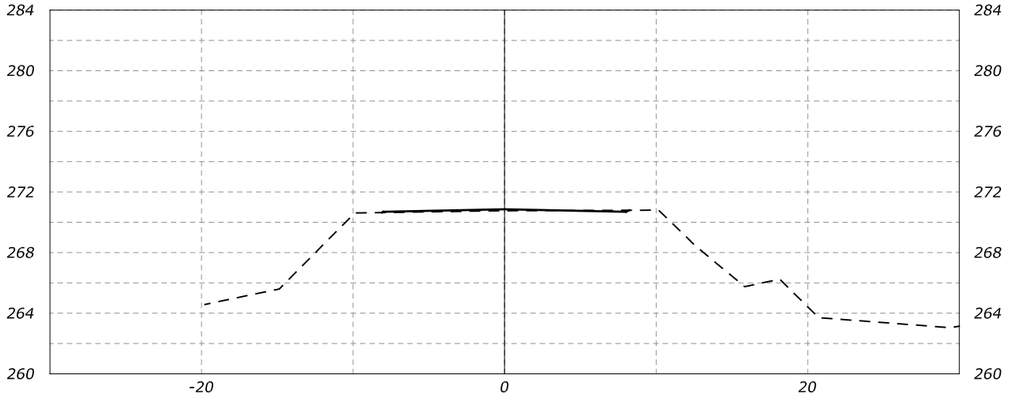
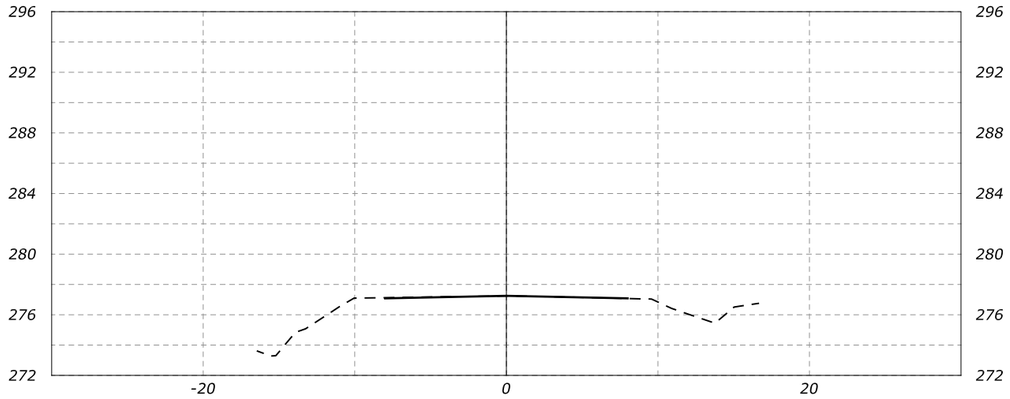


AOP CULVERT REPLACEMENT
NFSR 2050000 MP 22.23
ROAD CROSS SECTIONS

PREPARED BY : DJ&A, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-8591
Phone 406/721-4320 Fax 406/549-6371

14+00.00



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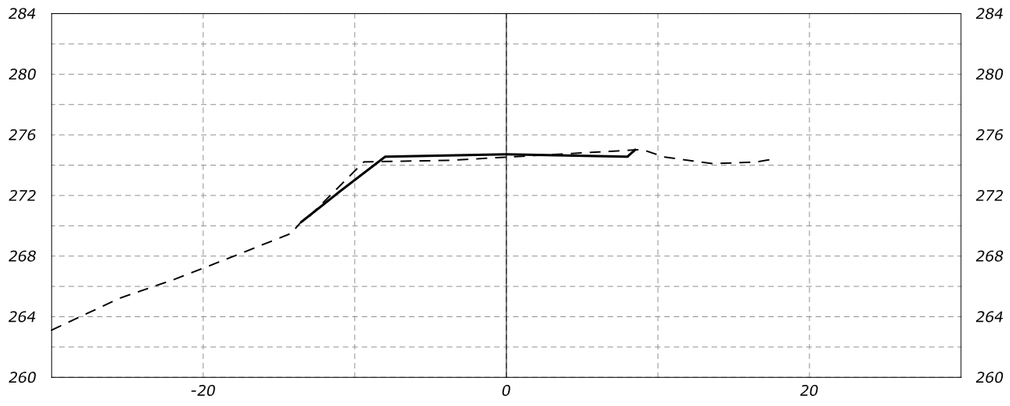

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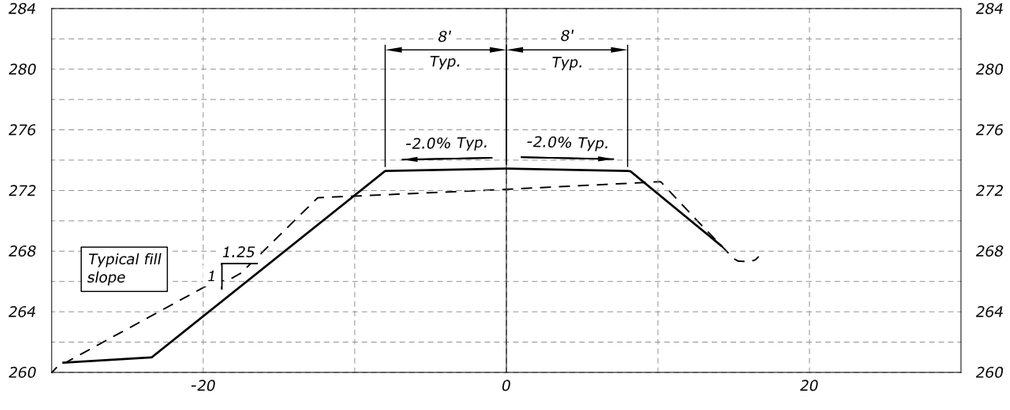

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