

PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-2200
H:\Projects\parks_hwy\61297_parks_163_163_rehab\08_support\03_Hydro\Drafting\E_Note-CULVERT NOTES Fri, Sep/21/18 11:20am

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	PENDING/NFHWY00102	2019	E5	E17

GENERAL CULVERT NOTES:

- CULVERT DETAILS APPLY TO CULVERTS AND RELATED APPURTANCES (RIPRAP, DEADMAN, ETC.,) REFER TO P&P SHEETS, TYPICALS, STANDARD DRAWINGS, AND SPECIFICATIONS FOR DETAILS OF GUARDRAIL, SIGNS, STRIPING, ETC.
- FOLLOW MANUFACTURERS INSTALLATION SPECIFICATIONS IN ALL CULVERT INSTALLATIONS.
- ALL CULVERTS SHALL BE INSTALLED IN EXCAVATIONS ABSENT OF STANDING WATER.
- CULVERT BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 204 OF THE SPECIFICATIONS.
- STATIONING AND SKEW FOR CULVERTS ARE APPROXIMATE. STAKE CULVERTS TO FIT FIELD CONDITIONS AND AS DIRECTED BY THE ENGINEER.
- CULVERT LENGTHS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR. WHEN INSTALLING SKEWED CULVERTS, ENSURE THE FINAL LENGTH IS DETERMINED OFF THE NEAR EDGE, NOT THE CENTERLINE OF THE CULVERT.
- REMOVAL OF EXISTING CULVERTS, MARKER POSTS, DEADMAN, AND THAW PIPES BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE PROJECT AND DISPOSED OF AT NO ADDITIONAL COST TO THE DEPARTMENT, UNLESS NOTED OTHERWISE.
- IN AREAS OF POOR FOUNDATION, SUBEXCAVATE BENEATH CULVERTS 1 FOOT TO 3 FEET, OR GREATER TO PROVIDE ADEQUATE FOUNDATION, AS DIRECTED BY THE ENGINEER. CONTACT THE MATERIALS SECTION FOR SPECIFIC RECOMMENDATIONS.
- INSTALL CULVERTS IN ACCORDANCE WITH THE CULVERT BEDDING DETAIL "TYPE A" ON STANDARD DRAWING D-01.02 TO A MINIMUM OF 1 FOOT BELOW INVERT.
- MINIMUM ALLOWABLE CULVERT CROSS SLOPE IS 0.5%, UNLESS NOTED OTHERWISE ON THE PLANS.
- ALL CULVERTS SHALL HAVE A MINIMUM CAMBER EQUAL TO 1% OF THE LENGTH OF THE PIPE, UNLESS THE PROJECT ENGINEER DIRECTS OTHERWISE.
- NO CULVERT SHALL BE PLACED UNTIL THE BED HAS BEEN APPROVED BY THE ENGINEER.
- WHERE APRONS ARE NOT SPECIFIED, MINIMIZE DISTURBANCE TO THE VEGETATIVE MAT AROUND CULVERT ENDS, BUT CLEAR AND GRADE AS NEEDED TO ENSURE PROPER DRAINAGE. THIS WORK IS SUBSIDIARY TO 603 SERIES PAY ITEMS.
- ESTABLISH RIPRAP APRONS AND FORESLOPES AS SOON AS POSSIBLE AS PERMANENT EROSION CONTROL.
- EROSION CONTROL STRUCTURES ARE APPROXIMATE AND MAY BE FIELD ADJUSTED BY THE ENGINEER TO TAKE ADVANTAGE OF EXISTING BANKS AND OTHER CHANNEL FEATURES WITHIN THE PERMITTED CONSTRUCTION AREA.
- PLACE GEOTEXTILE, EROSION CONTROL, CLASS I (NON-WOVEN), UNDER ALL RIPRAP. GEOTEXTILE SHALL BE TRIMMED SO THAT IT IS NOT VISIBLE UPON PROJECT COMPLETION.
- ALL WORK FOR CULVERT ARMORING AND CULVERT RIPRAP APRONS, INCLUDING EXCAVATION AND CLEARING AND GRUBBING, IS SUBSIDIARY TO 611 PAY ITEMS.
- THE CONTRACTOR SHALL ENTER AS-BUILT LOCATIONS FOR ALL CULVERTS IN THE CULVERT SUMMARY TABLE. COORDINATES SHALL BE LOCATED AT THE INTERSECTION OF THE CULVERT AND ROAD CENTERLINE. USE NAD 83 DATUM FORMATTED TO DECIMAL DEGREES, TO A PRECISION OF 5 DECIMAL PLACES (DDD'). THIS WORK IS SUBSIDIARY TO 603 SERIES PAY ITEMS.
- WARP EMBANKMENT SIDE SLOPES FROM VALUE SHOWN IN THE PROJECT SIDE SLOPE TABLE TO THOSE SHOWN IN THE CULVERT PLANS OVER 100 FEET AS MEASURED FROM THE EDGE OF RIPRAP LAYOUT OR AS DIRECTED BY THE ENGINEER.
- SKEWED CULVERTS WITH SPANS 4 FEET AND LARGER, SHALL HAVE FORESLOPES WIDENED, AS INDICATED ON CULVERT SUMMARY, ON THE OUTSIDE TO PROVIDE BALANCED FILL PRESSURE ON BOTH SIDES OF THE CULVERT ENDS. EXTENT OF WIDENING CAN BE LIMITED TO A FILL HEIGHT OF 3 FEET ABOVE THE TOP OF CULVERT.
- FORESLOPE RIPRAP SHALL BE INSET INTO THE ROADWAY TYPICAL PRISM, FLUSH WITH FORESLOPE SURFACE. THE GEOTEXTILE SHALL BE WRAPPED ON TOP OF THE RIPRAP, AND TOPPED WITH EMBANKMENT MATERIAL.

FISH PASSAGE CULVERT NOTES:

- FISH PASSAGE SUBSTRATE CONSISTS OF RIPRAP WITH VOIDS FILLED WITH FILLER MATERIAL, AS SPECIFIED IN SPECIAL PROVISION 628.
- BACKFILL ALONG THE ENTIRE CULVERT INVERT WITH FISH PASSAGE SUBSTRATE TO THE CHANNEL ELEVATION PER SPECIAL PROVISION 628.
- PLACE FISH PASSAGE SUBSTRATE IN LOW-FLOW CHANNEL OF RIPRAP APRON INLET & OUTLET POOL/CHANNELS AS SPECIFIED ON THE FISH PASSAGE CULVERT DETAIL SHEETS AND PER SPECIAL PROVISION 628. SHAPE INLET & OUTLET CHANNELS TO MATCH EXISTING CREEK CHANNEL CROSS SECTION, OR AS SPECIFIED ON THE PLANS.
- EXTEND FORESLOPE RIPRAP 3.0 FEET ABOVE THE CULVERT, OR TO THE SHOULDER ELEVATION, WHICHEVER IS LESS ON THE INLET SIDE, AND TO THE TOP OF THE CULVERT ON THE OUTLET SIDE, UNLESS NOTED OTHERWISE ON THE PLANS.
- CONDUCT AN AS-BUILT SURVEY TO ENSURE THAT FISH PASSAGE CULVERTS WERE CONSTRUCTED PER DESIGN. INCLUDE ELEVATIONS OF CULVERT INVERTS, TOP OF FISH PASSAGE SUBSTRATE ELEVATIONS AND RIPRAP APRON ELEVATIONS. COLLECT APPROPRIATE DATA AT CORRESPONDING PHASE OF INSTALLATION. EG: SURVEY TOP OF BEDDING PRIOR TO PLACING CULVERT.
- ADDITIONAL REQUIREMENTS FOR FISH PASSAGE CULVERTS MAY BE CONTAINED IN THE ADF&G HABITAT PERMITS.

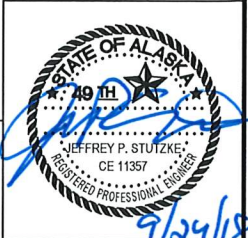
MAJOR CULVERT NOTES. 10-FOOT DIAMETER (SPAN) AND LARGER:

- SET MAJOR CULVERTS AT STREAM GRADIENT, UNLESS NOTED OTHERWISE ON THE SPECIFIC PLAN SHEET.
- CULVERT BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 204 OF THE SPECIFICATIONS.
- EXTEND FORESLOPE RIPRAP 3.0 FEET ABOVE THE CULVERT, OR TO THE SHOULDER ELEVATION, WHICHEVER IS LESS ON THE INLET SIDE, AND TO THE TOP OF THE CULVERT ON THE OUTLET SIDE, UNLESS NOTED OTHERWISE ON THE PLANS.
- CONDUCT AN AS-BUILT SURVEY TO ENSURE THAT CULVERTS WERE CONSTRUCTED PER DESIGN. INCLUDE ELEVATIONS OF CULVERT INVERTS, TOP OF RIPRAP APRON ELEVATIONS. AND ELEVATIONS SPECIFIED ON THE DETAIL SHEETS. COLLECT APPROPRIATE DATA AT CORRESPONDING PHASE OF INSTALLATION.
IE: SURVEY TOP OF BEDDING PRIOR TO PLACING CULVERT.

ENHANCED HYDRAULIC DESIGN NOTES:

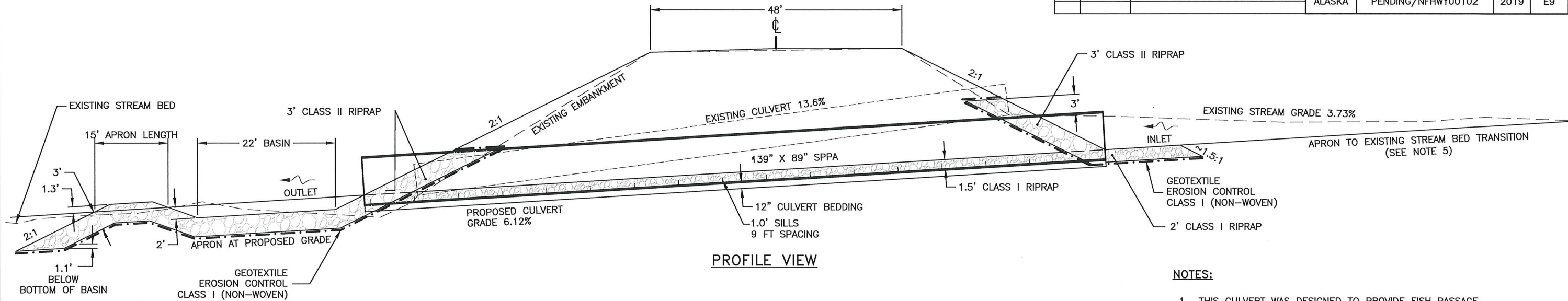
- THESE ARE FISH PASSAGE CULVERTS THAT WILL BE INSTALLED IN LOWER PRIORITY FISH STREAMS.
- THE CULVERT INVERTS SHALL BE SET ONE (1.0) FOOT BELOW THE STREAMBED ELEVATION (DEPRESSED/EMBEDDED).
- SET ENHANCED HYDRAULIC DESIGN CULVERT AT STREAM GRADIENT, UNLESS NOTED OTHERWISE ON THE SPECIFIC PLAN SHEET.
- PLACE FISH PASSAGE SUBSTRATE IN RIPRAP INLET & OUTLET APRON CHANNELS AS SPECIFIED ON THE ENHANCED HYDRAULIC DESIGN CULVERT DETAIL SHEET(S), AND PER SPECIAL PROVISION 628.
- EXTEND FORESLOPE RIPRAP 3.0 FEET ABOVE THE CULVERT, OR TO THE SHOULDER ELEVATION, WHICHEVER IS LESS ON THE INLET SIDE, AND TO THE TOP OF THE CULVERT ON THE OUTLET SIDE, UNLESS NOTED OTHERWISE ON THE PLANS.
- SHAPE APRON INLET AND OUTLET CHANNELS TO MATCH EXISTING CREEK CHANNEL CROSS SECTION, OR AS SPECIFIED ON THE PLANS. IT MAY BE NECESSARY TO CREATE A V-SHAPED, LOW-FLOW CHANNEL IN THE INLET AND OUTLET APRONS.
- FISH PASSAGE SUBSTRATE NEED NOT BE PLACED INSIDE THE ENTIRE LENGTH OF THE DEPRESSED INVERT. CREATE A RAMP, COMPOSED OF FISH PASSAGE SUBSTRATE, ON THE INSIDE OF THE CULVERT AT INLET AND OUTLET. GENERALLY, ALLUVIAL STREAMBED MATERIAL WILL EVENTUALLY FILL THE DEPRESSED INVERT.
- FISH PASSAGE SUBSTRATE CONSISTS OF RIPRAP WITH VOIDS FILLED WITH FILLER MATERIAL, AS SPECIFIED IN SPECIAL PROVISION 628.
- SET INVERT OF NEW FLOOD RELIEF CULVERT(S) , IF SPECIFIED, AT EXISTING STREAM BANK TOP ELEVATION. FLOOD RELIEF CULVERTS SHALL MEET THE MINIMUM COVER OF 2 FEET.

CULVERT NOTES



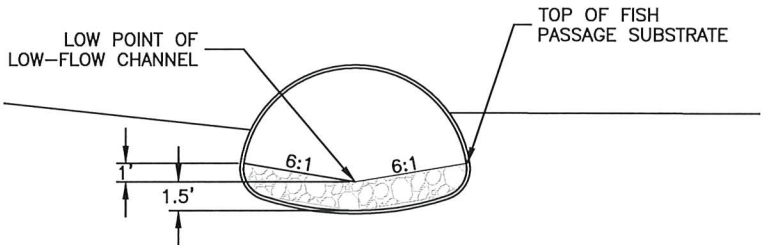
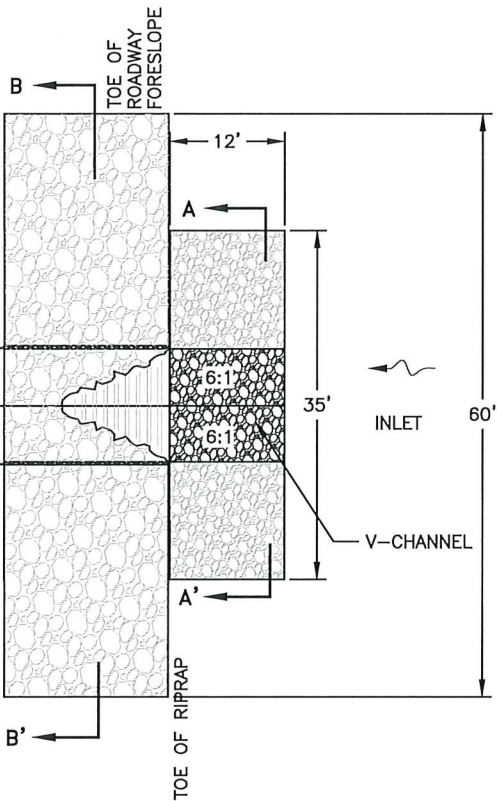
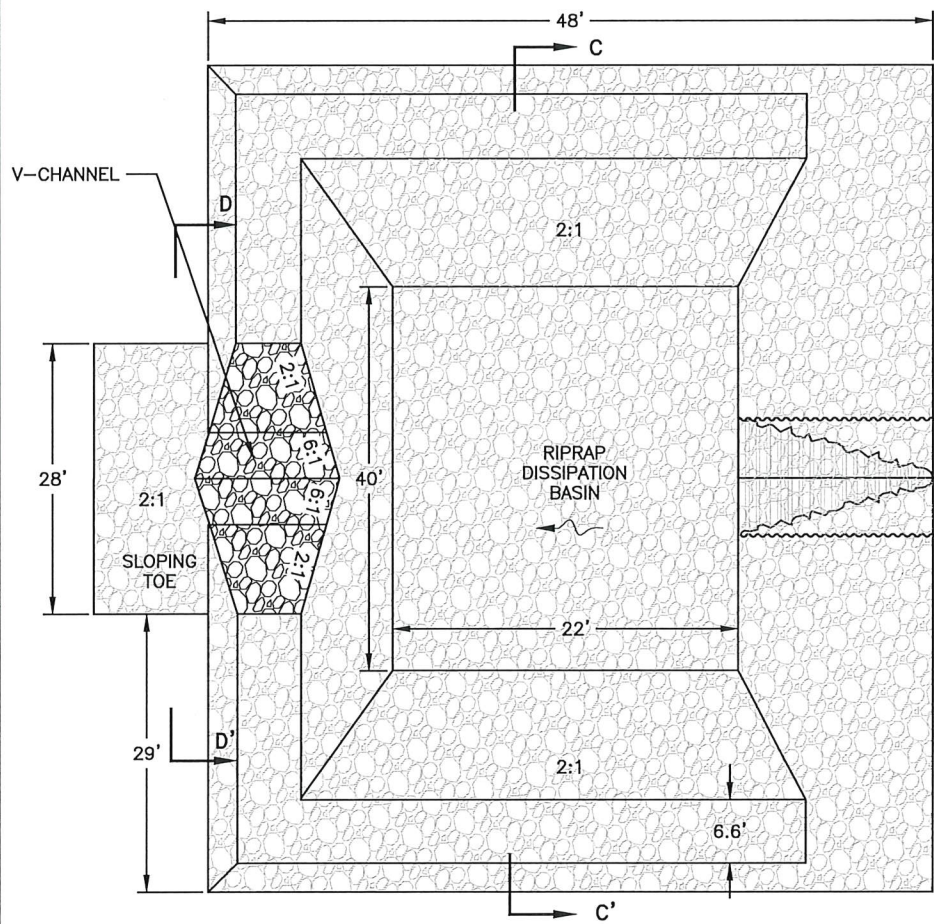
PLANS DEVELOPED BY: STATE OF ALASKA, DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-2200
H:\Projects\parks_hwy_61297_parks_163_183_rehab\08 support\03 Hydro\Drafting\Pass Creek Tributary 165.2.dwg-E9 Pass Creek Tributary 165.2.dwg - PARKS HWY MILE 165.2 Fri, Sep/21/18 11:20am

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	PENDING/NFHWY00102	2019	E9	E17



NOTES:

1. THIS CULVERT WAS DESIGNED TO PROVIDE FISH PASSAGE.
2. SEE GENERAL AND FISH PASSAGE NOTES ON SHEET E5.
3. INSTALL A 139" X 89" STRUCTURAL PLATE PIPE ARCH WITH THE INVERT DEPRESSED 1.5 FEET INTO THE CHANNEL BOTTOM.
4. INSTALL SIXTEEN (16) SEDIMENT RETENTION SILLS, STARTING 1-FOOT FROM THE CULVERT OUTLET, AND SPACED 7 FEET APART. SEE SPECIAL PROVISION 602 FOR SEDIMENT RETENTION SILL MATERIAL, AND ATTACHMENT DETAILS.
5. INLET RIPRAP APRON WILL BE LOWER THAN EXISTING STREAM BED. EXCAVATE TRANSITION APPROXIMATELY OVER 70 FEET UPSTREAM OF RIPRAP APRON TO TIE INTO EXISTING STREAM BED ELEVATION.



HYDROLOGIC & HYDRAULIC SUMMARY

PARKS MILE 165.2, STATION 127+47, PASS CREEK TRIBUTARY					
BASIN AREA (SQ. MI)	QFISH (CFS)	Q2 (CFS)	Q5 (CFS)	Q50 (CFS)	Q100 (cfs)
2.69	26.7	36	59	125	147
HEADWATER ELEVATION @Q50 IS 1286.3 FT, HEADWATER ELEVATION @Q100 IS 1286.7 FT					
ROAD OVERTOPS AT APPROXIMATELY 746 CFS, H _w /D @ 1 = 330 CFS					
CROSS CULVERT / FISH-PASSAGE DESIGN					

NOTE:
Q_{FISH} = EXCEEDANCE DISCHARGE FOR SPAWNING RESIDENT SPECIES, 0-S₉

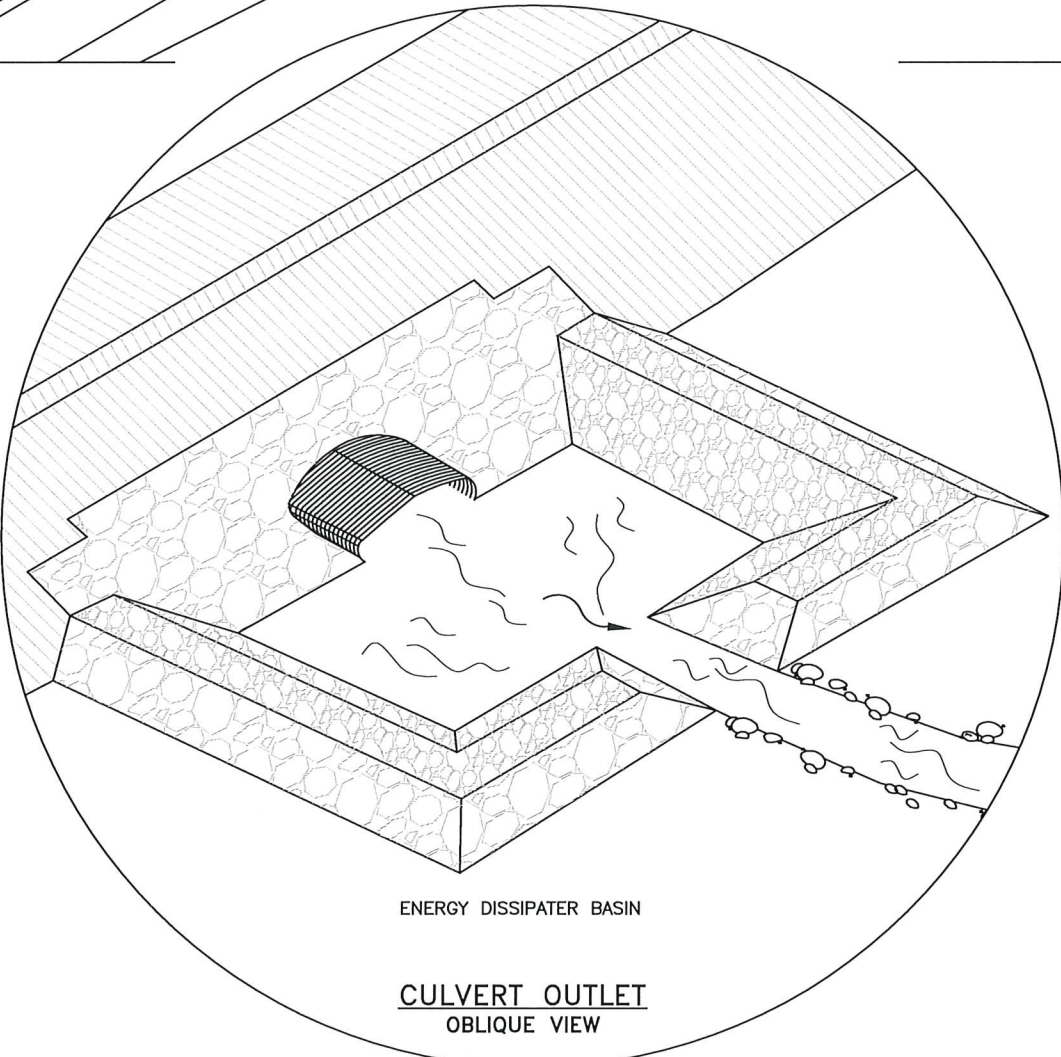
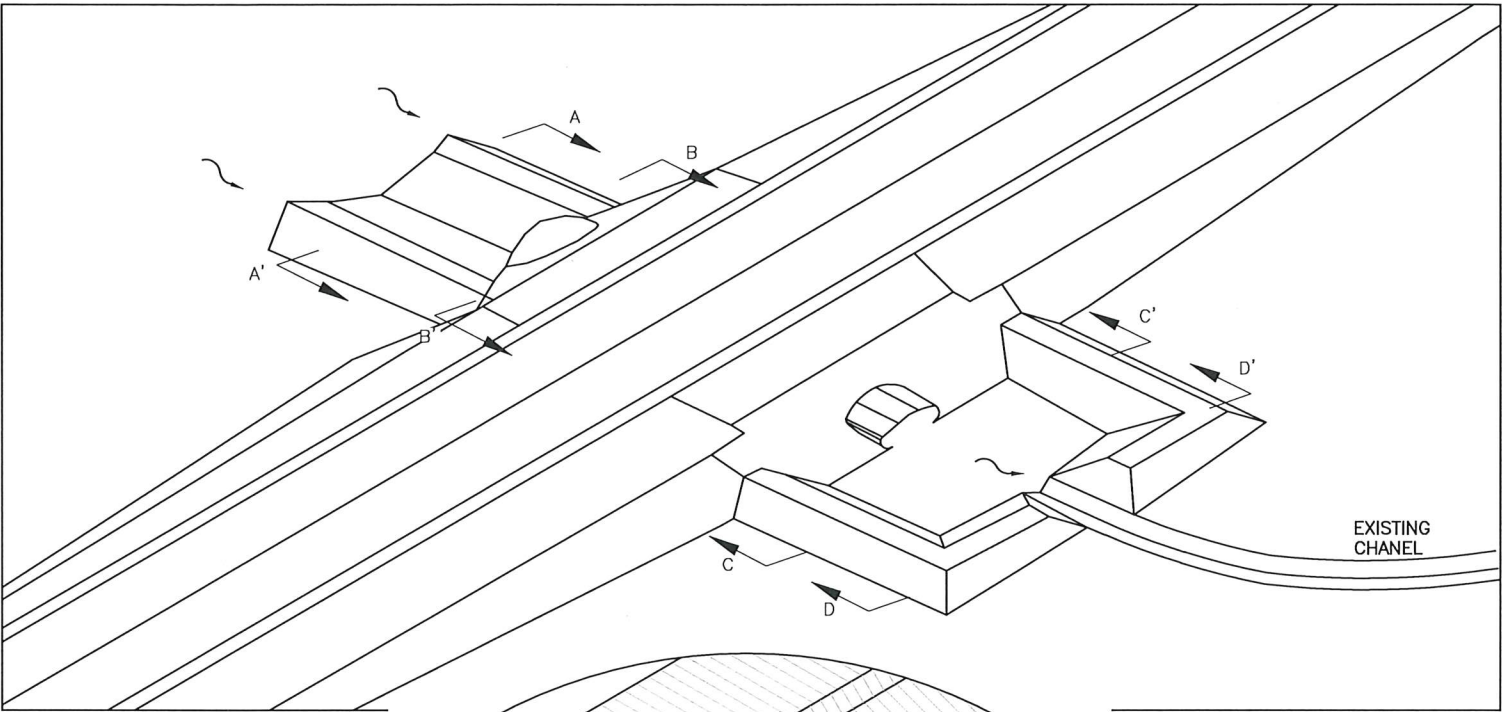
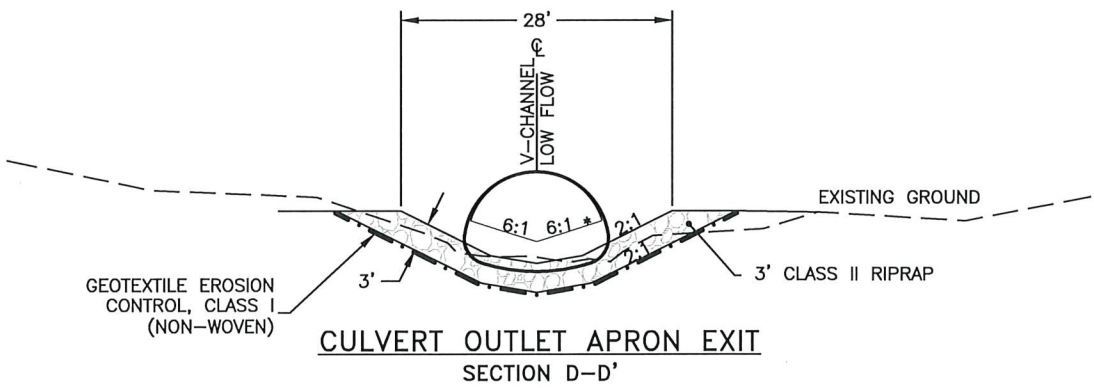
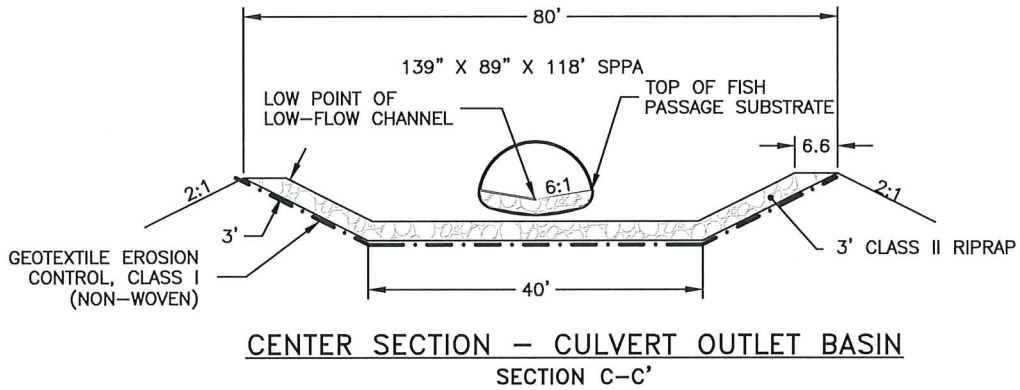
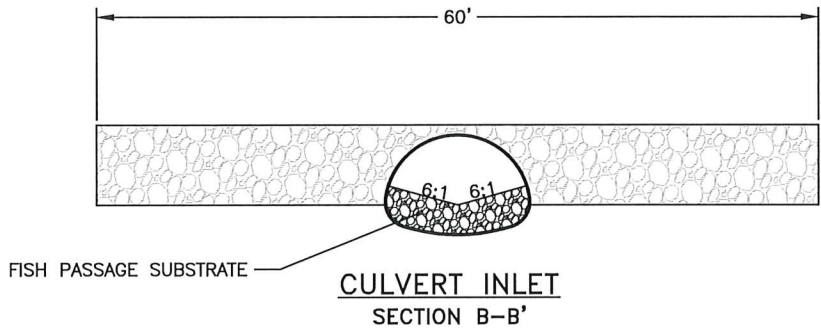
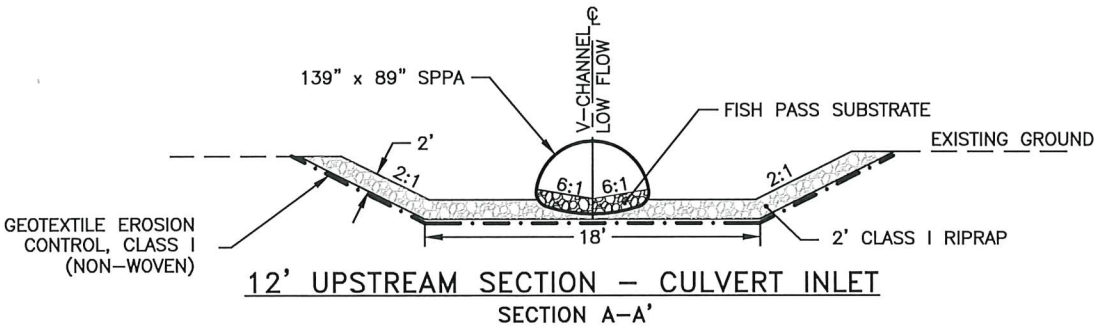
FISH PASSAGE CULVERT SUMMARY MILE 165.2 - PASS CREEK TRIBUTARY

DESCRIPTION	MATERIAL	LOCATION	DIAMETER OR SPAN X RISE (IN)	LENGTH (FT)	SKEW	ELEVATIONS (FT)	
						INLET INVERT	OUTLET INVERT
MAIN PIPE	8 GAGE SPPA	127+47	139 x 89	126	0 DEG	1290.29	1282.58

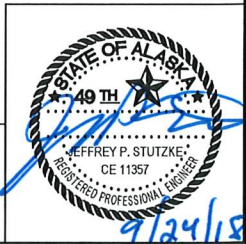
PARKS HWY MILE 165.2
PASS CREEK TRIBUTARY



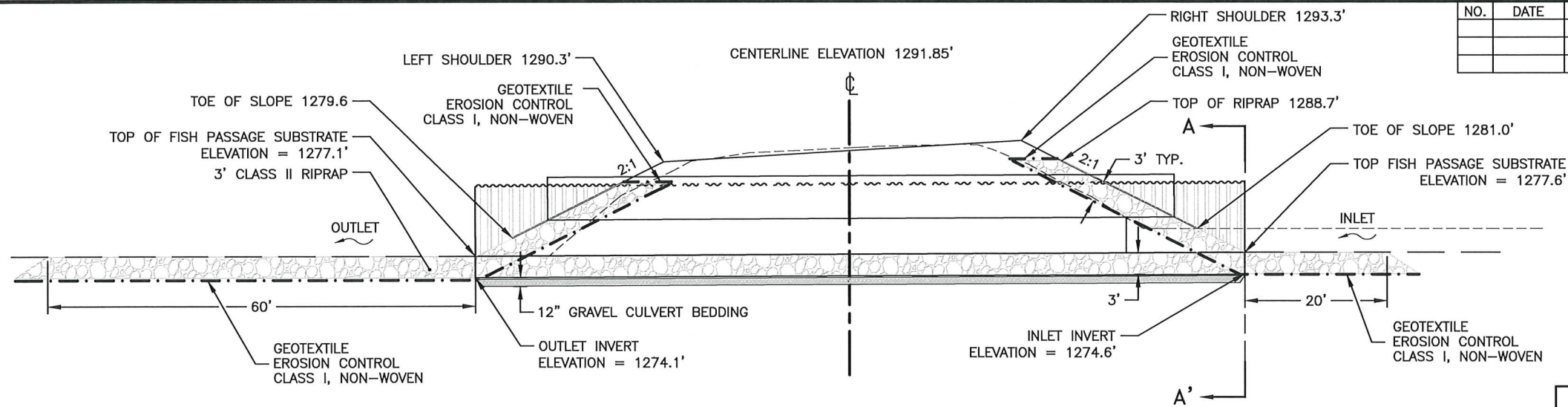
NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	PENDING/NFHWY00102	2019	E10	E17



PARKS HWY MILE 165.2
PASS CREEK TRIBUTARY



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H:\Projects\parks_hwy\61297_parks\163_183_rehab\03_Hydro\61297_Pass Creek 4-13-16-PARKS HWY MILE 165.5 PASS CREEK Fri_Sep/21/18 11:20am



SECTION B-B'

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	PENDING/NFHWY00102	2019	E11	E17

NOTES:

1. THIS CULVERT WAS DESIGNED TO PROVIDE FISH PASSAGE.
2. SEE GENERAL AND FISH PASSAGE CULVERT NOTES ON SHEET E5.
3. INSTALL A 236" X 152" STRUCTURAL PLATE PIPE ARCH WITH THE INVERT EMBEDDED 3.0 FEET INTO THE CHANNEL BOTTOM.

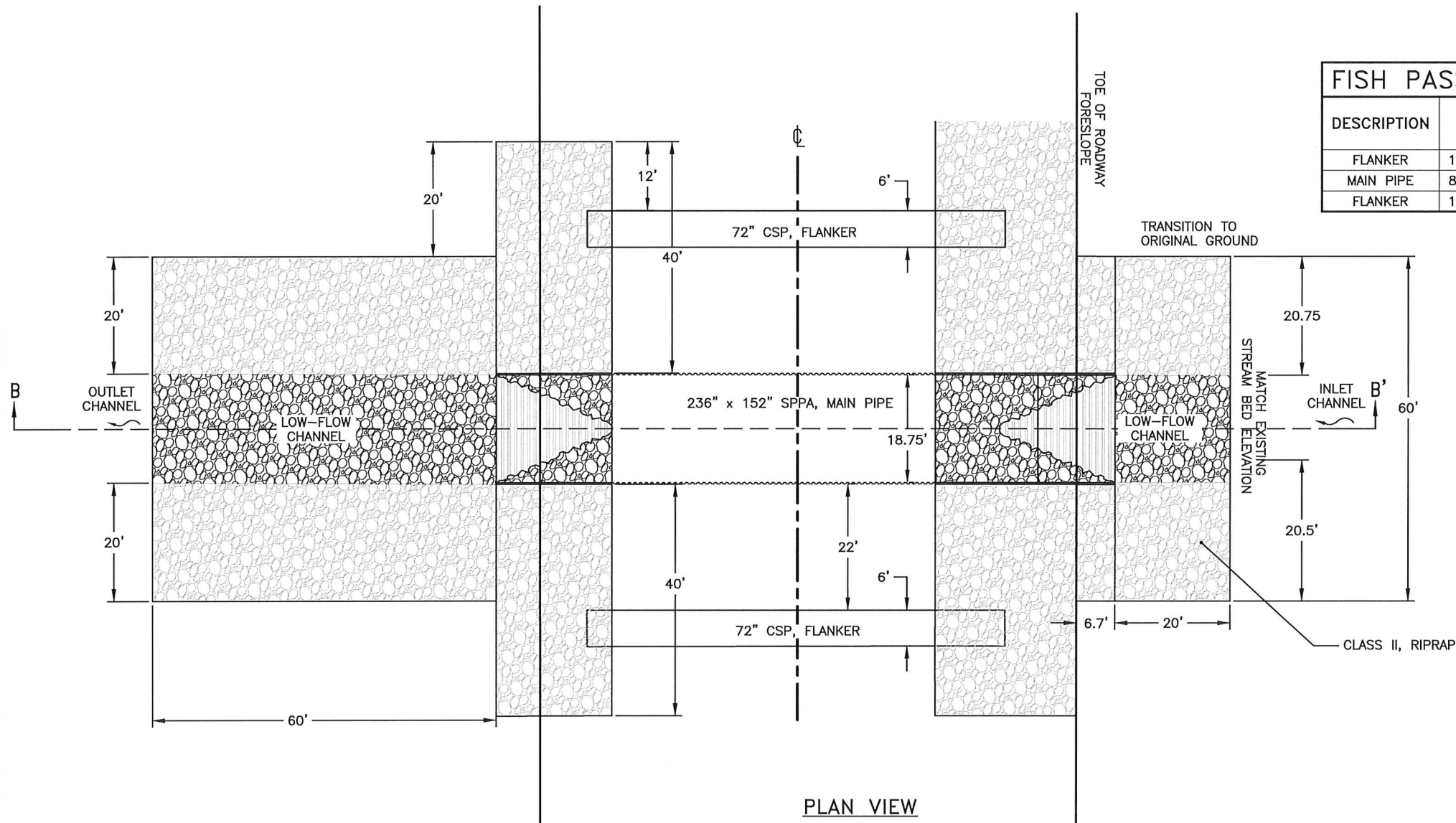
HYDROLOGIC & HYDRAULIC SUMMARY

PARKS MILE 165.5, STATION 141+18, PASS CREEK

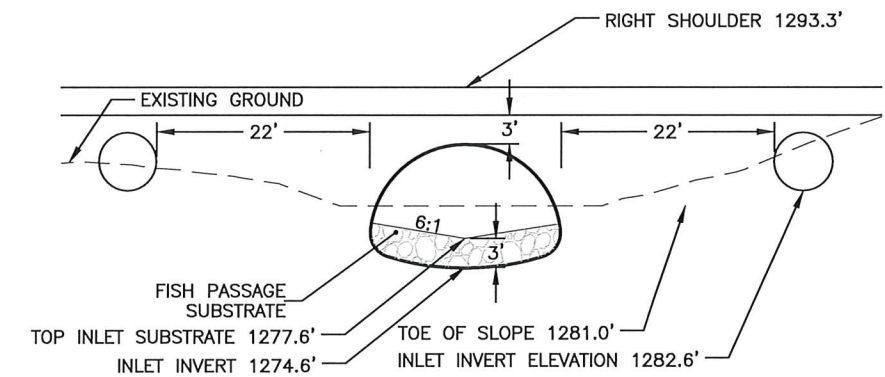
BASIN AREA (SQ. MI)	QFISH (CFS)	Q2 (CFS)	Q5 (CFS)	Q50 (CFS)	Q100 (cfs)
23.4	156	356	551	1065	1228
HEADWATER ELEVATION @Q50 IS 1287.6 FT, HEADWATER ELEVATION @Q100 IS 1288.7 FT					
ROAD OVERTOPS AT APPROXIMATELY 1292.8', Hw/D @ 1 = 1025 CFS (D = RISE = 9.7')					
CROSS CULVERT / FISH-PASSAGE DESIGN					

FISH PASSAGE CULVERT SUMMARY MILE 165.5 - PASS CREEK

DESCRIPTION	MATERIAL	LOCATION	DIAMETER OR SPAN X RISE (IN)	LENGTH (FT)	SKEW	ELEVATIONS (FT)	
						INLET INVERT	OUTLET INVERT
FLANKER	12 GAGE CSP	140+65	72	88	0 DEG	1282.6'	1822.2'
MAIN PIPE	8 GAGE SPPA	141+18	236 x 152	108	0 DEG	1274.6'	1274.1'
FLANKER	12 GAGE CSP	141+53	72	88	0 DEG	1282.6'	1282.2'

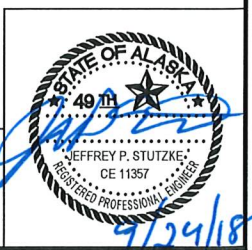


PLAN VIEW

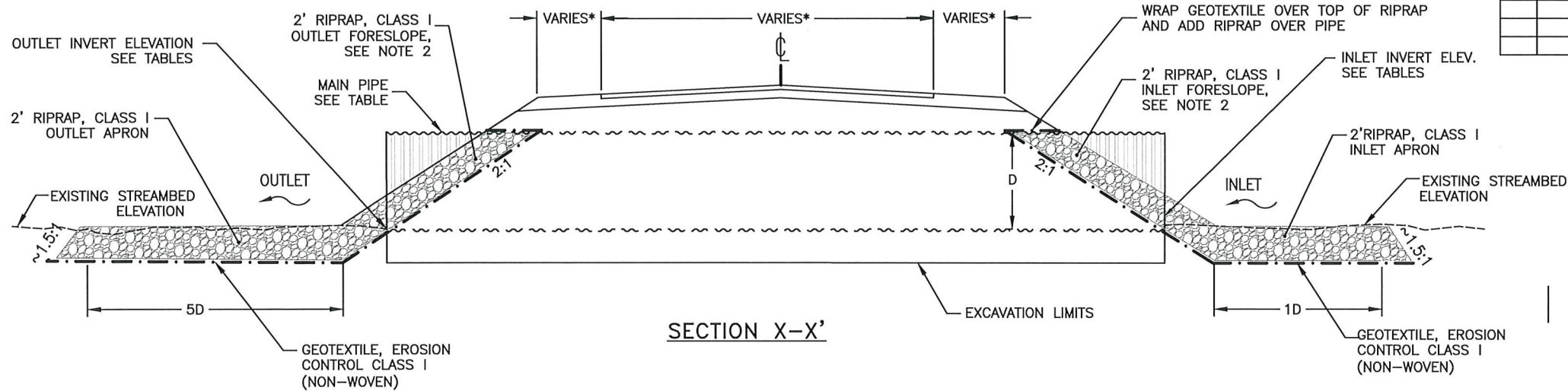


SECTION A - A'

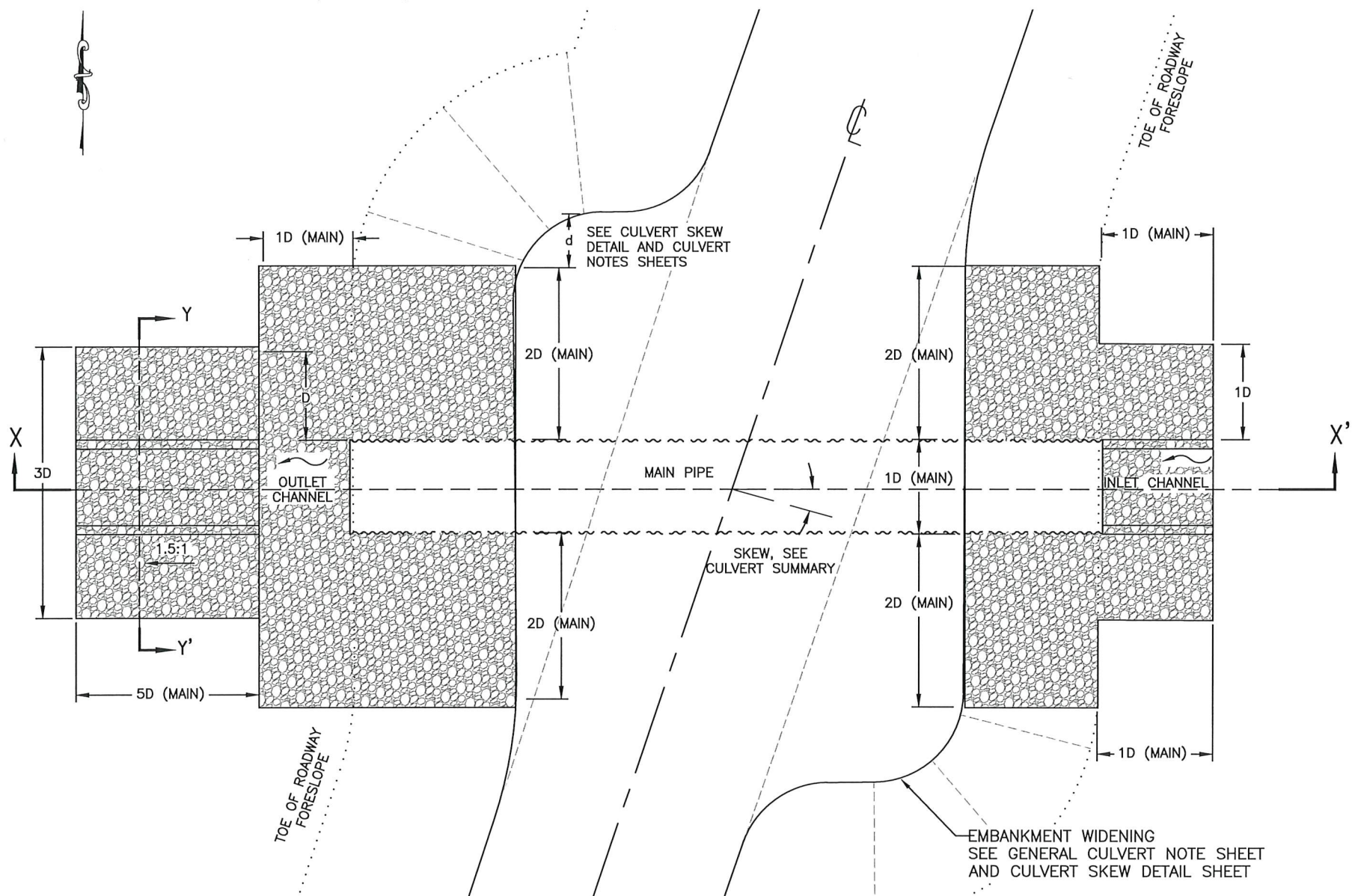
PARKS MILE 165.5
PASS CREEK



PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-2200
H:\Projects\parks_hwy\61297_parks_163_183_rehab\03_Hydro\61297_E_hydro-culvert DETAILS MP 166.9 172.3 & 173.4 Fri, Sep/21/18 11:20am

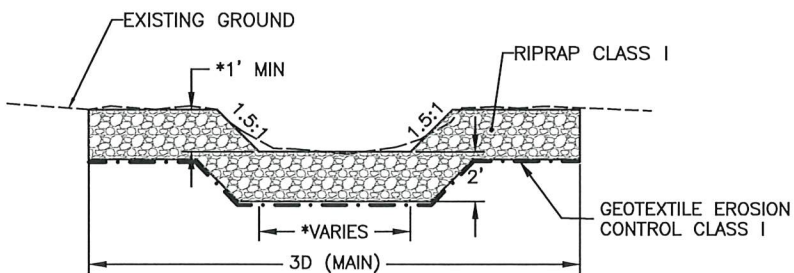


SECTION X-X'



NOTES:

1. SEE GENERAL AND MAJOR CULVERT NOTES ON SHEET E5.
2. EXTEND FORESLOPE RIPRAP 3 FEET ABOVE THE PIPE ON THE INLET SIDE, AND TO THE TOP OF THE PIPE ON THE OUTLET SIDE. RIPRAP SHALL BE INSET INTO THE ROADWAY TYPICAL PRISM.



SECTION Y-Y'

CULVERT SUMMARY, MILE 166.9

DESCRIPTION	LOCATION	DIAMETER OR SPAN X RISE (IN)	LENGTH (FT)	SKEW	ELEVATIONS (FT)	
					INLET INVERT	OUTLET INVERT
FLANKER 12 GAGE CSP	214+50	48	140	0 DEG	1347.0	1343.0
MAIN PIPE 10 GAGE SPP	215+13	108	170	26 DEG	1345.0	1339.1

HYDROLOGIC & HYDRAULIC SUMMARY

PARKS HWY, MILE 166.9 - STATION 215+13

BASIN AREA (SQ. MI)	QFISH (CFS)	Q2 (CFS)	Q5 (CFS)	Q50 (CFS)	Q100 (CFS)
9.0	NA	151	243	494	576
HEADWATER ELEVATION @Q50 IS 1352.7 FT, @Q100 IS 1353.6 FT					
HW/D @ 1= 610 CFS, ROAD OVERTOPS AT APPROXIMATELY 978 CFS					
CULVERT PURPOSE: CROSS DRAINAGE					

CULVERT SUMMARY, MILE 172.3

DESCRIPTION	LOCATION	DIAMETER OR SPAN X RISE (IN)	LENGTH (FT)	SKEW	ELEVATIONS (FT)	
					INLET INVERT	OUTLET INVERT
MAIN PIPE 10 GAGE CMP	489+17	60	170	30 DEG RT	1763.0	1755.3

HYDROLOGIC & HYDRAULIC SUMMARY

PARKS HWY, MILE 172.3 - STATION 489+17

BASIN AREA (SQ. MI)	QFISH (CFS)	Q2 (CFS)	Q5 (CFS)	Q50 (CFS)	Q100 (CFS)
0.8	NA	16	29	67	80
HEADWATER ELEVATION @Q50 IS 1766.5 FT, @Q100 IS 1766.9 FT					
HW/D @ 1= 115 CFS, ROAD OVERTOPS AT APPROXIMATELY 367 CFS					
CULVERT PURPOSE: CROSS DRAINAGE					

CULVERT SUMMARY, MILE 173.4

DESCRIPTION	LOCATION	DIAMETER OR SPAN X RISE (IN)	LENGTH (FT)	SKEW	ELEVATIONS (FT)	
					INLET INVERT	OUTLET INVERT
MAIN PIPE 10 GAGE CMP	549+77	60	114	14 DEG RT	1854.5	1842.9

HYDROLOGIC & HYDRAULIC SUMMARY

PARKS HWY, MILE 173.4 - STATION 549+77

BASIN AREA (SQ. MI)	QFISH (CFS)	Q2 (CFS)	Q5 (CFS)	Q50 (CFS)	Q100 (CFS)
1.1	NA	17	29	66	78
HEADWATER ELEVATION @Q50 IS 1857.8 FT, @Q100 IS 1858.2 FT					
HW/D @ 1= 119 CFS, ROAD OVERTOPS AT APPROXIMATELY 228 CFS					
CULVERT PURPOSE: CROSS DRAINAGE					

CULVERT DETAILS MILEPOINT
166.9, 172.3 & 173.4

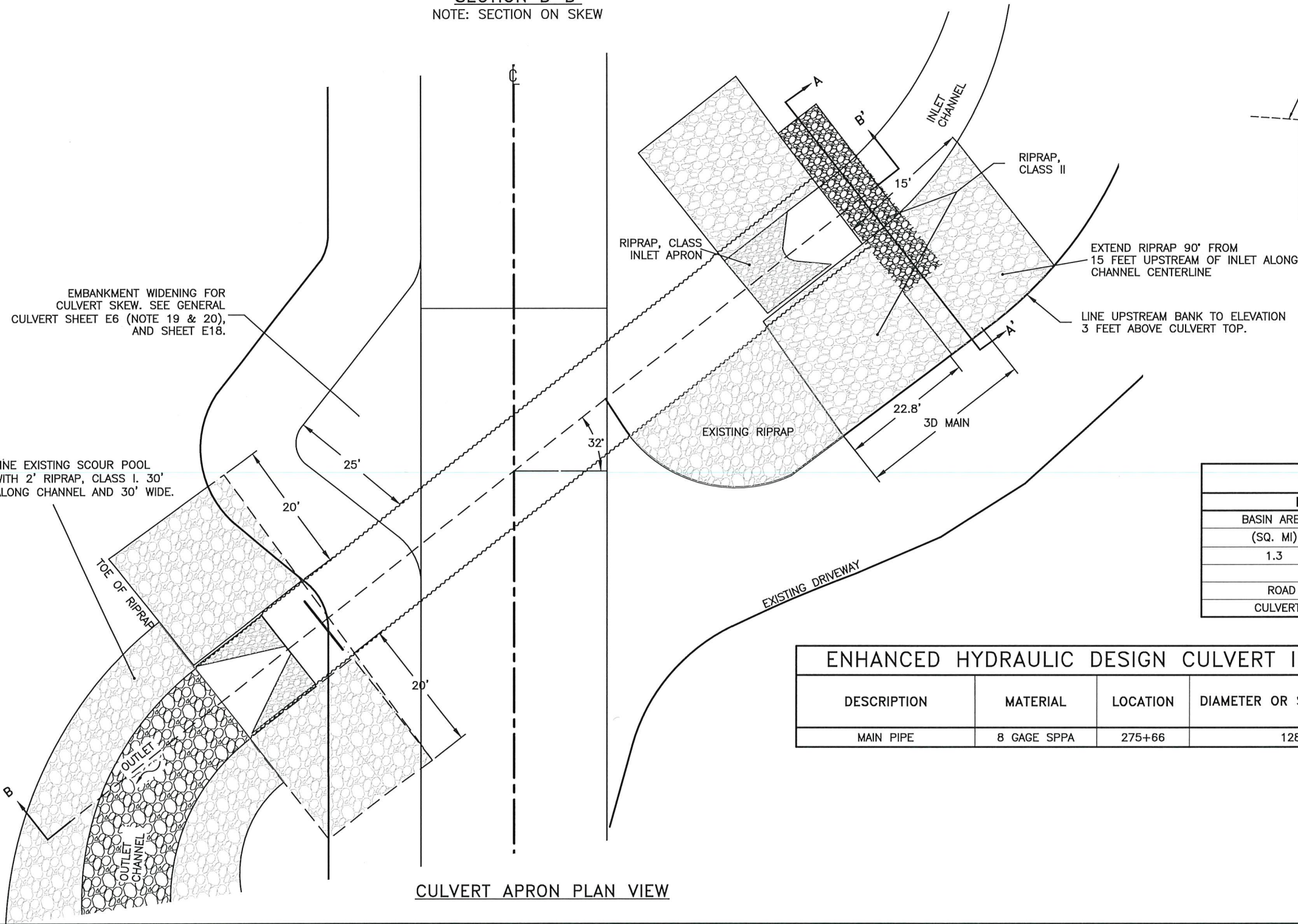
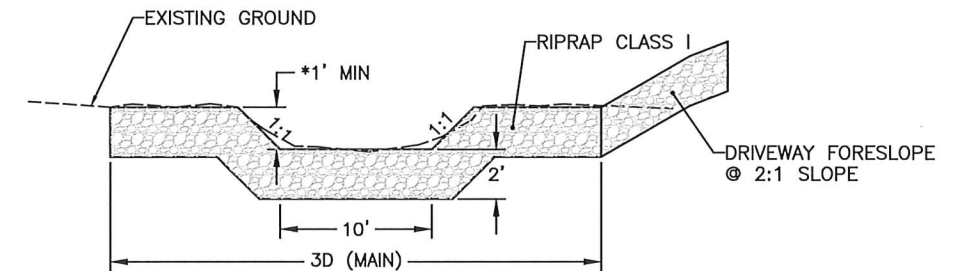
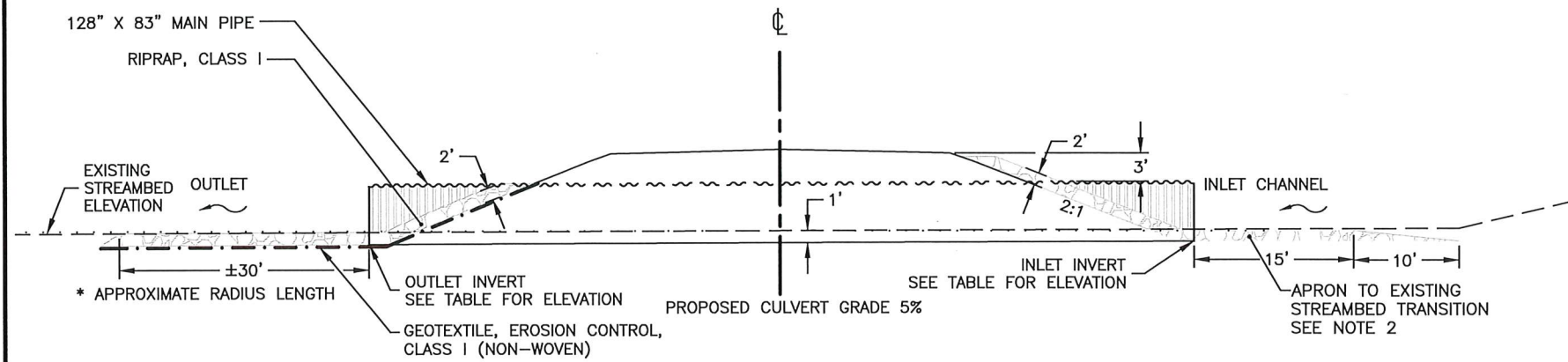


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NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	PENDING/NFHWY00102	2019	E13	E17

NOTES:

- SEE GENERAL, MAJOR, AND ENHANCED HYDRAULIC DESIGN CULVERT NOTES ON SHEET E6.
- INLET RIPRAP APRON WILL BE LOWER THAN EXISTING STREAMBED. EXCAVATE STREAMBED TRANSITION OVER 10 FEET. UPSTREAM OF RIPRAP APRON TO TIE INTO EXISTING STREAMBED ELEVATION.



HYDROLOGIC & HYDRAULIC SUMMARY

PARKS HWY MILE 168 - STATION 275+66 - DIVISION CREEK

BASIN AREA (SQ. MI)	QFISH (CFS)	Q2 (CFS)	Q5 (CFS)	Q50 (CFS)	Q100 (CFS)
1.3	8.1	27	47	108	129

HEADWATER ELEVATION @Q50 IS 1492.5 FT, @Q100 IS 1492.8 FT

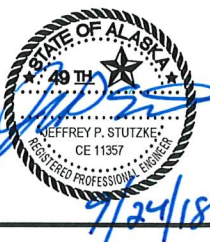
ROAD OVERTOPS AT APPROXIMATELY 679 CFS, HW/D @ 1= 335 CFS (D=RISE=6.9')

CULVERT PURPOSE: CROSS DRAINAGE/ ENHANCED HYDRAULIC DESIGN FOR FISH PASSAGE

ENHANCED HYDRAULIC DESIGN CULVERT INSTALLATIONS, MILE 168 - DIVISION CREEK

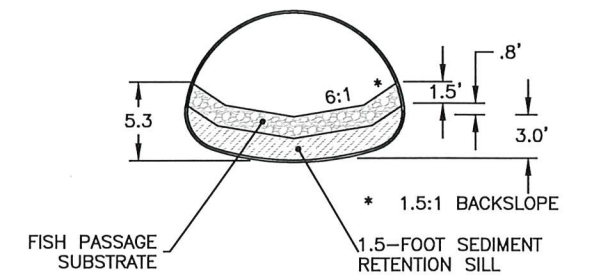
DESCRIPTION	MATERIAL	LOCATION	DIAMETER OR SPAN X RISE (IN)	LENGTH (FT)	SKEW	ELEVATIONS (FT)	
						INLET INVERT	OUTLET INVERT
MAIN PIPE	8 GAGE SPPA	275+66	128 X 83	127	32 DEG RT	1489.0	1482.5

DIVISION CREEK PARKS
HWY MILE POINT 168





1. THIS CULVERT WAS DESIGNED TO PROVIDE FISH PASSAGE. SEE GENERAL AND FISH PASSAGE NOTES ON SHEET E5.
2. INSTALL A 14'11"x10'2" STRUCTURAL PLATE PIPE ARCH WITH THE INVERT DEPRESSED 3 FEET INTO THE CHANNEL BOTTOM.
3. INSTALL TEN SEDIMENT RETENTION SILLS, STARTING 1-FOOT FROM THE CULVERT OUTLET, AND SPACED 9 FEET APART. SEE SPECIAL PROVISION 602 FOR SEDIMENT RETENTION SILL MATERIAL, AND ATTACHMENT DETAILS.
4. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING HEADWALLS. REMOVAL TO BE PAID PER ITEM 202(1) REMOVAL OF STRUCTURES AND OBSTRUCTIONS



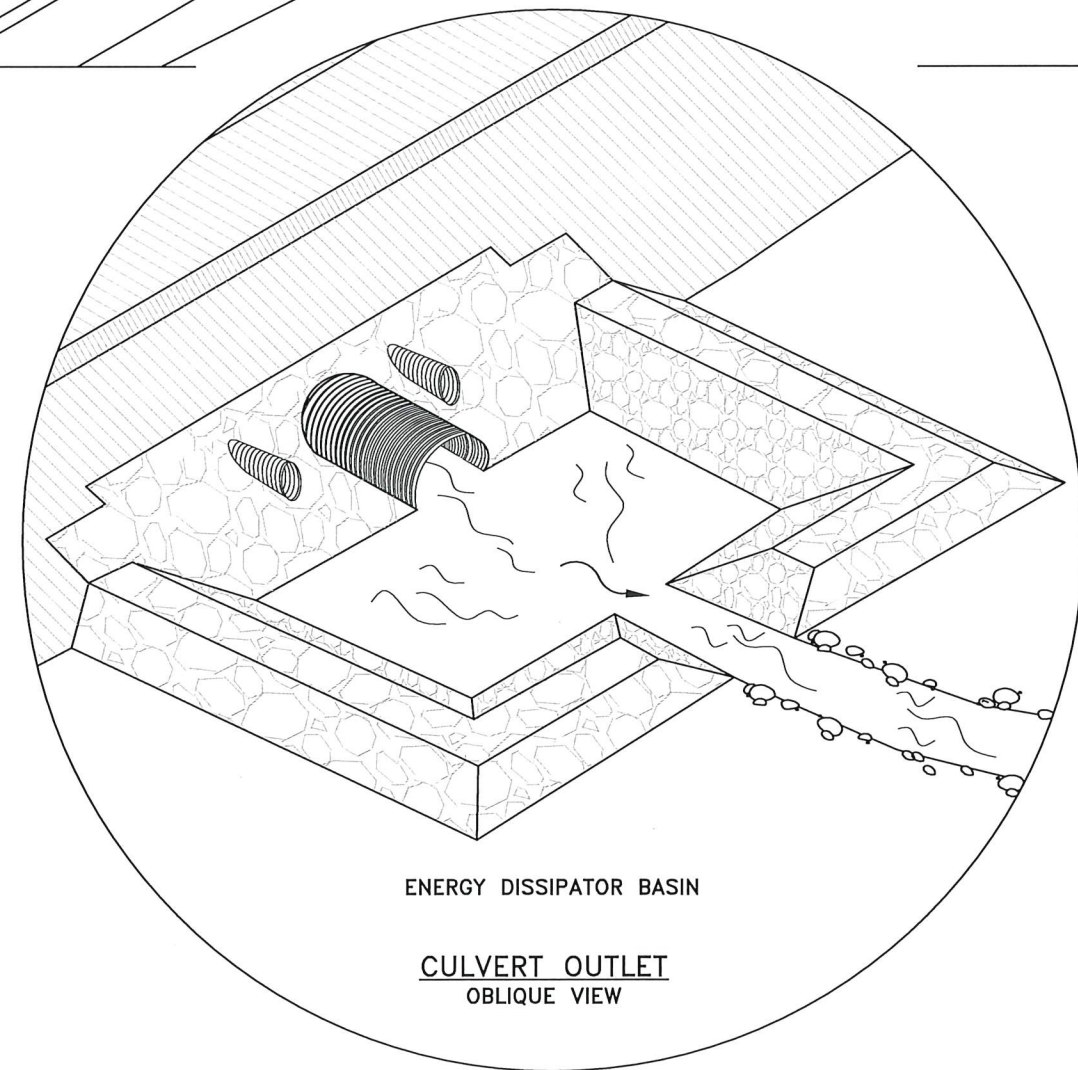
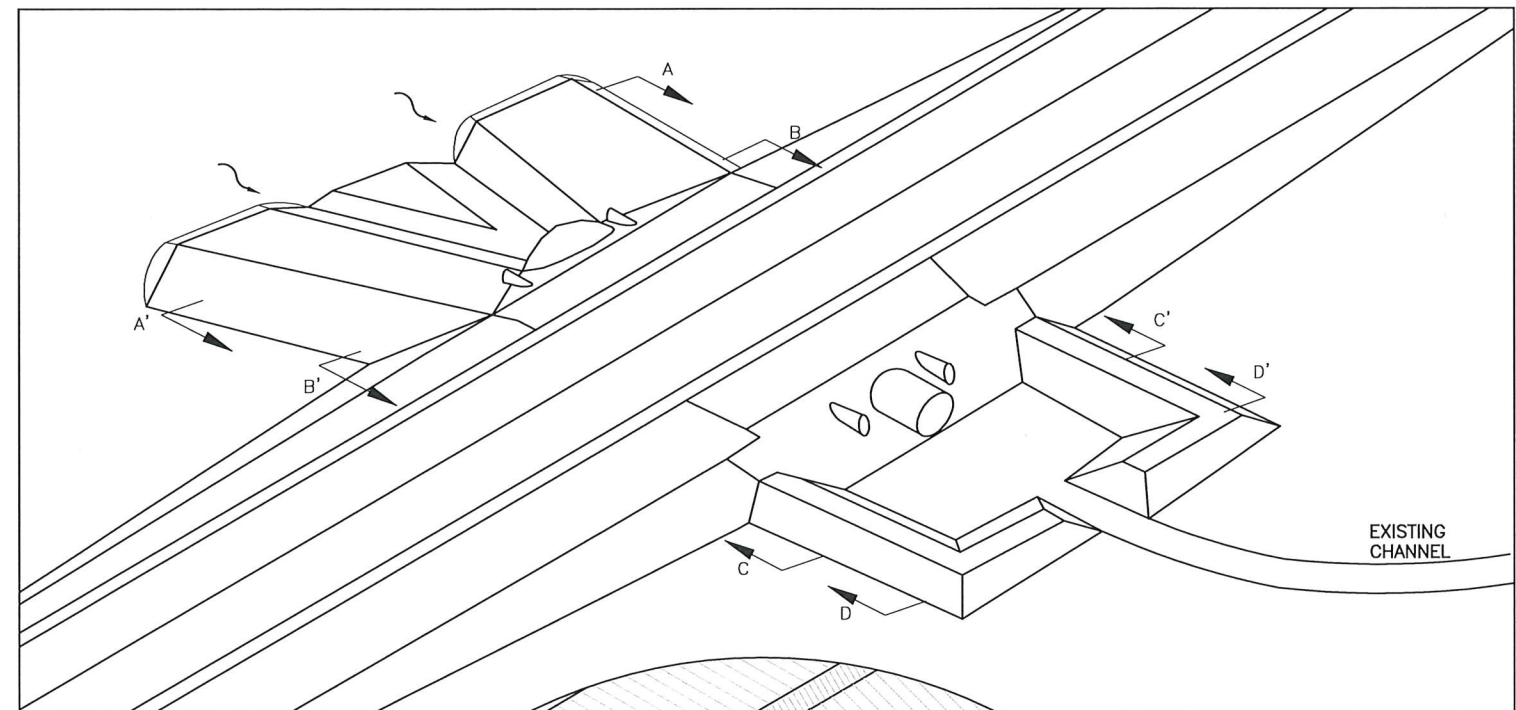
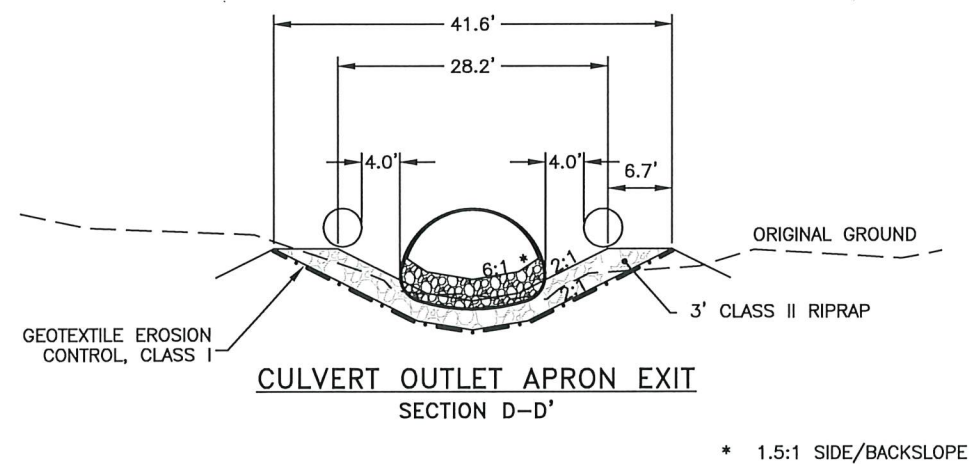
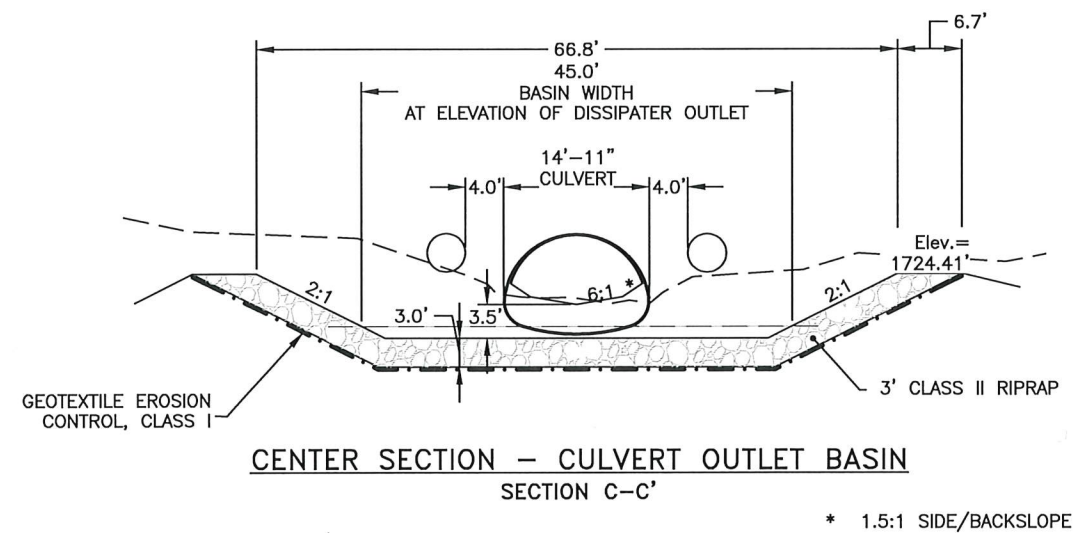
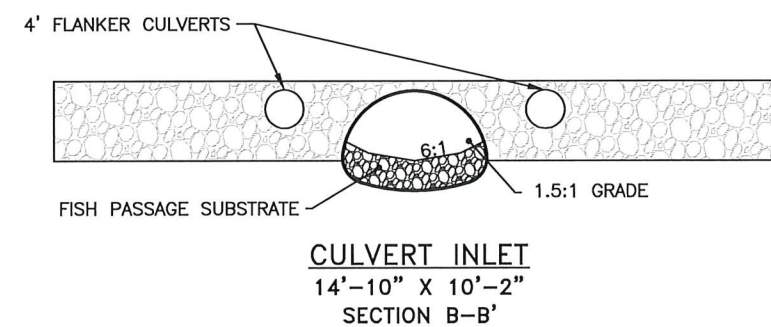
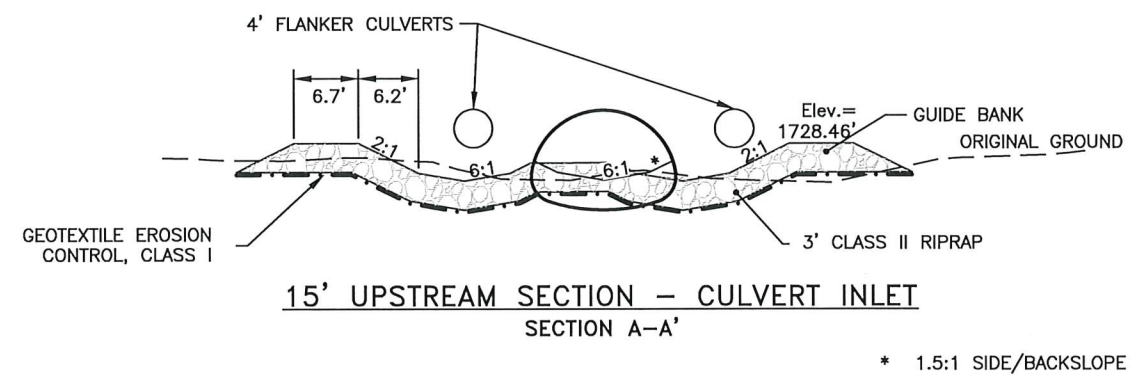
CULVERT
14'-11" X 10'-2"
CLASS II RIPRAP BURIED 3.0 FT
COMPOUND CHANNEL
6:1 AND 1.5:1

HYDROLOGIC & HYDRAULIC SUMMARY						FISH PASSAGE CULVERT SUMMARY GRANITE CREEK-PARKS HWY MILE 170.9									
GRANITE CREEK-PARKS HWY MILE 170.9, STATION 236+94 SPPA BURIED 3.0 FEET						14'11"X10'2"		DESCRIPTION	MATERIAL	LOCATION	DIAMETER OR SPAN X RISE (IN)	LENGTH (FT)	SKEW	ELEVATIONS (FT)	
BASIN AREA (SQ. MI)	QFISH (CFS)	Q2 (CFS)	Q5 (CFS)	Q50 (CFS)	Q100 (cfs)	INLET INVERT	OUTLET INVERT								
4.0	36	71	118	251	295	FLANKER	12 GAGE CSP	425+54.5	48	96	0 DEG	1728.4	1724.9		
HEADWATER ELEVATION AT Q50 IS 1729.26 FT, HEADWATER ELEVATION AT Q100 IS 1729.80 FT						MAIN PIPE	8 GAGE SPPA	425+68.0	179 x 122	110	0 DEG	1722.2	1718.1		
ROAD OVERTOPS AT APPROXIMATELY 1736.4', 15.4 FEET ABOVE TOP OF CULVERT Hw/D @ 1 = 515 CFS (D = RISE = 7.2')						FLANKER	12 GAGE CSP	425+81.5	48	96	0 DEG	1728.4	1724.9		
CROSS CULVERT / FISH-PASSAGE DESIGN													PARKS GRAN		

PARKS MILE 170.9
GRANITE CREEK



STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	PENDING/NFHWY00102	2019	E15	E17



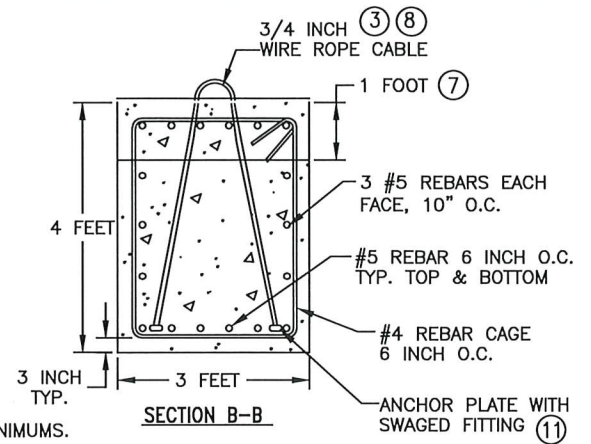
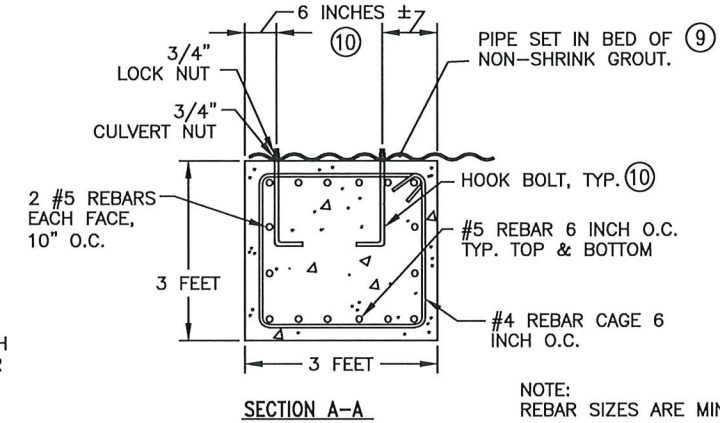
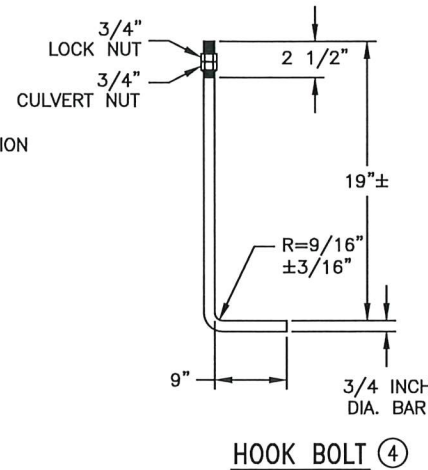
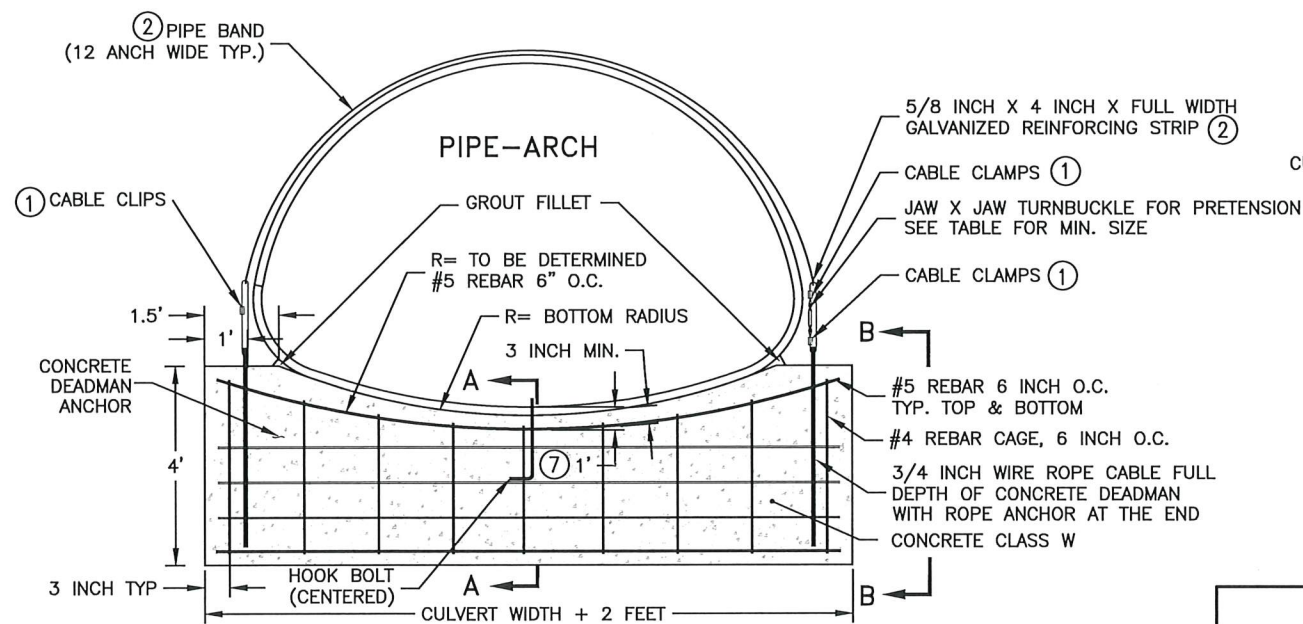
PARKS HWY MP 170.9 GRANITE CREEK

GRANITE CREEK
INLET & OUTLET



H:\Projects\parks_hwy\61297_parks_163_183_rehab\08 support\03 Hydro\Drafting\61297_Q-E14 GRANITE CREEK INLET & OUTLET Frt, Sep/21/18 11:20am

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	PENDING/NFHWY00102	2019	E16	E17



NOTE: REBAR SIZES ARE MINIMUMS.

CONCRETE DEADMAN ANCHOR DETAILS

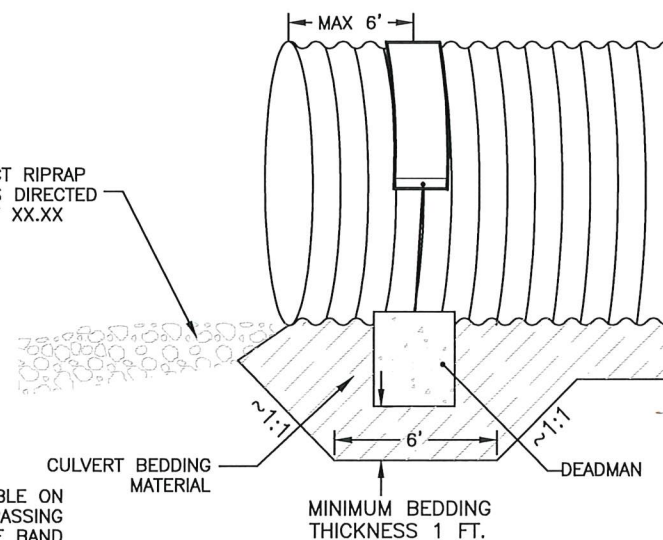
MINIMUM HARDWARE SIZE

CULVERT DIA./SPAN (FT)	WIRE ROPE DIA. (IN)	TURNBUCKLE DIA. (IN)	MINIMUM WIRE ROPE TURNBACK/SPLICE (IN)	U-BOLT NUT TORQUE (FT-LB)
2.00 TO 6.00	5/16	7/8	5 1/2	30
6.01 TO 10.00	3/8	1	6 1/4	45
10.01 TO 16.00	7/16	1 1/4	7	65
16.01 TO 19.99	1/2	1 1/2	11	65

NOTES:

- IF DROP FORGED U-BOLT TYPE CLIPS ARE USED, THEY SHOULD BE INSTALLED USING THE FOLLOWING:
AMT. WIRE ROPE TO TURN BACK OR SPLICE: SEE TABLE.
TORQUE REQUIRED TO REACH HOLDING POWER: SEE TABLE.
SPACING: DIAMETER OF THE ROPE (INCHES) TIMES 6. THE BASE OF THE CLAMPS AND NUTS MUST BE ON THE LIVE END OF THE WIRE. INSTALL THIMBLE.
- THE LENGTH OF THE PIPE BANDS SHALL BE A MINIMUM OF HALF THE CIRCUMFERENCE OF THE ROUND CULVERT OR SHALL EXTEND TO WITHIN 6" OF THE SPRINGLINE ON PIPE ARCH CULVERT. THE PIPE BANDS SHALL BE A MINIMUM THICKNESS OF 1/16" GALVANIZED ASTM A1011 SS GRADE 36 OR MINIMUM THICKNESS 0.109" GALVANIZED AASHTO M218. THE REINFORCING STRIP SHALL BE GALVANIZED ASTM A36.
- WIRE ROPE SHALL BE 6X19 IWRC, EIPS & GALVANIZED AND MEET AASHTO M30 TYPE II REQUIREMENTS OR APPROVED EQUAL.
- ALL HARDWARE SHALL BE GALVANIZED TO MEET AASHTO M232
- CLASS W CONCRETE SHALL BE USED TO CONSTRUCT THE CONCRETE DEADMAN ANCHOR. REINFORCEMENT SHALL BE ASTM A615 GRADE 40.
- ALL WORK AND MATERIALS REQUIRED FOR THE CONSTRUCTION AND INSTALLATION OF THE DEADMAN SHALL NOT BE MEASURED OR PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO OTHER ITEMS.
- CONCRETE DEADMAN SHALL BE CAST TO CONFORM TO THE OUTER RADIUS OF THE CULVERT.
- USE A SPREADER BEAM/BAR WHEN LIFTING DEADMAN TO AVOID BENDING OF TIE-DOWN/LIFTING LOOP.
- THE PIPE SHALL BE SET IN A BED OF NON-SHRINK GROUT OF SUFFICIENT THICKNESS TO FULLY FILL THE CORRUGATIONS AFTER TENSIONING OF THE ANCHOR BOLTS AND TIE-DOWN BAND. THE DEADMAN SURFACE SHALL BE PROPERLY PREPARED FOR BEST BONDING WITH GROUT - CLEAN, DUST FREE, SATURATED SURFACE DRY (SSD) CONDITION. BOTTOM OF PIPE SHALL BE AS CLEAN AND DUST FREE AS PRACTICABLE. GROUT SHALL BE FILLETED/CROWNED ALONG SIDES OF PIPE AT THE DEADMAN/PIPE SEAM IN ORDER TO REDUCE WATER INFILTRATION INTO THE GROUTED AREA.
- PENETRATE CULVERT INVERT HOOK BOLTS IN A CORRUGATION VALLEY TO PROTECT NUT. ANCHOR BOLT HOLES SHALL BE DRILLED, NOT CUT WITH A TORCH, AND COATED WITH APPROPRIATE ZINC RICH PAINT PRIOR TO INSTALLATION. AFTER INSTALLATION AND ANCHOR BOLT NUTS HAVE BEEN TIGHTENED, COAT THE ANCHOR BOLT AND SURROUNDING AREA WITH ZINC RICH PAINT.
- SEE STANDARD DRAWING G-00.04 SHEET 4 FOR ROPE ANCHOR DETAILS.

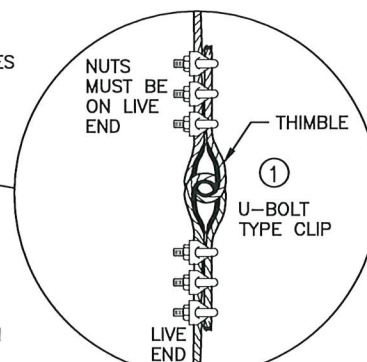
CONSTRUCT RIPRAP APRON AS DIRECTED ON SHEET XX.XX



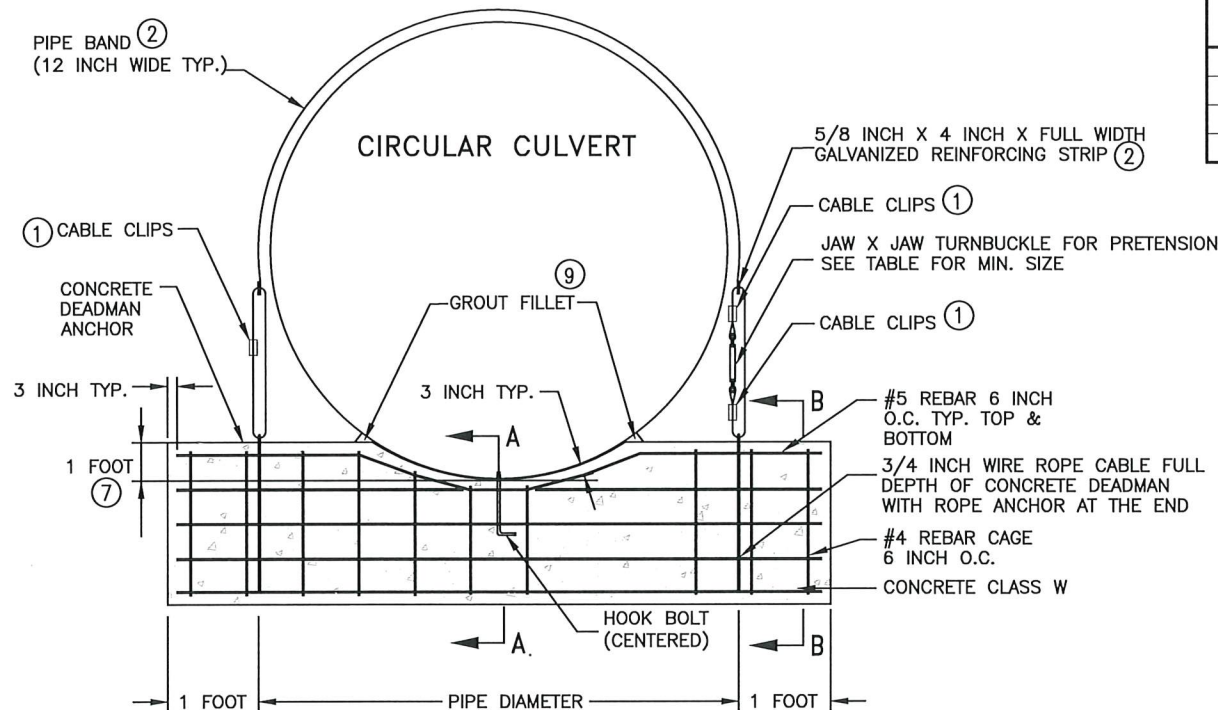
DEADMAN BEDDING DETAIL

USE THIMBLE ON WIRE ROPE PASSING THROUGH PIPE BAND

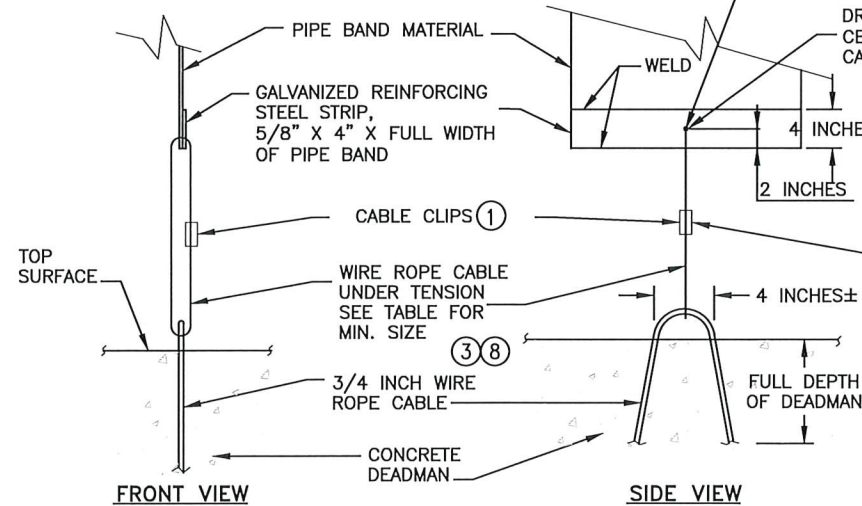
DRILL 5/8" HOLE CENTERED FOR CABLE.



WIRE ROPE CLAMPS ENLARGED VIEW



DEADMAN DETAIL

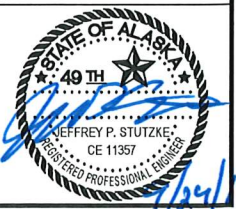


FRONT VIEW

SIDE VIEW

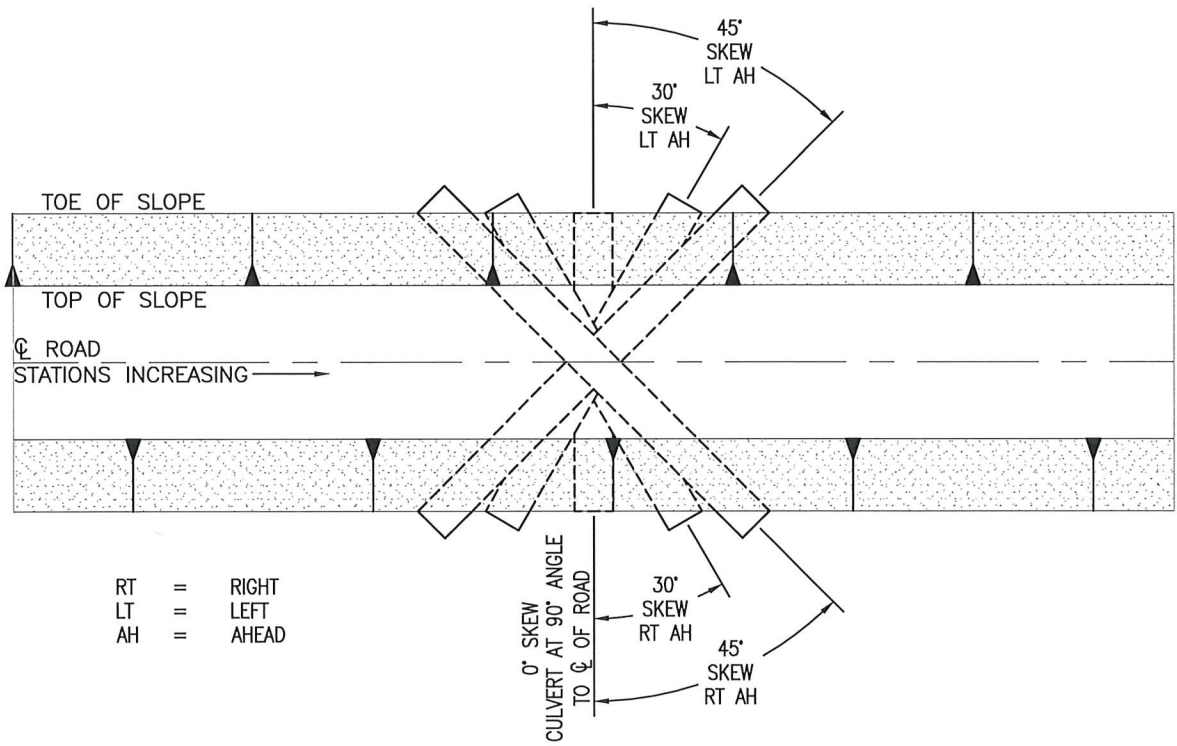
PIPE BAND DETAILS

DEADMAN DETAIL

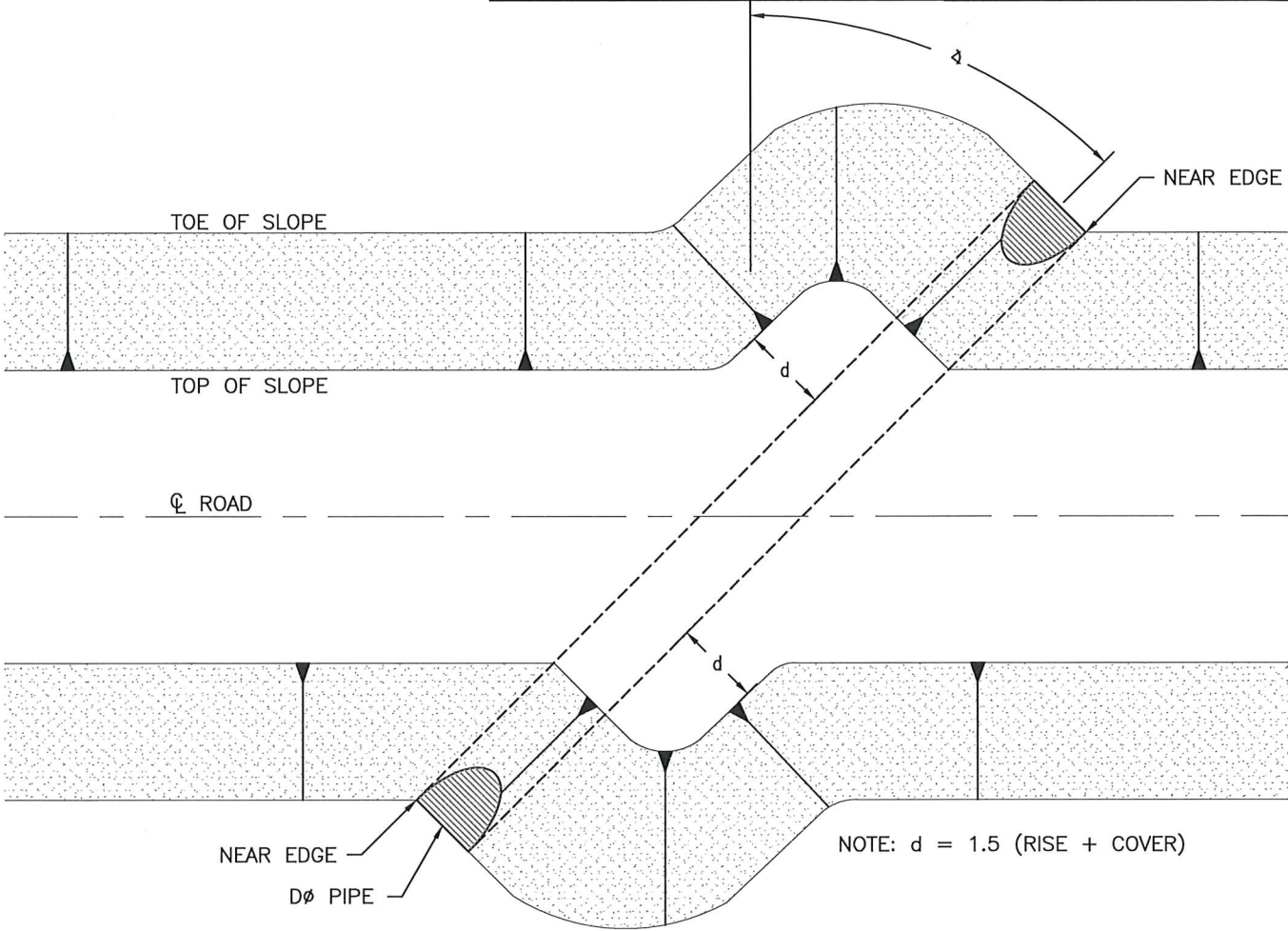


PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-2200
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NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	PENDING/NFHWY00102	2019	E17	E17



CULVERT SKEW

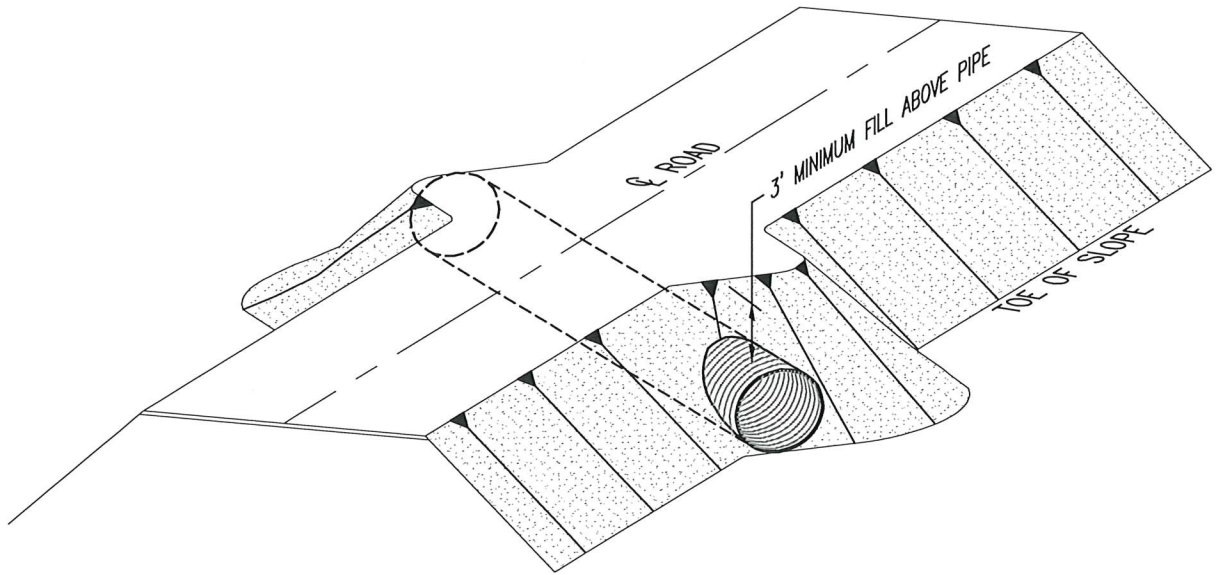


NOTE: $d = 1.5 (\text{RISE} + \text{COVER})$

EMBANKMENT WIDENING FOR SKEWED CULVERTS PLAN

NOTES:

1. WHEN INSTALLING NEW, OR EXTENDING EXISTING, SKEWED CULVERTS, ENSURE THE FINAL LENGTH IS DETERMINED OFF THE NEAR EDGE, NOT THE CENTERLINE OF THE CULVERT.
2. TO PREVENT UNBALANCED SOIL LOADS ON THE SKEWED CULVERT, THE EMBANKMENT SHALL BE SHAPED OR WARPED, TO BALANCE LOADS AND ENSURE SIDE SUPPORT.
3. CONSTRUCT CULVERT EMBANKMENT WIDENING WHERE NOTED ON THE CULVERT SUMMARY.
4. CONSTRUCT LIFTS ON EACH SIDE OF THE CULVERT CONCURRENTLY TO MINIMIZE UNBALANCED LOADING DURING INSTALLATION.



EMBANKMENT WIDENING FOR SKEWED CULVERTS OBLIQUE

CULVERT SKEW DETAILS

