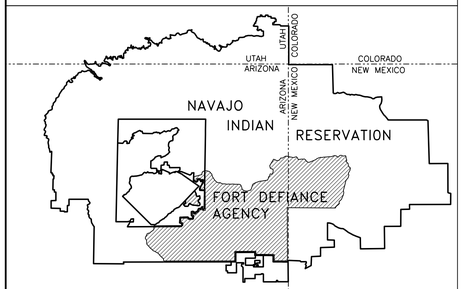
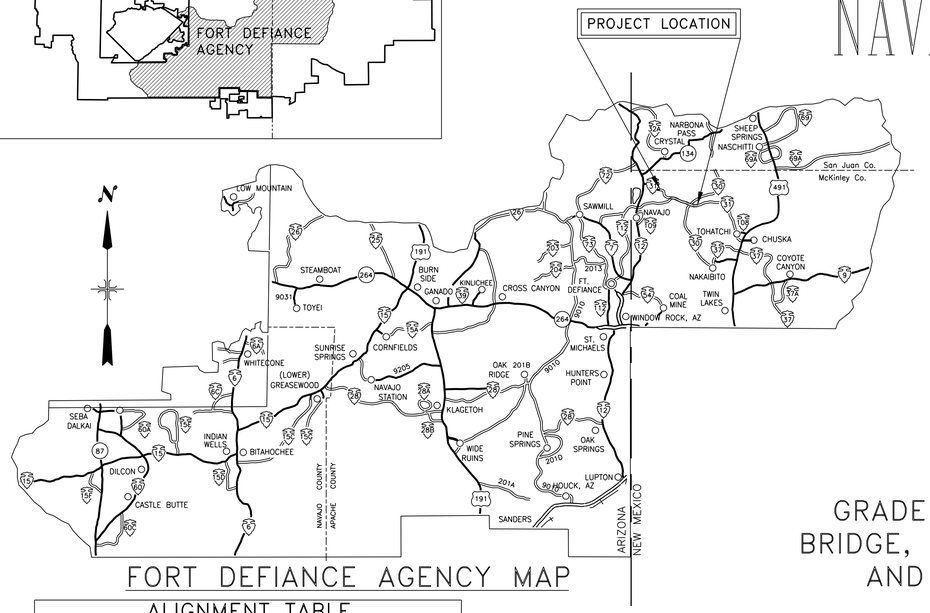
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGION D.O.T.
ROUTE

INDEX MAP



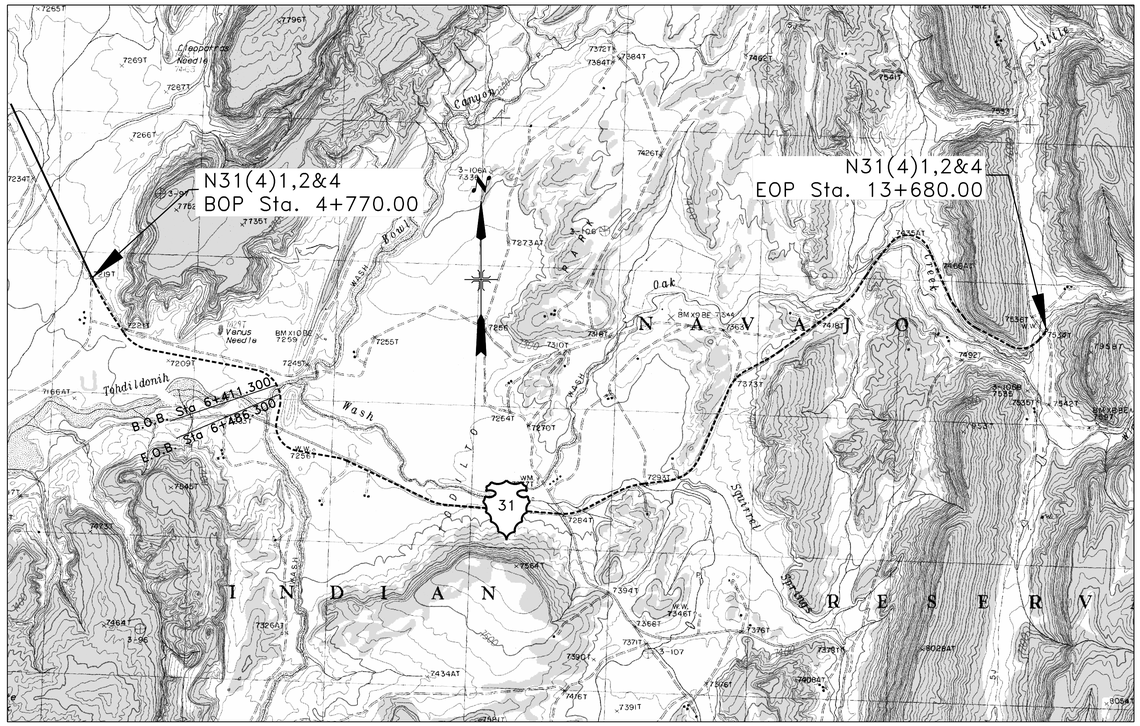


FORT DEFIANCE AGENCY MAP

CONSTRUCTION PLANS
Approved Date: 5/30/2013

31

PROJECT N31(4)1,2&4
GRADE, DRAIN & AGGREGATE BASE COURSE,
BRIDGE, HOT ASPHALTIC CONCRETE PAVEMENT
AND MISCELLANEOUS CONSTRUCTION
8.910 km ID. NO. N36236



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ALIGNMENT TABLE

PROJECT: N31(4)1,2&4			
STATION		LENGTH (m)	LENGTH (km)
BOP Sta.	4+770.000		
		1,641.300	1.641
BRIDGE: BOP	6+411.300		
		75.000	0.075
BRIDGE: EOP	6+486.300		
		7,193.700	7.194
EOP STATION	13+680.000		
	GRAND TOTAL	8,910.000	8.910

DESIGN DATA – N31(4)1,2&4

DESIGN DATA	60 km/h
MINIMUM RADIUS	150 m
MAXIMUM GRADIENT	4.85
MINIMUM STOPPING SIGHT DISTANCE	85 m
MINIMUM PASSING SIGHT DISTANCE	410 m
AVERAGE DAILY TRAFFIC (2003)	136 vpd
AVERAGE DAILY TRAFFIC (2032)	256 vpd
DESIGN HOURLY VOLUME (DVH)	19 vph
MAXIMUM SUPERELEVATION (e max)	0.04

RIGHT OF WAY TABLE

STATION TO STATION			LEFT OFFSET (m)	RIGHT OFFSET (m)
4+815.00	To	6+372.00	–23.00	23.00
6+372.00	To	6+507.00	–50.00	50.00
6+507.00	To	6+710.00	–15.00	23.00
6+710.00	To	8+320.00	–23.00	23.00
8+320.00	To	8+550.00	–30.00	23.00
8+550.00	To	9+340.17	–23.00	23.00
9+340.17	To	9+500.00	–30.00	23.00
9+500.00	To	9+600.00	–40.00	23.00
9+600.00	To	10+000.00	–30.00	23.00
10+000.00	To	11+000.00	–30.00	30.00
11+000.00	To	11+320.00	–23.00	23.00
11+320.00	To	11+520.00	–30.00	23.00
11+520.00	To	11+812.90	–23.00	23.00
11+812.90	To	11+940.00	–23.00	30.00
11+940.00	To	12+120.00	–30.00	30.00
12+120.00	To	12+600.00	–23.00	23.00
12+600.00	To	12+872.77	–40.00	23.00
12+872.77	To	12+910.00	–40.00	50.00
12+910.00	To	13+500.00	–40.00	23.00
13+500.00	To	13+530.00	–40.00	40.00
13+530.00	To	13+600.00	–40.00	23.00
13+600.00	To	13+706.72	–23.00	23.00

LEGEND

STATE LINE
RESERVATION LINE
COUNTY LINE
TOWNSHIP or RANGE LINE
SECTION LINE
NATIONAL FOREST LINE (SHOWN ON RIDGE OF LINE)
HIGHWAY RIGHT–OF–WAY LINE
UNFENCED PROPERTY
SECTION CORNER AND 1/4 CORNER
POWER LINE AND POLES
TELEPHONE LINE AND POLES
POLE GUY AND ANCHOR
TRAFFIC SIGN
GUARD RAIL (PLANNED, EXISTING)
DELINEATORS (ONE WAY, TWO WAY)
CHEVRON SIGN
BARBED WIRE FENCE (GATE)
WOVEN WIRE FENCE
CATTLE GUARD (PLANNED, EXISTING)
CULVERTS (PLANNED, EXISTING)
CONCRETE BOX CULVERTS (PLANNED, EXISTING)
GROUND LINE – EARTH
GROUND LINE – ROCK
EXISTING ROAD (WIDTH & TYPE)
SIDE ROAD TURNOUT (PLANNED, EXISTING)
TREES and SHRUBS
CHANNEL or DITCH
EARTHEN DIKE and BERM
RIPRAP
DWELLING
RIGHT–OF–WAY MONUMENT (PLANNED, EXISTING)
TELEPHONE PEDESTAL
IRRIGATION DITCH (F.D.)
FURROW DITCH (F.D.)
EROSION CONTROL TYPE IV FABRIC
OBLITERATION OF EXISTING ROAD

31 INDIAN SERVICE · COUNTY · 134 STATE · 491 FEDERAL

PROPOSED · PAVED · GRADED · UNIMPROVED

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

RECOMMENDED APPROVAL		APPROVAL
AGENCY ROAD ENGINEER	3/27/2013 DATE	
DIVISION MANAGER	5/28/13 DATE	
PLANNING & DESIGN BRANCH CHIEF	5/28/2013 DATE	REGIONAL DIRECTOR 5/30/2013 DATE

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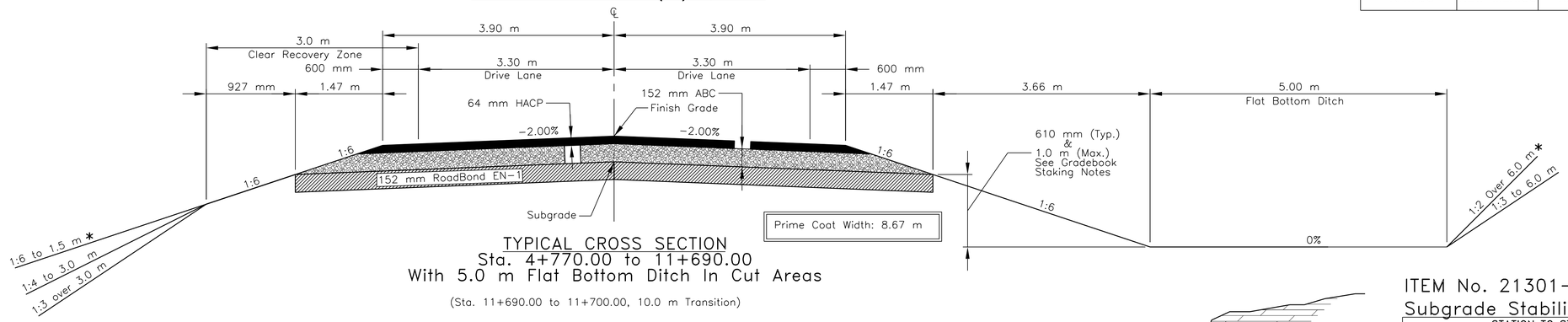
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	2	76

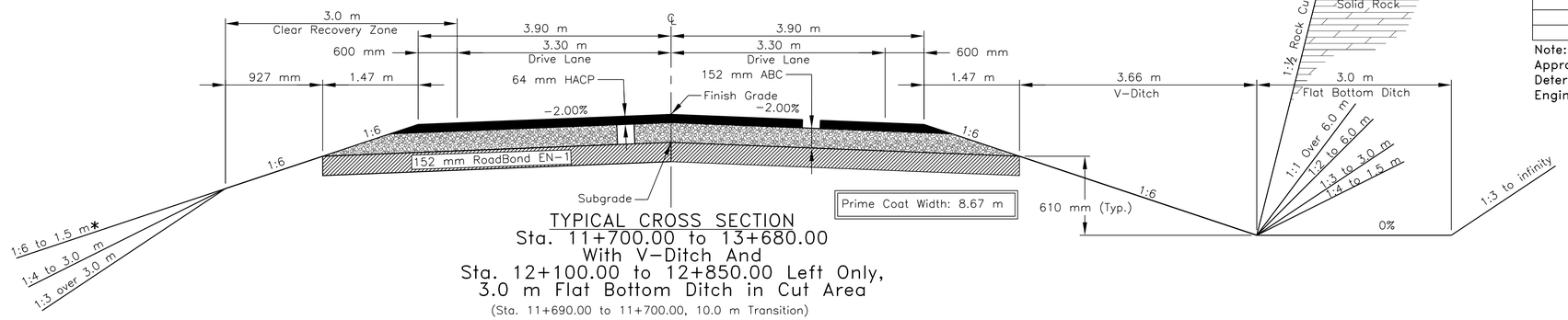
PROJECT: N31(4)1,2&4

* See General Note 8 of Sheet 3



TYPICAL CROSS SECTION
Sta. 4+770.00 to 11+690.00
With 5.0 m Flat Bottom Ditch In Cut Areas

(Sta. 11+690.00 to 11+700.00, 10.0 m Transition)



TYPICAL CROSS SECTION
Sta. 11+700.00 to 13+680.00
With V−Ditch And
Sta. 12+100.00 to 12+850.00 Left Only,
3.0 m Flat Bottom Ditch in Cut Area

(Sta. 11+690.00 to 11+700.00, 10.0 m Transition)

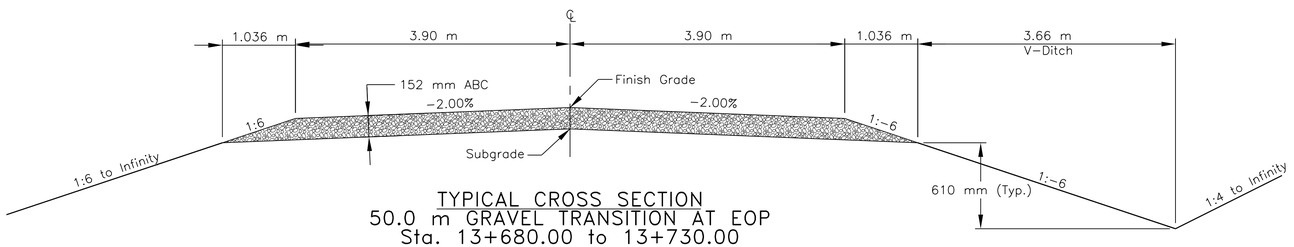
ITEM No. 21301−4000
Subgrade Stabilization − RoadBond EN − 1

STATION TO STATION			LENGTH (m)	REMARKS
7+040.00	to	7+120.00	80.00	9.68 m Wide
11+880.00	TO	11+940.00	60.00	9.68 m Wide
13+100.00	TO	13+300.00	200.00	9.68 m Wide
		TOTAL:	340.00	

Note: The Sections Given For Subgrade Stabilization Are To Be Considered Approximate. The Final Location(s) And Sizes of Stabilization Areas Will Be Determined By The NRDOT Planning and Design Chief and The Materials Engineer During Construction.

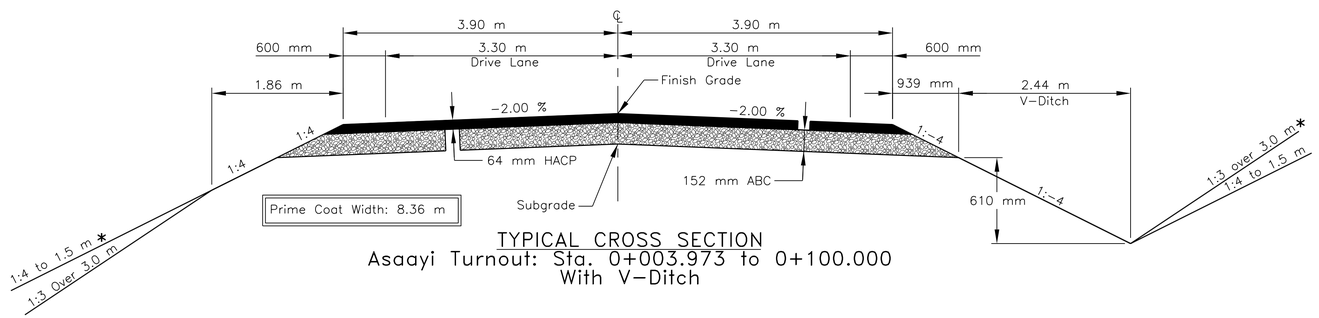
ITEM No. 20502−0000 − Rock Cut Location

Station to Station	Location	Remarks
11+860.00 to 11+985.00	Right	Estimated Blasting Are = 1371.88 m²



TYPICAL CROSS SECTION
50.0 m GRAVEL TRANSITION AT EOP
Sta. 13+680.00 to 13+730.00

NOTE:
These typicals are drawn with FILL conditions on the left side and the CUT conditions on the right side. This may cause confusion and can be misleading. In the field, the CUT & FILL conditions can be on either side of the roadway.



TYPICAL CROSS SECTION
Asaayi Turnout: Sta. 0+003.973 to 0+100.000
With V−Ditch

BASIS OF ESTIMATED QUANTITIES

ITEM No.	DESCRIPTION	GRADE	UNITS	APPLICATION
30103−2000	Untreated Aggregate Base Course	"D"	2268 kg/m³	Main Roadway: 152 mm, Turnouts: 102 mm
40201−0500	Hot Asphaltic Concrete Pavement, Class "B", Grade B, Type III Smoothness	"B"	2430 kg/m³	Main Roadway: 1−64 mm Lift & Turnouts: 1−51 mm Lift
40502−1100	Asphalt Cement	PG 58−28		5.5% By Weight of Total Mix
41101−5000	Prime Coat − Penetrating Emulsified Prime	PEP	1056 L/t	1.36 L/m Apply on Top of ABC

UNITED STATES
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BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TYPICAL CROSS SECTION DETAILS

DRAWN BY: NRDOT	DATE: 2/16/2011
DESIGNED BY: NRDOT	DATE: 2/16/2011
REVISED: 1/31/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	3	76

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (**FP-03**), AND THE SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.

2. ALL PERMANENT AND TEMPORARY ROADSIDE SIGNS, AND PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS (LATEST EDITION) AND IN ACCORDANCE WITH THE DETAILS ON THESE PLANS. PLACEMENT OF "STOP" BAR, PERMANENT TRAFFIC SIGNS AND PAVEMENT MARKINGS SHALL BE FIELD ADJUSTED AS DIRECTED BY THE COR/AOTR, AT NO ADDITIONAL COST TO THE GOVERNMENT.

3. THE TEMPORARY TRAFFIC CONTROL DETAILS SHOWN REFLECTS GENERAL REQUIREMENTS FOR THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR PREPARING AND SUBMITTING A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH THESE DETAILS, TAKING INTO ACCOUNT THE CONTRACTOR'S CONSTRUCTION SEQUENCING PLAN, MUTCD, AND THE SUPPLEMENTAL SPECIFICATIONS FOR SECTION 635.–TEMPORARY TRAFFIC CONTROL.

4. THE DESIGN FEATURES INCLUDING HORIZONTAL AND VERTICAL ALIGNMENTS, TYPICAL SECTIONS, AND OTHER DESIGN DETAILS SHOWN SHALL NOT BE ALTERED OR MODIFIED IN ANYWAY DURING CONSTRUCTION WITHOUT THE EXPRESSED WRITTEN DIRECTION AND WRITTEN APPROVAL OF THE NAVAJO REGION OFFICE–DIVISION OF TRANSPORTATION (NRDOT) DIVISION MANAGER THROUGH THE AWARDING OFFICIAL (AO), UNLESS OTHERWISE NOTED IN THESE PLANS OR SPECIFICATIONS. DRAINAGE STRUCTURES AND TURNOUTS SHALL BE INSTALLED AS SHOWN WITH ONLY MINOR CORRECTIONS IN LOCATION, SKEW, AND/OR INVERT ELEVATIONS AS NEEDED TO FIT FIELD CONDITIONS. TURNOUTS MAY NOT BE SHIFTED MORE THAN 5.0 METERS FROM THE LOCATIONS SHOWN ON THE PLANS WITHOUT THE WRITTEN APPROVAL OF THE NRDOT DIVISION MANAGER THROUGH THE AWARDING OFFICIAL.

5. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND EXPENSE FOR DISPOSAL OF TRASH AND/OR CONSTRUCTION DEBRIS IN ACCORDANCE WITH SECTIONS 107 AND 203 OF THE **FP-03** AS WELL AS ANY AND ALL PERMIT REQUIREMENTS. THIS WORK SHALL BE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR, UNLESS SPECIFIED OTHERWISE HEREIN.

6. THECONTRACTORSHALL READ AND MAKE CAREFUL EXAMINATION OF THE PLANS, SPECIFICATIONS, QUANTITIES, MATERIAL, SURVEYING REQUIREMENTS, AND VISIT THE SITE OF THE PROPOSED CONSTRUCTION TO BECOME FAMILIAR WITH THE SITE CONDITIONS AND LIMITATIONS BEFORE MAKING A PROPOSAL. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY AND ALL ERRORS RESULTING FROM THE FAILURE TO MAKE SUCH AN EXAMINATION. ANY INFORMATION DERIVED FROM THE MAPS, PLANS, SPECIFICATIONS, PROFILES, DRAWINGS OR THE ENGINEER, SHALL NOT RELIEVE THE CONTRACTOR FROM ANY RISK OR FROM FULFILLING THE TERMS OF THE CONTRACT. THERE ARE SEVERAL AREAS WITH LIMITED WORKING ROOM WITHIN THE PROJECT RIGHT–OF–WAY, AND/OR WITH EXISTING FEATURES WITHIN OR NEAR THE PROJECT RIGHT–OF–WAY, THAT WILL REQUIRE 'SPECIAL' CONSTRUCTION PROCEDURES.

7. THE CONTRACTOR IS REQUIRED TO SUBMIT A REVISED PIPE LIST TO THE NRDOT, PLANNING & DESIGN BRANCH CHIEF THROUGH THE COR/AOTR, BASED ON THE FIELD STAKING IN ACCORDANCE WITH SECTION 152 OF THE CONTRACT SUPPLEMENTAL SPECIFICATION. THE APPROVAL OF ANY AND ALL REVISED PIPE LISTS WITH ACCOMPANYING DRAWINGS IS RENDERED AS A SERVICE ONLY AND IS NOT CONSIDERED A GUARANTEE OF MEASUREMENTS, QUANTITIES, INSTALLATION PROCEDURES, AND/OR DIMENSIONS, NOR SHALL IT BE CONSIDERED AS RELIEVING THE CONTRACTOR FROM COMPLYING WITH THE CONTRACT SPECIFICATIONS AND DESIGN PLANS. THE CONTRACTOR IS HEREBY NOTIFIED THAT UNDER NO CIRCUMSTANCES SHALL ANY DRAINAGE STRUCTURE(S) BE INSTALLED BELOW THE NATURAL FLOW LINE OF THE WASH, CHANNEL, ARROYO, OR DITCH LINE.

8. NO WORK SHALL BE PERFORMED OR GROUND DISTURBED OUTSIDE OF THE DESIGNATED CONSTRUCTION LIMITS IN ACCORDANCE WITH SECTION 107 OF THE FP–03 WITHOUT WRITTEN APPROVAL BY THE NRDOT DIVISION MANAGER UNLESS OTHERWISE SHOWN AND LABELED ON THESE PLANS AS "CONSTRUCTION ZONE". IN NO CASE SHALL ANY WORK BE PERFORMED OUTSIDE THE DESIGNATED RIGHTS–OF–WAY LIMITS WITHOUT WRITTEN APPROVAL FROM THE NRDOT DIVISION MANAGER, UNLESS OTHERWISE SHOWN AND CALLED OUT ON THESE PLANS AS "CONSTRUCTION ZONE". THE CONSTRUCTION LIMIT IS THE CATCH POINT EARTHWORK LIMIT PLUS 3.0 METERS, NOT TO EXCEED THE RIGHT–OF–WAY LIMITS.

9. THE DETAILS SHOWN ON THE STORM WATER POLLUTION AND EROSION/SEDIMENT CONTROL DETAILS ARE GENERAL REQUIREMENTS TO BE USED BY THE CONTRACTOR IN PREPARING A STORM WATER POLLUTION PREVENTION PLAN ALONG WITH THE REQUIREMENTS IN SECTION 157 OF THE SUPPLEMENTAL SPECIFICATION AND SPECIAL CONTRACT REQUIREMENTS. THE SWPPP IS ONLY REQUIRED AT THE DRAINAGE PIPE REPLACEMENT LOCATIONS UNLESS OTHERWISE SHOWN ON THE APPROVED SWPPP.THE CONTRACTOR IS REQUIRED TO SUBMIT COURTESY COPY OF THE APPROVED SWPPP TO THE NAVAJO NATIONWATER QUALITY EPA OFFICE.

10. THE QUANTITIES SHOWN ARE FOR ESTIMATING PURPOSES ONLY AND TO COMPARE AND CANVAS BIDS. ACTUAL PAY QUANTITIES WILL BE DETERMINED IN THE FIELD FOR AUTHORIZED CHANGES THAT AFFECT THE QUANTITIES. ANY OVER–RUN OR UNDER–RUN OF QUANTITIES SHALL BE SUBJECT TO FAR 52.211–18, VARIATION IN ESTIMATED QUANTITY.

11. ALL TURNOUT/DRIVEWAYS, AS CALLED FOR ON THESE PLANS, SHALL EITHER BE CONSTRUCTED, REBUILT, RESHAPED AND/OR REMOVED UP TO THE RIGHT–OF–WAY LIMITS. ALL TURNOUTS SHALL BE PAVED TO THE CATTLEGUARD, THEN FROM THE BACK OF CATTLEGUARD TO THE R/W LINE, PLACE AGGREGATE BASE FOR ALL 4.5m WIDE TURNOUTS; PLACE AGGREGATE AND HOT ASPHALTIC CONCRETE FOR TURNOUTS WIDER THAN 4.5m TO MATCH THE STRUCTURAL SECTION. REQUIRED GRADING, SHAPING, AND EARTH COMPACTION OUTSIDE OF THE RIGHT–OF–WAY, TO CONNECT NEW TURNOUTS TO THE EXISTING ROADWAY/DRIVEWAY (AS SHOWN ON THE PLANS OR AS DIRECTED BY THECOR/AOTR) SHALL BE INCIDENTAL TO BID ITEM 20401–0000. ANY REQUIRED AGGREGATE BASE AND/OR ASPHALT MATERIAL SHALL BE PAID FOR UNDER THE APPROPRIATE BID ITEMS FOR THIS WORK AS SHOWN IN THE BID SCHEDULE.

12. THE CONTRACTOR SHALL BE REQUIRED TO OBLITERATE ALL EXISTING ABANDONED TURNOUTS AND ROADWAY WITHIN THE RIGHT–OF–WAY LIMITS, AND ANY EXISTING TURNOUTS/ROADWAY OUTSIDE OF THE RIGHT–OF–WAY THAT ARE DESIGNATED ON THE PLANS FOR OBLITERATION. OBLITERATION SHALL BE AS PER **FP–03**, METHOD 2. SCARIFICATION SHALL BE TO A DEPTH OF 300mm. THE SCARIFIED SURFACE SHALL BE LEFT ROUGH, WITH 100mm TO 300mm HIGH RIDGES PERPENDICULAR TO THE EXISTING ROAD CENTERLINE. ROADWAY OBLITERATION INCLUDES GRADING DRAINAGE CHANNELS ACROSS THE OLD ROADBED, TO RE–ESTABLISH NATURAL DRAINAGE CHANNELS AND/OR TO OPEN CHANNELS FOR THE NEWLY INSTALLED (IN NEW ROADWAY) DRAINAGE STRUCTURES. THIS WORK TO BE INCLUDED IN THE BID ITEM 21102–2000. PERMANENT SEEDING AND STRAW MULCHING SHALL BE APPLIED TO ALL OBLITERATION AREAS, WITHIN THE CONSTRUCTION LIMITS. SEEDING AND MULCHING TO BE PAID UNDER ITEM 62510–1000.

GENERAL NOTES (Continue..)

13. STRUCTURAL EXCAVATION AND BEDDING/BACKFILL OF ALL DRAINAGE STRUCTURES (CULVERTS AND CONCRETE HEAD/WING WALLS) SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF STRUCTURES. BEDDING AND BACKFILL MATERIAL SHALL MEET ALL REQUIREMENTS OF FP–03, SECTIONS 209 AND 704. APPROVED EXCESS EXCAVATION MATERIAL MAY BE USED TO REBUILD TURNOUTS, EARTHEN DIKES/BERMS, AND/OR PLACED ALONG ROADWAY SHOULDERS AS EMBANKMENT IN AREAS ADJACENT TO THE REMOVAL WITH PROPER COMPACTION AND AS DIRECTED BY THE COR/AOTR.

14. ALL FURROW AND DRAINAGE DITCHES SHALL BE STAKED AND GRADED TO DRAIN UP TO THE RIGHT–OF–WAY LIMITS. EARTHEN DIKES/BERMS AND DITCHES SHALL BE CONSTRUCTED AS SHOWN ON THESE PLANS AND/OR ADDED AT LOCATIONS DESIGNATED BY THE COR/AOTR. ALL EARTHEN DIKES/BERMSAND FURROW DITCHES SHALL BE PAID FOR UNDER THE APPROPRIATE BID ITEMS FOR THIS WORK AS SHOWN IN THE BID SCHEDULE. AT ALL DRAINAGE PIPE REPLACEMENTS, INSTALLATIONS, EXTENSIONS, AND IN–PLACE PIPE CLEANING LOCATIONS, THE CONTRACTOR SHALL CLEAN, REGRADE, AND RESHAPE THE INLET AND OUTLET CHANNELS TO THE RIGHT–OF–WAY LINE AS DIRECTED BY THE COR/AOTR. THIS WORK SHALL BE INCIDENTAL TO BID ITEMS FOR SECTIONS 602, 603, AND/OR 607.

15. IMMEDIATELY PRIOR TO PLACING EMBANKMENT,OR AGGREGATE BASE THE TOP 152 mm OF THE ORIGINAL GROUND, ORFINISHED SUBGRADE (INCLUDING TURNOUTS) SHALL BE CHECKED FOR COMPACTION AND GRADE. IF COMPACTION DOES NOT MEET THE MINIMUM SPECIFIED COMPACTION AND TOLERANCE REQUIREMENTS, THEORIGINAL GROUND AND/OR SUBGRADE SHALL BE RE–WATERED AND/OR SCARIFIED AS NEEDED AND RE–COMPACTED TO THE REQUIRED DENSITY AND TOLERANCE, AT THE CONTRACTOR'S EXPENSE. IN NO CASE SHALL ANY EMBANKMENT OR SURFACING MATERIAL BE PLACED ON FROZEN, MUDDY OR UNSTABLE NATURAL GROUND OR SUBGRADE. THIS WORK SHALL BE CONSIDERED AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.

16. THE EARTHWORK TABLE SHOWN IS TO ASSIST THE CONTRACTOR IN ESTABLISHING A BID UNDER THE EARTHWORK ITEMS SHOWN IN THE BID SCHEDULE. ANY BORROW MATERIAL CALLED FOR ON THE PLANS SHALL BE TAKEN FROM CONTRACTOR IDENTIFIED SOURCES OUTSIDE THE RIGHT–OF–WAY LIMITS. IT IS THE SOLE RESPONSIBILITY AND EXPENSE OF THE CONTRACTOR TO PROVIDE ANY NECESSARY BORROW MATERIAL FOR THIS PROJECT INCLUDING ALL NECESSARY PERMITS. ALL EXCAVATION, BORROW, WASTE AND EMBANKMENT MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 20401–0000 AND 20403–0000. IF MATERIAL IS APPROVED, THE WASTE MATERIAL SHOWN ON THESE PLANS SHALL BE USED AS NECESSARY TO CONSTRUCT TURNOUTS,EARTHEN DIKES/BERMS , AND/OR BE PLACED AS EMBANKMENT ALONG THE SHOULDERS IN AREAS AS DIRECTED BY THE COR/AOTR. WASTE MATERIAL NOT USED WITHIN THE PROJECT LIMITS, SHALL BE DISPOSED OF AS PER**FP–03**, SECTION 204.14.

17. AT ALL TOP EDGES OF CUT SLOPES 3.0 METER OR HIGHER THAN THE DITCH FLOWLINE, THE CONTRACTOR SHALL REMOVE ALL LOOSE AND UNSTABLE ROCK OR ROCK THAT AS DETERMINED BY THE COR/AOTR, MAY BECOME LOOSE WITHIN 5.0 METER OF THE TOP CUT SLOPE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO BID ITEM 20401–0000,20502–0000AND NO ADDITIONAL PAYMENT WILL BE MADE.

18. THE LOCATION OF UTILITIES AS SHOWN IN THESE PLANS ARE APPROXIMATE AND ARE ONLY TO ASSIST THE CONTRACTOR IN COMPLETING THE WORK. THE CONTRACTOR SHALL CONTACT ALL UTILITY OWNERS PRIOR TO STARTING ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL CONTACT THE NEW MEXICO ONE–CALL AT (800)–321–2537, NAVAJO TRIBAL UTILITY AUTHORITY (NTUA) AT (928)–729–5721AND FRONTIER COMMUNICATION COMPANY AT (928)–871–3748, PRIOR TO STARTING ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITIES AND THEIR LOCATIONS WITH THE UTILITY OWNERS PRIOR TO CONSTRUCTION. ANY UTILITIES DAMAGED DUE TO NEGLIGENCE OF THE CONTRACTOR SHALL BE RESTORED TO CODE REQUIREMENTS AT THE CONTRACTOR'S EXPENSE.

19. THE CONTRACTOR SHALL REMOVE, CLEAN, AND STOCKPILE ALL SALVAGEABLE EXISTING CULVERTS, GUARDRAIL, CATTLE GUARDS AND FENCINGMATERIALS, ETC., AS CALLED FOR ON THESE PLANS AND /OR SECTIONS 203 AND 607 IN A DESIGNATED LOCATION ADJACENT TO THE REMOVAL LOCATION BUT OUTSIDE OF THE RIGHT–OF–WAY. THE COR/AOTR SHALL OFFER THIS SALVAGED MATERIALS TO THE COMMUNITY MEMBERS AND/OR PROPERTY OWNERS. IF THEY ACCEPT, THE MATERIALS MUST BE PICKED THAT SAME DAY. ANY PIPE MATERIALS DETERMINED TO BE UNUSEABLE BY THE COR/AOTR OR UNACCEPTABLE BY THE LAND OWNER/COMMUNITY MEMBERS SHALL BE DISPOSED OF BY THE CONTRACTORIN ACCORDANCE WITH SECTIONS 107 AND 203. THE SALVAGE WORK SHALL BE INCLUDED IN THE APPROPRIATE UNIT PRICE BID ITEMS FOR SECTIONS 203 AND/OR 607.

20. THE ROADWAY TYPICAL SECTION SHOWN IS THE BASIC TEMPLATE TO WHICH THE PROJECT IS TO BE STAKED AND BUILT. HOWEVER, THERE WILL BE LOCATIONS WHERE, DUE TO EXISTING GROUND CONDITIONS, TURNOUTS, CULVERTS OR OTHER STRUCTURES, ETC., THE SHOWN TYPICAL SLOPES CANNOT BE CONSTRUCTED. IN THIS CASE, THE NRDOT PLANNING & DESIGN BRANCH CHIEF, THROUGH THE COR/AOTR, SHALL BE CONSULTED FOR CHANGES IN THE TYPICAL SECTIONS, DESIGN SLOPES, AND/OR OTHER ADJUSTMENTS BEFORE PROCEEDING WITH THE WORK UNLESS NOTED OTHERWISE ON THE PLANS. THE FINAL CONSTRUCTED ROAD SECTION SHALL BE BASED ON THE GOVERNMENT FURNISHED COMPUTERIZED STAKING REPORT AS ADJUSTED TO FIT FIELD CONDITIONS. THE CONTRACTOR SHALL STAY WITHIN THE LIMITS OF CONSTRUCTION, UNLESS OTHERWISE APPROVED. IN NO CASE SHALL THE CUT AND FILL BACK SLOPES BE BUILT STEEPER THAN THE MAXIMUM ALLOWED IN THE ROADWAY TYPICAL SECTION SHOWN.

21. THE CONTRACTOR SHALL SAW CUT (FULL DEPTH) THE EXISTING ASPHALT PAVEMENT WHERE NEW ASPHALT IS TO TIE INTO THE OLD ASPHALT PAVEMENT AT THE LOCATIONS NOTED ON THE PLANS. THE CONTRACTOR SHALL MATCH THE NEW ASPHALTIC CONCRETE PAVEMENT SURFACE TO EXISTING PAVEMENT SECTION AT TIE–IN POINTS AND TO PROVIDE FOR A SMOOTH TRANSITION AS DIRECTED BY THE COR/AOTR. ALL SAWED PAVEMENT EDGES TO RECEIVE ASPHALT TACK COAT. THIS WORK SHALL BE INCIDENTAL TO BID ITEM 40201–0500 AS SHOWN IN THE BID SCHEDULE.

22. ANY EXISTING OR NEW ROADSIDE FEATURES OR OTHER IMPROVEMENTS NEGLIGENTLY DAMAGED BY THE CONTRACTOR, DURING CONSTRUCTION, SHALL BE RESTORED/REPLACED IN EQUAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE.

23. REMOVAL AND RE–ATTACHMENT OF FENCING REQUIRED TO COMPLETE SPECIFIED WORK AT DRAINAGE STRUCTURES, CATTLE GUARDS, GATES, TURNOUTS, RIPRAP, ETC., SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEMS RELATED TO THE WORK REQUIRING SAID FENCE REMOVAL/RE–ATTACHMENT. FENCING REPAIRS, TEMPORARY FENCING AND/OR REMOVAL AND RE–ATTACHMENT OF FENCING, SHALL BE COMPLETED IN THE SAME WORK DAY SO AS NOT TO ALLOW LIVESTOCK ONTO THE PROJECT. IF WIRE TENSION IS LOST IN THE EXISTING FENCE, THE CONTRACTOR SHALL RE–TIGHTEN THE FENCE AS DIRECTED BY THE COR/AOTR.

GENERAL NOTES (Continue..)

24. THE CONTRACTOR SHALL REMOVE BIA ROUTE N31 EXISTING ROADSIDE SIGNS THAT INTERFERE WITH ROAD CONSTRUCTION AND/OR CONTRADICT THE CONTRACTOR'S TEMPORARY TRAFFIC CONTROL PLAN, AT THE START OF THE CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE COR/AOTR AT LEAST THREE (3) WORKING DAYS IN ADVANCE OF SUCH SIGN REMOVAL. THESE ROADSIDE SIGNS SHALL BE SALVAGED AND TAKEN TO THE **FORT DEFIANCE MAINTENANCE YARD**. SIGNS NEEDED FOR SAFETY/INFORMATION SHALL BE TEMPORARILY RESET AS DIRECTED BY THE COR/AOTR. ALL REMAINING SIGNS ALONG THE EXISTING N31 ROADWAY, NOT SPECIFICALLY DESIGNATED ON THE PLANS TO REMAIN, SHALL BE REMOVED. THIS WORK SHALL BE CONSIDERED AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.

25. GRADE AND SHAPE THE SHOULDER AND DITCHES (AS DIRECTED BY COR/AOTR) FROM THE SUBGRADE HINGE POINTS TO AND INCLUDING THE EXISTING DITCH LINE AREAS FOR THE CONSTRUCTION OF RIPRAP DITCH LININGS, SLOPE PROTECTION, AND RUNDOWNS. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE RIPRAP ITEMS SHOWN IN THE BID SCHEDULE.

26. AT MAJOR DRAINAGE STRUCTURES AND LIVESTOCK PASS LOCATIONS, THE CONTRACTOR SHALL EITHER TIE THE WING FENCES TO STRUCTURES IN ACCORDANCE WITH THE DETAILS ON SHEET 62 OF 76 OR INSTALL FENCE OVER THE STRUCTURE AT THE CLEAR RECOVERY ZONE AS NOTED ON THE PLANS. IF NO CORNER FENCE POST/BRACE/STRAIN EXISTS AT TIE–IN TO RIGHT–OF–WAY FENCE, THE CONTRACTOR SHALL INSTALL A STRAIN POST ASSEMBLY AS PER PLAN SHEET 62 OF 76. ANY EXISTING CATTLE PASS CLOSURES ARE TO BE REMOVED. THIS WORK TO BE INCIDENTAL TO BID ITEM 61901–3400 AND NO ADDITIONAL PAYMENT SHALL BE MADE.

27. ALL RIGHT–OF–WAY REFERENCE MARKERS SHALL BE LABELED IN THE METRIC UNITS OF MEASURE. ALL EXISTING AND NEW BRASS CAPS SHALL BE STAMPED WITH BOTH ALIGNMENT STATIONING AND ELEVATIONS IN METRIC, UNLESS OTHERWISE NOTED UNDER SECTION 152 OF THE SUPPLEMENTAL SPECIFICATIONS. ANY EXISTING R/W MONUMENTS AND BRASS CAPS MISSING SHALL BE RE–SURVEYED–IN TO THEIR ORIGINAL POSITION AND LABELED AND STAMPED ACCORDINGLY. ALL EXISTING REFERENCE MARKERS SHALL BE SAND BLASTED, CLEAN, AND REPAINTED WITH ENGLISH STATIONS ON ONE SIDE AND METRIC STATIONS ON THE OTHER. ANY MISSING OR DAMAGED MARKERS SHALL BE RE–SURVEYED AND REPLACED. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 62101–0000 AND 62102–0000.

28. THERE ARE A NUMBER OF ARCHAEOLOGICAL SITE MITIGATIONS THAT ARE NOTED ON THE PLANS. THE CONTRACTOR SHALL NOTIFY THE NAVAJO NATION DEPARTMENT OF TRANSPORTATION (NNDOT) ROADS CULTURAL RESOURCE MANAGEMENT (RCRM)AS REQUIRED PRIOR TO STARTING CONSTRUCTION ACTIVITIES IN THESE LOCATIONS. SEE THE SPECIAL CONTRACT REQUIREMENT SECTION OF THE CONTRACT FOR ADDITIONAL INFORMATION, AND REQUIREMENTS.THE CONTRACTOR SHALL PLACE TEMPORARY FLEXIBLE SAFETY FENCE AROUNDTHE ARCHAEOLOGY SITE(S) AS NOTED ON THE PLANS. THE FENCING MATERIAL SHALL BE SQUARE LINK (ORANGE COLOR) PLASTIC TYPE MADE OF HI–DENSITY HDPE, AS PER SECTION 710.11 OF**FP–03**. TEMPORARY ARCHAEOLOGY FENCING SHALL BE CONSIDERED INCIDENTAL OBLIGATIONS OF THE CONTRACTORIF A SPECIFIC BID ITEMS IS NOT SHOWN ON THE BID SCHEDULE.

29. AS–BUILTS PLAN AND PROFILE SHEETS [OF PROJECT N31(4)2&4] SHALL BE PROVIDED UPON WRITTEN REQUEST TO THE COR/AOTR. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEYINGANDCHECKING THE EXISTING ROADWAY (HORIZONTAL AND VERTICAL) CENTERLINE ALIGNMENT TO INSURE THE PREVIOUS PROJECT ALIGNMENT MATCHES THE NEW ROADWAY ALIGNMENT AT THE BOP. REGRADE AND RESHAPE THE EXISTING ROADSIDE DITCHES AS NEEDED TO MATCH THE NEW DITCH LINES. THE CONTRACTOR IS ADVISED THAT MUCH OF THE INFORMATION FOUND ON THE AS–BUILT PLANS HAS BEEN REVISED/UPDATED/CORRECTED FOR THE CURRENT PROJECT. THE AS–BUILT PLANS ARE PROVIDED FOR BACKGROUND INFORMATION ONLY. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 15201–0000, 20401–0000, AND 40201–0500.

30. THE GEO–TECHNICAL REPORT FOR THIS PROJECT SHALL BE PROVIDED UPON WRITTEN REQUEST FROM THE CONTRACTOR THRU COR/AOTR.

31. ROADWAY END AREA AND PIPE CROSS SECTION DRAWINGS WILL BE PROVIDED IN EITHER HARD COPY OR ELECTRONIC FORMAT UPON WRITTEN REQUEST FROM THE CONTRACTOR THRU COR/AOTR.

32. AT THE COMPLETION OF THE CONSTRUCTION, THE CONTRACTOR SHALL INSPECT THE INTERIOR OF ALL NEWLY INSTALLED OR EXTENDED/CLEANED CULVERTS, CATTLEGUARDS, AND/OR OTHER EXISTING DRAINAGE STRUCTURES. THESE STRUCTURES SHALL BE MAINTAINED IN A CLEAN CONDITION, FREE OF SILT AND OTHER DEBRIS UNTIL FINAL ACCEPTANCE OF THE PROJECT. THIS WORK SHALL BE CONSIDERED AN INCIDENTAL OBLIGATIONS OF THE CONTRACTOR UNDER THE APPROPRIATE BID ITEMS, FOR SECTIONS 602, 603, 607, AND 619.

33. THERE ARE NUMBER OF LOCATIONS WHERE RIPRAP, CHANNEL FLOWLINE GRADING, TURNOUTS, ETC., WILL REQUIRE WORK AND IMPROVEMENTS PLACED THROUGH AND BEYOND THE RIGHT–OF–WAY FENCING LOCATIONS. IN THESE LOCATIONS, THE RIGHT–OF–WAY FENCING SHALL BE ADJUSTED (POST SPACING, VERTICAL ALIGNMENT, POST INSTALLATIONS THROUGH RIPRAP, RIGHT–OF–WAY MONUMENT/MARKER ADJUSTMENT, ETC.) AS DIRECTED BY THE COR/AOTR. THIS WORK TO BE INCIDENTAL TO BID ITEMS 61901–3400, 62101–0000, AND 62102–0000, AND NO ADDITIONAL PAYMENT WILL BE MADE.

34. IT IS EXPECTED ADJUSTMENTS IN RIGHTS–OF–WAY GRANT REFERENCE MARKERS WILL BE DETERMINED DURING THE CONSTRUCTION OF THE N31(4) PROJECT. THE CONTRACTOR SHALL NOT SURVEY OR INSTALL R.O.W. MONUMENTS AND MARKERS OR FENCINGS UNTIL EXPRESSLY APPROVED BY THE NRDOT DIVISION MANAGER THROUGH THE COR/AOTR. FENCING CAN BE PLACED AT ALL ARCHAEOLOGICAL SITES IF SPECIFIED ON THE PLANS.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GENERAL NOTES

DRAWN BY: NRDOT	DATE: 12/10/2009
DESIGNED BY: NRDOT	DATE: 12/10/2009
REVISED: 1/31/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	4	76

N31(4)1,2&4 HORIZONTAL ALIGNMENT TABLE

POI	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
BOP	4+770.000			549,518.244	725,783.978
		Linear= 45.005 (m)	S 24°59'50"E		
PC	4+815.005			549,477.455	725,802.996
PI	4+950.003	CURVE DATA		549,355.102	725,860.043
		Delta = 8°17'00"Lt.			
		R = 1864.335 (m)			
		L = 269.526 (m)			
		T = 134.998 (m)			
		e = 4.881 (m)			
PT	5+084.531			549,242.244	725,934.122
		Linear= 135.109	S 33°16'50"E		
PC	5+219.640			549,129.294	726,008.261
PI	5+338.326	CURVE DATA		549,030.074	726,073.388
		Delta = 45°56'31"Lt.			
		R = 280.000 (m)			
		L = 224.514 (m)			
		T = 118.685 (m)			
		e = 24.115 (m)			
PT	5+444.154			549,007.880	726,189.980
		Linear= 770.703	S 79°13'20"E		
PC	6+214.857			548,863.760	726,947.088
PI	6+435.863	CURVE DATA		548,822.432	727,164.195
		Delta = 9°34'42"Rt.			
		R = 215.000 (m)			
		L = 343.644 (m)			
		T = 221.006 (m)			
		e = 93.332 (m)			
PT	6+558.501			548,606.545	727,116.903
		Linear= 102.958	S 1°21'22"W		
PC	6+661.460			548,505.972	727,094.871
PI	6+849.600	CURVE DATA		548,322.189	727,054.612
		Delta = 92°32'01"Lt.			
		R = 180.000 (m)			
		L = 290.703 (m)			
		T = 188.141 (m)			
		e = 80.379 (m)			
PT	6+952.163			548,290.093	727,239.995
		Linear= 278.830	S 80°10'39"E		
PC	7+230.993			548,242.525	727,514.738
PI	7+274.992	CURVE DATA		548,235.019	727,558.092
		Delta = 15°46'13"Rt.			
		R = 317.689 (m)			
		L = 87.442 (m)			
		T = 43.999 (m)			
		e = 3.032 (m)			
PT	7+318.435			548,216.013	727,597.774
		Linear= 638.406	S 64°24'26"E		
PC	7+956.841			547,940.239	728,173.544
PI	8+026.839	CURVE DATA		547,910.002	728,236.675
		Delta = 2°03'49"Lt.			
		R = 376.509 (m)			
		L = 138.416 (m)			
		T = 69.998 (m)			
		e = 6.452 (m)			
PT	8+095.257			547,904.474	728,306.454
		Linear= 794.329	S 85°28'15"E		
PC	8+889.587			547,841.750	729,098.303
PI	8+995.602	CURVE DATA		547,833.378	729,203.988
		Delta = 32°22'45"Lt.			
		R = 365.156 (m)			
		L = 206.358 (m)			
		T = 106.016 (m)			
		e = 15.078 (m)			
PT	9+095.944			547,882.904	729,297.724
		Linear= 244.223	N 62°09'00"E		
PC	9+340.168			547,996.996	729,513.659
PI	9+439.577	CURVE DATA		548,043.436	729,601.554
		Delta = 2°03'32"Rt.			
		R = 534.829 (m)			
		L = 196.575 (m)			
		T = 99.409 (m)			
		e = 9.160 (m)			
PT	9+536.743			548,055.191	729,700.266
		Linear= 174.381	N 83°12'32"E		
PC	9+711.124			548,075.811	729,873.424
PI	9+872.757	CURVE DATA		548,094.924	730,033.923
		Delta = 59°59'23"Lt.			
		R = 280.015 (m)			
		L = 293.180 (m)			
		T = 161.633 (m)			
		e = 43.302 (m)			
PT	10+004.304			548,243.465	730,097.647

POINT	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
PT	10+004.304			548,243.465	730,097.647
		Linear= 520.009	N 2°13'09"E		
PC	10+524.313			548,721.355	730,302.660
PI	10+622.468	CURVE DATA		548,811.560	730,341.358
		Delta = 38°38'19"Rt.			
		R = 279.984 (m)			
		L = 188.812 (m)			
		T = 98.155 (m)			
		e = 16.707 (m)			
PT	10+713.126			548,857.856	730,427.908
		Linear= 142.951	N 6°51'28"E		
PC	10+856.077			548,925.280	730,553.960
PI	10+923.946	CURVE DATA		548,957.291	730,613.805
		Delta = 8°06'08"Lt.			
		R = 958.288 (m)			
		L = 135.511 (m)			
		T = 67.869 (m)			
		e = 2.400 (m)			
PT	10+991.588			548,997.417	730,668.541
		Linear= 549.470	N 5°45'20"E		
PC	11+541.058			549,322.281	731,111.690
PI	11+624.282	CURVE DATA		549,371.485	731,178.810
		Delta = 2°17'58"Lt.			
		R = 442.577 (m)			
		L = 164.525 (m)			
		T = 83.223 (m)			
		e = 7.757 (m)			
PT	11+705.584			549,441.709	731,223.472
		Linear= 107.318	N 3°27'23"E		
PC	11+812.902			549,532.264	731,281.065
PI	11+898.724	CURVE DATA		549,604.682	731,327.123
		Delta = 6°23'36"Rt.			
		R = 1536.639 (m)			
		L = 171.467 (m)			
		T = 85.823 (m)			
		e = 2.395 (m)			
PT	11+984.369			549,671.520	731,380.957
		Linear= 112.196	N 38°50'59"E		
PC	12+096.565			549,758.898	731,451.336
PI	12+361.493	CURVE DATA		549,965.222	731,617.519
		Delta = 11°44'28"			
		R = 160.000 (m)			
		L = 328.796 (m)			
		T = 264.928 (m)			
		e = 149.494 (m)			
PT	12+425.361			549,722.100	731,722.774
		Linear= 373.544	S 23°24'33"E		
PC	12+798.905			549,379.302	731,871.180
PI	12+836.055	CURVE DATA		549,345.209	731,885.940
		Delta = 15°06'57"Lt.			
		R = 280.000 (m)			
		L = 73.869 (m)			
		T = 37.150 (m)			
		e = 2.454 (m)			
PT	12+872.774			549,316.145	731,909.079
		Linear= 107.321	S 38°31'29"E		
PC	12+980.095			549,232.184	731,975.924
PI	13+038.406	CURVE DATA		549,186.565	732,012.243
		Delta = 23°31'41"Lt.			
		R = 280.000 (m)			
		L = 114.980 (m)			
		T = 58.312 (m)			
		e = 6.007 (m)			
PT	13+095.074			549,159.236	732,063.755
		Linear= 269.801	S 6°03'10"E		
PC	13+364.875			549,032.792	732,302.091
PI	13+502.032	CURVE DATA		548,968.513	732,423.253
		Delta = 8°05'43"Lt.			
		R = 163.182 (m)			
		L = 228.116 (m)			
		T = 137.157 (m)			
		e = 49.986 (m)			
PT	13+592.991			549,076.812	732,507.416
		Linear= 87.009 m)	N 37°51'07"E		
EOP	13+680.00			549,145.514	732,560.807

GENERAL NOTES

1. SURVEY WAS CONSTRUCTED BY GPS OBSERVATIONS UNDER THE DIRECTION OF THE BIA. NAVAJO REGIONAL OFFICE, DIVISION OF TRANSPORTATION, GALLUP, NM.
2. ALL CONTROL POINTS ARE CONCRETE CYLINDERS SET WITH BRASS DISK AND NO. 5 REBAR SET FLUSH WITH THE GROUND. 1 TO 2 HOUR STATIC NETWORK OBSERVATIONS WERE HELD FOR CONTROL POINTS BM16, BM29, BM39, BM44, CP1 AND P34A WITH 95% CONFIDENCE LEVEL. CONRTOL POINT P34A WAS HELD FOR THE HORIZONTAL CONSTRAINTS. ALL OTHER CONTROLS WERE MEASURED BY GPS RTK-OBSERVATION CONTROL AND VERIFIED WITH GPS RTK-TOPO FIELD MEASUREMENTS. PRECISION ACCURACY IS 1:5000 OR BETTER - THIRD ORDER. SEE SHEET 8 OF 76 FOR DETAILS.
3. THE BASIS OF BEARING WAS OBTAINED FROM GPS SESSIONS HOLDING GEODETIC MONUMENT "P34A" LOCATED IN WINDOW ROCK, AZ. NEAR THE NORTH RUNWAY OF THE WINDOW ROCK AIRPORT. THE MONUMENT WAS FOUND IN GOOD CONDITION AT THE TIME OF OUR SURVEY. PUBLISHED COORDINATES ARE AS FOLLOWS: GRID SPC 83 NM(W) N=517,514.834, E=718,921.623, EL.2055.100(NAVD88 VERTON SHIFT NGV29); GEODETIC COORDINATES: 35°39'36.68855"(N) 109°03'36.46005"(W); ARIZONA STATE PLANE COORDINATES - EAST ZONE: N=517,376.934 M, E=313,547.873 M.
4. BASIS OF VERTICAL ELEVATIONS HELD WAS HOLDING SCP-16, NM-SPC-WZ GRID COORDINATES: N=549,244.737 M, E=725,585.541 M, ELV.=2199.403 M, GROUND COORDINATES: N=549,412.924 M, E=725,807.726 M CONCRETE CYLINDER WITH DISK, WHICH DERIVED FROM PREVIOUS PROJECT N31(2) LEVEL RUN (NACD29).
5. PROJECT N31(4)1,2&4 CENTERLINE WAS STAKED WITH GPS REAL TIME PROCEDURES, TOPO-GRAPHIC-DESIGN SURVEY COMMENCED ON MAY 2001 AND WAS COMPLETED JUNE 03, 2011.

GENERAL NOTES (Cont.)

6. THE COMBINED SCALE FACTOR (GROUND TO GRID) USED FOR THIS PROJECT IS 0.999693879(1.0003062147).
7. THE SECTION CORNERS DEPICTED ON THIS DRAWING WERE RECOVERED IN FIELD, MAY 2009.
8. THE RECORD BEARINGS FOR THE CADASTRAL SURVEY SHOWN WERE TAKEN FROM RECORDED DOCUMENTS OBTAINED FROM THE BUREAU OF LAND MANAGEMENT, SANTA FE, NM FOR TOWNSHIP 20 NORTH, RANGE 20 WEST, APPROVED FEBUARY 05, 1947.
9. RECORD OF SURVEY IS FILED AT BIA, NAVAJO REGIONAL, DIVISION OF TRANSPORTATION, GALLUP, NM.
10. NO UTILITY EASEMENT RECORDS WERE AVAILABLE DURING TIME OF SURVEY.
11. SEE SHEET 08 OF 76 FOR CONTROL POINT TABLE.

SUPERELEVATION TABLE

Station	Left Rate	Right Rate	Point Type
C1	Normal Crown		
C2			
5+198.357	-2.00%	-2.00%	Runout
5+210.122	-2.00%	0.00%	Runoff
5+219.640	-2.00%	1.62%	PC
5+221.887	-2.00%	2.00%	Reverse Crown
5+230.122	-3.40%	3.40%	Full Super
5+433.672	-3.40%	3.40%	Full Super
5+441.907	-2.00%	2.00%	Reverse Crown
5+444.154	-2.00%	1.62%	PT
5+453.672	-2.00%	0.00%	Runoff
5+465.436	-2.00%	-2.00%	Runout
C3			
6+191.257	-2.00%	-2.00%	Runout
6+203.362	0.00%	-2.00%	Runoff
6+214.857	1.90%	-2.00%	PC
6+215.468	2.00%	-2.00%	Reverse Crown
6+226.362	3.80%	-3.80%	Full Super
6+546.836	3.80%	-3.80%	Full Super
6+557.731	2.00%	-2.00%	Reverse Crown
6+558.501	1.87%	-2.00%	PT
6+569.836	0.00%	-2.00%	Runoff
6+581.942	-2.00%	-2.00%	Runout
C4			
6+637.240	-2.00%	-2.00%	Runout
6+649.240	-2.00%	0.00%	Runoff
6+661.240	-2.00%	2.00%	Reverse Crown
6+661.460	-2.04%	2.04%	PC
6+673.240	-4.00%	4.00%	Full Super
6+940.182	-4.00%	4.00%	Full Super
6+952.163	-2.00%	2.00%	PT
6+952.182	-2.00%	2.00%	Reverse Crown
6+964.182	-2.00%	0.00%	Runoff
6+976.182	-2.00%	-2.00%	Runout
C5			
7+210.206	-2.00%	-2.00%	Runout
7+222.081	0.00%	-2.00%	Runoff
7+230.993	1.50%	-2.00%	PC
7+233.956	2.00%	-2.00%	Reverse Crown
7+241.081	3.20%	-3.20%	Full Super
7+308.096	3.20%	-3.20%	Full Super
7+315.221	2.00%	-2.00%	Reverse Crown
7+318.435	1.46%	-2.00%	PT
7+327.096	0.00%	-2.00%	Runoff
7+338.971	-2.00%	-2.00%	Runout
C6			
7+936.630	-2.00%	-2.00%	Runout
7+948.630	-2.00%	0.00%	Runoff
7+956.841	-2.00%	1.37%	PC
7+960.630	-2.00%	2.00%	Reverse Crown
7+966.630	-3.00%	3.00%	Full Super
8+085.249	-3.00%	3.00%	Full Super
8+091.249	-2.00%	2.00%	Reverse Crown
8+095.257	-2.00%	1.33%	PT
8+103.249	-2.00%	0.00%	Runoff
8+115.249	-2.00%	-2.00%	Runout
C7			
8+869.379	-2.00%	-2.00%	Runout
8+881.379	-2.00%	0.00%	Runoff
8+889.587	-2.00%	1.37%	PC
8+893.379	-2.00%	2.00%	Reverse Crown
8+899.379	-3.00%	3.00%	Full Super
9+085.939	-3.00%	3.00%	Full Super
9+091.939	-2.00%	2.00%	Reverse Crown
9+095.944	-2.00%	1.33%	PT
9+103.939	-2.00%	0.00%	Runoff
9+115.939	-2.00%	-2.00%	Runout
C8			
9+321.109	-2.00%	-2.00%	Runout
9+333.417	0.00%	-2.00%	Runoff
9+340.168	1.10%	-2.00%	PC
9+345.725	2.00%	-2.00%	Reverse Crown
9+349.417	2.60%	-2.60%	Full Super
9+527.314	2.60%	-2.60%	Full Super
9+531.006	2.00%	-2.00%	Reverse Crown
9+536.743	1.07%	-2.00%	PT
9+543.314	0.00%	-2.00%	Runoff
9+555.621	-2.00%	-2.00%	Runout
C9			
9+689.760	-2.00%	-2.00%	Runout
9+701.525	-2.00%	0.00%	Runoff
9+711.124	-2.00%	1.63%	PC
9+713.289	-2.00%	2.00%	Reverse Crown
9+721.525	-3.40%	3.40%	Full Super
9+993.722	-3.40%	3.40%	Full Super
10+001.957	-2.00%	2.00%	Reverse Crown
10+004.304	-2.00%	1.60%	PT
10+013.722	-2.00%	0.00%	Runoff
10+025.486	-2.00%	-2.00%	Runout

Station	Left Rate	Right Rate	Point Type
C10			
10+502.940	-2.00%	-2.00%	Runout
10+514.705	0.00%	-2.00%	Runoff
10+524.313	1.63%	-2.00%	PC
10+526.470	2.00%	-2.00%	Reverse Crown
10+534.705	3.40%	-3.40%	Full Super
10+702.589	3.40%	-3.40%	Full Super
10+710.824	2.00%	-2.00%	Reverse Crown
10+713.126	1.61%	-2.00%	PT
10+722.589	0.00%	-2.00%	Runoff
10+734.353	-2.00%	-2.00%	Runout
C11			
10+839.838	-2.00%	-2.00%	Runout
10+851.838	-2.00%	0.00%	Runoff
10+856.077	-2.00%	0.71%	PC
10+863.838	-2.00%	2.00%	Reverse Crown
10+983.654	-2.00%	2.00%	Reverse Crown
10+991.588	-2.00%	0.68%	PT
10+995.654	-2.00%	0.00%	Runoff
11+007.654	-2.00%	-2.00%	Runout
C12			
11+521.459	-1.81%	-2.00%	Runout
11+521.460	-2.00%	0.00%	Runoff
11+541.058	-2.00%	1.23%	PC
11+545.745	-2.00%	2.00%	Reverse Crown
11+550.602	-2.80%	2.80%	Full Super
11+695.903	-2.80%	2.80%	Full Super
11+700.760	-2.00%	2.00%	Reverse Crown
11+705.584	-2.00%	1.21%	PT
11+712.903	-2.00%	0.00%	Runoff
11+725.046	-2.00%	-2.00%	Runout
C13	Normal Crown		
C14			
12+072.403	-2.00%	-2.00%	Runout
12+084.403	0.00%	-2.00%	Runoff
12+096.403	2.00%	-2.00%	Reverse Crown
12+096.565	2.03%	-2.03%	PC
12+108.403	4.00%	-4.00%	Full Super
12+413.428	4.00%	-4.00%	Full Super
12+425.361	2.01%	-2.01%	PT
12+425.428	2.00%	-2.00%	Reverse Crown
12+437.428	0.00%	-2.00%	Runoff
12+449.428	-2.00%	-2.00%	Runout
C15			
12+777.554	-2.00%	-2.00%	Runout
12+789.319	-2.00%	0.00%	Runoff
12+798.905	-2.00%	1.63%	PC
12+801.084	-2.00%	2.00%	Reverse Crown
12+809.319	-3.40%	3.40%	Full Super
12+862.272	-3.40%	3.40%	Full Super
12+870.507	-2.00%	2.00%	Reverse Crown
12+872.774	-2.00%	1.61%	PT
12+882.272	-2.00%	0.00%	Runoff
12+894.037	-2.00%	-2.00%	Runout
C16			
12+958.846	-2.00%	-2.00%	Runout
12+970.610	-2.00%	0.00%	Runoff
12+980.095	-2.00%	1.61%	PC
12+982.375	-2.00%	2.00%	Reverse Crown
12+990.610	-3.40%	3.40%	Full Super
13+084.506	-3.40%	3.40%	Full Super
13+092.741	-2.00%	2.00%	Reverse Crown
13+095.074	-2.00%	1.60%	PT
13+104.506	-2.00%	0.00%	Runoff
13+116.271	-2.00%	-2.00%	Runout
C17			
13+340.707	-2.00%	-2.00%	Runout
13+352.707	-2.00%	0.00%	Runoff
13+364.707	-2.00%	2.00%	Reverse Crown
13+364.875	-2.03%	2.03%	PC
13+376.707	-4.00%	4.00%	Full Super
13+581.089	-4.00%	4.00%	Full Super
13+592.991	-2.02%	2.02%	PT
13+593.089	-2.00%	2.00%	Reverse Crown
13+605.089	-2.00%	0.00%	Runoff
13+617.089	-2.00%	-2.00%	Runout

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ALIGNMENT AND SUPERELEVATION TABLE

DRAWN BY: NRDOT	DATE: 9/7/2006
DESIGNED BY: NRDOT	DATE: 9/7/2006
REVISED: 1/31/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 04_N31 Ali_Data.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	5	76

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	QUANTITY	Units
10901-0000	Extra & Miscellaneous Work Authorized under Section 109.02(m)	All Req'd	Lump Sum
15101-0000	Mobilization	All Req'd	Lump Sum
15201-0000	Construction Survey and Staking	All Req'd	Lump Sum
15301-0020	Contractor Quality Control	10,000	Man Hrs.
15701-0000	Temporary Erosion Control	All Req'd	Lump Sum
15708-1000	Temporary Straw Mulching	15.72	ha
20102-0000	Clearing & Grubbing	All Req'd	Lump Sum
20304-1000	Removal of Structures & Obstructions	All Req'd	Lump Sum
20401-0000	Roadway Excavation	145,578	m^3
20425-2000	Furrow Ditches	1,500	m
20420-0000	Embankment Construction	1,530	m^3
20443-1000	Earthen Dike & Berm, Type B	150	m
20502-0000	Controlled Blasting	1,371.88	m^2
20601-0000	Development of Water Supply	47.99	M-Liter
20801-0000	Structural Excavation	108.00	m^3
20802-0000	Foundation Fill	34.00	m^3
21102-2000	Roadway Obliteration, Method 2	All Req'd	Lump Sum
21301-4000	Subgrade Stabilization with RoadBond, 152 mm depth	3,713.41	m^2
25101-2000	Placed Riprap , Class-2	1,404.13	m^3
25101-3000	Placed Riprap , Class-3	167.58	m^3
25110-2000	Grouted Riprap Class-2,	197.72	m^3
25112-2000	Wire Enclosed Riprap, Class 2	1,540.36	m^3
25302-1000	Gabions, Aluminized Coated, Class 2	851.04	m^3
30101-2000	Untreated Aggregate Base, Grading Special	30,934.69	t
40201-0500	Hot Asphaltic Concrete Pavement,Class B, Grade B, Type III Smoothness	11,867.15	t
40502-0800	Asphalt Binder, Grade PG-58-28	652.70	t
41101-5000	Prime Coat - Penetrating Emulsified Prime, Grade PEP	104.86	t
55201-0200	Structural Concrete, Class A(AE)	336.00	m^3
55301-3300	Precast, Prestressed Concrete	12	Each
55401-1000	Reinforcing Steel Grade 420	12,040.00	kg
55401-2000	Epoxy Coated, Reinforcing Steel, Grade 420	23,629.00	kg
55601-0800	Bridge Railing, Concrete, Jersey Safety Shape	169.00	m
56501-0400	Drilled Shafts, 900 Millimeter Diameter	121.00	m
60101-1000	Minor Concrete, Class A(AE)	261.26	m^3
60201-0410	305 mm Corrugated Steel Pipe, Aluminum Alloy coated, type 2	21.34	m
60201-0810	610 mm Corrugated Steel Pipe, Aluminum Alloy coated, type 2	587.52	m
60201-0910	762 mm Corrugated Steel Pipe, Aluminum Alloy coated, type 2	110.36	m
60201-1010	914 mm Corrugated Steel Pipe, Aluminum Alloy coated, type 2	92.67	m
60201-1110	1067 mm Corrugated Steel Pipe, Aluminum Alloy coated	105.38	m
60201-1210	1219 mm Corrugated Steel Pipe, Aluminum Alloy coated	73.16	m
60201-1810	2134 mm Corrugated Steel Pipe, Aluminum Alloy coated	146.31	m
60202-0510	711 mm Span x 508 mm Rise Corrugated Steel Pipe-Arch, Aluminum Alloy coated	42.67	m
60202-0710	1067 mm Span x 737 mm Rise Corrugated Steel Pipe-Arch, Aluminum Alloy coated	78.04	m
60202-1450	2210 mm Span x 1600 mm Rise Corrugated Steel Pipe-Arch, Aluminum Alloy coated	212.81	m
60210-0810	End Section 610 mm CSPC, Aluminum Alloy coated	32	Each
60210-0910	End section 762 mm CSPC, Aluminum Alloy coated	5	Each
60210-1010	End Section 914 mm CSPC, Aluminum Alloy coated	4	Each
60210-1110	End Section 1067 mm CSPC, Aluminum Alloy coated	4	Each
60211-0910	End Section 711 mm Span x 508 mm Rise CSPA, Aluminum Alloy coated	2	Each
60211-1110	End Section 1067 mm Span x 737 mm Rise CSPA, Aluminum Alloy coated	4	Each
60221-4050	3.66 m span x 2.44 m rise Reinforced CBC, Single Barrel with Wingwall & Footing	22.23	m
60221-4150	3.66 m span x 3.05 m rise Reinforced CBC, Single Barrel with Wingwall & Footing	28.55	m
60222-1900	2.44 m span x 1.83 m rise, Reinforced CBC, Double Barrel with Wingwall & Footing	11.85	m
60701-1000	Remove, Clean and Stockpiling Pipe	452.61	m
60812-0400	Concrete Spillway, Type IV, for Guardrail curbing	1	Each
61701-5000	Guardrail System, SGR04b, Type PDE02 with ET-Plus End Treatment	581.77	m
61707-0000	Thrie-Beam Guardrail, ET-Plus	23	m
61901-3400	Fence, 4-Strand, WildLife Fencing	17,782.75	m
61902-1300	Type 1 Gate only	5	Each
61903-0310	Cattleguard, 4900 mm Width with Gate	13	Each
61903-0710	Cattleguard, 7190 mm Width with Gate	5	Each
61903-1010	Cattleguard, 9480 mm Width with Gate	1	Each
62101-0000	Right-Of-Way Monument	113	Each
62102-0000	Reference Marker	113	Each
62510-1000	Seeding, Dry Method	15.72	ha
62901-1100	Erosion Control Matting, Type IV	26,942	m^2
63302-0003	Sign Installation 1 Post & Hardware: 4.10 kg/m	21.42	m^2
63302-0010	Sign Installation 2 Post & Hardware: 2.98 kg/m	18.50	m^2
63302-0023	Sign Installation 3 Post & Hardware: 4.47 kg/m	11.50	m^2
63308-2000	Object Marker, glass fiber, Type 2	82	Each
63308-3000	Object Marker, glass fiber, Type 3, 1-Post and Hardware, 2.98 kg/m	4	Each
63309-0010	Delineator, glass fiber, Type "1a"	4	Each
63309-0020	Delineator, glass fiber, Type "1b"	122	Each
63318-1000	Milepost, 1 Post & Hardware: 2.98 kg/m	24	Each
63401-1510	Pavement Markings, Type "H" Solid Yellow	7,169	m
63401-1520	Pavement Markings, Type "H" Solid White	17,317.50	m
63401-1610	Pavement Markings, Type "H" Broken Yellow	5,451	m
63405-3260	Pavement Markings, Type "H" STOP bar	6	Each
63501-0000	Temporary Traffic Control	All Req'd	Lump Sum
63502-3000	Temporary Traffic Control, Raised Pavement Marker	3,959	Each
63509-1000	Flagger	8,500	Man Hrs.

20304-1000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

STATION	LOCATION	REMARKS
0+030.00	Lt./Rt. (From Previous Project)	R11-4, "Rd. Closed to Thru Traffic" Should be Removed Only @ Completion of Project N31(4)
4+315.00	Rt.	R4-1, "Do Not Pass" From Previous Project
4+315.00	Lt.	W14-3, "No Passing Zone", From Previous Project
4+315.00 - 4+770.00	Rt.	Remove "Yellow" No Passing Strip By Sandblasting
4+460.00	Lt./Rt. (Before BOP)	W8-3 w/W16-2 "ROAD ENDS" "1000 Ft.", From Previous
4+660.00	Rt. (Before BOP)	G20-2A "End Road Work", From Previous Project
4+760.00	Lt./Rt.	W8-3, "ROAD ENDS", From Previous Project.
4+770.00	Lt.	R4-2, "PASS WITH CARE", From Previous Project.
4+771.78	Rt.	"1b" Delineator, From Previous Project.
4+815.00	C/L	4-Unit Cattleguard @ End of N31(2) Project, (9.48 m) (Remove & Reset to EOP, Sta. 13+680.00)
5+795.00	8.0 m Rt.	Stone Irregation - Water gates(Abandoned/Broken)
5+885.00	7.5 m Lt.	Stone Irregation - Water gates(Abandoned/Broken)
6+359.62	C/L	Existing Fencing X-ing Roadway. Tie-In To New Fence @ ROW
6+501.33	C\L	Existing Fencing X-ing Roadway. (Fencing Down & Broken)
7+349.05	20.70 m Lt.	Existing Fence Line
7+350.00	Rt.	Existing Fencing Inside Rt. ROW Line.
11+705.58 - 12+120.00	414.42 m Lt.	Existing Fence Line
12+094.69	6.70 m Lt.	Existing Fence Line
13+670.00	Lt.	Existing Sign "Asaayi Lake/Bowl Canyon"

60701-1000 REMOVE, CLEAN & STOCKPILE CULVERTS

STATION	LOCATION	DESCRIPTION	LENGTH (m)	REMARKS
7+818.00	Rt.	1-305 mm CSPC	9.92	Existing Pipe on Old Rdwy.
8+141.74	Rt.	1-610 mm CSPC	10.74	Existing Pipe
8+339.95	Rt.	1-610 mm CSPC	12.95	Existing Pipe
8+425.65	Rt.	1-457 mm CSPC	12.38	Existing Pipe
8+495.00	Rt.	1-457 mm CSPC	10.00	Existing Pipe
8+528.32	Rt.	1-610 mm CSPC	13.07	Existing Pipe
8+860.77	Rt.	1-914 mm CSPC	12.31	Existing Pipe
9+020.00	CL	1-914 mm CSPC	10.00	Existing Pipe
9+060.00	CL	1-914 mm CSPC	10.00	Existing Pipe
9+075.42	Rt.	1-610 mm CSPC	13.49	Existing Pipe
9+532.18	Rt.	3-1219 mm CSPC	45.90	Existing Pipe
10+055.16	Rt.	1-457 mm CSPC	12.51	Existing Pipe
10+313.14	Rt.	1-457 mm CSPC	13.60	Existing Pipe
10+625.00	Rt.	1-457 mm CSPC	10.00	Existing Damaged CSPC
10+675.00	CL	1-610 mm CSPC	10.00	Existing Pipe
10+784.00	CL	1-610 mm CSPC	10.00	Existing Pipe
10+883.00	CL	1-457 mm CSPC	10.00	Existing Pipe
11+509.00	CL	2-914 mm CSPC	10.00	Existing Pipes
11+131.88	CL	1-610 mm CSPC	15.05	Existing Pipe
11+345.93	CL	1-914 mm CSPC	16.63	Existing Pipe
11+347.00	CL	1-457 mm CSPC	10.00	Existing Pipe
11+510.00	CL	2-914 mm CSPC	10.00	Existing Pipes
11+514.47	CL	2-914 mm CSPC	19.91	Existing Pipes
12+021.78	C/L	1-914 mm CSPC	28.48	Existing Pipe
12+050.00	CL	3-1219 mm CSPC	10.00	Existing Pipes
12+273.18	Rt.	1-914 mm CSPC	12.29	Existing Pipe On Old N31
12+385.94	Rt.	1-914 mm CSPC	12.27	Existing Pipe On Old N31
12+546.45	Rt.	1-457 mm CSPC	14.97	Existing Pipe
12+703.85	Rt.	1-457 mm CSPC	12.09	Existing Pipe
12+895.26	Rt.	1-457 mm CSPC	16.07	Existing Pipe On Old N31
13+527.76	Rt.	1-1219 mm CSPC	29.63	Existing Pipe
0+037.45	Lt.	1-1524 mm CSPC	18.35	Existing Pipe T/O to Asaayi Lake - N321
		GRAND TOTAL	462.61	

ITEM No. 61701-5000: GUARDRAIL SYSTEM, ET PLUS

STATION TO STATION	LOCATION	LENGTH (m)	REMARKS
6+346.08 to 6+402.16	Lt.	57.15	* Lt. Guardrail before BOB
6+495.44 to 6+532.83	Lt.	38.10	* Lt. Guardrail past EOB
6+386.67 to 6+400.18	Rt.	13.26	* Rt. Guardrail before BOB
6+497.42 to 6+510.93	Rt.	13.26	* Rt. Guardrail past EOB
11+470.00 to 11+520.00	Lt.	50.00	
11+870.00 to 12+100.00	Lt.	230.00	Asphalt Curbing
11+990.00 to 12+100.00	Rt.	110.00	Asphalt Curbing
13+500.00 to 13+570.00	Rt.	70.00	
	TOTAL	581.77	

*Note: Length given are arc length and does not equal Sta. to Sta. difference due offsets on Curves

TURNOUT LOCATIONS

STATION	LOCATION	DESCRIPTION	REMARKS
5+070.00	Rt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
6+696.00	Rt.	New 7.00 m Turnout, 7190 mm Cattleguard With Type 2 Gate	To Old Route N31
7+055.00	Lt.	New 4.50 m Turnout, With Type 1 Gate Only	Pump House
7+160.00	Rt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
7+215.00	Lt.	New 7.00 m Turnout, 7190 mm Cattleguard With Type 2 Gate	To Residence
7+327.00	Rt.	New 7.00 m Turnout, 7190 mm Cattleguard With Type 2 Gate	To Residence
7+505.00	Rt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate &	To Residence
8+326.00	Rt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
8+764.00	Lt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
8+940.00	Rt.	New 7.00 m Turnout, 7190 mm Cattleguard With Type 2 Gate	To Route N126
9+500.00	Rt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
9+562.00	Lt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
9+776.00	Lt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate &	To Residence
10+625.00	Lt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
10+702.00	Lt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate &	To Residence
11+311.00	Lt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
11+509.00	Rt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate	To Residence
11+555.00	Rt.	New 7.00 m Turnout, 7190 mm Cattleguard With Type 1 Gate &	To Residence
13+650.00	Rt.	New 4.50 m Turnout, 4900 mm Cattleguard With Type 2 Gate &	To Residence
13+653.96	Lt.	New 7.80 m Turnout, 9480 mm Cattleguard With Type 2 Gate	To Route N321

REVISED: 10/29/2013

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DEPARTMENT OF THE INTERIOR
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ESTIMATED QUANTITY
TABLE 1

DRAWN BY: NRDOT DATE: 8/25/2011
DESIGNED BY: NRDOT DATE: 8/25/2011
REVISED: 10/29/2013 BY: Leroy.Toledo
Sht 05_N31 qty.1.dgn

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 05_N31 qty.1.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	6	76

21301-4000 SUBGRADE STABILIZATION, ROADBOND EN-1

STATION TO STATION	AREA (m^2)	AREA (ha)	PERIMETER (m)	Remarks
7+040.00 TO 7+120.00	859.64	0.06	181.49	Before Bridge
11+880.00 to 11+940.00	706.69	0.07	142.71	After Bridge
13+100.00 to 13+300.00	2,147.09	0.22	421.26	After Bridge
TOTAL	3,713.41			

30101-2000 UNTREATED ABC, Grade- SPECIAL

STATION TO STATION	VOLUME (m^3)	Unit Wt (kg/m^3)	WEIGHT (t)	Remarks
4+770.00 to 6+411.30	2,428.90	2,268.00	5,508.75	Before Bridge
6+486.30 to 13+680.00	10,656.10	2,268.00	24,168.03	After Bridge
13+680.00 to 13+730.00	67.16	2,268.00	152.32	50 m Transition at EOP
		SUB=TOTAL	29,829.10	
		SUB-TOTAL	1,105.59	Turn Out Totals
		TOTAL	30,934.69	

40201-0500: HACP, CLASS "B" GRADING "B", TYPE III SMOOTHNESS

STATION TO STATION	VOLUME (m^3)	Unit Wt (kg/m^3)	WEIGHT (t)	Remarks
4+770.00 to 6+411.30	871.40	2,430.00	2,117.50	Before Bridge
6+486.30 to 13+680.00	3,831.00	2,430.00	9,309.33	After Bridge
		SUB=TOTAL	11,426.83	
		SUB-TOTAL	440.32	Turn Out Totals
		TOTAL	11,867.15	

40502-0800 ASPHALT BINDER PG 58-28

STATION TO STATION	WEIGHT (t)	5.5% By Weight of Total Mix (t)	Remarks
4+770.00 to 6+411.30	2,117.50	116.46	Before Bridge
6+486.30 to 13+680.00	9,309.33	512.01	After Bridge
	SUB=TOTAL	628.48	
	SUB-TOTAL	24.22	Turn Out Totals
	TOTAL	652.70	

41101-5000 PRIME COAT , GRADE PEP (Penetrating Emulsified Prime)

STATION TO STATION	Area Top of ABC (m^2)	L/m^2	L/kg	WEIGHT (t)	Remarks
4+770.00 to 13+680.00	77,202.64	1.360	1.056	99.43	Bridge Area Excluded
			SUB=TOTAL	99.43	
			SUB-TOTAL	5.43	Turn Out Totals
			TOTAL	104.86	

Note: Volumes and Areas Measured with InRoads from DTM Roadway Model

N31(4)1,2&4 EARTH WORK VOLUME REPORT

Station to Station	Cut (m^3)	Fill (m^3)	Waste (m^3)	Borrow (m^3)
4+770.00 to 4+874.85	640.00	640.00	0.00	0.00
4+874.85 to 6+060.93	16,019.00	16,019.00	0.00	0.00
6+060.93 to 6+240.32	1,443.00	1,443.00	0.00	0.00
6+240.32 to 13+481.37	124,975.00	124,975.00	0.00	0.00
13+481.37 to 13+680.00	2,281.00	1,066.00	1,215.00	0.00
Sub-Total	145,358.00	144,143.00	1,215.00	0.00

N31(4)1,2&4 EARTH WORK AT EOP 50 m TRANSITION

Station	Cut (m^3)	Fill (m^3)	Waste (m^3)	Borrow (m^3)
13+680.00 TO 13+730.00	39.00	163.00	0.00	124.00
Sub-Total	39.00	163.00	0.00	124.00

N321 ASAAYI TURNOUT EARTH WORK VOLUME REPORT

Station	Cut (m^3)	Fill (m^3)	Waste (m^3)	Borrow (m^3)
0+005.00 to 0+100.00	181.00	961.00	0.00	780.00
Sub-Total	181.00	961.00	0.00	780.00
GRAND TOTAL	145,578.00	145,267.00	311.00	0.00

25% Shrinkage Factor Applied To Fill
Sta. 6+411.30 to 6+486.30, Bridge Area Excluded From Earthwork Calc.

EXISTING UTILITIES

STATION	LOCATION	DESCRIPTION	REMARKS
5+157.48	C\L	Existing Powerline & Telephone Line X-ing	To Be Raised By Owner(s)
5+467.58	C\L	Existing Powerline & Telephone Line X-ing	To Be Raised By Owner(s)
6+729.97	C\L	Existing Powerline & Telephone Line X-ing	To Be Raised By Owner(s)
6+873.68	C\L	Existing Private Waterline X-ing	Protect-in-Place
7+055.00	Lt.	Existing Pump House w/ Waterlines	Protect-in-Place
7+065.71	C\L	Existing Private Waterline X-ing	Protect-in-Place
7+205.21	C\L	Existing Powerline & Telephone Line X-ing	To Be Raised By Owner(s)
7+233.00	Rt.	Existing Power Pole @ 8.4 m Rt.	Relocate By Owners
8+645.96	C\L	Existing Powerline X-ing	Protect-in-Place
8+888.89	C\L	Existing Powerline & Telephone Line X-ing	To Be Raised By Owner(s)
9+115.59	C\L	Existing Powerline & Telephone Line X-ing	To Be Raised By Owner(s)
9+133.00	Lt.	Existing Power Pole @ 3.1 m Lt.	Relocate By Owners
9+839.12	C\L	Existing Powerline & Telephone Line X-ing	To Be Raised By Owner(s)
9+843.00	Lt.	Existing Power Pole @ 10.3 m Lt.	Relocate By Owners
10+426.00	Lt.	Existing Power Pole @ 3.5 m Lt.	Relocate By Owners
10+431.10	C\L	Existing Powerline & Telephone Line X-ing	
10+839.55	C\L	Existing Powerline & Telephone Line X-ing	Protect-in-Place
11+277.29	C\L	Existing Powerline X-ing	Protect-in-Place
13+636.67	C\L	Existing Powerline & Telephone Line X-ing	To Be Raised By Owner(s)
13+636.67	Lt.	Existing Power Pole @ 3.5 m Lt.	Relocate By Owners

NOTE: Protection/Relocate comments noted are assumed and are based on the best available information. The Actual Work Required/Performed By The Utility Owner may Vary.

ITEM No. 61903-0310: CATTLEGUARD, 4900 mm (2-Unit) With TYPE 2 GATE

STATION	LOC.	REMARKS
5+070.00	Rt.	4.50 m Turnout To Residence
7+160.00	Rt.	4.50 m Turnout To Residence
7+505.00	Rt.	4.50 m Turnout To Residence
8+326.00	Rt.	4.50 m Turnout To Residence
8+764.00	Lt.	4.50 m Turnout To Residence
9+500.00	Rt.	4.50 m Turnout To Residence
9+562.00	Lt.	4.50 m Turnout To Residence
9+776.00	Lt.	4.50 m Turnout To Residence
10+625.00	Lt.	4.50 m Turnout To Residence
10+702.00	Lt.	4.50 m Turnout To Residence
11+311.00	Lt.	4.50 m Turnout To Residence
11+509.00	Rt.	4.50 m Turnout To Residence
13+650.00	Rt.	4.50 m Turnout To Residence
TOTAL	13 EACH	

ITEM No. 61903-0710: CATTLEGUARD, 7190 mm (3-Unit) With TYPE 2 GATE

STATION	LOC.	REMARKS
6+696.00	Rt.	7.00 m Turnout To Old N31
7+215.00	Lt.	7.00 m Turnout To Residence
7+327.00	Rt.	7.00 m Turnout To Residence
8+940.00	Rt.	7.00 m Turnout To N126
11+555.00	Rt.	7.00 m Turnout To Residence With Type-1 Gate
TOTAL	5 EACH	

ITEM No. 61903-1010: CATTLEGUARD, 9480 mm (4-Unit) WITH TYPE 1 GATE

STATION	LOC.	REMARKS
13+653.96	Lt.	N31(4) & N321 Junction
TOTAL	1 EACH	

* ITEM No. 61902-1300: TYPE-1 GATES ONLY, No Cattleguard

STATION	LOC.	REMARKS
5+840.00	Lt.	Gate Only - Livestock Passage, No Turnout
7+055.00	Lt.	4.50 m Turnout Type -1 Gate Only, To Pump House
11+580.00	Lt.	Gate Only - Livestock Passage, No Turnout
12+500.00	Lt. & Rt.	Gates Only - Livestock Passage, No Turnout
TOTAL	5 EACH	

*Type-1 And Type-II Gates Associated With a Cattleguard Are Included In The Cost Of The Cattleguard. No Separated Payment Will Be Made. Gates Not Associated With Cattleguards Will Be Paid Under The Item(s) Listed In The Bid Schedule.

ITEM No. 21102-2000 ROADWAY AND TURNOUT OBLITERATION, Method 2

STATION	TO	STATION	LOCATION	LENGTH (m)	DESCRIPTION
6+180.00	-	6+274.00	Lt.	94.00	Old N31 Rdwy.
6+705.00	-	7+340.00	Lt.	635.00	Old N31 Rdwy.
7+525.00			Lt.	15.00	Existing Turnout
7+530.00	-	7+625.00	Lt.	95.00	Old N31 Rdwy.
7+850.00	-	7+956.00	Rt.	106.00	Old N31 Rdwy.
8+740.00	-	9+530.00	Rt.	790.00	Old N31 Rdwy.
9+955.00	-	9+980.00	Rt.	25.00	Old N31 Rdwy.
12+140.00	-	12+420.00	Rt.	280.00	Old N31 Rdwy.
12+872.00	-	13+364.00	Rt.	492.00	Old N31 Rdwy.
			TOTAL	2,532.00	

ROLLED EROSION CONTROL MATTING, TYPE 4

STATION TO STATION			LOCATION	AREA (m^2)	REMARKS
4+940.00	to	5+100.00	Rt.	1,531.13	On Fill Slope
5+250.00	to	5+390.00	Rt.	1,348.18	On Fill Slope
6+680.00	to	6+740.00	Rt.	491.61	On Fill Slope
12+000.00	to	12+080.00	Rt.	430.84	On Fill Slope
12+840.00	to	13+400.00	Rt.	3,133.02	On Fill Slope
13+525.00	to	13+580.00	Rt.	441.16	On Fill Slope
4+880.00	to	5+060.00	Lt.	1,352.03	On Fill Slope
7+790.00	to	9+760.00	Lt.	15,698.45	On Fill Slope
11+090.00	to	11+200.00	Lt.	601.36	On Fill Slope
11+360.00	to	11+520.00	Lt.	885.94	On Fill Slope
11+984.36	to	12+095.00	Lt.	702.60	On Fill Slope
13+525.00	to	13+580.00	Lt.	345.32	On Fill Slope
			Grand - TOTAL	26,961.64	

ITEM No. 61901-3400 WILDLIFE FENCING, 4-STRAND

STATION	OFFSET	LENGTH (m)	DESCRIPTION	REMARKS
4+815.00 - 13+680.00	Lt./Rt.	17,730.000	Fencing Starts @ 4+815 @ BOP	Total Fencing Both Lt./Rt. R.O.W
5+070.00	Rt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
6+411.30 - 6+486.30	Lt./Rt.	-150.000	Bridge Location	75 m Gap Each Side
6+696.00	Rt.	-10.640	7.00 m Turnout	7190 mm Cattleguard With Gate
7+055.00	Lt.	-4.880	4.50 m Turnout	Type-1 Gate Only, No Cattleguard
7+160.00	Rt.	-4.880	4.50 m Turnout	4900 mm Cattleguard With Gate
7+215.00	Lt.	-10.640	7.00 m Turnout	7190 mm Cattleguard With Gate
7+327.00	Rt.	-10.640	7.00 m Turnout	7190 mm Cattleguard With Gate
7+505.00	Rt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
8+326.00	Rt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
8+764.00	Lt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
8+940.00	Rt.	-10.640	7.00 m Turnout	7190 mm Cattleguard With Gate
9+500.00	Rt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
9+562.00	Lt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
9+776.00	Lt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
10+625.00	Lt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
10+702.00	Lt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
11+311.00	Lt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
11+509.00	Rt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
11+555.00	Rt.	-10.640	7.00 m Turnout	7190 mm Cattleguard With Gate
11+812.90 - 11+980.00	Rt.	-167.100	Rock Wall*	Attach Fence To Rock Wall
13+650.00	Rt.	-8.350	4.50 m Turnout	4900 mm Cattleguard With Gate
13+653.96	Lt.	-12.930	7.8 m Turnout	9480 mm Cattleguard With Gate
13+680.00	C/L	28.000	X-ing Rdwy @ EOP w/CG	9480 mm Cattleguard With Gate
	TOTAL	17,264.810		
	GRAND TOTAL	17,782.754	** 3% Added to Account for Terrain Slope/Special Fencing/Arch. Sites	

*NOTE: When ROW Fencing Ends At Rock Walls, The Last Fence Post(s) Shall Be Set So As No Gap Exists To Allow Livestock To Pass Through.The Last Post(s) Shall Be Set As Directed By Or With The Approval Of The COR/AOTR. This Work To Be Incidental To The Bid Item 61901-3400 And No Additional Payment Will Be Made.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

ESTIMATED QUANTITY TABLE 2

DRAWN BY: NRDOT DATE: 7/11/2011
DESIGNED BY: NRDOT DATE: 7/11/2011
REVISED: 1/31/2013 BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 06_N31 qty.2.dgn

ESTIMATED DRAINAGE STRUCTURE QUANTITY

STATION	STRUCTURE SIZE	SKEW NO.	60201-0410 Corr. 305 mm x 68 x 2.77 mm Thickness	60201-0810 Corr. 610 mm CSPC 68 x 13 mm x 2.77 mm Thickness	60201-0910 Corr. 762 mm CSPC 68 x 13 mm x 2.77 mm Thickness	60201-1010 Corr. 914 mm CSPC 68 x 13 mm x 2.77 mm Thickness	60201-1110 Corr. 1067 mm CSPC 68 x 13 mm x 2.77 mm Thickness	60201-1210 Corr. 1219 mm CSPC 125 x 25 mm x 2.77 mm Thickness	60201-1810 Corr. 2134 mm CSPC 125 x 25 mm x 3.5 mm Thickness	60202-0510 Corr. 711 mm CSPA 68 x 13 mm x 2.77 mm Thickness	60202-0710 Corr. 1067 mm S x 508 mm R CSPA 68 x 13 mm x 2.77 mm Thickness	60202-1450 Corr. 2210 mm S x 737 mm R CSPA 68 x 13 mm x 2.77 mm Thickness	60210-0810 CSPC. 2.77 mm End Section 1600 mm R Thickness	60210-0910 CSPC. 2.77 mm End Section 610 mm Thickness	60210-1010 CSPC. 2.77 mm End Section 762 mm Thickness	60210-1110 CSPC. 2.77 mm End Section 914 m Thickness	60211-0910 CSPC. 2.77 mm End Section 1067 m Thickness	60211-1110 CSPA. 2.77 mm End Section 711 mm S x 508 mm R Thickness	60221-4050 CSPA. 2.77 mm End Section 1067 mm S x 737 mm R Thickness	60221-4150 3.66 m x 2.44 m Concrete Box Culvert Single Barrel	60222-1900 3.66 m x 305 m Concrete Box Culvert Single Barrel	2.44 m x 1.83 m Concrete Box Culvert Double Barrel
			m	m	m	m	m	m	m	m	m	m	m	Ea.	Ea.	Ea.	Ea.	Ea.	Ea.	m	m	m
5+000.00	1-914 mm x 20.73 m CSPC	90.00					20.73									1						
5+300.00	2-610 mm x 25.30 m CSPC	90.00		50.60										2								
5+382.00	4-1067 mm S x 737 mm R x 19.51 m CSPA	105.00										78.04								4		
6+728.00	1-610 mm x 30.48 m CSPC	117.00		30.48										1								
6+960.00	1-610 mm x 31.78 m CSPC	80.00		31.78										1								
7+505.00	1-610 mm x 10.0 m CSPC, T/O Rt.			10.00										2								
7+818.00	2-1067 mm x 23.43 m CSPC	90.00						46.86											2			
8+005.00	2-762 m x 22.56 m CSPC	90.00			45.12										2							
8+040.00	1-610 mm x 21.95 m CSPC	90.00		21.95										1								
8+076.00	1-610 mm x 23.77 m CSPC	90.00		23.77										1								
8+141.00	1-610 mm x 20.12 m CSPC	72.00		20.12										1								
8+220.00	1-610 mm x 23.77 m CSPC	90.00		23.77										1								
8+285.00	1-610 mm x 19.51 m CSPC	90.00		19.51										1								
8+339.00	1-914 mm x 31.70 m CSPC	84.33				31.70										1						
8+430.00	1-610 mm x 34.14 m CSPC	100.00		34.14										1								
8+495.00	1-610 mm x 18.90 m CSPC	90.00		18.90										1								
8+527.00	1-610 mm x 30.48 m CSPC	80.00		30.48										1								
8+627.00	1-610 mm x 18.29 m CSPC	90.00		18.29										1								
8+670.00	1-610 mm x 19.51 m CSPC	90.00		19.51										1								
8+740.00	1-762 mm x 21.34 m CSPC	90.00			21.34										1							
8+860.00	2-1067 mm x 29.26 m CSPC	78.00						58.52											2			
9+040.00	1-610 mm x 24.38 m CSPC	90.00		24.38										1								
9+058.00	1-762 mm x 22.56 m CSPC	90.00			22.56										1							
9+072.00	2-914 mm x 20.12 m CSPC	90.00				40.24										2						
9+082.00	1-762 mm x 21.34 m CSPC	90.00			21.34										1							
9+315.00	1-610 mm x 23.77 m CSPC	90.00		23.77										1								
9+527.00	3-2134 mm x 48.77 m CSPC	50.00							146.31													
9+590.00	3-2210 mm Span x 1600 mm Rise x 31.09 m CSPA	90.00											93.27									
9+620.00	2-2210 mm Span x 1600 mm Rise x 29.29 m CSPA	90.00											58.58									
9+670.00	2-2210 mm Span x 1600 mm Rise x 30.48 m CSPA	90.00											60.96									
9+776.00	1-610 mm x 10.0 m CSPC, T/O Lt.			10.00										2								
10+060.00	1-610 mm x 17.07 m CSPC	95.50		17.07										1								
10+317.00	1-711 mm S x 508 mm R x 25.60 m CSPA	130.00								25.60									1			
10+702.00	1-610 mm x 15.0 m CSPC, T/O Lt.			15.00										2								
11+132.00	1-610 mm x 21.34 m CSPC	94.00		21.34										1								
11+214.00	1-610 mm x 19.51 m CSPC	90.00		19.51										1								
11+347.00	1-610 mm x 26.82 m CSPC	90.00		26.82										1								
11+435.00	1-610 mm x 25.60 m CSPC	135.00		25.60										1								
11+518.00	2-1219 mm x 36.58 m CSPC	42.00							73.16													
11+555.00	1-610 mm x 20.0 m CSPC, T/O Rt.			20.00										2								
12+020.00	Single Barrel 3.66 m Span x 3.05 m Rise x 27.42 m CBC	50.00																			28.55	
13+150.00	1-711 mm S x 508 mm R x 17.07 m CSPA	90.00								17.07									1			
13+340.00	1-610 mm x 20.73 m CSPC	90.00		20.73										1								
13+529.50	Single Barrel 3.66 m Span x 2.44 m Rise x 22.23 m CBC, Single Barrel	105.00																		22.23		
13+650.00	1-610 mm x 10.0 m CSPC, T/O Rt.			10.00										2								
13+705.00	1-305 mm x 21.34 m CSPC	135.00	21.34																			
0+037.45	2 Barrel- 2.44 m Span x 1.83 m Rise x 11.85 m CBC, Under T/O Left To	66.00																				11.85
	TOTAL		21.34	587.52	110.36	92.67	105.38	73.16	146.31	42.67	78.04	212.81	32	5	4	4	2	4	22.23	28.55	11.85	

NOTE: Sta. 0+034.45, (N321) Is Sta.13+653.96 (N31) T/O See Sheet 22 of 76 for Details.

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	7	76

GENERAL NOTES

1. FOR MULTIPLE INSTALLATION OF ALL TYPES, A MINIMUM OF A 610 mm SPACING MEASURED ALONG THE HORIZONTAL BETWEEN FLARED END SECTIONS AT THEIR WIDEST CROSS SECTION SHALL BE USED.
2. ALL THREE (3) PIECE BODIES TO HAVE 2.77 mm THICKNESS SIDES AND 3.5 mm THICKNESS CENTER PANELS. WIDTH OF CENTER PANELS TO BE GREATER THAN 20% OF THE PIPE PERIPNERY. MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED BY 9.53 mmø GALVANIZED RIVETS OR BOLTS.
3. END SECTIONS FOR STEEL PIPE-ARCHES: FOR THE 1956 mm x 1321 mm AND 2108 mm x 1448 mm SIZES, REINFORCED EDGE TO BE SUPPLEMENTED BY 51 mm x 51 mm x 6.35 mm GALVANIZED ANGLES. THE ANGLES TO BE ATTACHED BY 9.53 mm dia. GALVANIZED NUTS AND BOLTS. ANGLE REINFORCEMENT WILL BE PLACED UNDER THE CENTER PANEL SEAMS.
4. END SECTIONS FOR STEEL CIRCULAR PIPES: FOR 1524 mmø THRU 2134 mmø SIZES, REINFORCED EDGE TO BE SUPPLEMENTED WITH GALVANIZED STIFFENER ANGLES. THE ANGLES WILL BE 51 mm x 51 mm x 6.35 mm FOR 1524 mmø THRU 1829 mmø, AND 64 mm x 64 mm x 6.35 mm FOR 1981 mmø AND 2134 mmø. THE ANGLES TO BE ATTACHED BY 9.53 mmø GALVANIZED NUTS AND BOLTS.
5. WELDING SHALL NOT BE PERMITTED IN CONNECTING END SECTIONS TO CONNECTOR SECTIONS OR CONNECTOR SECTIONS TO PIPE.
6. TYPE NO. 1 STEEL END SECTION. CONNECT END SECTION WITH THREADED ROD WITH CONNECTOR LUG, FOR 610 mmø ROUND PIPE & 711 mm x 308 mm CSPA.
7. TYPE NO. 2 STEEL END SECTION. CONNECT END SECTION WITH THREADED ROD WITH ROD HOLDER, FOR 762 mmø AND 914 mmø ROUND PIPE; AND 432 mm x 330 mm THRU 1448 mm x 965 mm CSPA.
8. TYPE NO. 3 STEEL END SECTION. THE CONNECTION INCLUDES 305 mm OF THE PIPE LENGTH AS A CONNECTOR SECTION FOR PIPE ARCH SIZES 1626 mm x 1092 mm THRU 2108 mm x 1448 mm AND ROUND PIPE SIZES 1067 mmø THRU 2134 mmø. GAGES OF CONNECTOR SECTION SHALL BE THE SAME AS THE END SECTIONS AS MENTION ABOVE. THE CONNECTOR SECTION WILL BE ATTACHED TO THE END SECTION BY 9.5 mmø GALVANIZED RIVETS OR BOLTS APPROXIMATELY 152mm CENTERS.
9. HELICALLY-CORRUGATED PIPE FOR TYPE NO 5 AND TYPE NO.3 THE DIMPLE BAND OR CORRUGATED PIPE CONNECTOR SECTION SHALL BE ATTACHED TO THE END SECTION BY 9.5 mmø GALVANIZED STEEL RIVETS OR BOLTS SPACED AT APPROXIMATELY 152mm CENTERS.
10. TYPE NO. 1, TYPE NO. 2 AND TYPE NO. 3 CONNECTIONS MAY BE USED WITH WELDED SEAMS HELICALLY CORRUGATED PIPE WITH RE-ROLLED ENDS. RE-ROLLED ENDS SHALL INCLUDE A MINIMUM OF TWO (2) ANNULAR CORRUGATIONS OF THE SAME SIZE AS THE PIPE CORRUGATIONS

REVISED: 9/5/2013

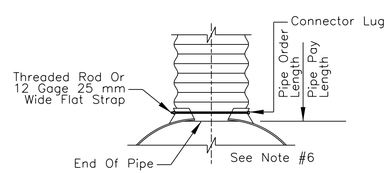
ROUND PIPE END SECTION - ALUMINUM COATED, TYPE 2

Pipe Diam (mm)	Thickness (mm)	DIMENSIONS A (25 mm=)	B (Max.)	H (25 mm±)	F (mm)	L (38 mm±)	W Max Width	Approx. Slope	BODY
610	1.6	229	330	152	1168	1041	1829	2 1/2	1 Pc
762	2	279	406	203	1397	1295	2235	2 1/2	2 Pc
914	2	330	482	229	1778	1524	2665	2 1/2	2 Pc
1067	2.8	381	635	254	2083	1753	3098	2 1/2	2 Pc
1219	2.8	432	736	305	2235	1981	3327	2 1/4	3 Pc

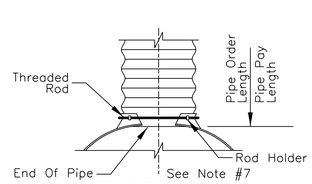
ARCH PIPE END SECTION - ALUMINUM COATED, TYPE 2

SPAN* *68 mm x 13 mm	RISE *76 mm x 25 mm	Thickness (mm)	DIMENSIONS A (25 mm±)	B (Max.)	H (25 mm±)	F (mm)	L (38 mm±)	W Max Width	Approx. Slope	BODY
711 x 508		1.6	177	406	152	1168	813	1778	2 1/2	1 Pc
890 x 610		2.0	229	406	152	1473	991	2159	2 1/2	1 Pc
1067 x 737		2.0	279	457	178	1854	1168	2642	2 1/2	2 Pc

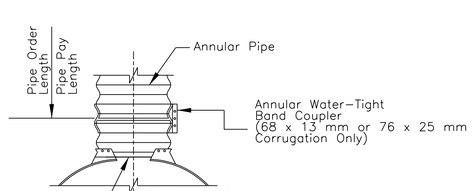
* CORRUGATION DIMENSION



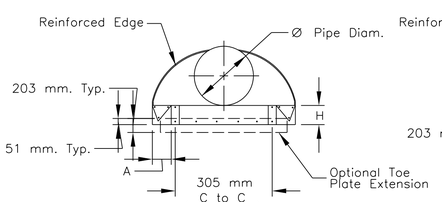
TYPE NO. 1



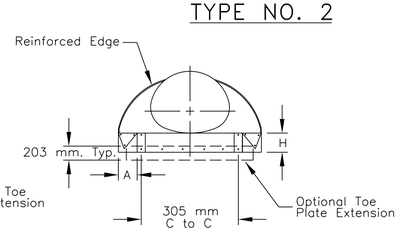
TYPE NO. 2



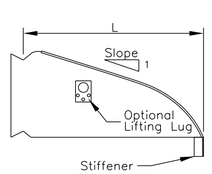
TYPE NO. 3



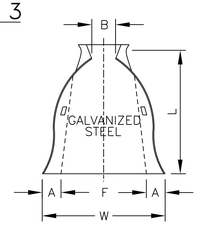
ELEVATION



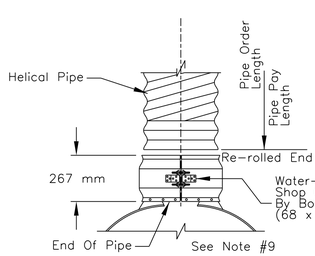
ELEVATION



SIDE VIEW



PLAN



TYPE NO. 5

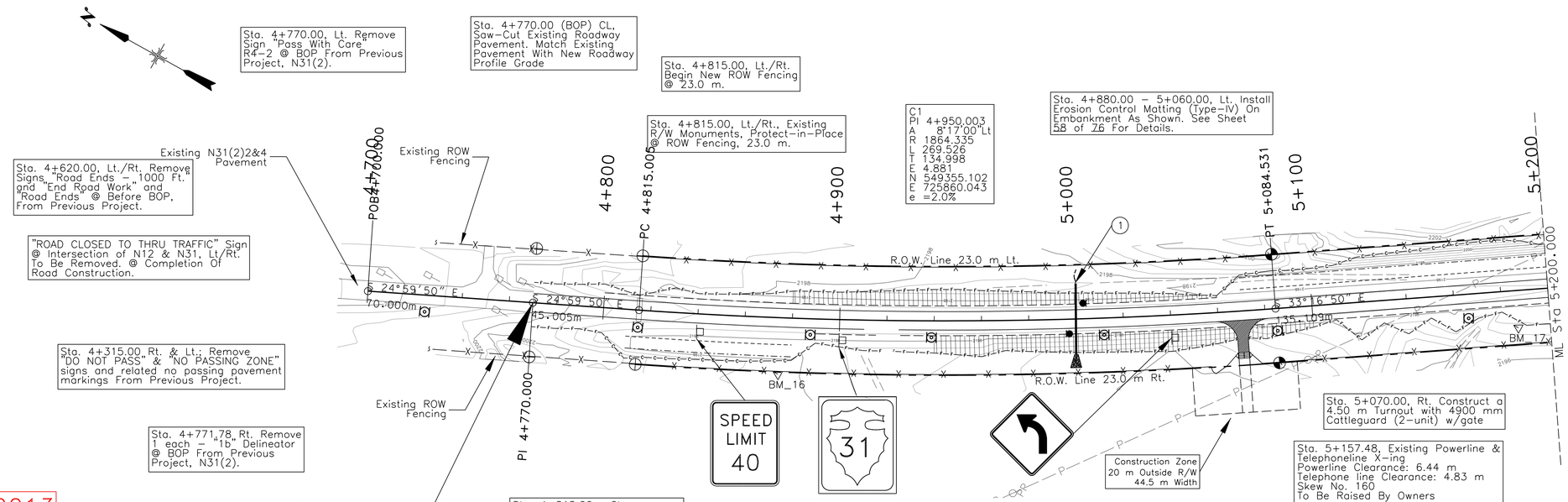
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

DRAINAGE STRUCTURE QUANTITY TABLE

DRAWN BY: NRDOT	DATE: 12/8/2009
DESIGNED BY: NRDOT	DATE: 12/8/2009
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 07_N31 STRUCT.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	8	76



REVISED: 9/5/2013

PROJECT: N31(4)1,2&4
BOP Sta 4+770.000
Elev 2200.551

DELINEATORS		TYPE 2	RIGHT-OF-WAY
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
⊙	⊠	●	◔
0	6	2	2

SCALE: Meters
0 20 40 60 80 100

Scale: 1cm = 10 m (Horiz.)
1cm = 2 m (Vert.)

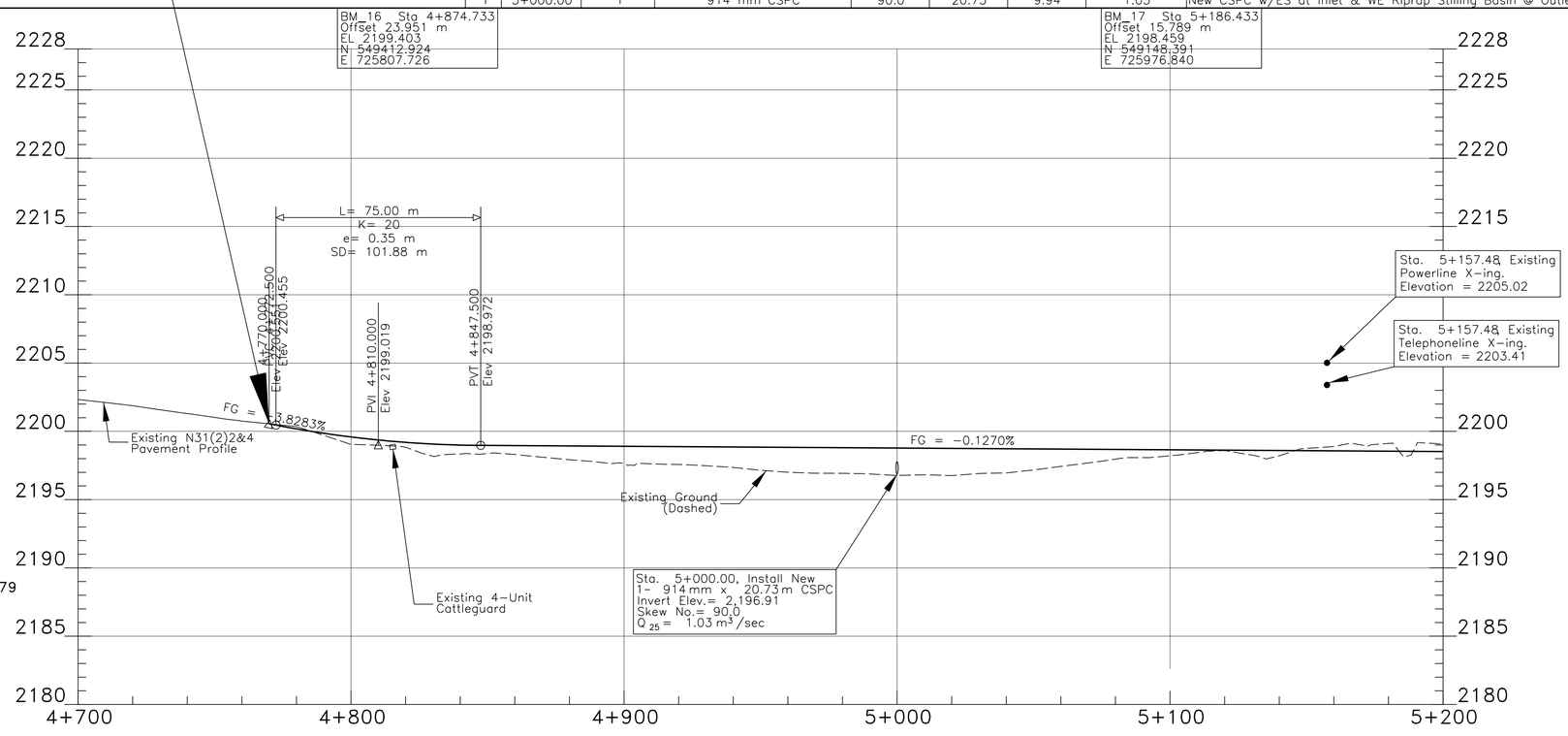
DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
1	5+000.00	1	914 mm CSPC	90.0	20.73	9.94	1.03	New CSPC w/ES at Inlet & WE Riprap Stilling Basin @ Outlet

N31(4)1,2&4 HORIZONTAL & VERTICAL CONTROL POINTS

Point	Station	Offset (m)		* Northing	* Easting	Elevation
BM_16	4+874.733	23.950	Right	549,412.924	725,807.726	2,199.403
BM_17	5+186.433	15.790	Right	549,148.391	725,976.840	2,198.459
BM_18	5+509.141	13.690	Left	549,009.175	726,256.380	2,197.918
BM_19	5+806.235	47.600	Right	548,893.411	726,536.772	2,197.857
BM_20	6+118.586	73.130	Right	548,809.925	726,838.840	2,199.284
BM_21	6+612.311	40.000	Right	548,562.542	727,066.310	2,202.988
BM_22	6+880.109	30.000	Left	548,341.310	727,189.539	2,207.573
CP1	6+952.766	173.760	Right	548,118.773	727,210.946	2,212.071
BM_23	7+255.014	30.010	Right	548,208.437	727,530.890	2,210.172
BM_25	7+868.085	37.660	Right	547,944.617	728,077.230	2,211.107
P34 A	8+015.143	31,581.200	Right	517,673.305	719,141.767	2,055.069
BM_26	8+175.583	30.820	Left	547,928.859	728,388.963	2,213.317
BM_27	8+478.600	32.130	Left	547,906.235	728,691.137	2,216.438
BM_28	8+784.672	33.120	Left	547,883.050	728,996.331	2,216.354
BM_29	9+082.939	46.870	Right	547,834.837	729,306.527	2,218.613
BM_31	9+695.588	35.540	Left	548,109.268	729,853.794	2,221.596
BM_32	10+030.417	33.490	Left	548,280.667	730,077.162	2,238.718
BM_33	10+332.740	19.810	Right	548,537.490	730,245.335	2,240.803
BM_34	10+643.875	47.580	Right	548,782.828	730,403.514	2,249.312
BM_35	10+951.110	18.150	Right	548,959.106	730,645.502	2,258.707
BM_36	11+257.575	18.900	Right	549,139.431	730,894.237	2,265.089
BM_37	11+564.915	22.970	Right	549,319.131	731,145.100	2,258.893
BM_38	11+866.732	23.790	Left	549,590.635	731,291.126	2,263.467
BM_39	12+156.091	57.830	Left	549,847.494	731,467.574	2,268.083
BM_40	12+416.732	22.910	Left	549,740.146	731,739.640	2,274.891
BM_41	12+720.345	23.110	Right	549,442.216	731,818.765	2,278.548
BM_42	13+019.803	11.930	Left	549,211.647	732,010.961	2,292.238
BM_43	13+322.558	13.830	Left	549,064.844	732,271.192	2,292.400
BM_44	13+661.626	48.330	Right	549,101.349	732,587.693	2,300.885

* MODIFIED (GROUND) NM STATE PLANE COORDINATES, WEST ZONE, NAD83, CF=0.999693879



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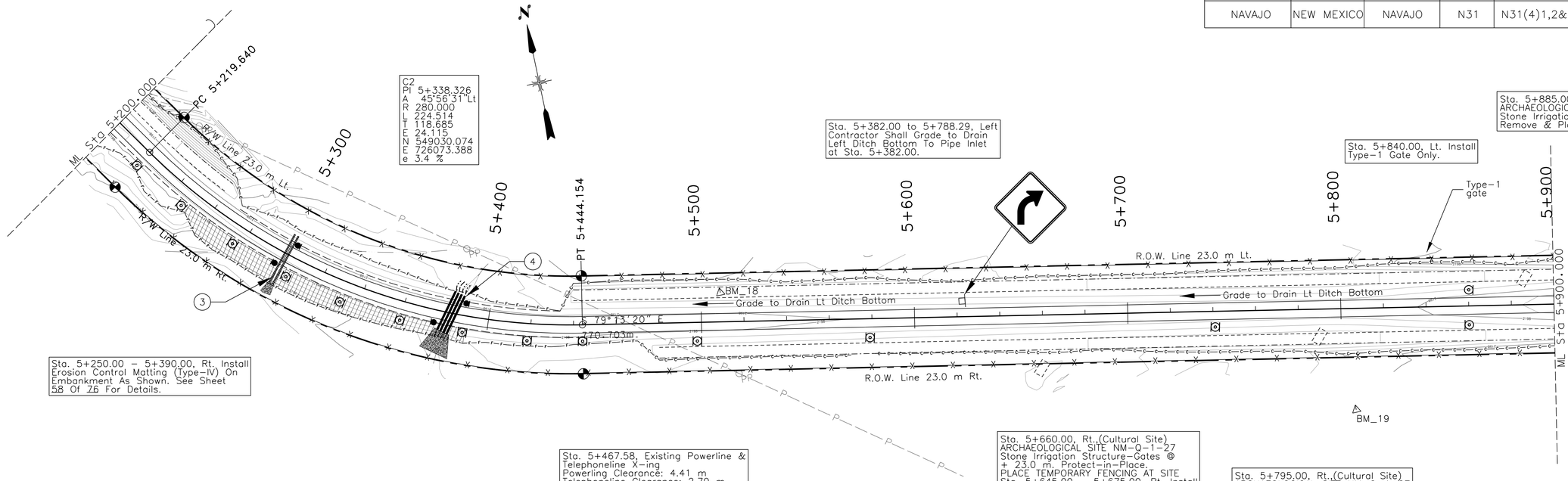
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	9	76



REVISED: 9/5/2013

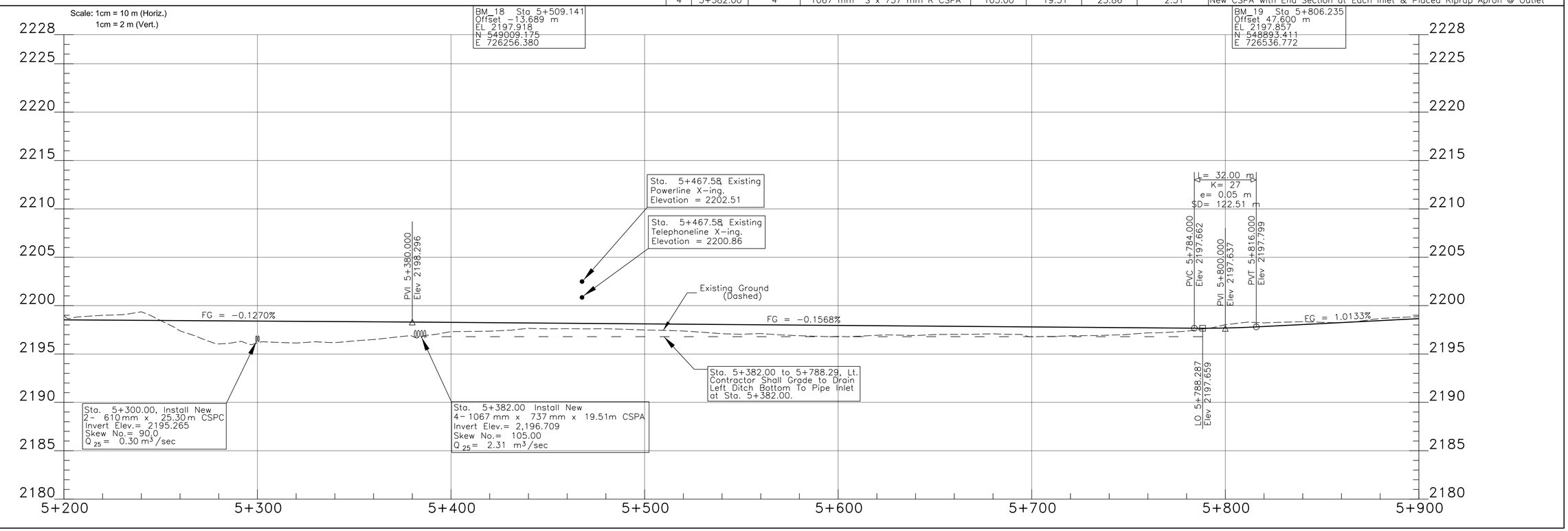
DELINEATORS		TYPE 2	RIGHT-OF-WAY
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
⊙	⊡	■	◕
2	12	4	4

SCALE: Meters

0 20 40 60 80 100

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
3	5+300.00	2	610 mm CSPC	90.00	25.30	2.15	0.30	New CSPS with End Section at Each Inlet & Placed Riprap Apron @ Outlet
4	5+382.00	4	1067 mm S x 737 mm R CSPA	105.00	19.51	23.86	2.31	New CSPA with End Section at Each Inlet & Placed Riprap Apron @ Outlet



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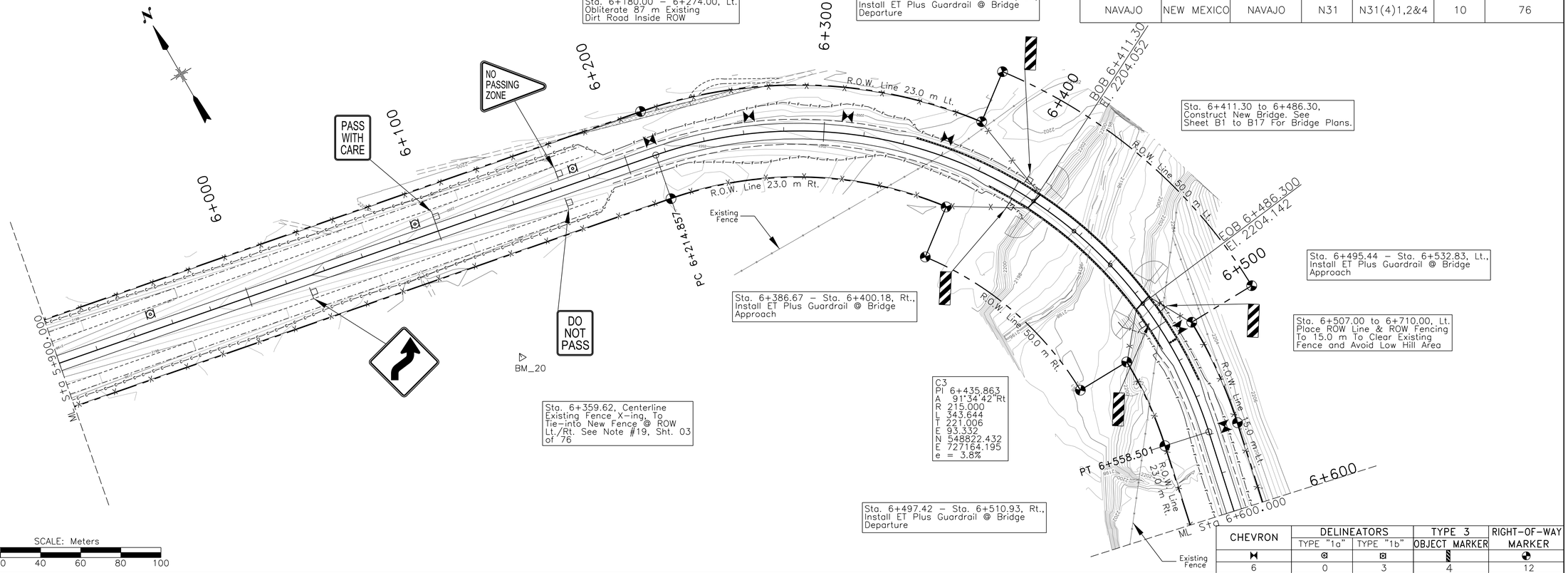
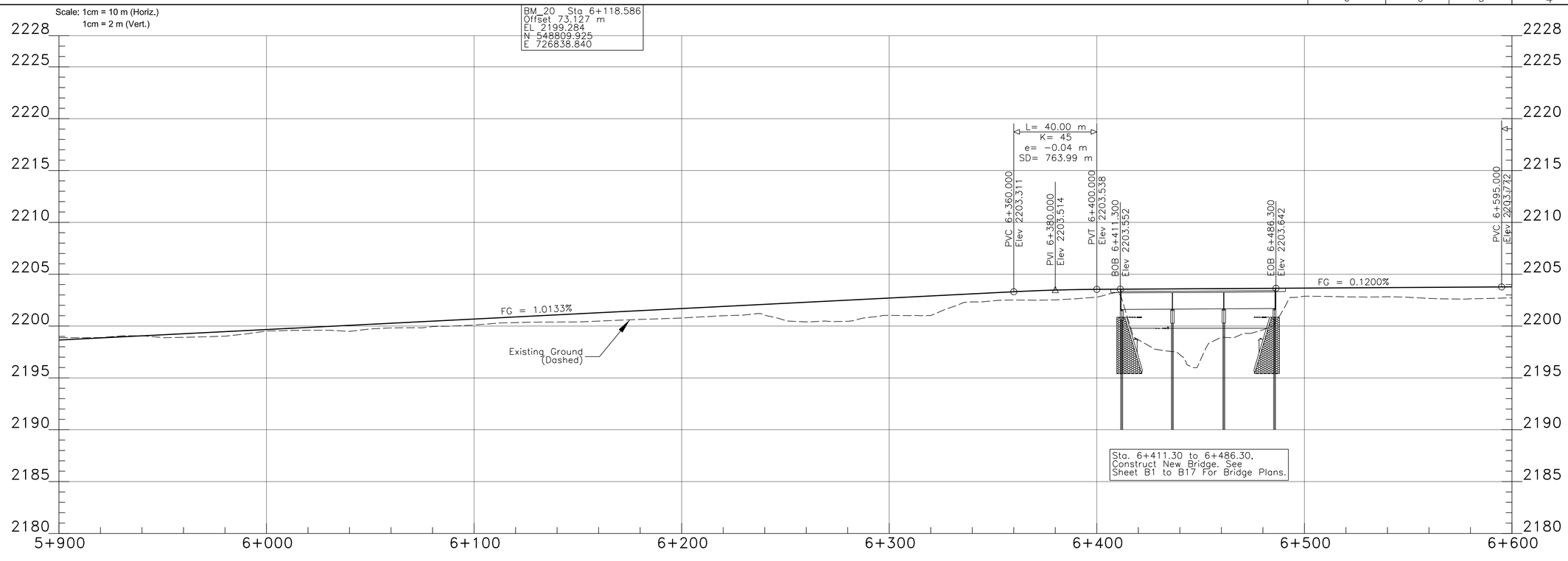
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	10	76



CHEVRON	DELINEATORS		TYPE 3	RIGHT-OF-WAY
	TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
6	0	3	4	12



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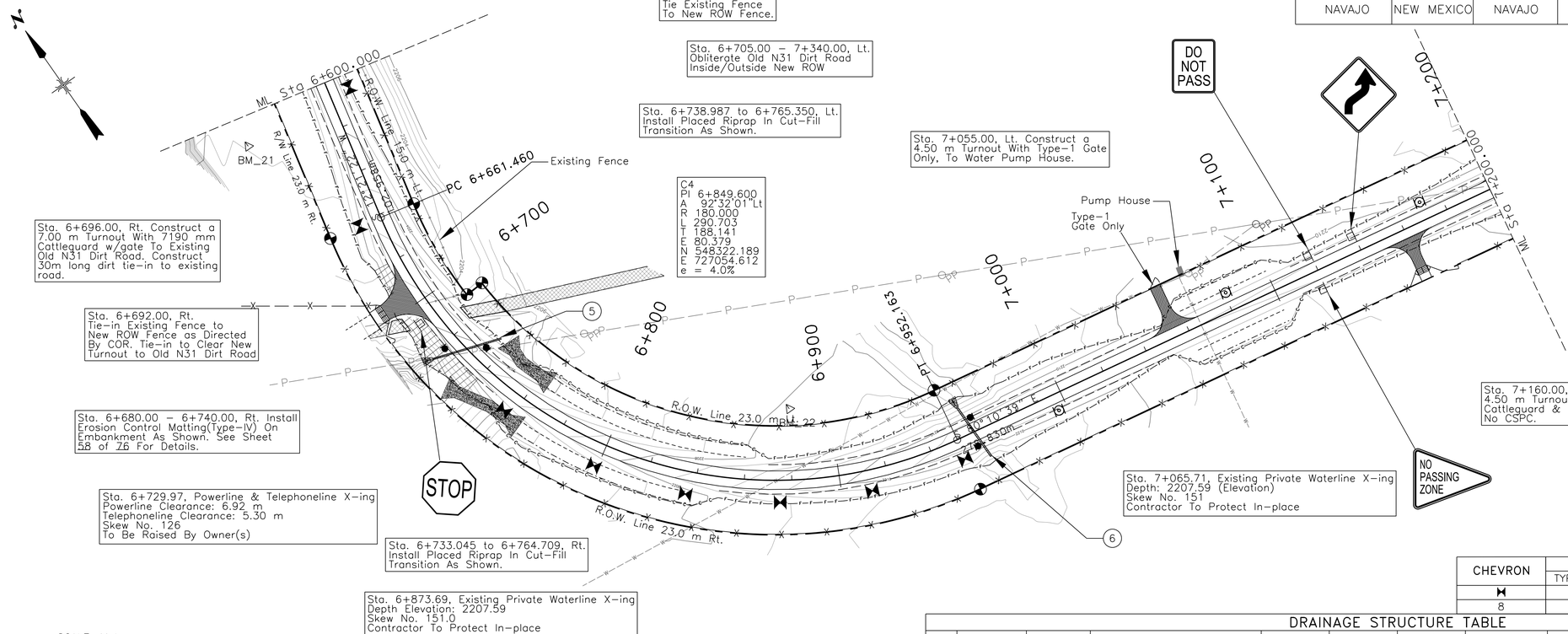
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	11	76



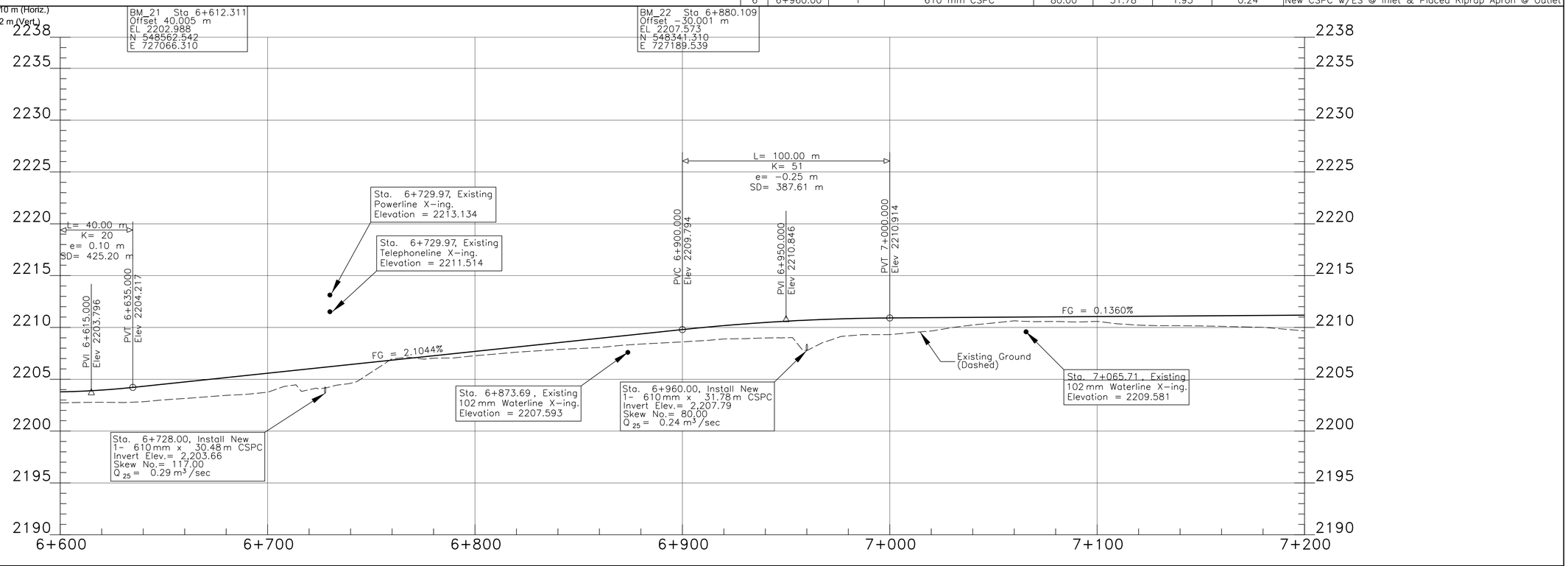
CHEVRON	DELINEATORS		TYPE 2	RIGHT–OF–WAY
	TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
8		3	4	6

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
5	6+728.00	1	610 mm CSPC	117.00	30.48	3.61	0.29	New CSPC w/ES @ Inlet & WE Stilling Basin @ Outlet
6	6+960.00	1	610 mm CSPC	80.00	31.78	1.93	0.24	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet

SCALE: Meters
0 20 40 60 80 100

Scale: 1cm = 10 m (Horiz.)
1cm = 2 m (Vert.)



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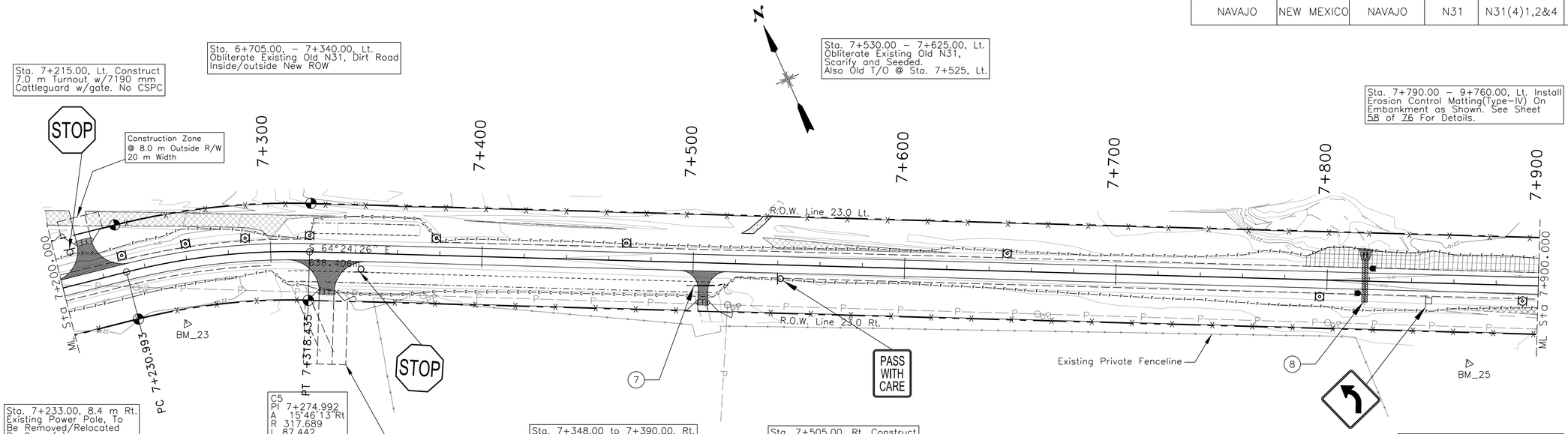
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	12	76



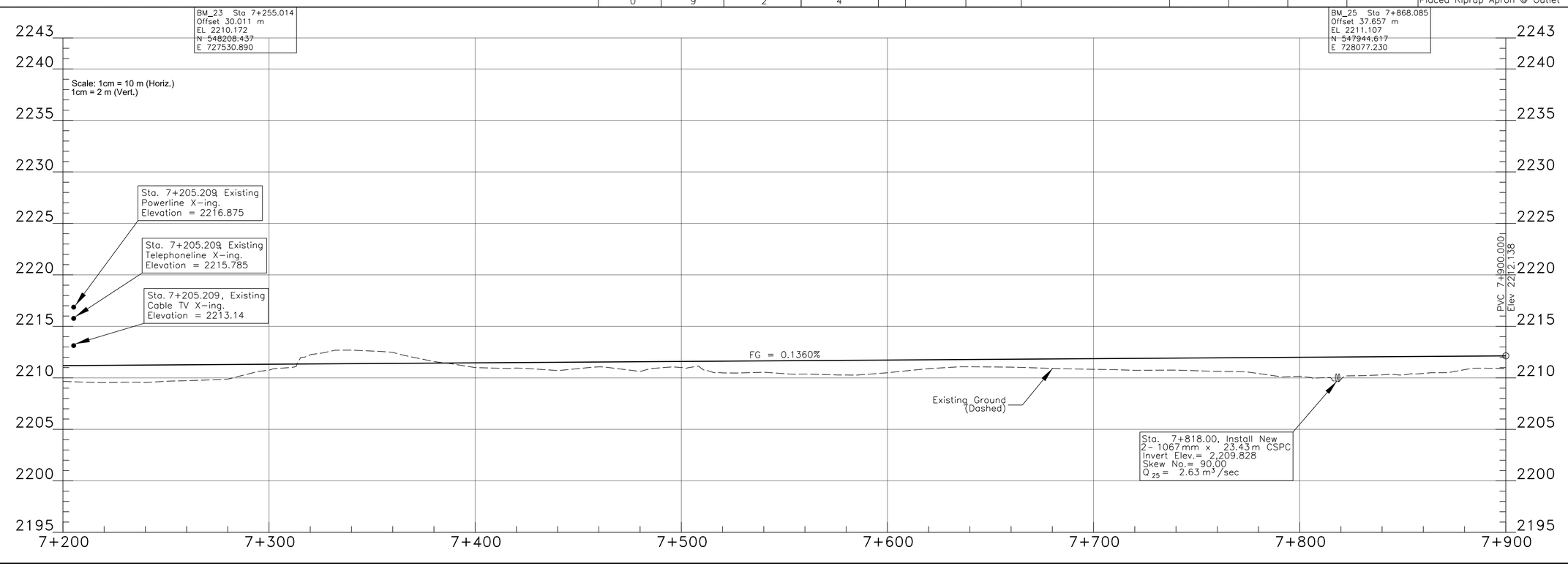
SCALE: Meters

0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
0	9	2	4

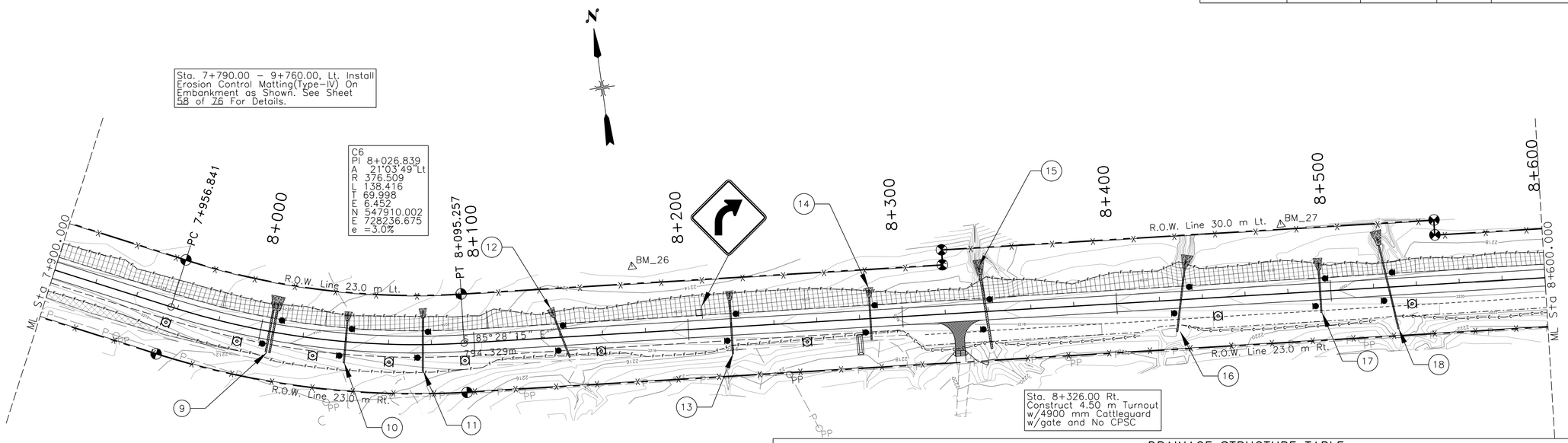
DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
7	7+505.00	1	610 mm CSPC, Rt. T/O	90.00	10.00	0.40	0.06	New CSPC w/End Section @ Inlet/Outlet
8	7+818.00	2	1067 mm CSPC	90.00	23.43	36.77	2.63	New CSPC w/Slope Paving @ Inlet/Outlet And Placed Riprap Apron @ Outlet



I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\REV_PLP Sheets 8 to 21 and PipeXS\Sht 12_N31 plp5.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	13	76

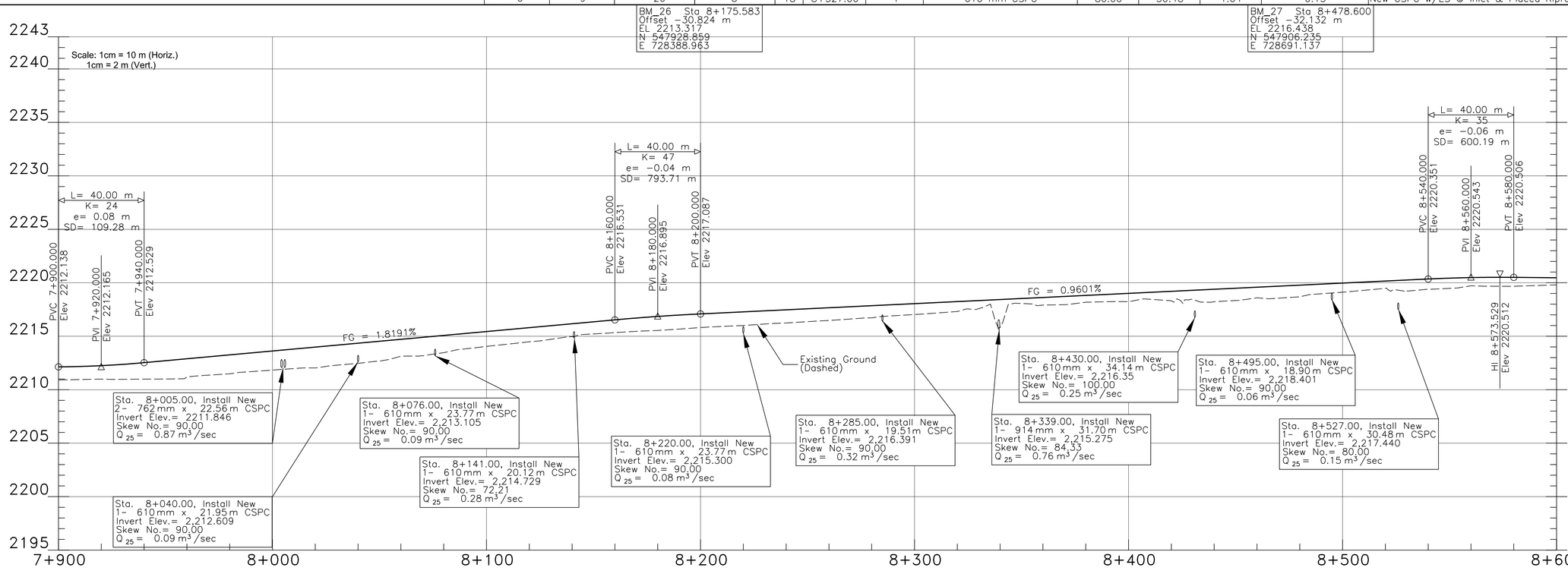


SCALE: Meters
0 20 40 60 80 100

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF Q25 (cms)	REMARKS
9	8+005.00	2	762 mm CSPC	90.00	22.56	6.13	0.87	New CSPC w/ES @ Each Inlet & Placed Riprap Apron @ Outlet
10	8+040.00	1	610 mm CSPC	90.00	21.95	0.64	0.09	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet
11	8+076.00	1	610 mm CSPC	90.00	23.77	0.14	0.09	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet
12	8+141.00	1	610 mm CSPC	72.00	20.12	2.01	0.28	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet
13	8+220.00	1	610 mm CSPC	90.00	23.77	0.58	0.08	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet
14	8+285.00	1	610 mm CSPC	90.00	19.51	2.39	0.32	New CSPC w/ES @ Inlet & Placed Riprap Stilling Basin @ Outlet
15	8+339.00	1	914 mm CSPC	84.33	31.70	5.62	0.76	New CSPC w/ES @ Inlet & WE–Riprap Stilling Basin @ Outlet
16	8+430.00	1	610 mm CSPC	100.00	34.14	1.86	0.25	New CSPC w/ES @ Inlet & WE–Riprap Stilling Basin @ Outlet
17	8+495.00	1	610 mm CSPC	90.00	18.90	0.41	0.06	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet
18	8+527.00	1	610 mm CSPC	80.00	30.48	1.04	0.15	New CSPC w/ES @ Inlet & Placed Riprap Stilling Basin @ Outlet

DELINEATORS		TYPE 2	RIGHT-OF-WAY
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
0	9	20	8



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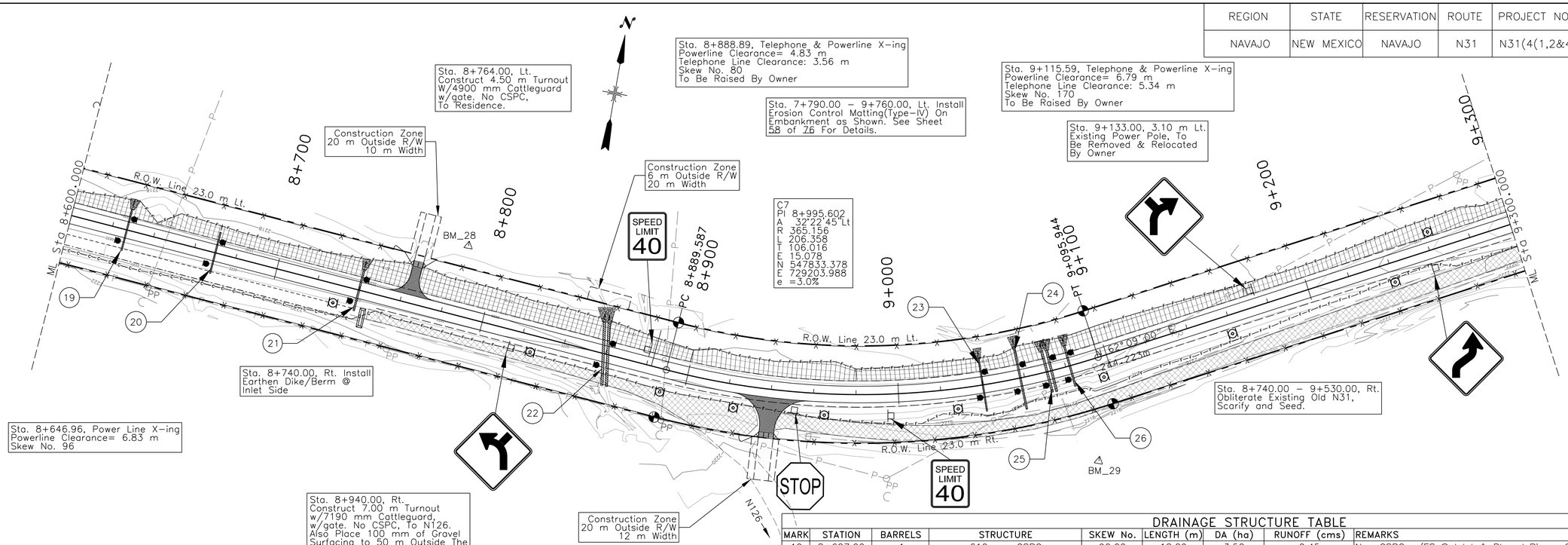
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4(1,2&4	14	76

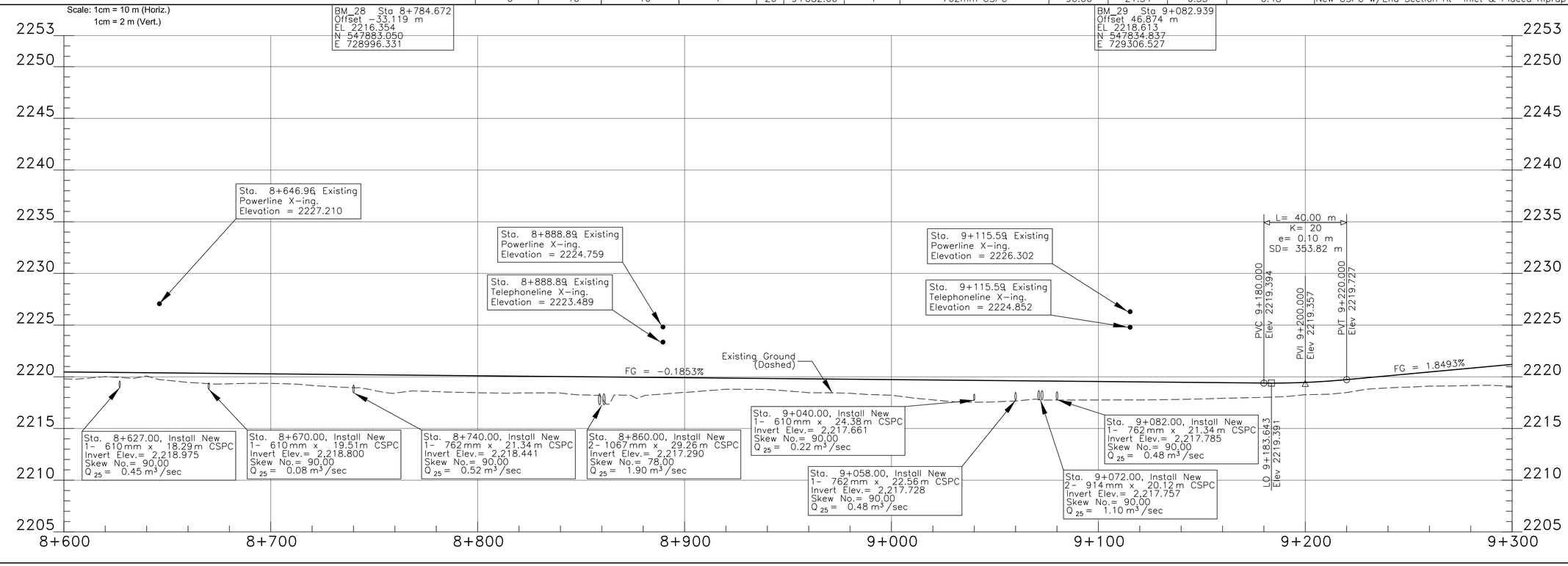


SCALE: Meters
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
0	10	16	4

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
19	8+627.00	1	610 mm CSPC	90.00	18.29	3.52	0.45	New CSPC w/ES @ Inlet & Placed Riprap Stilling Basin @ Outlet
20	8+670.00	1	610 mm CSPC	90.00	19.51	0.56	0.08	New CSPC w/End Section At Inlet
21	8+740.00	1	762 mm CSPC	90.00	21.34	3.88	0.52	New CSPC w/ES @ Inlet & WE Riprap Stilling Basin @ Outlet
22	8+860.00	2	1067 mm CSPC	78.00	29.26	25.97	1.90	New CSPC w/ES @ Inlet & Placed Riprap Stilling Basin @ Outlet
23	9+040.00	1	610 mm CSPC	90.00	24.38	2.12	0.22	New CSPC w/End Section At Inlet & Placed Riprap Apron @ Outlet
24	9+058.00	1	762 mm CSPC	90.00	22.56	6.55	0.48	New CSPC w/End Section At Inlet & Placed Riprap Apron @ Outlet
25	9+072.00	2	914 mm CSPC	90.00	20.12	6.55	1.10	New CSPC w/End Section At Inlet & Placed Riprap Apron @ Outlet
26	9+082.00	1	762mm CSPC	90.00	21.34	6.55	0.48	New CSPC w/End Section At Inlet & Placed Riprap Apron @ Outlet



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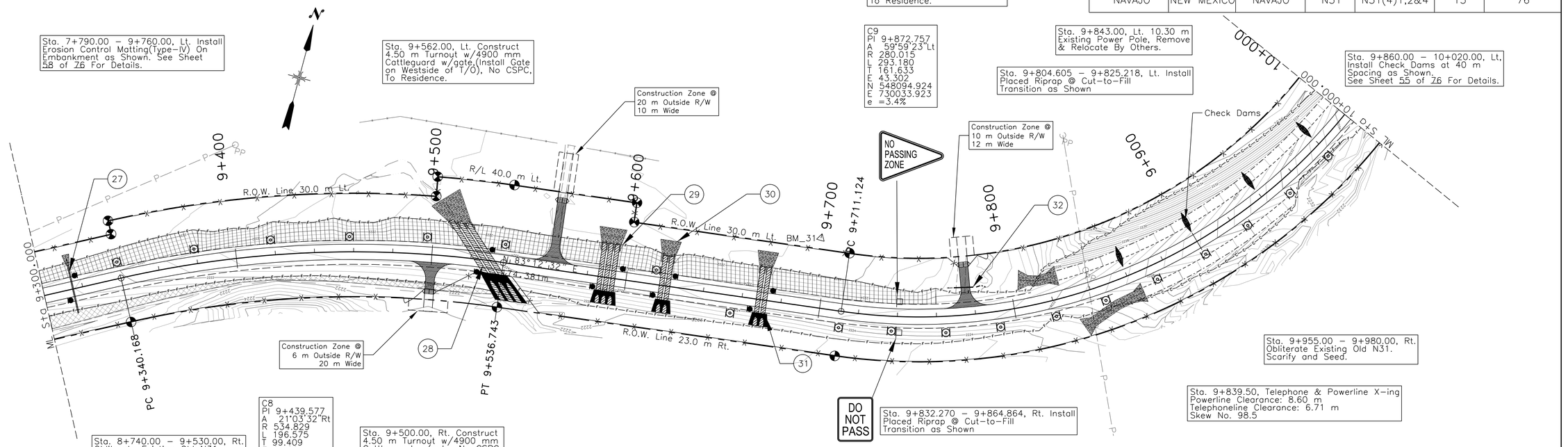
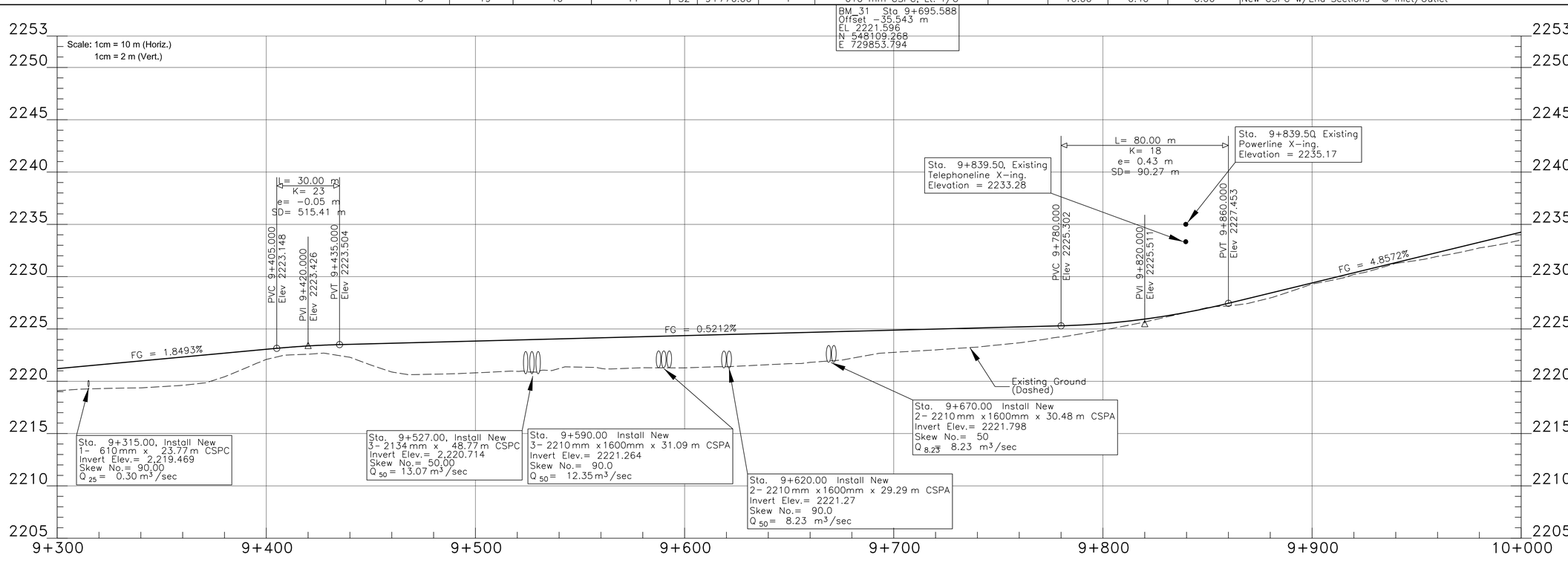
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	15	76



DELINEATORS		TYPE 2	RIGHT–OF–WAY
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
0	19	10	11

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
27	9+315.00	1	610 mm CSPC	90.00	23.77	2.15	0.30	New CSPC w/End Section @ Inlet & Placed Riprap @ Outlet
28	9+527.00	3	2134 mm CSPC, Live Stock Pass	50.00	48.77	730.80	13.07	New Dual Purpose CSPC w/Slope Paving @ Inlet Only & Grouted Riprap Apron @ Outlet
29	9+590.00	3	2210 mm S x 1600 mm R CSPA	90.00	31.09	730.80	12.35	New CSPC w/Slope Paving @ Inlet Only & Placed Riprap Apron @ Outlet
30	9+620.00	2	2210 mm S x 1600 mm R CSPA	90.00	29.29	730.80	8.23	New CSPC w/Slope Paving @ Inlet Only & Placed Riprap Apron @ Outlet
31	9+670.00	2	2210 mm S x 1600 mm R CSPA	90.00	30.48	730.80	8.23	New CSPC w/Slope Paving @ Inlet Only & Placed Riprap Apron @ Outlet
32	9+776.00	1	610 mm CSPC, Lt. T/O		10.00	0.40	0.06	New CSPC w/End Sections @ Inlet/Outlet



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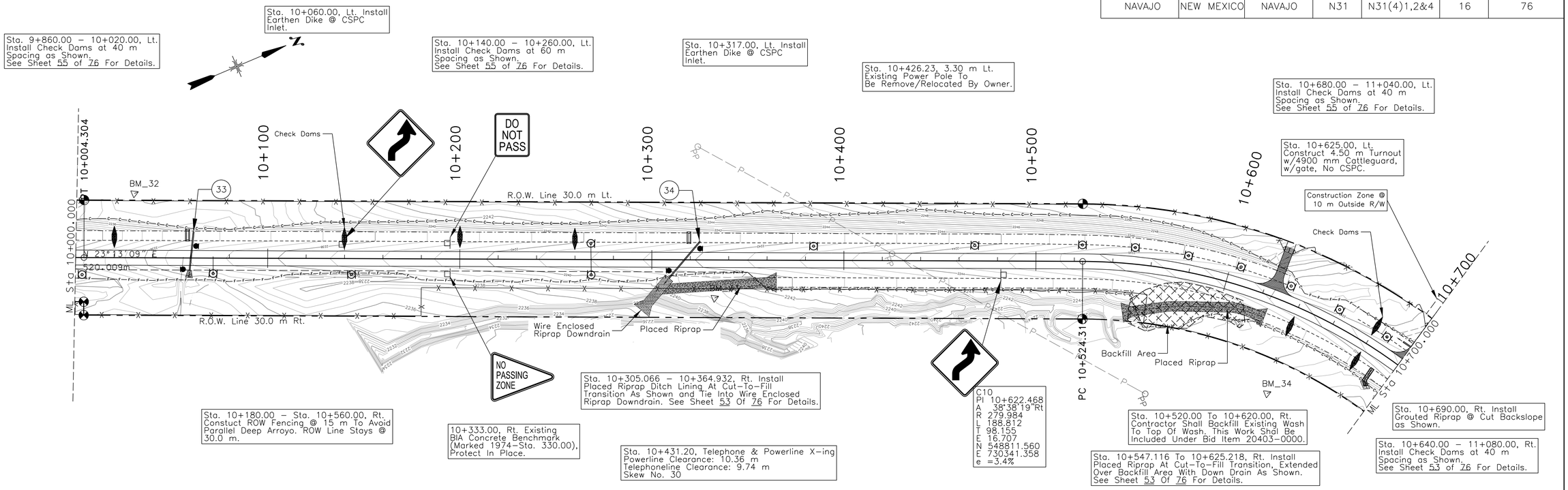
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	16	76



SCALE: Meters

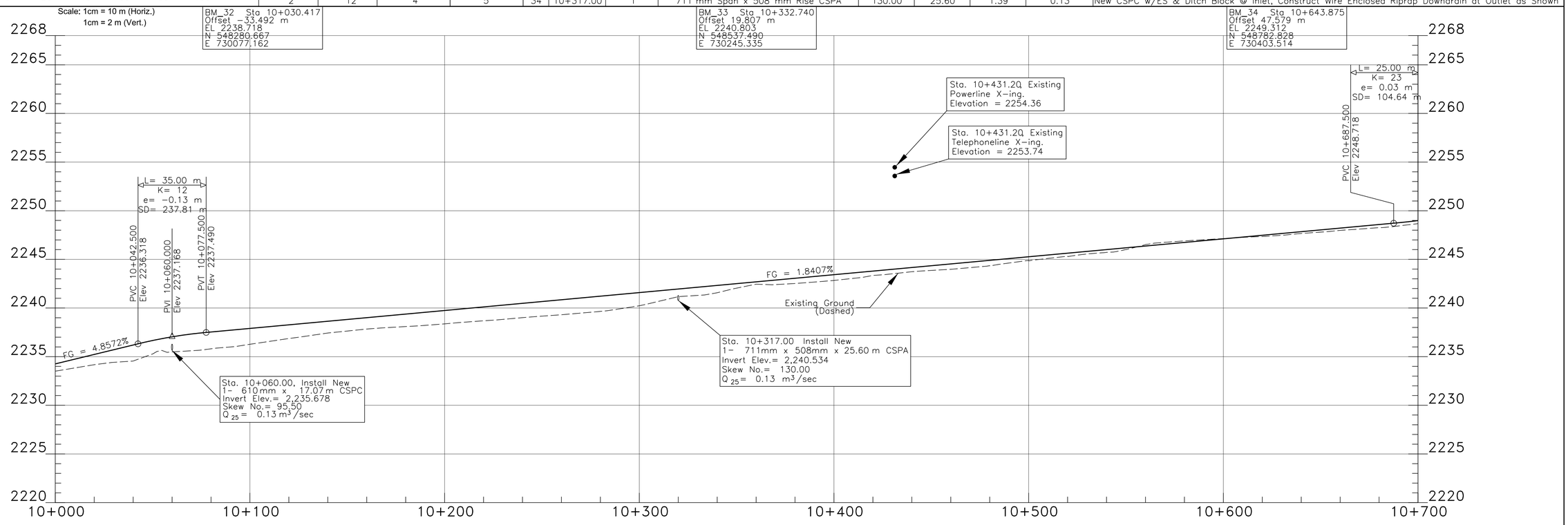
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
⊙	⊙	●	◔
2	12	4	5

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
33	10+060.00	1	610 mm CSPC	95.50	17.07	1.10	0.13	New CSPC w/ES @ Inlet, Construct Ditch Block @ Inlet & Placed Riprap Apron @ Outlet
34	10+317.00	1	711 mm Span x 508 mm Rise CSPA	130.00	25.60	1.39	0.13	New CSPC w/ES & Ditch Block @ Inlet, Construct Wire Enclosed Riprap Downdrain at Outlet as Shown

Scale: 1cm = 10 m (Horiz.)
1cm = 2 m (Vert.)



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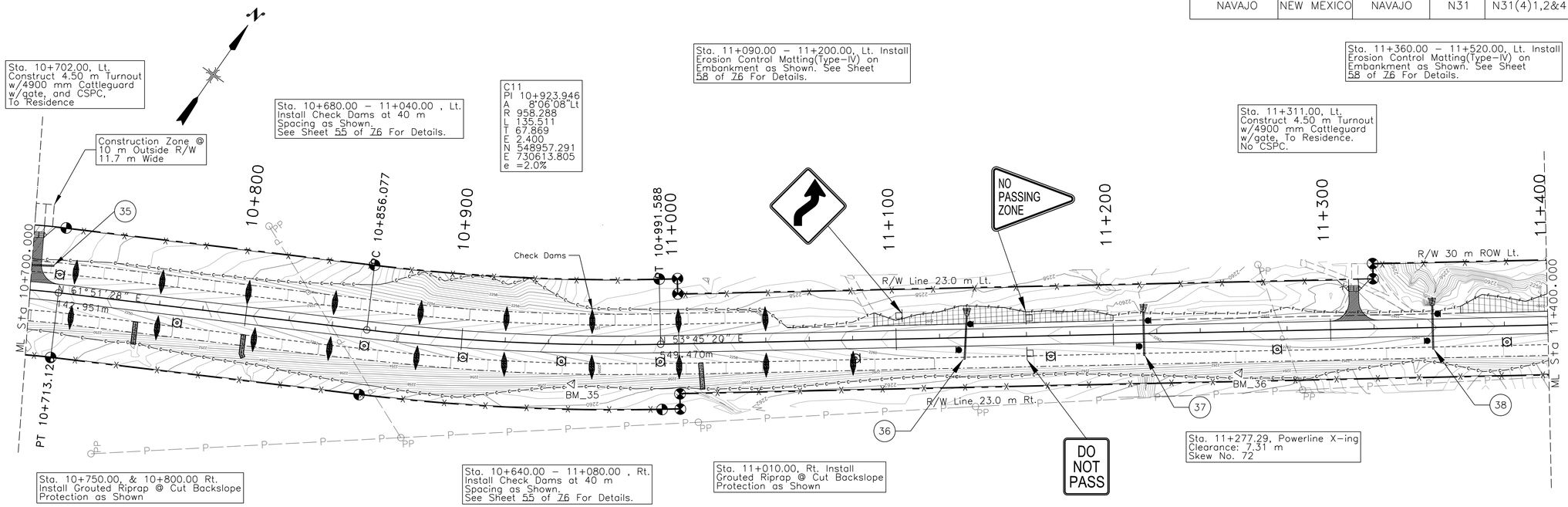
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	17	76



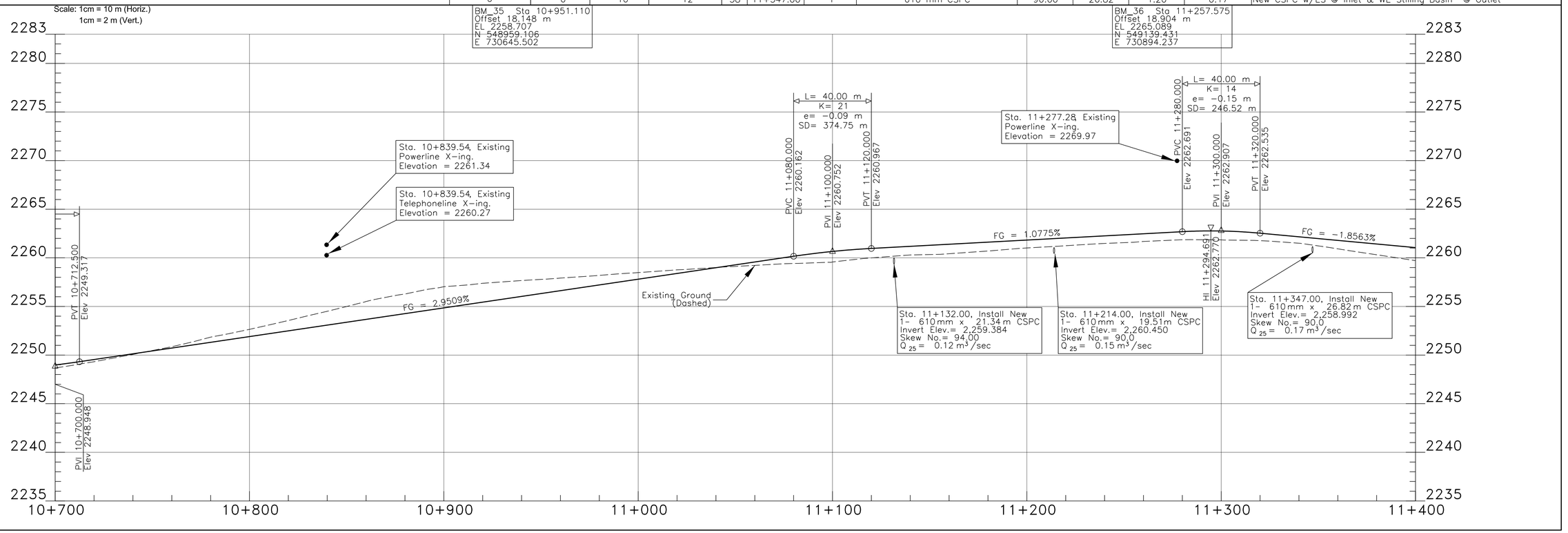
SCALE: Meters

0 20 40 60 80 100

TYPE 2	DELINEATORS		RIGHT–OF–WAY
OBJECT MARKER	TYPE "1a"	TYPE "1b"	MARKER
■	⊙	⊙	◔
6	0	10	12

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
35	10+702.00	1	610 mm CSPC, Lt. T/O		15.00	0.4	0.06	New CSPC With End Section At Inlet/Outlet
36	11+132.00	1	610 mm CSPC	94.00	21.34	0.85	0.12	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet
37	11+214.00	1	610 mm CSPC	90.00	19.51	1.10	0.15	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet
38	11+347.00	1	610 mm CSPC	90.00	26.82	1.20	0.17	New CSPC w/ES @ Inlet & WE Stilling Basin @ Outlet



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	18	76

Sta. 11+460.00 to 11+506.00, Lt. Construct Gabion Wall & Wire Enclosed Riprap In Existing Channel At Left For Embankment Protection. See Sheet 48 Of 76 For Details.

Sta. 11+470.00 – 11+520.00, Lt. Install ET Plus Guardrail

Sta. 11+705.00 – 12+120.00, Lt. Remove Existing Old Fence Line.

Sta. 11+360.00 – 11+520.00, Lt. Install Erosion Control Matting(Type–IV) on Embankment as Shown. See Sheet 58 of 76 For Details.

Sta. 11+580.00, Lt. Install Type–1 Gate Only For Livestock.

Sta. 11+705.58 – 11+860.00, Lt. Place New ROW Fencing @ 20 m And From Sta. 11+860.00 to 12+100.00 Place Fence Behind New ET Plus Guardrail.

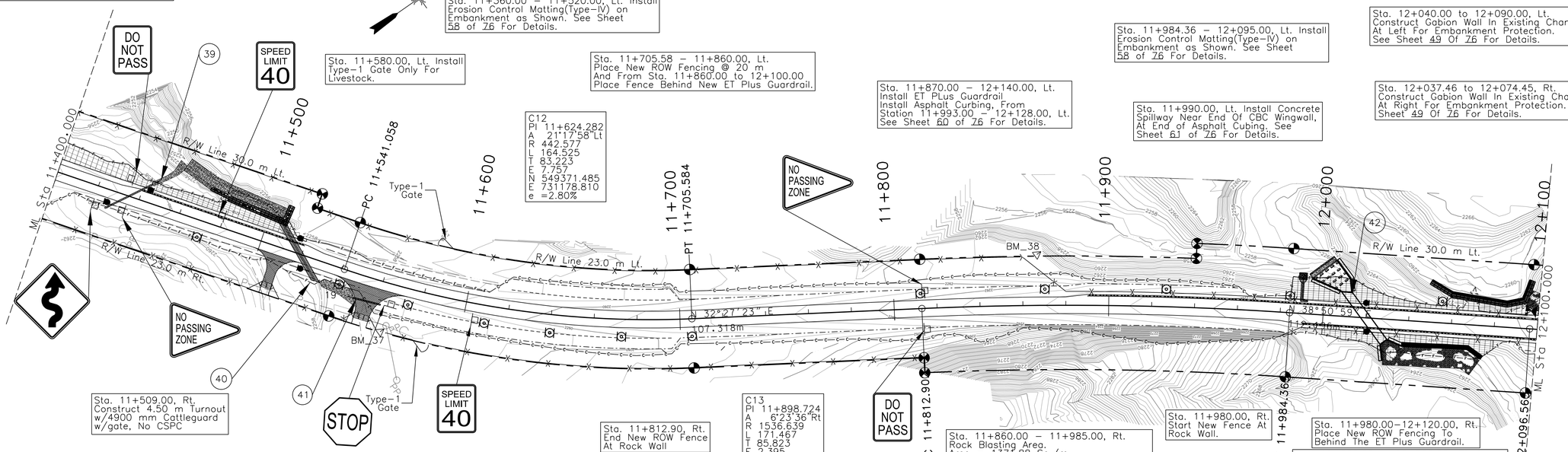
Sta. 11+984.36 – 12+095.00, Lt. Install Erosion Control Matting(Type–IV) on Embankment as Shown. See Sheet 58 of 76 For Details.

Sta. 12+040.00 to 12+090.00, Lt. Construct Gabion Wall In Existing Channel At Left For Embankment Protection. See Sheet 49 Of 76 For Details.

Sta. 11+870.00 – 12+140.00, Lt. Install ET PLus Guardrail Install Asphalt Curbing, From Station 11+993.00 – 12+128.00, Lt. See Sheet 60 of 76 For Details.

Sta. 11+990.00, Lt. Install Concrete Spillway Near End Of CBC Wingwall, At End of Asphalt Cubing. See Sheet 61 of 76 For Details.

Sta. 12+037.46 to 12+074.45, Rt. Construct Gabion Wall In Existing Channel At Right For Embankment Protection. See Sheet 49 Of 76 For Details.



Sta. 11+509.00, Rt. Construct 4.50 m Turnout w/4900 mm Cattleguard w/gate, No CSPC

Sta. 11+812.90, Rt. End New ROW Fence At Rock Wall

C13
PI 11+898.724
A 6°23'36"Rt
R 1536.639
L 171.467
T 85.823
E 2.395
N 549604.682
E 731327.123

Sta. 11+860.00 – 11+985.00, Rt. Rock Blasting Area. Area = 1371.88 Sq./m. Constractor Shall Clear All Loose Rocks From The Top Of The Hill. Under Bid Item 20502–0000

Sta. 11+980.00, Rt. Start New Fence At Rock Wall.

Sta. 11+980.00–12+120.00, Rt. Place New ROW Fencing To Behind The ET Plus Guardrail.

Sta. 12+000.00 – 12+080.00, Rt. Install Erosion Control Matting(Type–IV) on Embankment as Shown. See Sheet 58 of 76 For Details.

Sta. 11+990.00 – 12+100.00, Rt. Install ET Plus Guardrail

Sta. 11+530.00 – 11+555.00, Rt. Install Placed Riprap From Pipe to Pipe.

Sta. 11+555.00, Rt. Construct 7.00 m Turnout w/7190 mm Cattleguard & New CSPC. No Gate, Due To Power Pole. Gate Is Installed At Sta. 11+580.

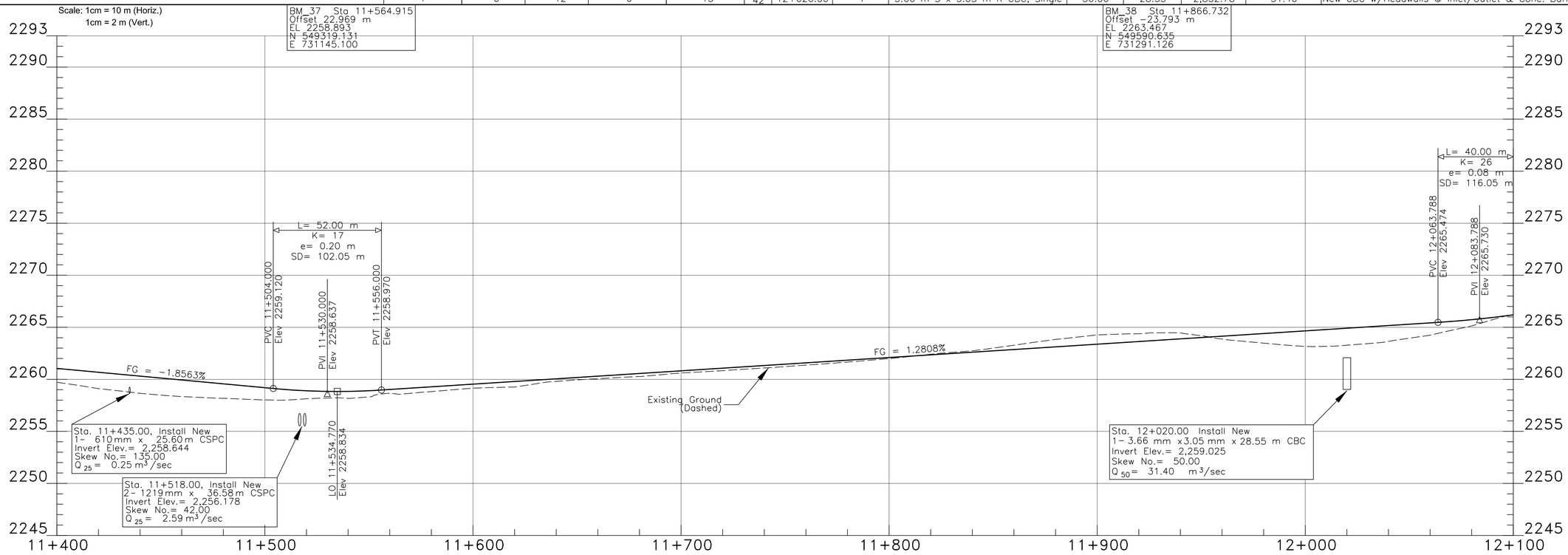
SCALE: Meters
0 20 40 60 80 100

CHEVRON	DELINEATORS		TYPE 2	RIGHT–OF–WAY MARKER
	TYPE "1a"	TYPE "1b"	OBJECT MARKER	
1	0	12	6	15

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
39	11+435.00	1	610 mm CSPC	135.00	25.60	1.78	0.25	New CSPC w/ES @ Inlet & Placed Riprap Stilling Basin @ Outlet
40	11+518.00	2	1219mm CSPC	42.00	36.38	72.28	2.59	New CSPC w/Concrete Slope Paving @ Inlet Only & Gabion Wall & Wire Enclosed Riprap End Treatment @ Outlet
41	11+555.00	1	610 mm CSPC, T/O Rt.	90.00	20.00	0.40	0.06	New CSPC w/End Section @ Inlet/Outlet
42	12+020.00	1	3.66 m S x 3.05 m R CBC, Single	50.00	28.55	2,832.78	31.40	New CBC w/Headwalls @ Inlet/Outlet & Conc. Baffled Apron @ Outlet

Scale: 1cm = 10 m (Horiz.)
1cm = 2 m (Vert.)



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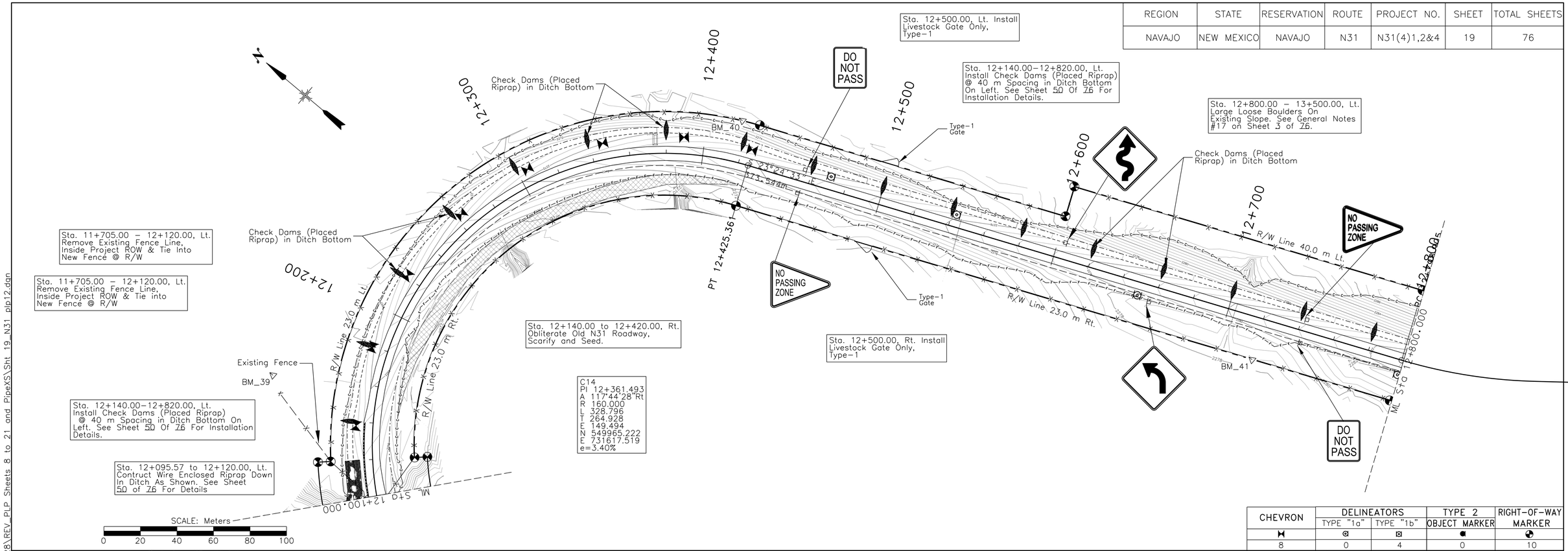
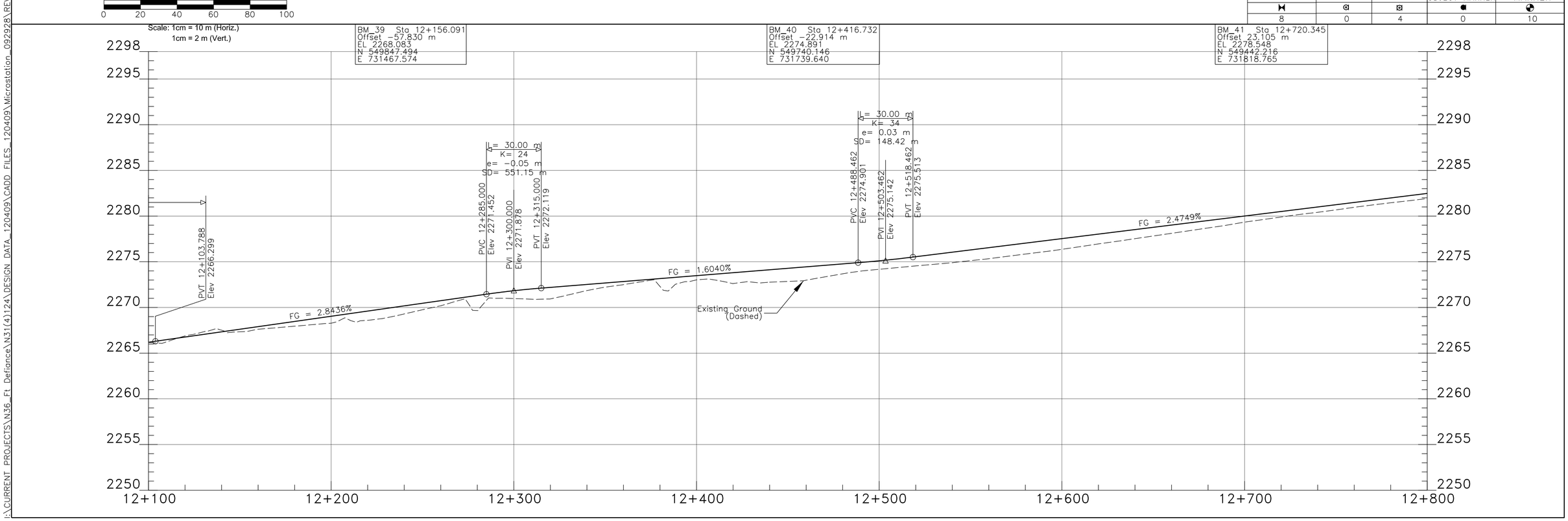
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	19	76



CHEVRON	DELINEATORS		TYPE 2	RIGHT-OF-WAY
	TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
8	0	4	0	10



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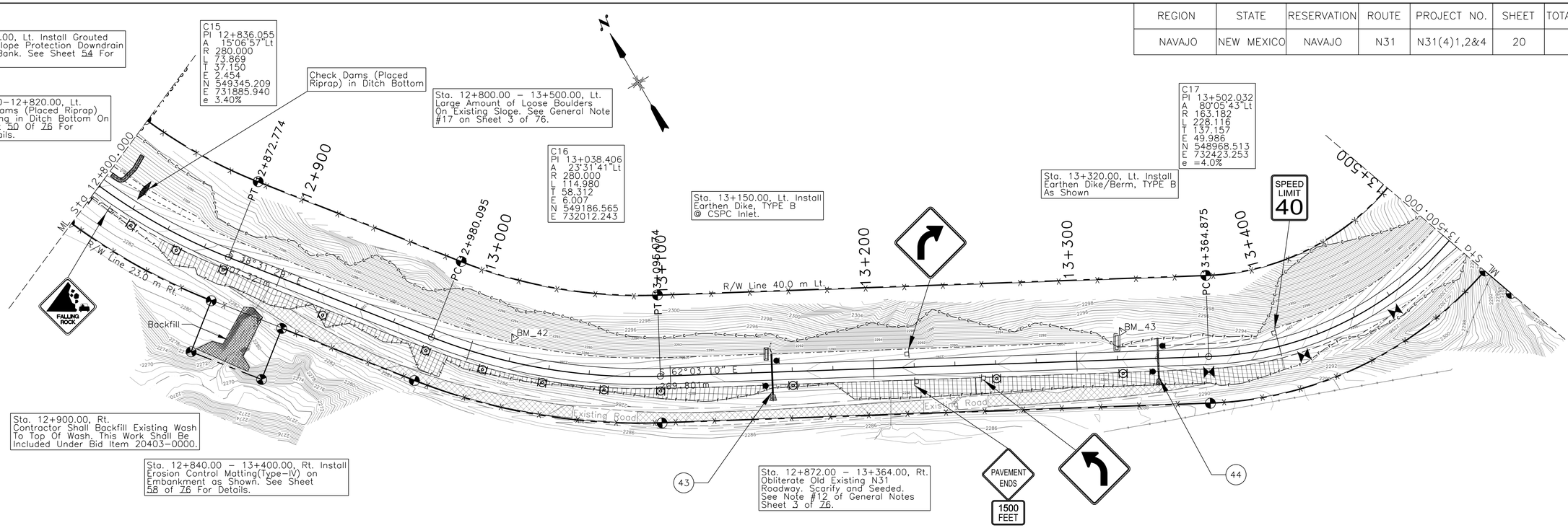
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	20	76

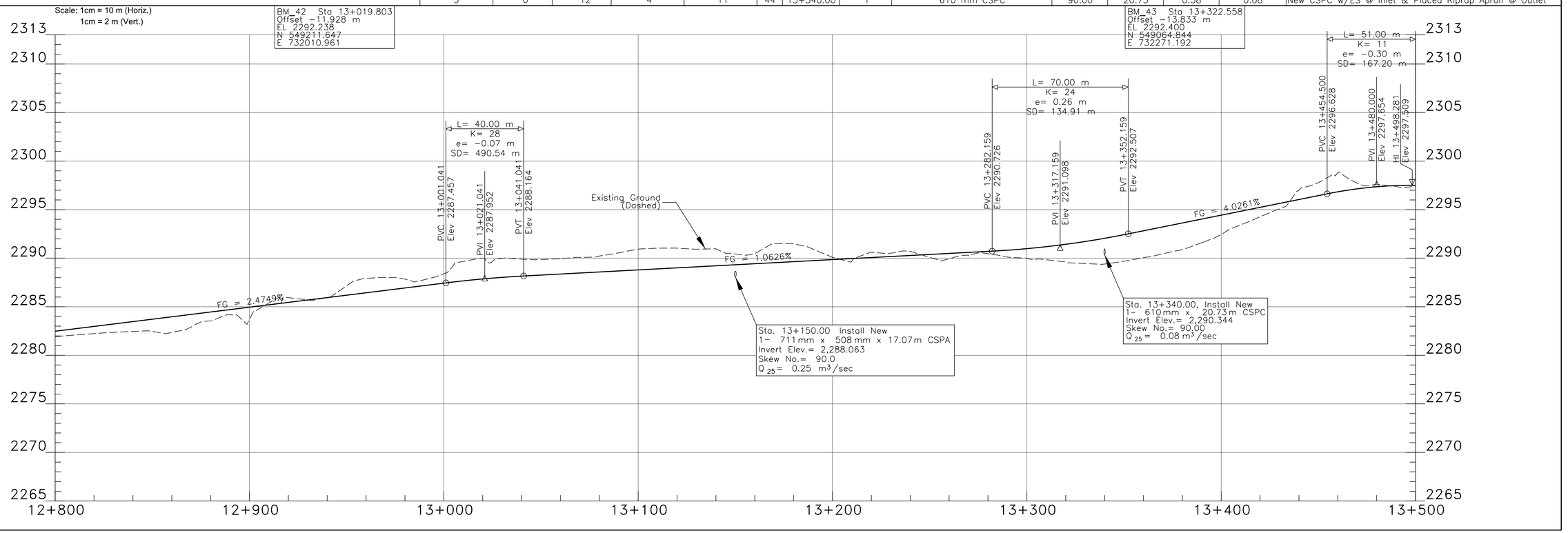


SCALE: Meters
0 20 40 60 80 100

CHEVRON	DELINEATORS		TYPE 2	RIGHT-OF-WAY
	TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
3	0	12	4	11

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
43	13+150.00	1	711 mm S x 508 mm R CSPA	90.00	17.07	1.84	0.25	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet
44	13+340.00	1	610 mm CSPC	90.00	20.73	0.58	0.08	New CSPC w/ES @ Inlet & Placed Riprap Apron @ Outlet



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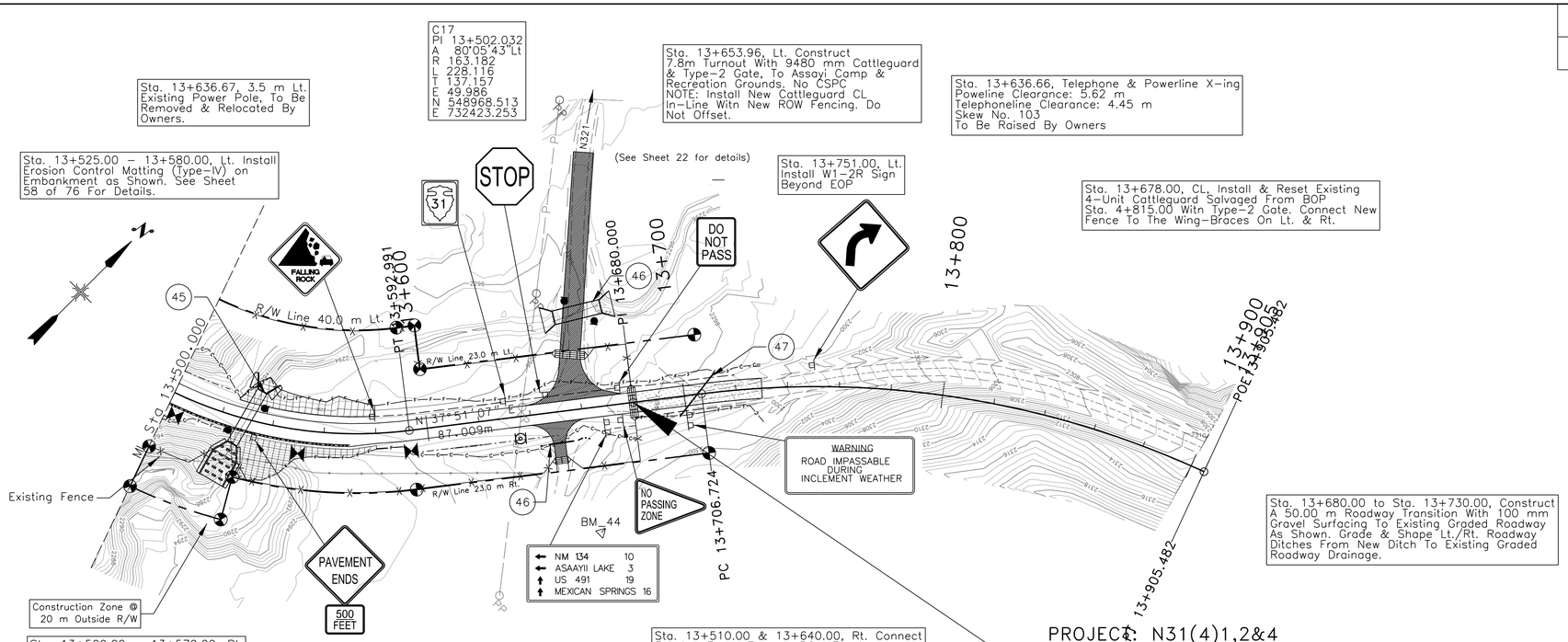
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	21	76

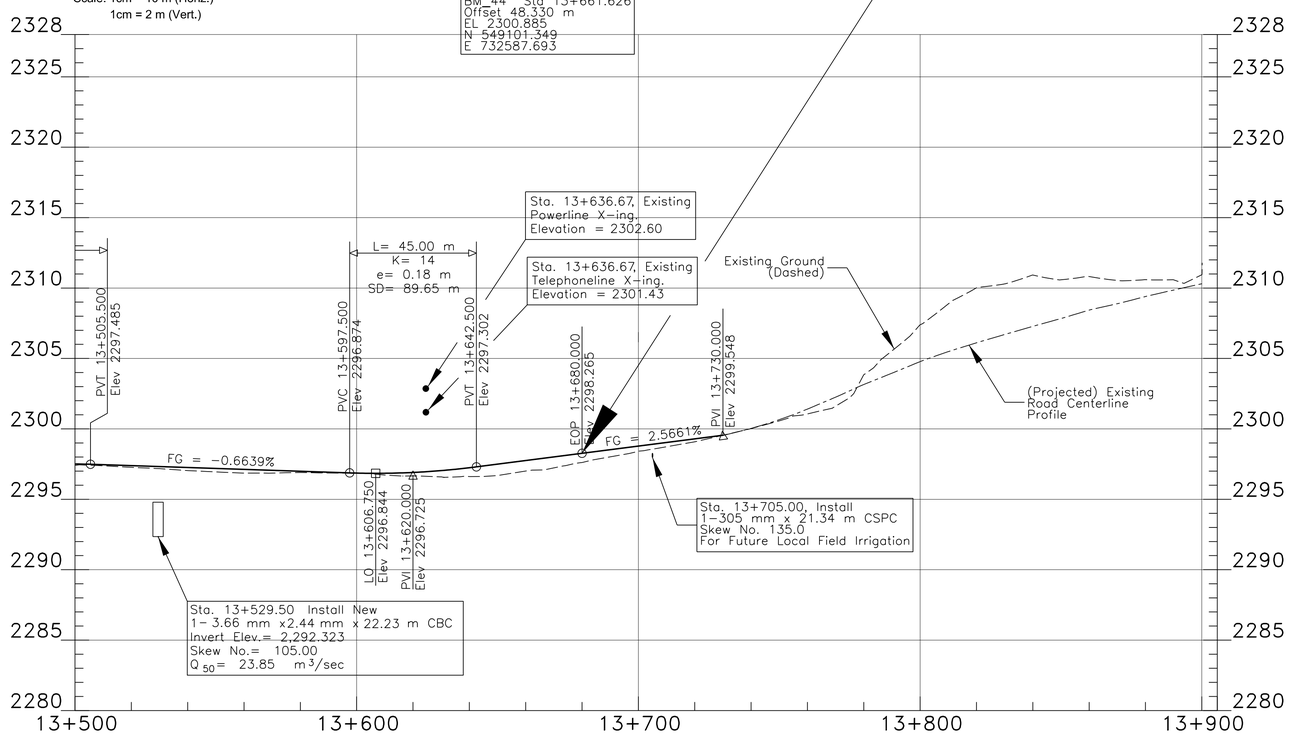


PROJECT: N31(4)1,2&4
EOP Sta. 13+680.00
Elev. 2298.265

CHEVRON	DELINEATORS		TYPE 2	RIGHT-OF-WAY
	TYPE "1a"	TYPE "1b"	OBJECT MARKER	MARKER
	⊙	⊡	●	◔
3	0	1	4	10

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
45	13+529.50	1	Singel Barrel 3.66 m S x 2.44 m R CBC	105.00	22.23	1,793.59	23.85	New CBC w/Concrete Headwall @ Inlet/Outlet, Type IX, Baffle Apron w/Wire-Enclosed Riprap
46	13+650.00	1	610 mm CSPC Under	90.00	10.00	0.40	0.06	New CSPC w/End Sections @ Inlet/Outlet @ T/O Rt.
47	13+705.00	1	305 mm CSPC	135.00	21.34	n/a	n/a	New CSPC For Future Local Field Irrigation



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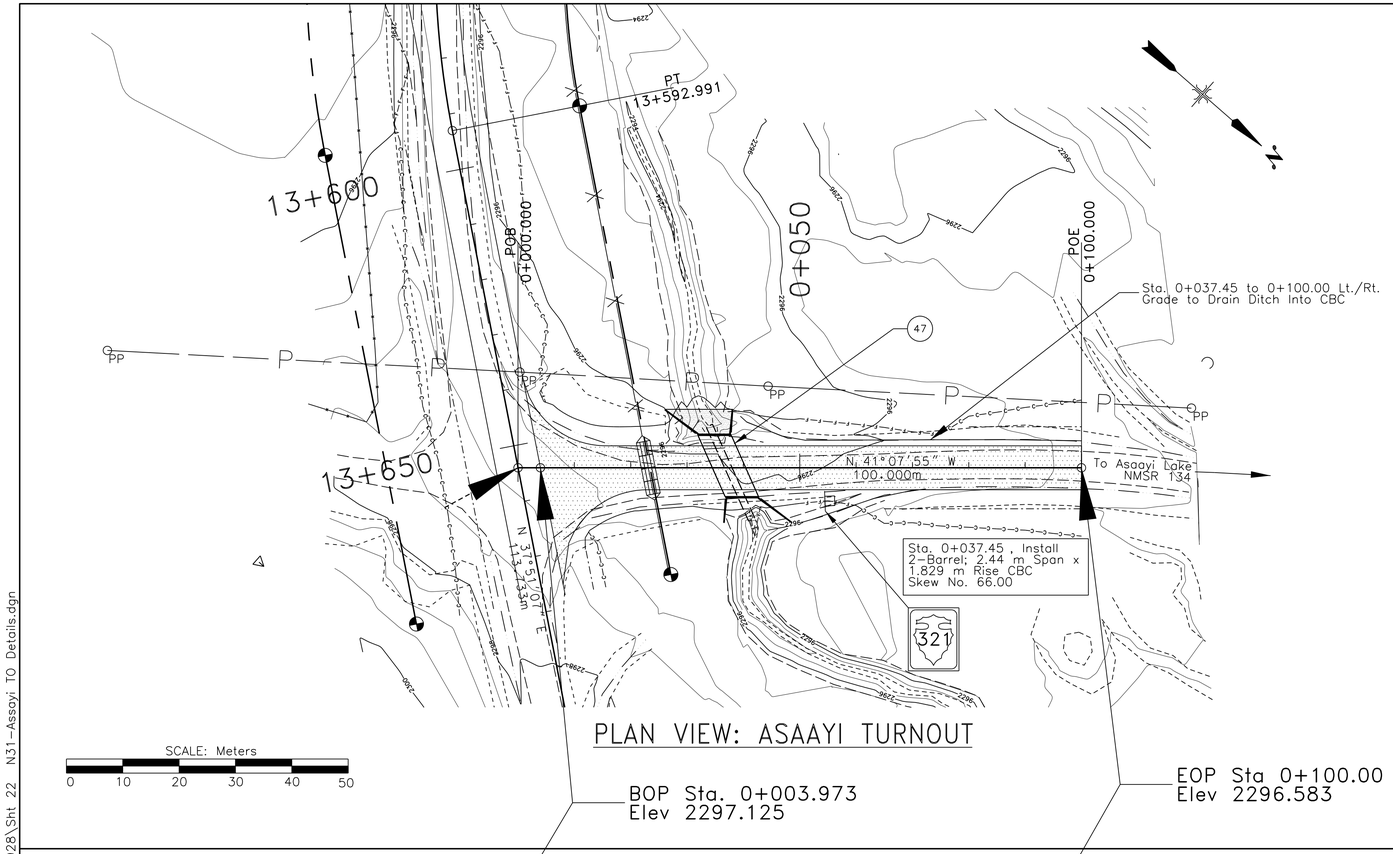
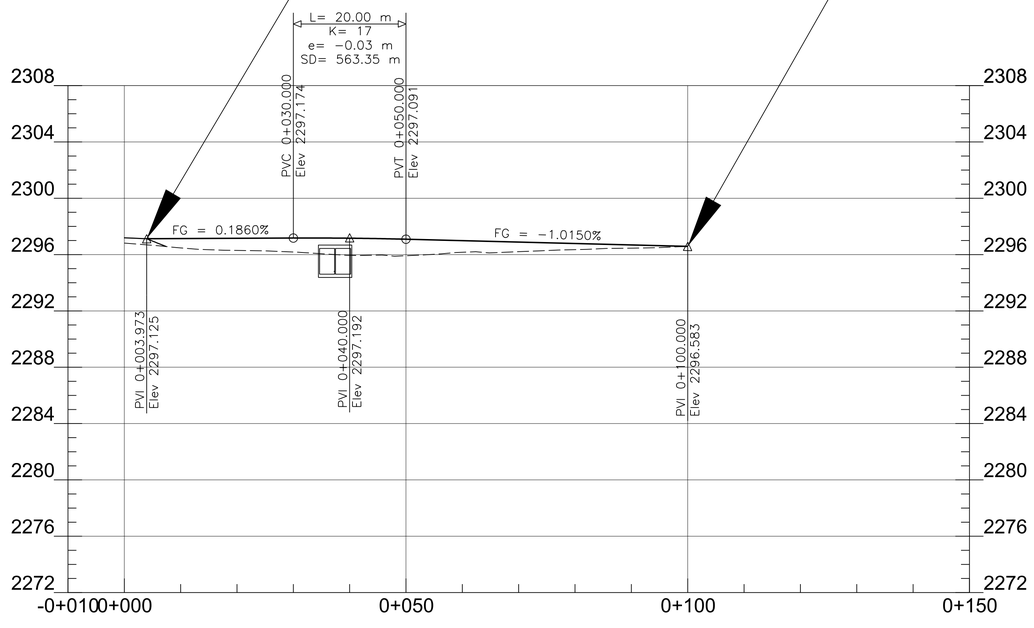
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	22	76



PLAN VIEW: ASAAYI TURNOUT



PROFILE: ASAAYI TURNOUT

HORIZONTAL ALIGNMENT TABLE: ASAAYI TURNOUT

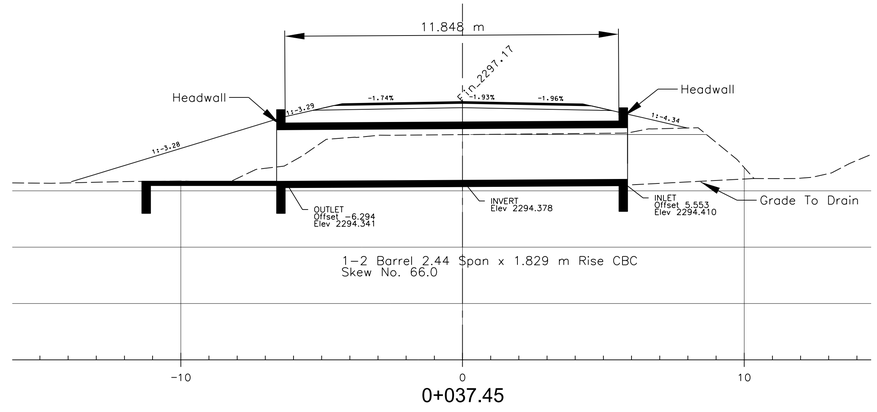
STATION	NORTHING	EASTING
BOP 0+000.000	549124.957	732544.831
Direction: N 41°07'55" W Length: 100.000		
EOP 0+100.000	549200.277	732479.051

DRAINAGE STRUCTURE TABLE

MARK	STATION	BARRELS	STRUCTURE	SKEW No.	LENGTH (m)	DA (ha)	RUNOFF (cms)	REMARKS
47	0+037.45 N321	2	2.44 m S x 1.83 m R CBC Double	66.00	11.85	1,793.59	23.85	New CBC with Headwall & Wingwall at Inlet & /Outlet and Install Concrete Apron on Outlet Side Only

REVISED: 9/5/2013

ASAAYI TURNOUT PIPE CROSS SECTION



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

ASAAYI TURNOUT-PLAN & PROFILE AND CBC CROSS SECTION

DRAWN BY: NRDOT	DATE: 5/16/2011
DESIGNED BY: NRDOT	DATE: 5/16/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
Sht 22 N31-Assayi TO Details.dgn	

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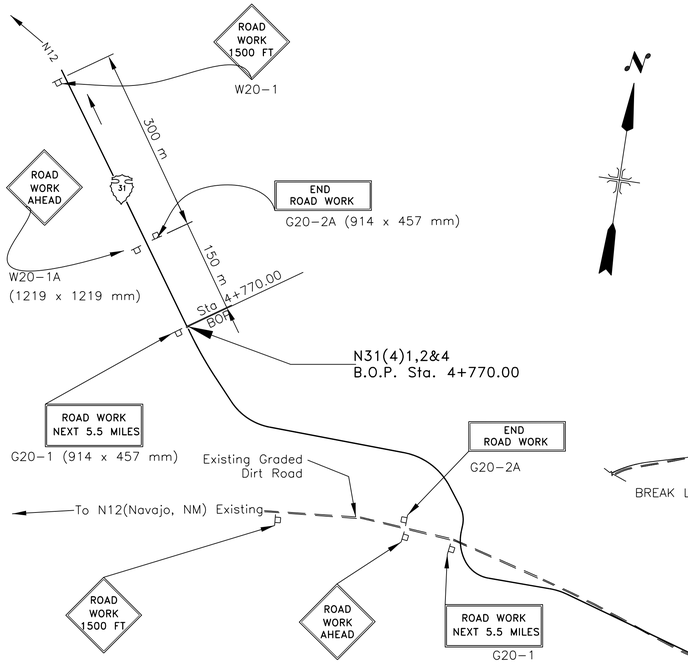
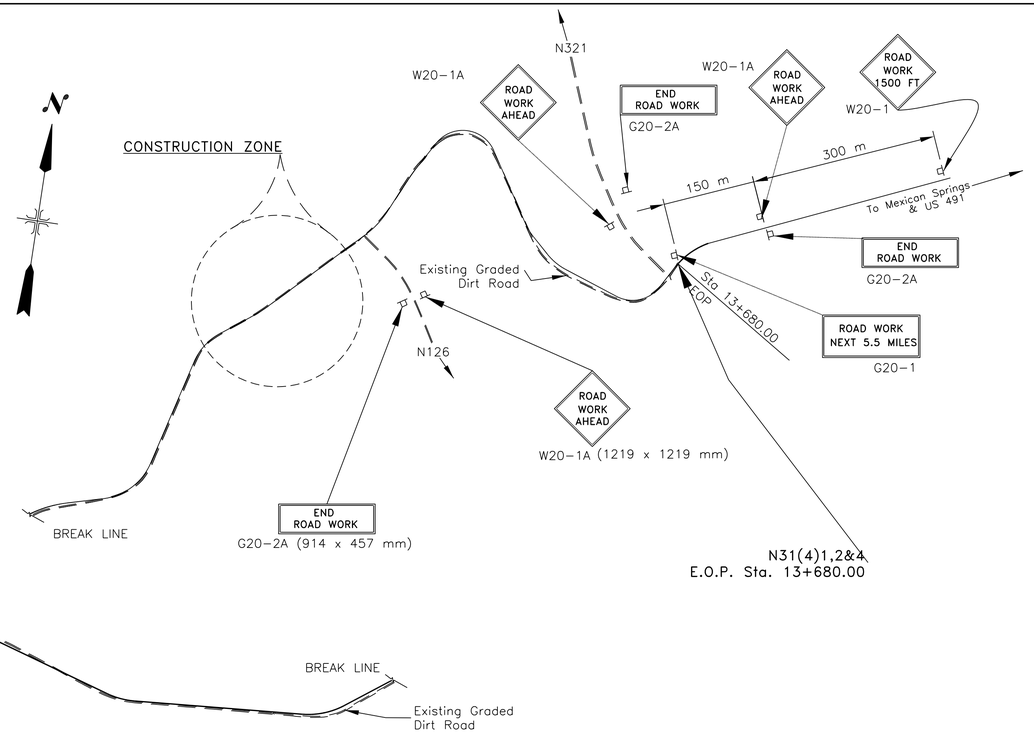
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	23	76



PHASED CONSTRUCTION



PHASE CONSTRUCTION NOTES:

1. THE CONTRACTOR MAY CONSTRUCT 1/2 THE NEW ROADWAY (UNDER THE PHASE CONSTRUCTION PLAN SHOWN) WHILE DETOURING TWO-WAY TRAFFIC ON THE OTHER (EXISTING) HALF ONCE THE FIRST 1/2 OF ROADWAY IS BUILD UP TO THE NEW GRADES; THEN TRAFFIC SHALL BE DIRECTED TO THE NEW HALF OF ROADWAY WHILE THE OTHER (EXISTING) HALF IS CONSTRUCTED.

2. ALL (NEW) DRAINAGE PIPE INSTALLATION SHALL BE IN ACCORDANCE WITH THE PHASED CONSTRUCTION PLAN ABOVE AS WELL AS REMOVAL OF EXISTING PIPES. ALL THIS PIPE INSTALLATION & REMOVAL SHALL BE CONSIDERED INCIDENTAL TO PIPE ITEMS SHOWN AND NO ADDITIONAL PAYMENT SHALL BE MADE.

3. THIS PHASED CONSTRUCTION SHALL BE CONSIDERED INCIDENTAL TO THE TCP AND NO ADDITIONAL PAYMENT SHALL BE MADE.

4. THE CONTRACTOR'S CONSTRUCTION SCHEDULE, CONSTRUCTION SEQUENCING PLAN, AND STORM WATER POLLUTION PREVENTION PLAN SHALL REFLECT THIS PHASED CONSTRUCTION.

GENERAL NOTES

1. ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE MUTCD MANUAL (LATEST EDITION AND AMENDMENTS) AND THE SUPPLEMENTAL SPECIFICATION FOR THIS PROJECT.

2. THE TRAFFIC CONTROL DETAILS SHOWN ARE ONLY A GUIDE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PREPARING AND IMPLEMENTING A TRAFFIC CONTROL PLAN (TCP) IN ACCORDANCE WITH THESE DETAILS, SECTION 635, AND THE MUTCD UNDER CONTRACT ITEM 63501. ANY ADDITIONAL TRAFFIC CONTROL DEVICES CALLED FOR ON THE CONTRACTOR'S TCP WILL NOT BE MEASURED FOR PAYMENT BUT SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEMS FOR TRAFFIC CONTROL SHOWN IN THE BID SCHEDULE. SEE SUPPLEMENTAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

3. SIGNS (G20-1, W20-1A, AND G20-2A) SHALL BE PLACED AT THE PROJECT LIMITS AND REMAIN IN PLACE THROUGH THE DURATION OF THE PROJECT.

4. FLAGGERS SHALL BE STATIONED LEFT & RIGHT AS SHOWN WHEN EQUIPMENT IS CROSSING OR WORKING WITHIN EXISTING ROADWAY PRISM.

5. IN AREAS OF EXISTING ROADWAY WIDENING, THE CONTRACTOR SHALL ENSURE THAT NO PAVEMENT DROP-OFFS ARE LEFT EXPOSED DURING NON-WORKING HOURS. THE CONTRACTOR SHALL INITIATE CORRECTIVE MEANS TO ACHIEVE A MINIMUM 1:3 SLOPE AS SHOWN ON FILLET DETAIL.

6. AT THE END OF EACH WORKING DAY, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE A DRIVING SURFACE FREE OF OBSTRUCTIONS AS SHOWN ON THE PHASED AND FILLET CONSTRUCTION DETAILS AS APPLICABLE, ACCESS TO ALL ADJOINING PROPERTIES AND BIA SYSTEM ROUTES SHALL BE MAINTAINED AT ALL TIMES (DAY AND NIGHT).

7. ALL TRAFFIC CONTROL DEVICES (EXCEPT AT DETOUR ROAD LOCATIONS AND AS NOTED IN ABOVE NOTE #3) SUCH AS CONSTRUCTION SIGNS, DRUMS, BARRICADES, ETC.. SHALL BE REMOVED TO A LOCATION AT LEAST NINE (9) METERS FROM THE EDGE OF THE SHOULDER WHEN CONSTRUCTION IS NOT IN PROGRESS.

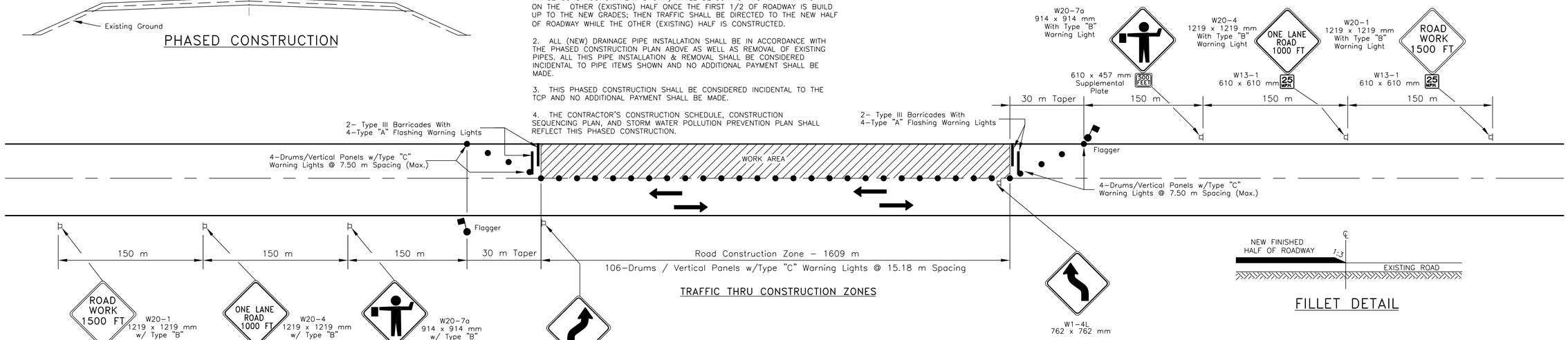
8. DURING CONSTRUCTION OPERATIONS, TRAFFIC SHALL BE MOVED THROUGH THE WORK ZONE USING PILOT CARS (AS REQUIRED), APPLICABLE SIGNS AND OTHER ITEMS (TWO-WAY RADIO CONTACT) RELATED TO THE USE OF THE PILOT CARS AND SHALL BE CONSIDERED INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.

9. THE CONTRACTOR HAS THE OPTION TO EITHER USE DRUMS OR VERTICAL PANELS; BUT SHALL NOT USE A COMBINATION OF BOTH. NO TRAFFIC CONES SHALL BE ALLOWED.

10. THE CONTRACTOR HAS THE OPTION TO UTILIZE DETOUR ROADS IN ACCORDANCE WITH THE MUTCD MANUAL IN CONJUNCTION WITH OR IN LIEU OF THE PHASE CONSTRUCTION DETAILS SHOWN AND IN ACCORDANCE WITH SECTION 107 AND 204, THE COST OF ANY DETOUR ROADS (INCLUDING ALL DETOUR RELATED EARTHWORK AND MAINTENANCE) SHALL BE CONSIDERED INCIDENTAL TO THE TEMPORARY TRAFFIC CONTROL BID ITEMS. THE CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY PERMITS AND CLEARANCES FOR ANY DETOUR ROADS.

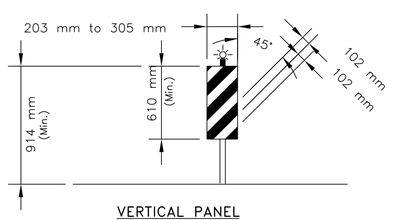
11. AT LOCATIONS WHERE NEW ROAD CONSTRUCTION CROSSES EXISTING ROADWAY AND AT TIE-INS WITH EXISTING ROADS AT THE END OF THE NEW CONSTRUCTION, SPECIAL TRAFFIC CONTROL PROCEDURES SHALL BE INCLUDED IN THE CONTRACTOR'S TCP TO INCLUDE THESE, BUT ARE NOT NECESSARILY LIMITED TO THE FOLLOWING: TYPE III BARRICADES WITH "ROAD CLOSED" SIGNS, "DETOUR" SIGNS, FLAGGERS AND DRUMS.

12. THE TRAFFIC CONTROL ON THIS PROJECT SHALL BE COORDINATED WITH THE PROJECT CONSTRUCTION SCHEDULE.

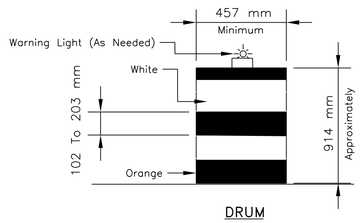


TRAFFIC THRU CONSTRUCTION ZONES

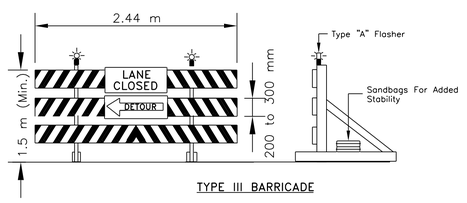
FILLET DETAIL



VERTICAL PANEL (ALTERNATE)



DRUM



TYPE III BARRICADE

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TEMPORARY TRAFFIC CONTROL

DRAWN BY: NRDOT	DATE: 8/25/2011
DESIGNED BY: NRDOT	DATE: 8/25/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 23_N31tcp.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	24	76

N31(4) PERMANENT TRAFFIC CONTROL – Sign, Post, & Hardware

Station	Location	Detail No.	Description	Sign Panel Size (mm)	Area of Sign (m^2)	No. of Post	Post Wt. (kg/m)	No. of Panel	Total Area of Panel (m^2)
6+696.00 7+215.00 7+327.00 8+940.00 11+555.00 13+653.96	Rt. Lt. Rt. Rt. Rt. Lt.	R1–1	STOP	762 X 762	0.58	2	2.98	6	3.48
13+220.00 13+527.75	Rt. Rt.	W8–3 W16–2	PAVEMENT ENDS / 500 FEET	610 x 610 457 x305	0.37 0.14	2	2.98	2	1.02
4+900.00 13+630.00	Rt. Lt.	See Detail	31	457 x 610	0.28	1	4.10	2	0.56
0+054.37 (N321)	Rt.	See Detail On "Sheet #22"	321	457 x 610	0.28	1	4.10	1	0.28
4+840.00 8+880.00 8+990.00 11+480.00 11+605.00 13+400.00	Rt. Lt. Rt. Lt. Rt. Lt.	R2–1	SPEED LIMIT 40	457 x 762	0.35	1	4.10	6	2.10
6+165.00 7+120.00 9+739.00 10+195.00 11+160.00 11+435.00 11+812.00 13+678.00	Lt. Rt. Lt. Rt. Lt. Rt. Lt. Rt.	W14–3	NO PASSING ZONE	1219 x 1219 x 914	0.52	2	2.98	8	4.16
6+165.00 7+120.00 9+739.00 10+195.00 11+160.00 11+435.00 11+812.00 13+678.00	Rt. Lt. Rt. Lt. Rt. Lt. Rt. Lt.	R4–1	DO NOT PASS	457 x 610	0.28	1	4.10	8	2.24
5+624.00 8+207.00 13+218.00 *13+751.00	Lt. Lt. Lt. Lt.	W1–2R		610 x 610	0.37	2	2.98	4	1.48
5+040.00 7+847.00 12+656.00 13+253.00	Rt. Rt. Rt. Rt.	W1–2L		610 x 610	0.37	2	2.98	4	1.48
6+100.00 7+540.00	Lt. Rt.	R4–2	PASS WITH CARE	457 x 610	0.28	2	2.98	2	0.56

*NOTE: New Sign Installation beyound EOP

N31(4) PERMANENT TRAFFIC CONTROL – Sign, Post, & Hardware

Station	Location	Detail No.	Description	Sign Panel Size (mm)	Area of Sign (m^2)	No. of Post	Post Wt. (kg/m)	No. of Panel	Total Area of Panel (m^2)
8+815.00	Rt.	W1–10L		914 x 914	0.84	2	2.98	1	0.84
9+175.00	Lt.	W1–10R		914 x 914	0.84	2	2.98	1	0.84
6+214.78 6+262.78 6+310.78 6+360.78 6+504.78 6+558.42 6+606.42 6+661.36 6+755.81 6+800.71 6+840.70 6+875.70 6+910.91 6+952.06 12+096.52 12+140.62 12+178.72 12+221.82 12+262.92 12+304.01 12+345.11 12+386.21 12+425.31 13+364.83 13+410.46 13+457.08 13+502.71 13+549.34 13+592.97	Lt. Lt. Lt. Lt. Lt. Lt. Lt. Rt. Rt. Rt. Rt. Rt. Rt. Rt. Lt. Lt. Lt. Lt. Lt. Lt. Lt. Lt. Lt. Rt. Rt. Rt. Rt. Rt. Rt.	W1–8L/ W1–8R (Note: These signs are mounted "back–back" on same post)		457 x 610	0.28	1	4.10	29	16.24
6+034.00 7+140.00 9+259.00 10+140.00 10+482.00 11+103.00	Rt. Lt. Rt. Lt. Rt. Lt.	W1–4		610 x 610	0.37	2	2.98	6	2.22
11+420.00 12+605.00	Rt. Lt.	W1–5		610 x 610	0.37	2	2.98	2	0.74
12+810.00 13+580.00	Rt. Lt.	W24–1a	FALLING ROCK	914 x 914	0.84	2	2.98	2	1.68
13+670.00	Rt.	D1–3	NM 134 10 ASAAYII LAKE 3 US 491 19 MEXICAN SPRINGS 16	2636 x 1096	2.89	3	4.46	1	2.89
Route N12	Lt. & Rt.	D1–1	NOTICE eRoute N31 Paved Road Ends At 8.5Miles At Asaayii Lake Junction	2620 x 1096	2.87	3	4.46	2	5.74
13+700.00	Rt.	EM–5a	NOTICE ROAD IMPASSABLE DURING INCLEMENT WEATHER	2620 x 1096	2.87	3	4.46	1	2.87
ITEM No. 63302–0003 – Sign Installation, 1 post & hardware: 4.10 kg/m									21.42 m^2
ITEM No. 63302–0010 – Sign Installation, 2 posts & hardware: 2.98 kg/m									18.50 m^2
ITEM No. 63302–0023– Sign Installation, 3 posts & hardware: 4.46 kg/m									11.50 m^2

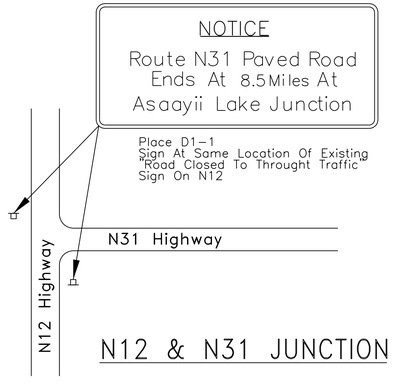
GENERAL NOTES

See Sheet 67 of 76 For Additional Chevron Details.

SEE SHEETS 23 – 26, OF 76 FOR SIGN DETAILS, DIMENSIONS, PLACEMENT\LOCATION, MARKINGS, TURNOUT TYPICALS, YIELD LINES, ETC.

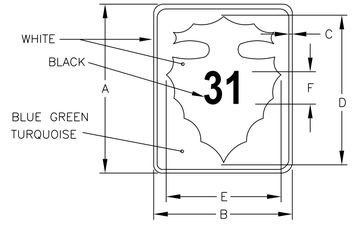
D1–3 @ Sta. 13+670.00 Rt.

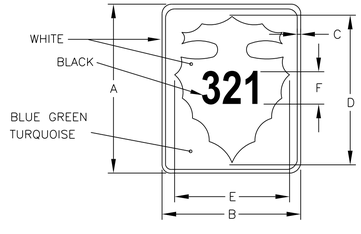
EM–5a Location @ N31(4) EOP
Notification for traveling tourist leaving Asaayii Lake.



N12 & N31 JUNCTION

SIGN	DIMENSION (mm)					F NUMERALS				
	A	B	C	D	E	DIGITS IN ROUTE	1	2	3	4
MIN.	610	457	13	495	343	SIZE & SERIES (mm)	254E	254D	203C	152B





UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PERMANENT & TEMPORARY
TRAFFIC CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 1/18/2011
DESIGNED BY: NRDOT	DATE: 1/18/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	25	76

N31 PAVEMENT MARKINGS
ITEM No. 63401–1510: SOLID YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH(m)
6+165.00	To	7+120.00	CL, Rt./Lt	Double Solid Yellow	1,910.00
9+739.00	To	10+100.00	CL, Rt./Lt	Double Solid Yellow	722.00
10+100.00	To	10+195.00	CL, Lt	Solid Yellow	95.00
11+160.00	To	11+435.00	CL, Rt./Lt	Double Solid Yellow	550.00
11+812.00	To	13+678.00	Cl, Rt./Lt	Double Solid Yellow	3,732.00
0+020.00	To	0+100.00	Cl, Rt./Lt	N321–Double Solid Yellow	160.00
				TOTAL	7,169.00

N31 PAVEMENT MARKINGS
ITEM No. 63401–1520: SOLID WHITE

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH(m)
4+770.00	To	13+680.00	Rt.	Solid White	8,910.00
Minus (7) 4.50 m T.O. @ 20.67 m					–144.69
Minus (4) 7.00 m T.O. @ 35.17 m					–140.68
				SUB–TOTAL	8,624.63
4+770.00	To	13+680.00	Lt.	Solid White	8,910.00
Munus (7) 4.50 m T.O. @ 20.67 m					–144.69
Minus (1) 7.00 m T.O. @ 35.17 m					–35.17
Minus (1) 7.80 m T.O. @ 37.27 m					–37.27
				SUB–TOTAL	8,692.87
				GRAND–TOTAL	17,317.50

N31 PAVEMENT MARKINGS
ITEM No.63401–1610: BROKEN YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH(m)
4+770.00	To	6+165.00	CL	Broken Yellow	1,395.00
7+120.00	To	9+739.00	CL	Broken Yellow	2,619.00
10+100.00	To	10+195.00	CL, Right	Broken Yellow	95.00
10+195.00	To	11+160.00	CL	Broken Yellow	965.00
11+435.00	To	11+812.00	CL	Broken Yellow	377.00
				TOTAL	5,451.00

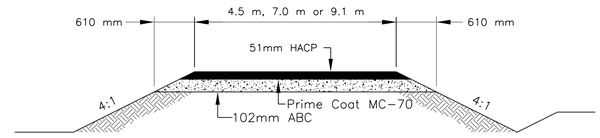
PERMANENT PAVING MARKINGS
ITEM No. 63405–3260: STOP BAR

STATION	LOCATION	Each	REMARKS
6+696.00	Rt.	1	7.00 m Turnout to Old N31 Dirt Rd.
7+215.00	Lt.	1	7.00 m Turnout To Residence
7+327.00	Rt.	1	7.00 m Turnout To Residence
8+940.00	Rt.	1	7.00 m Turnout To Residence
11+555.00	Rt.	1	7.00 m Turnout To Residence
13+653.96	Lt.	1	7.80 m Turnout To Asaayi Lake
	TOTAL	6	

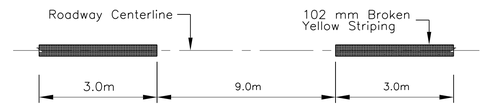
TEMPORARY TRAFFIC CONTROL SIGNS

TYPE	DESCRIPTION	SIZE (mm)
W20–1	ROAD WORK XXX FT	1219 x 1219
W20–4	ONE LANE ROAD XXX FT	1219 x 1219
W13–1	25 MPH	610 x 610
W20–7a		914 x 914
supplemental plate	500 FEET	457 x 610
G20–2	END ROAD WORK	1524 x 610
W1–4L		762 x 762
W20–1a	ROAD WORK AHEAD	1219 x 1219
G20–1	ROAD WORK NEXT 6 MILES	1524 x 914
W8–12	NO CENTER STRIPE	914 x 914

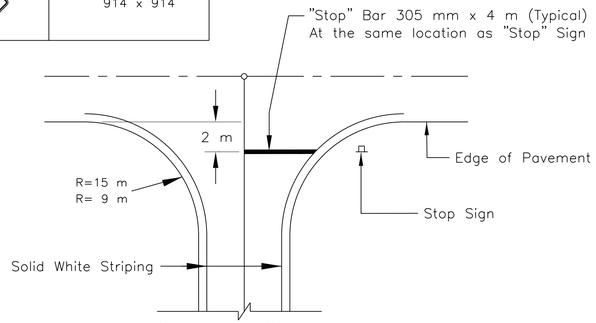
SEE SHEETS 23–26, OF 76 FOR SIGN DETAILS, DIMENSIONS, PLACEMENT\LOCATION, MARKINGS, TURNOUT TYPICALS, YIELD LINES, ETC.



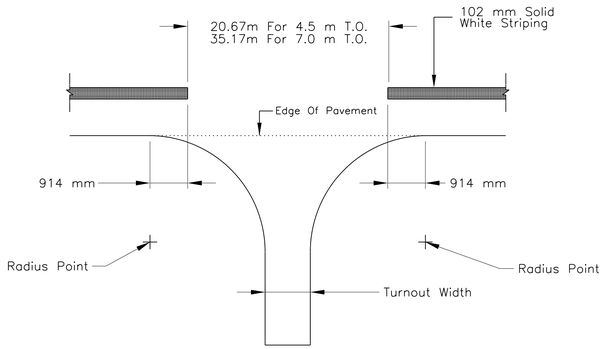
SECTION A–A



TYPICAL PAVEMENT MARKING "BROKEN YELLOW"
ROADWAY CENTERLINE STRIPING



TYPICAL "TURNOUT" STOP BAR MARKING
@ Turnouts 7.0 m or Greater

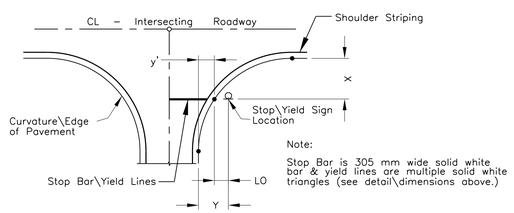


TYPICAL PAVEMENT MARKING @ TURNOUT
ROADWAY SHOULDER STRIPING

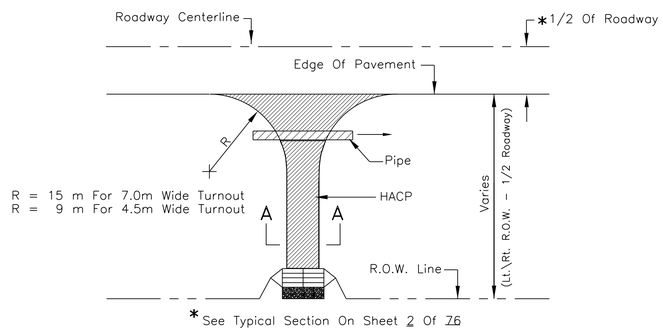
RADIUS OF TURNOUT (m)	X (m)	y' (m)	Y (m)= y'+LO (m)	LENGTH of STOP BAR
3.00	1.80	0.25	2.05	1/2 Roadway width
6.00	3.00	0.80	2.60	1/2 Roadway width
9.00	4.50	1.21	3.01	1/2 Roadway width
12.00	6.00	1.61	3.41	1/2 Roadway width
15.00	7.50	2.01	3.81	1/2 Roadway width

y'= Distance is the lateral projection from Roadway EOP (tangential) To Curvature\EOP. Lateral Offset (LO) is the lateral projection from Curvature\EOP to sign location = 1.80 m.

STOP\YIELD SIGN LOCATION TABLE



STOP\YIELD SIGN LOCATION AT MAJOR INTERSECTION



*See Typical Section On Sheet 2 Of 76

TYPICAL TYPE "A" TURNOUT
w/Cattleguard & Fencing

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PERMANENT & TEMPORARY
TRAFFIC CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 1/18/2011
DESIGNED BY: NRDOT	DATE: 1/18/2011
REVISED: 11/1/2012	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 25_N31 TFS2.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	26	76

CHART TO DETERMINE SINGLE POST SIZE

POST WEIGHT	K FACTOR (B x A)	B DIMENSION (Meter)												
		1.52	1.83	2.13	2.44	2.74	3.05	3.35	3.66	3.96	4.27	4.57	4.87	
2.976 kg/m	DOES NOT APPLY	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.34	0.32	0.30	0.27	0.26	A(m^2) SIGN AREA
3.348 kg/m		0.47	0.47	0.47	0.47	0.47	0.47	0.43	0.39	0.36	0.33	0.32	0.30	
4.092 kg/m		0.62	0.62	0.62	0.62	0.62	0.62	0.56	0.51	0.47	0.44	0.41	0.38	
4.464 kg/m		0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.62	0.58	0.52	0.47	0.46	
5.952 kg/m		0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.80	0.74	0.70	0.65	

CHART TO DETERMINE DOUBLE POST SIZE

POST WEIGHT	K FACTOR (B x A)	B DIMENSION (Meter)												
		1.52	1.83	2.13	2.44	2.74	3.05	3.35	3.66	3.96	4.27	4.57	4.87	
2.976 kg/m	2.74	1.80	1.50	1.28	1.12	1.00	0.90	0.82	0.75	0.70	0.64	0.60	0.57	A(m^2) SIGN AREA
3.348 kg/m	3.08	2.03	1.69	1.45	1.27	1.13	1.01	0.92	0.85	0.78	0.72	0.68	0.63	
4.092 kg/m	4.03	2.64	2.20	1.89	1.65	1.47	1.32	1.20	1.10	1.01	0.94	0.88	0.83	
4.464 kg/m	4.91	3.23	2.69	2.31	2.03	1.79	1.62	1.47	1.35	1.24	1.15	1.08	1.01	
5.952 kg/m	6.83	4.48	3.73	3.20	2.80	2.49	2.24	2.03	1.87	1.72	1.60	1.50	1.40	

CHART TO DETERMINE THREE POST SIZE

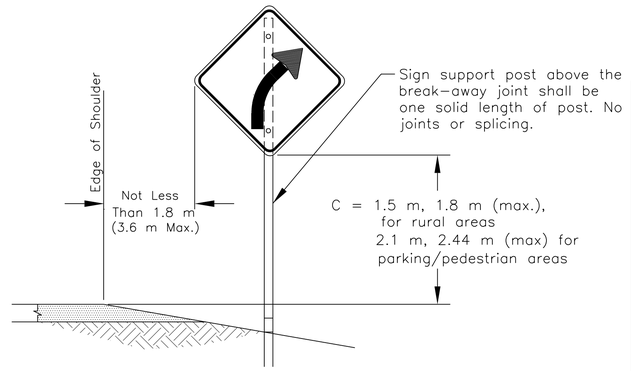
POST WEIGHT	K FACTOR (B x A)	B DIMENSION (Meter)												
		1.52	1.83	2.13	2.44	2.74	3.05	3.35	3.66	3.96	4.27	4.57	4.87	
2.976 kg/m	4.12	2.69	2.25	1.92	1.68	1.50	1.35	1.23	1.12	1.04	0.97	0.90	0.85	A(m^2) SIGN AREA
3.348 kg/m	4.65	3.05	2.54	2.17	1.90	1.69	1.52	1.38	1.27	1.17	1.09	1.01	0.96	
4.092 kg/m	6.02	3.96	3.30	2.82	2.47	2.19	1.98	1.79	1.64	1.52	1.41	1.32	1.24	
4.464 kg/m	7.40	4.85	4.04	3.47	3.03	2.69	2.42	2.20	2.02	1.86	1.73	1.62	1.51	
5.952 kg/m	10.20	6.71	5.58	4.78	4.19	3.73	3.35	3.05	2.79	2.57	2.40	2.23	2.09	

GENERAL NOTES:

1. THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE LENGTH OF SIGN SUPPORT POSTS. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE FOR THE APPROPRIATE BID ITEMS SHOWN IN THE BID SCHEDULE.

2. SIGN DIMENSION EQUAL TO OR IN EXCESS OF 762mm X 762mm SIZE SHALL BE INSTALL WITH A MINIMUM OF TWO(2) STEEL POSTS.

3. SIGN OFFSETS FOR ANY PARTICULAR PROJECT TO BE THE SAME THROUGHOUT THE PROJECT, EXCEPT AT SPECIFIC LOCATIONS WHERE FINISH/EXISTING GROUND CONDITIONS REQUIRE A MODIFIED OFFSET. THE BASIC SIGN OFFSET AND ANY SPECIFIC MODIFICATIONS TO THIS OFFSET SHALL BE APPROVED BY THE AOTR/COR PRIOR TO INSTALLING SIGNS.



TYPICAL ROADSIDE SIGN LOCATION

METHOD TO DETERMINE NUMBER OF POST(S) & POST WEIGHT REQUIREMENT:

For a 1.524m wide x 1.219m high traffic sign:
Located on a rural highway.

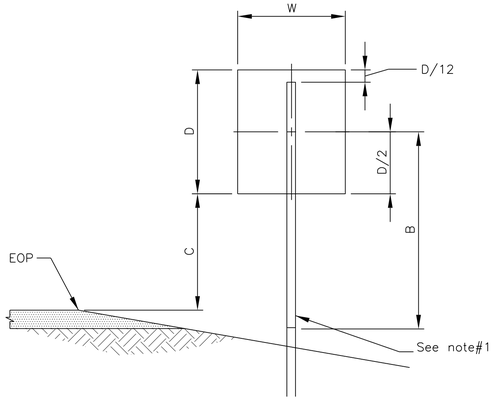
Given:
W = 1.524 m
D = 1.219 m
C = 1.828m, for rural areas

Solution:
1) B = C + (D/2)
B = 1.828m + (1.219m/2)
B = 2.438 m
2) A = W x D
A = 1.524m x 1.219m
A = 1.86 m^2
3) K factor = A x B
K = 1.86 x 2.438
K = 4.53
4) Begin with the single post chart for column of B = 2.44m and continue down until the area of the sign equals or exceed 1.86 m^2 or down the K factor column until the value equals or exceeds 4.53. Both the Area and K factor exceed the single post chart so go to the double post chart

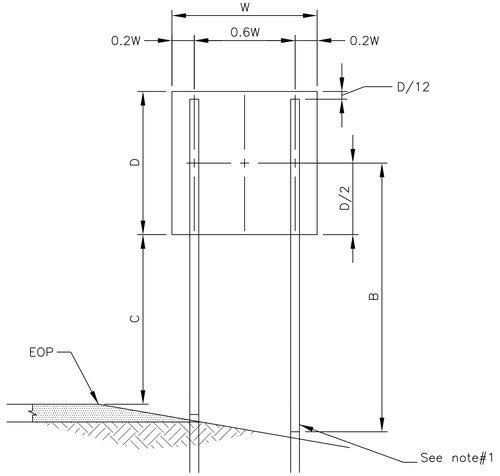
Select two (2) posts of 4.46 kg/m yields a factor of 4.91 which is optimum.

Example:

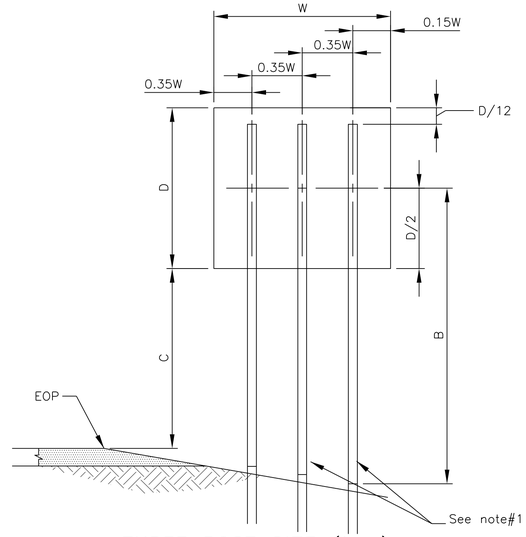
	K factor	Post weight	2.44	
4.51 >	4.03	4.09 kg/m	1.65	< 1.85
	4.91	4.46 kg/m	2.03?	
	6.83	5.95 kg/m	2.80	



SINGLE POST SIZE (typ.)



DOUBLE POST SIZE (typ.)



THREE POST SIZE (typ.)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PERMANENT SIGNING DETAILS

DRAWN BY: NRDOT	DATE: 6/30/2011
DESIGNED BY: NRDOT	DATE: 6/30/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

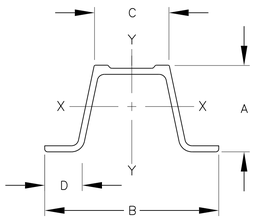
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 26_N31SGN1.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	27	76

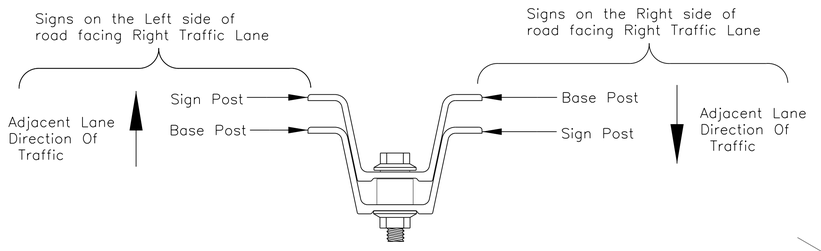
RIB–BAK U–CHANNEL SIGN SUPPORTS

WEIGHT	DIMENSIONS (mm)				AREA	X–X AXIS		Y–Y AXIS	
* kg/m	A	B	C	D	mm^2	$I(mm^4)$	$S(mm^3)$	$I(mm^4)$	$S(mm^3)$
2.97	38.30	76.91	33.12	16.10	54.83	81.99	42.27	195.62	50.96
3.71	38.68	79.35	33.15	18.33	51.28	103.22	51.29	249.73	62.92
4.08	39.47	78.77	32.72	16.94	55.74	112.38	54.89	278.04	70.62
4.45	48.34	85.85	33.73	18.42	62.45	188.65	73.24	374.60	87.34
5.94	50.27	85.78	34.04	19.10	80.77	260.14	97.99	476.58	111.10

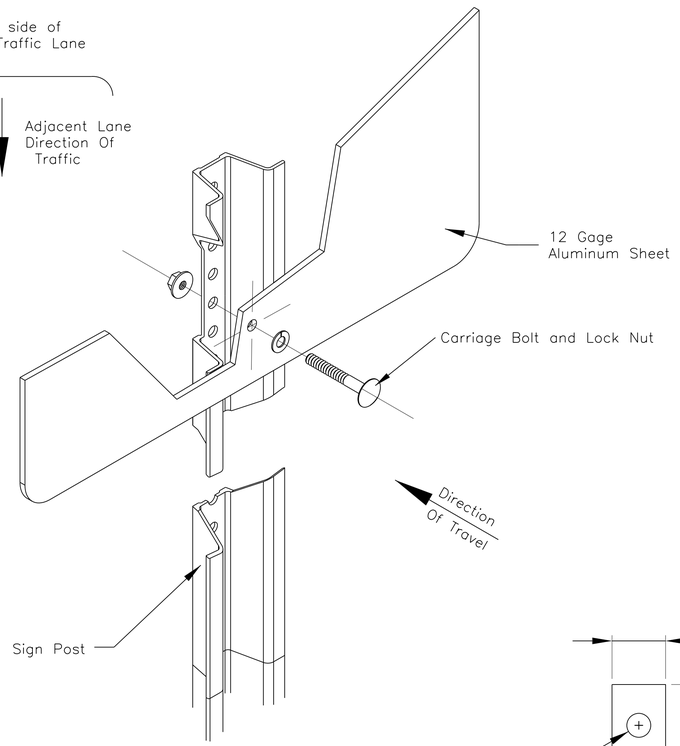
* ±5%

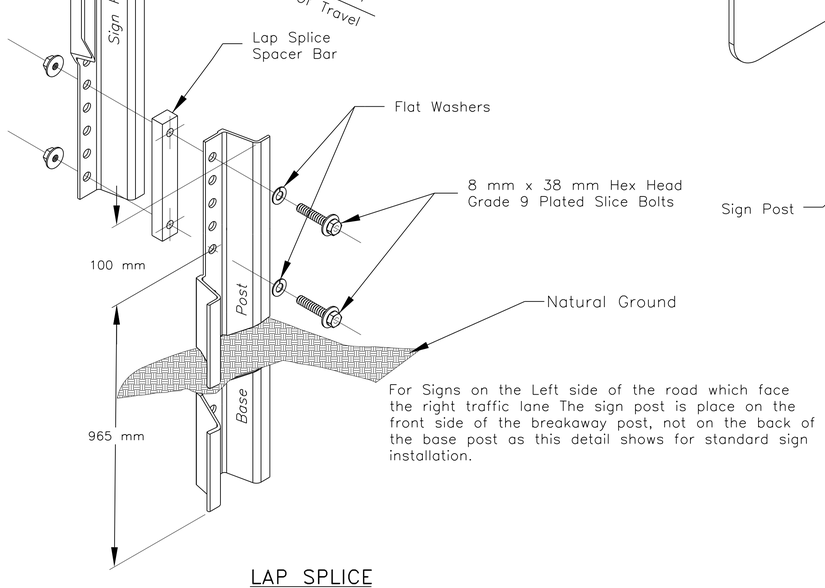


RIB–BAK U–CHANNEL



LAP SPLICE – TOP VIEW

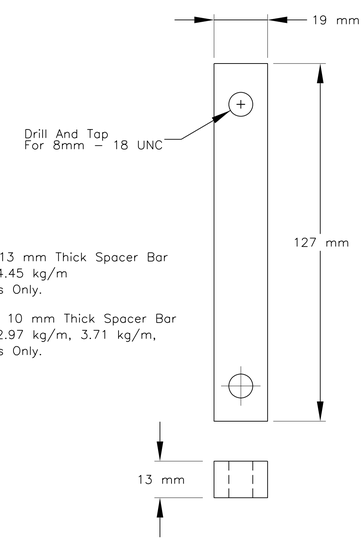




For Signs on the Left side of the road which face the right traffic lane The sign post is place on the front side of the breakaway post, not on the back of the base post as this detail shows for standard sign installation.

LAP SPLICE
CONNECTION DETAIL

NOTE: After Final Installation and Tightened, All Posts and Sign Bolt Threads Shall Be "Jammed" To Help Prevent Loosening. Jamming Shall Not Be So Severe As To Prevent Nut Removal.



NOTE: The GOLD ANODIZED 13 mm Thick Spacer Bar Is To Be Used With 4.45 kg/m And 5.94 kg/m Posts Only.

The SILVER ANODIZED 10 mm Thick Spacer Bar Is To Be Used With 2.97 kg/m, 3.71 kg/m, And 4.08 kg/m Posts Only.

LAP SPLICE SPACER BAR

GENERAL NOTE:

1. STEEL BASE POST AND SIGN POST SHALL BE RIB–BAK U–CHANNEL FABRICATED FROM HOT ROLLED CARBON STEEL BARS CONFORMING TO THE REQUIREMENTS OF ASTM A499. YIELD POINT AND TENSILE STRENGTH OF STEEL SHALL BE 550 AND 689.47 MPa (MINIMUM), RESPECTIVELY.
2. STEEL POSTS SHALL BE UNIFORM, MODIFIED, FLANGED CHANNEL SECTION OF RIB–BAK DESIGN. WEIGHT OF THE STEEL POSTS SHALL BE AS SPECIFIED BY THE USER, ±5% BEFORE PUNCHING. THE POST SHALL BE PUNCHED WITH CONTINUOUS 9mmØ HOLES ON 25mm INTERVAL ON CENTERS FOR THE ENTIRE LENGTH OF POST.
3. STEEL POSTS SHALL BE MACHINE STRAIGHTENED TO HAVE A SMOOTH UNIFORM FINISH, FREE FROM DEFECTS AFFECTING STRENGTH, DURABILITY, AND APPEARANCE. ALL HOLES AND EDGES SHALL BE FREE OF BURRS. THE PERMISSIBLE TOLERANCE FOR STRAIGHTNESS SHALL BE WITHIN 6.35mm IN 1.52 METER.
4. STEEL POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM 123 OR PAINTED WITH A BAKED–ON ALKYD RESIN, OR PAINTED WITH A POLYESTER POWDER PER NOTE 10. BOLTS, NUTS, AND WASHERS SHALL BE CADMIUM PLATED IN ACCORDANCE WITH ASTM A–165 OR ZINC PLATED IN ACCORDANCE WITH ASTM B–633.
5. SPLICE HARDWARE SHALL CONSIST OF TWO FULLY THREADED, 8mm X 38mm GRADE–9 PLATED HEX HEAD BOLTS, FLAT WASHERS, AND SELF LOCKING HEX NUTS PER POST. IN ADDITION, ONE 19mm X 127mm PLATED SPACER BAR PER POST, TO STIFFEN THE SPLICE CONNECTION. EACH SPACER SHALL BE DRILLED AND TAPPED WITH 8mm–18 UNC THREADS. THE SPACER SHALL BE FABRICATED FROM HOT ROLLED CARBON STEEL BAR CONFORMING TO ASTM A–36 OR M–1020.
6. BOLTS AND LOCK NUT HARDWARE FOR SIGN ATTACHMENT SHALL BE CARRIAGE HEAD TYPE, 8mm–18 UNC, AND SHALL BE CADMIUM PLATED CONFORMING TO ASTM B–766.
7. AN APPROVED ALTERNATE BREAKAWAY SYSTEM AND SIGN SUPPORT POST ASSEMBLY MAY BE SUBMITTED TO THE COR/AOTR FOR REVIEW AND APPROVAL PRIOR TO IT'S USE.
8. THE CONTRACTOR HAS THE OPTION TO USE "ANTI–THIEF" NUTS IN LIEU OF JAMMING THE BOLT THREADS. NO ADDITIONAL PAYMENT WILL BE MADE IN RELATION TO USING ANTI–THIEF BOLTS.
9. SUPPLEMENTAL SIGNS ON THE OPPOSITE SIDE OF ROADWAY SHALL HAVE THE U–CHANNEL REVERSED SO THAT RIB–BAK IS FACING AWAY FROM THE OPPOSING TRAFFIC.
10. IF THE CONTRACTOR ELECTS TO USE POWDER OR EPOXY COATED PAINT, IT SHALL CONFORM TO SECTION 718.08 OF THE FP–03 SUPPLEMENTAL SPECIFICATIONS.

INSTALLATION PROCEDURE

STEP 1:
DRIVE BASE POST TO WITHIN APPROXIMATELY 300 mm ABOVE GROUND LEVEL. PLACE ONE BOLT AND CUT WASHER IN FIFTH HOLE FROM THE TOP, AND SECURELY TIGHTEN THREADED SPACER ONTO BOLT.

STEP 2:
DRIVE BASE POST TO 100 mm ABOVE GROUND LEVEL. PLACE REMAINING BOLT AND CUT WASHER IN FIRST HOLE FROM THE END, AND SECURELY TIGHTEN THREADED SPACER ONTO BOLT.

STEP 3:
DIG OUT APPROXIMATELY 50 mm FROM AROUND BACK OF GROUND POST TO ALLOW ROOM FOR TOP POST TO BE ATTACHED.

STEP 4:
NEST TOP POST ONTO PROTRUDING BASE POST BOLTS, THROUGH THE FIRST AND FIFTH HOLES OF THE TOP POST.

STEP 5:
PLACE A SELF–LOCKING FLANGE NUT ON EACH BOLT. TIGHTEN NUTS AND TAMP EARTH AROUND POST FIRMLY.

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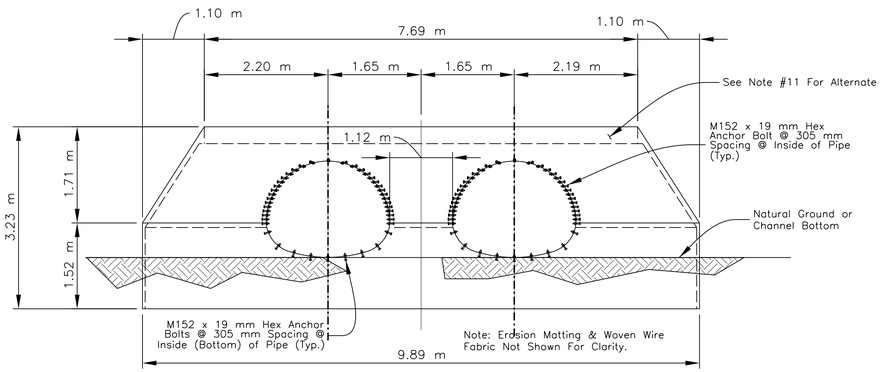
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

LAP SPLICE U–CHANNEL
BREAKAWAY SYSTEM
POST AND HARDWARE DETAILS

DRAWN BY: NRDOT	DATE: 11/2/2011
DESIGNED BY: NRDOT	DATE: 11/2/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

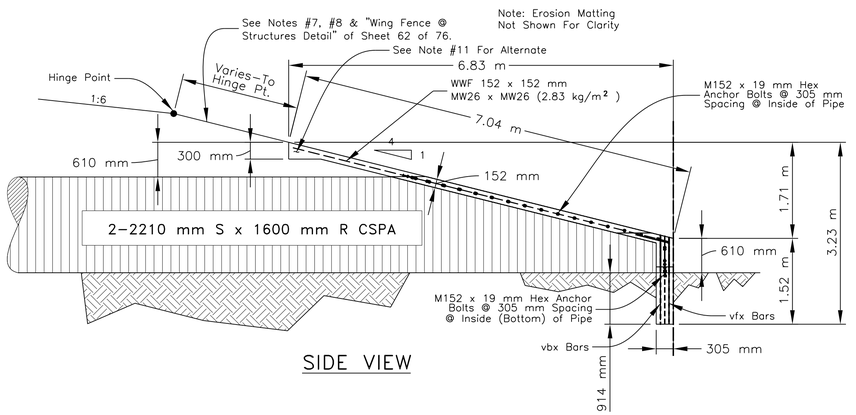
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Snt 27_N31 SGN2.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	28	76

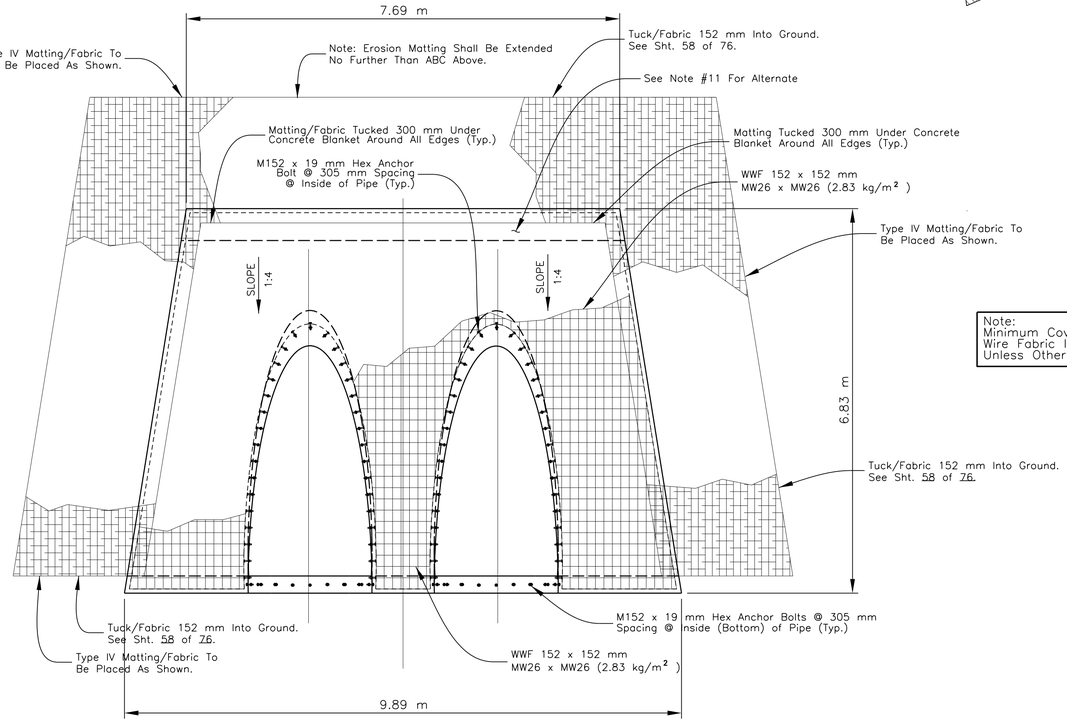


FRONT VIEW

2–2210 mm Span x 1600 mm Rise CSPA
CENTERED AT STA. 9+620 AND 9+670



SIDE VIEW



PLAN VIEW

2–2210 mm Span x 1600 mm Rise CSPA
CENTERED AT STA. 9+620 AND 9+670

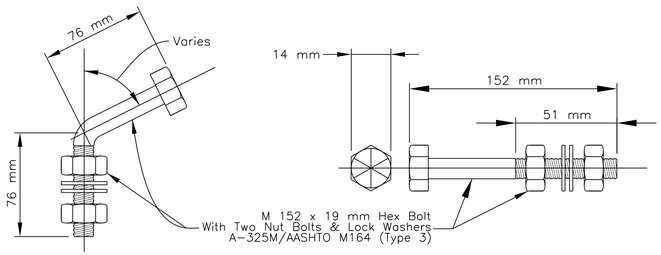
Note:
Minimum Cover For Rebar & Woven Wire Fabric Is 76 mm Along Edges Unless Otherwise Noted On Plans

ITEM 60101–0000: MINOR CONCRETE ESTIMATED QUANTITY

STATION	STRUCTURE	No. OF BARREL(S)	SKEW No.	VOLUME (m^3)	WWF (kg) **
9+620	2210 mm Span x 1600 mm Rise CSPC	2	90°	10.83	116.48
9+670	2210 mm Span x 1600 mm Rise CSPC	2	90°	10.83	116.48
			GRAND TOTAL: (Inlet Only)	21.66	232.97

See Note #10.

** WWF Unit Wt. 2.83 kg/m² WWF Area= 41.16 m²



BENT AND STRAIGHT ANCHOR BOLT DETAIL

(nts)

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP–03).
2. ALL CONCRETE SHALL BE CLASS A(AE) WITH CLASS 1 FINISH. CHAMFER ALL EXPOSED EDGES 19 mm. THE CONCRETE SHALL CONFORM TO SECTION 601 " MINOR CONCRETE" OF FP–03. F'c = 20.68 MPa.
3. REINFORCING STEEL SHALL CONFORM TO AASHTO SPECIFICATION M–31 (ASTM A 615M), GRADE 420, AND SECTION 554 OF FP–03. FURNISHING AND PLACEMENT OF REBARS, ANCHOR BOLT, AND WELDED WIRE FABRIC SHALL BE CONSIDERED INCIDENTAL TO CONTRACT BID ITEM 60101–0000.
4. ALL STRUCTURE EXCAVATION AND EMBANKMENT AROUND THE CONCRETE BLANKET SHALL BE DONE TO NEAT LINES AND WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
5. THE CONTRACTOR SHALL BE REQUIRED TO MAKE ANY NECESSARY FIELD ADJUSTMENTS TO FIT EXISTING FIELD CONDITIONS, AS DIRECTED BY THE COR/AOTR. NO ADDITIONAL PAYMENT SHALL BE MADE FOR SUCH ADJUSTMENTS.
6. IF UNSUITABLE MATERIAL IS FOUND AT THE FOOTING LOCATION AND ELEVATIONS, THE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED UNCLASSIFIED BACKFILL AS DETERMINED BY THE COR/AOTR. ALL UNCLASSIFIED BACKFILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T99 METHOD C, BEFORE AND AFTER FOOTINGS ARE PLACED. THE UNCLASSIFIED BACKFILL MATERIAL SHALL CONFORM TO SECTION 208 AND 209 OF FP–03. FURNISHING AND PLACEMENT OF UNCLASSIFIED BACKFILL SHALL BE ACCORDANCE WITH SECTION 109.02(m), 204 & 209.
7. ALL FOOTING EXCAVATIONS SHALL BE INSPECTED AND APPROVED BY THE COR/AOTR PRIOR TO PLACEMENT OF FORMS, REINFORCING STEEL, AND SUBSEQUENT CONCRETE.
8. CHANNEL RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE PLANS AND AS DETERMINED BY THE COR/AOTR. ANY WASTE MATERIAL SHALL BE USED AS BORROW WHERE NEEDED IN OTHER PROJECT LOCATION AS DESIGNATED AND APPROVAL BY THE COR/AOTR. ALL CHANNEL EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
9. IN NO CASE SHALL ANY BACKFILL BE PLACED UNTIL THE CONCRETE HAS ATTAINED A COMPRESSIVE STRENGTH OF 17.24 MPa.
10. ESTIMATED QUANTITIES OF TABULATED CONCRETE, WELDED WIRE FABRIC, AND REINFORCING STEEL AND NOTED SIZE OF STRUCTURE(S) ARE FOR ONE (1) SLOPE BLANKET AT A GIVEN STATION. CONCRETE BLANKETS ARE REQUIRED AT INLET SIDE OF THE DRAINAGE STRUCTURE(S) ONLY, UNLESS OTHERWISE NOTED.
11. AT LOCATIONS WHERE THE TOP EDGE OF THE CONCRETE BLANKET EXTENDS BEYOND/NEAR THE HINGE POINT OR CANNOT BE INSTALLED DUE TO INSUFFICIENT COVER OVER THE PIPES, THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE VERTICAL HEIGHT ABOVE THE PIPE(S) TO 305 mm AND INSTALL TWO (2) ADDITIONAL #13M REBARS SET VERTICALLY ±152 mm APART W/76 mm MINIMUM COVER ALL AROUND ACROSS THE ENTIRE WIDTH OF THE STRUCTURE AND WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
12. EROSION CONTROL MATTING SHALL CONFORM TO SECTION 629 AND 713.17(k) OF THE FP–03 FOR TYPE IV–B MATERIAL, AND SHALL BE INCIDENTAL TO THE UNIT PRICE FOR ITEM 60101–0000. MATTINGS SHALL BE TUCKED OR EMBEDDED INTO EMBANKMENT ALONG ALL EDGES AS SHOWN. SEE SHEET 58 OF 76 FOR EROSION CONTROL MATTING INSTALLATION DETAILS.

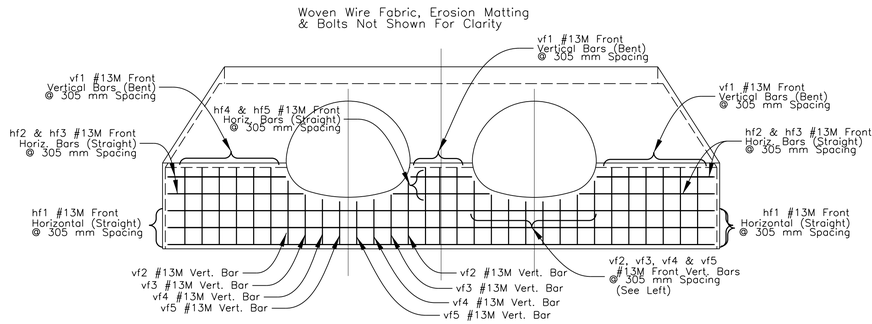
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE SLOPE PAVING
2–2210 mm SPAN X 1600 mm RISE CSPA
AT STA. 9+620.00 AND 9+670.00

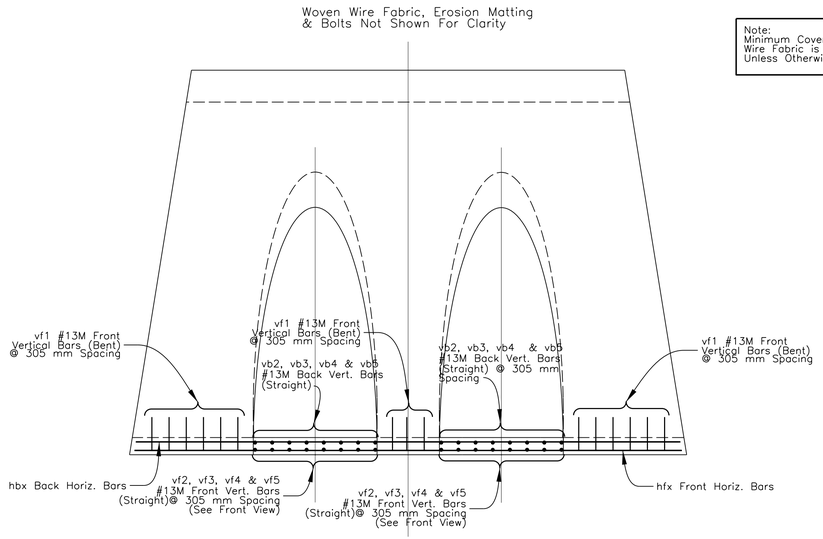
DRAWN BY: NRDOT	DATE: 7/14/2011
DESIGNED BY: NRDOT	DATE: 7/14/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 28 SlpPvg1 2po_221s_160r_101111_rev.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	29	76



FRONT VIEW



PLAN VIEW

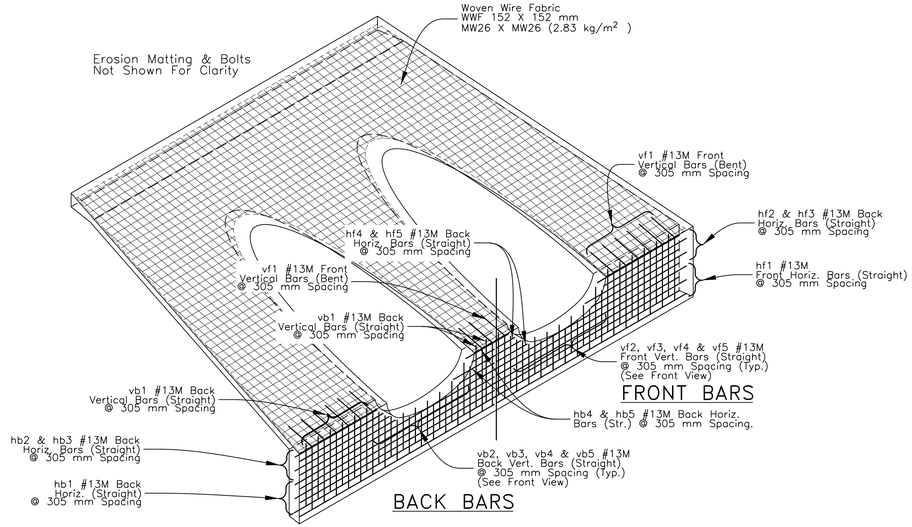
Note:
Minimum Cover For Rebar & Woven Wire Fabric is 76 mm Along Edges Unless Otherwise Noted On Plans

REINFORCING BAR SCHEDULE

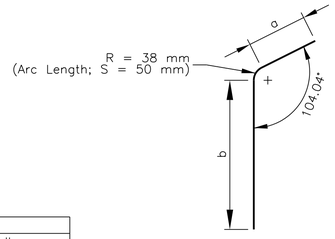
Mark	No. of Bars	Length (m)	Size	kg/m	Total Wt. (kg)	Remarks
hf1	3	9.71	#13M	0.994	28.96	Front Horizontal Straight Bars, Across All Pipes & Wall
hf2	2	2.41	#13M	0.994	4.79	Front Horizontal Straight Bars, Lt. & Rt. Outside of Pipes
hf3	2	2.10	#13M	0.994	4.17	Front Horizontal Straight Bars, Lt. & Rt. Outside of Pipes
hf4	1	1.71	#13M	0.994	1.70	Front Horizontal Straight Bars, Between Pipes
hf5	1	1.09	#13M	0.994	1.08	Front Horizontal Straight Bars, Between Pipes
hb1	3	9.66	#13M	0.994	28.81	Back Horizontal Straight Bars, Across All Pipes & Wall
hb2	2	2.39	#13M	0.994	4.75	Back Horizontal Straight Bars, Lt. & Rt.Outside of Pipes
hb3	2	2.08	#13M	0.994	4.14	Back Horizontal Straight Bars, Lt. & Rt.Outside of Pipes
hb4	1	1.71	#13M	0.994	1.70	Back Horizontal Straight Bars, Between Pipies
hb5	1	1.09	#13M	0.994	1.08	Back Horizontal Straight Bars, Between Pipies
vf1	15	1.97	#13M	0.994	29.37	Front Vertical Bent Bars: a = 580 mm b = 1342 mm
vf2	4	1.13	#13M	0.994	4.49	Front Vertical Straight Bars
vf3	4	0.89	#13M	0.994	3.54	Front Vertical Straight Bars
vf4	4	0.81	#13M	0.994	3.22	Front Vertical Straight Bars
vf5	4	0.77	#13M	0.994	3.06	Front Vertical Straight Bars
vb1	15	1.37	#13M	0.994	20.43	Back Vertical Straight Bars
vb2	4	1.13	#13M	0.994	4.49	Back Vertical Straight Bars
vb3	4	0.89	#13M	0.994	3.54	Back Vertical Straight Bars
vb4	4	0.81	#13M	0.994	3.22	Back Vertical Straight Bars
vb5	4	0.77	#13M	0.994	3.06	Back Vertical Straight Bars
GRAND TOTAL: (Per Inlet)					159.61	

GENERAL NOTES

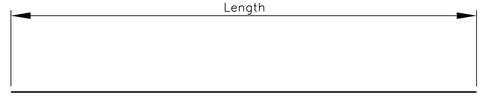
SEE SHEET 28 OF 76 FOR ADDITIONAL DETAILS AND NOTES.



ISOMETRIC
VIEW



VFI BENT BAR
(nts)



STRAIGHT BARS
(nts)

UNITED STATES
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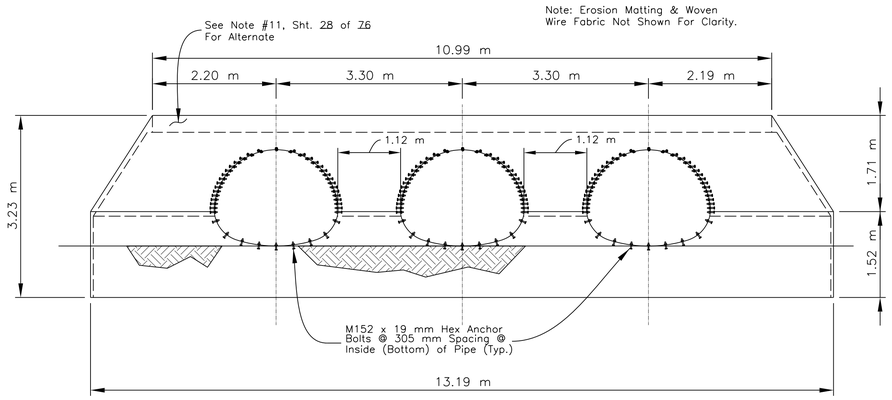
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE SLOPE PAVING
2-2210 mm SPAN X 1600 mm RISE CSPA
AT STA. 9+620.00 AND 9+670.00

DRAWN BY: NRDOT	DATE: 7/14/2011
DESIGNED BY: NRDOT	DATE: 7/14/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

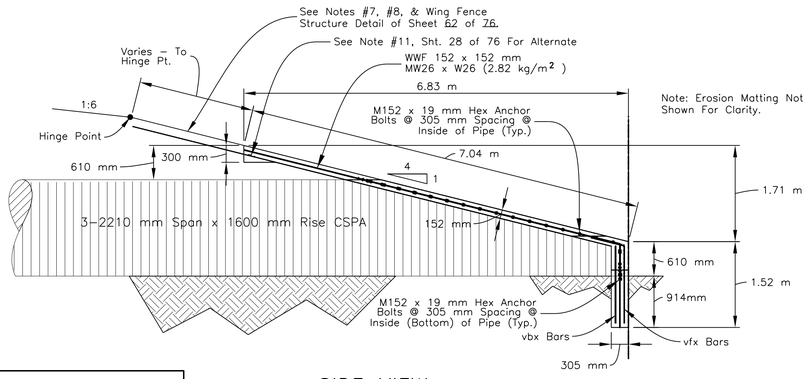
i:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 29 SlpPvg2 2po_221s_160r_101111_rev.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	30	76



FRONT VIEW

3-2210 mm Span x 1600 mm Rise CSPA
CENTERED ON STA. 9+590



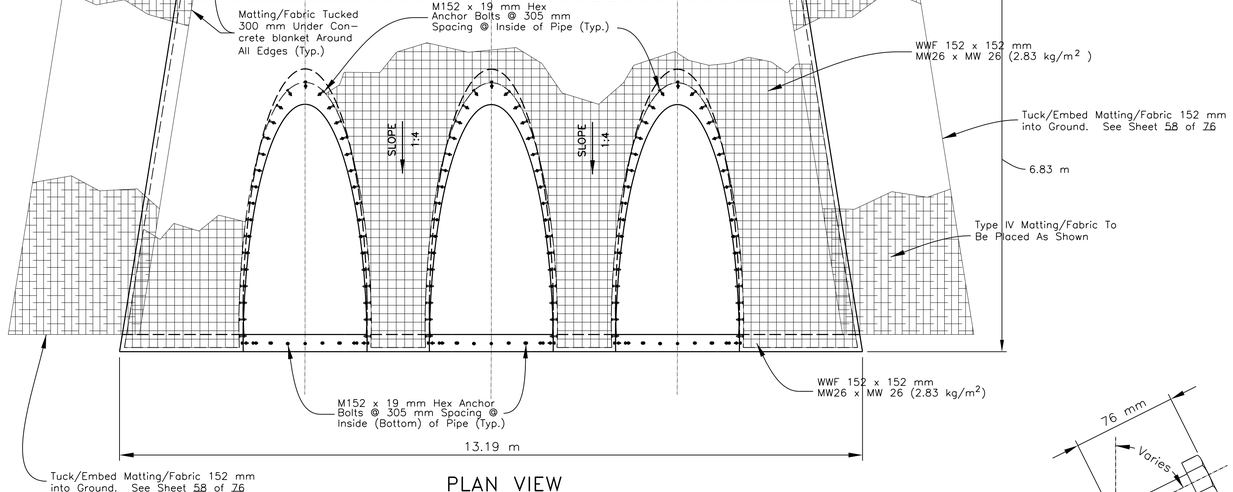
SIDE VIEW

Note:
Minimum Cover For Rebar & Woven Wire Fabric is 76 mm Along Edges Unless Otherwise Noted On Plans

Note:
Anchor Bolts Shall Be Bent/Fabricated As Needed To Align With The Concrete Slope Blanket Prior To Bolting To the Culvert.

GENERAL NOTES

See Sheet 28 of 76 For Additional Details And Notes.



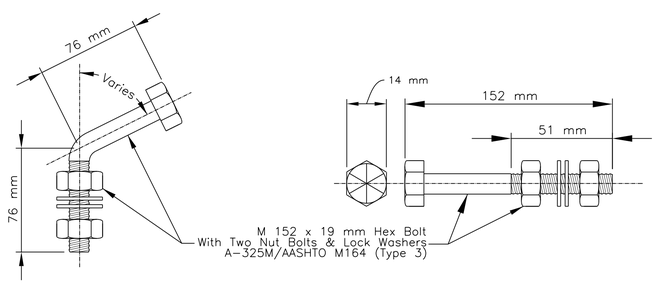
PLAN VIEW

3-2210 mm Span x 1600 mm Rise CSPA
CENTERED ON STA. 9+590

ITEM 60101-0000: MINOR CONCRETE ESTIMATED QUANTITY

STATION	STRUCTURE	No. OF BARREL(S)	SKEW No.	VOLUME (m^3)	WWF (kg) **
9+590.00	2210 mm Span x 1600 mm Rise CSPA	3	90°	14.36	154.94
			GRAND TOTAL (Inlet Only)	14.36	154.94

**WWF Unit Wt. 2.83 kg/m' WWF Area= 54.75 sq. m



BENT AND STRAIGHT ANCHOR BOLT DETAIL

(nts)

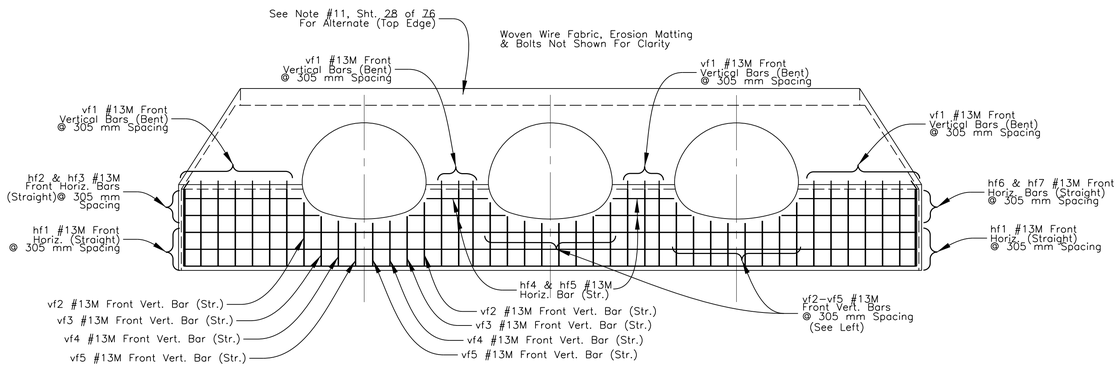
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE SLOPE PAVING
3-2210 mm SPAN X 1600 mm RISE CSPA
AT STA. 9+590.00

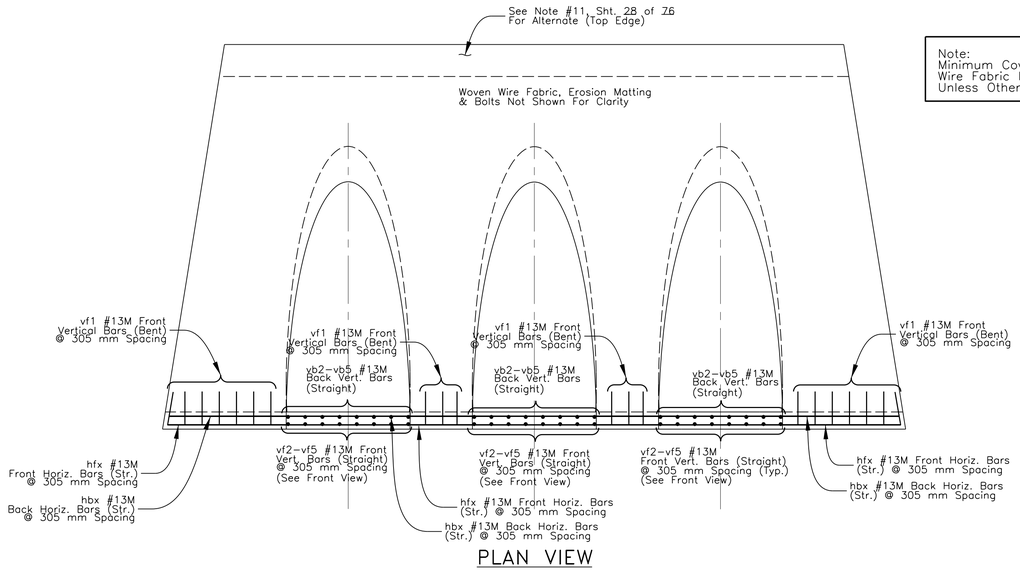
DRAWN BY: NRDOT	DATE: 7/14/2011
DESIGNED BY: NRDOT	DATE: 7/14/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 30 SlpPvg1 3po_221s_160r_101111_rev.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	31	76



FRONT VIEW

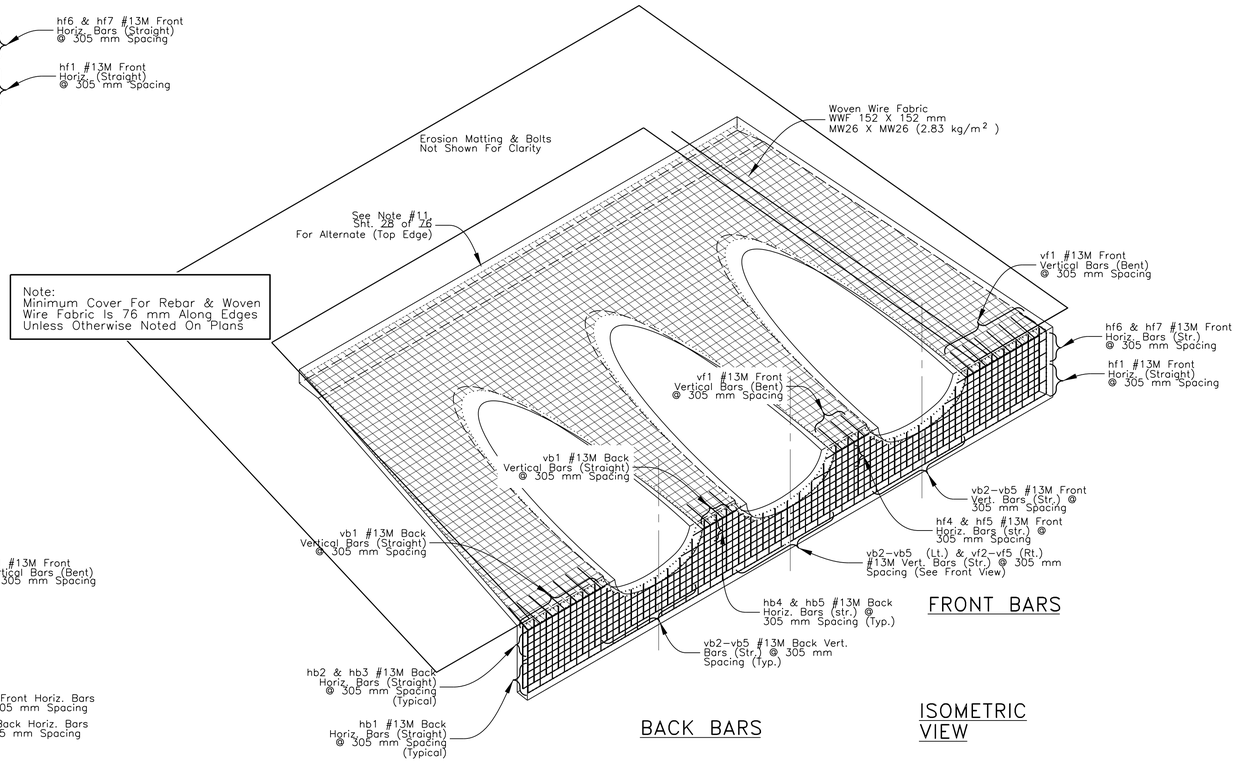


PLAN VIEW

GENERAL NOTES

See Sheet 28 of 76 For Additional Details And Notes.

Note:
Minimum Cover For Rebar & Woven Wire Fabric Is 76 mm Along Edges Unless Otherwise Noted On Plans



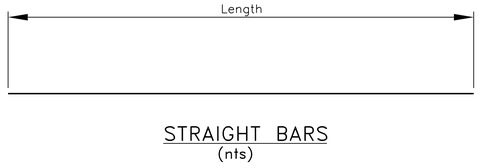
FRONT BARS

BACK BARS

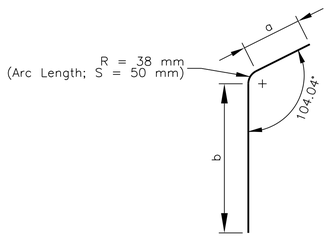
ISOMETRIC VIEW

REINFORCING BAR SCHEDULE

Mark	No. of Bars	Length (m)	Size	kg/m	Total Wt. (kg)	Remarks
hf1	3	13.01	#13M	0.994	38.80	Front Horizontal Straight Bars, Across All Pipes & Wall
hf2	2	2.41	#13M	0.994	4.79	Front Horizontal Straight Bars, Lt. & Rt. Outside of Pipes
hf3	2	2.10	#13M	0.994	4.17	Front Horizontal Straight Bars, Lt. & Rt. Outside of Pipes
hf4	2	1.71	#13M	0.994	3.40	Front Horizontal Straight Bars, Between Pipes
hf5	2	1.09	#13M	0.994	2.17	Front Horizontal Straight Bars, Between Pipes
hb1	3	12.96	#13M	0.994	38.65	Back Horizontal Straight Bars, Across All Pipies & Wall
hb2	1	2.39	#13M	0.994	2.38	Front Horizontal Straight Bars, Lt. & Rt. Outside of Pipes
hb3	1	2.08	#13M	0.994	2.07	Front Horizontal Straight Bars, Lt. & Rt. Outside of Pipes
hb4	2	1.71	#13M	0.994	3.40	Back Horizontal Straight Bars, Between Pipes
hb5	2	1.09	#13M	0.994	2.17	Back Horizontal Straight Bars, Between Pipes
vf1	20	1.97	#13M	0.994	39.16	Front Vertical Bent Bars: a = 580 mm b = 1342 mm s = 50 mm
vf2	6	1.13	#13M	0.994	6.74	Front Vertical Straight Bars
vf3	6	0.89	#13M	0.994	5.31	Front Vertical Straight Bars
vf4	6	0.81	#13M	0.994	4.83	Front Vertical Straight Bars
vf5	6	0.77	#13M	0.994	4.59	Front Vertical Straight Bars
vb1	20	1.37	#13M	0.994	27.24	Back Vertical Straight Bars
vb2	6	1.13	#13M	0.994	6.74	Back Vertical Straight Bars
vb3	6	0.89	#13M	0.994	5.31	Back Vertical Straight Bars
vb4	6	0.81	#13M	0.994	4.83	Back Vertical Straight Bars
vb5	6	0.77	#13M	0.994	4.59	Back Vertical Straight Bars
GRAND TOTAL: (Per Inlet)					206.73	



STRAIGHT BARS
(nts)



BENT BAR
(nts)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE SLOPE PAVING-REBARS
3-2210 mm SPAN X 1600 mm RISE CSPA
AT STA. 9+590.00

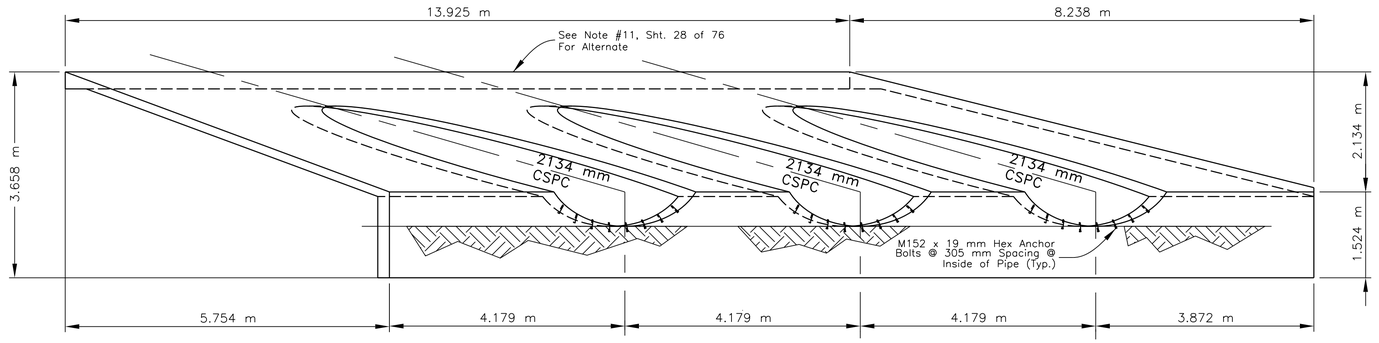
DRAWN BY: NRDOT	DATE: 7/14/2011
DESIGNED BY: NRDOT	DATE: 7/14/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Snt 31 SlpPvg2 3po_221s_160r_101111_rev.dgn

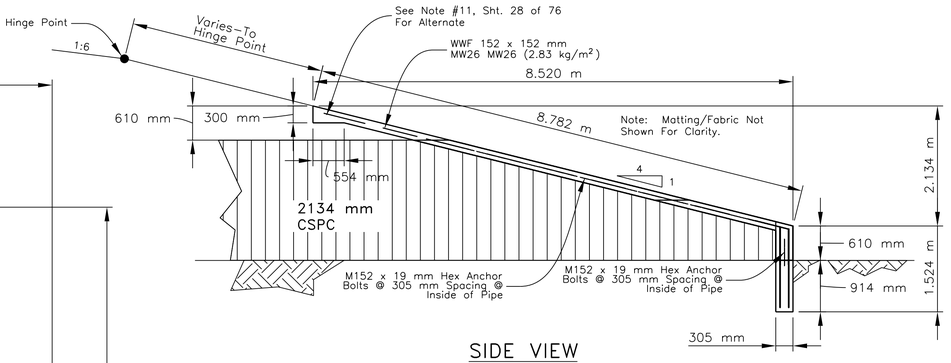
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	32	76

GENERAL NOTES

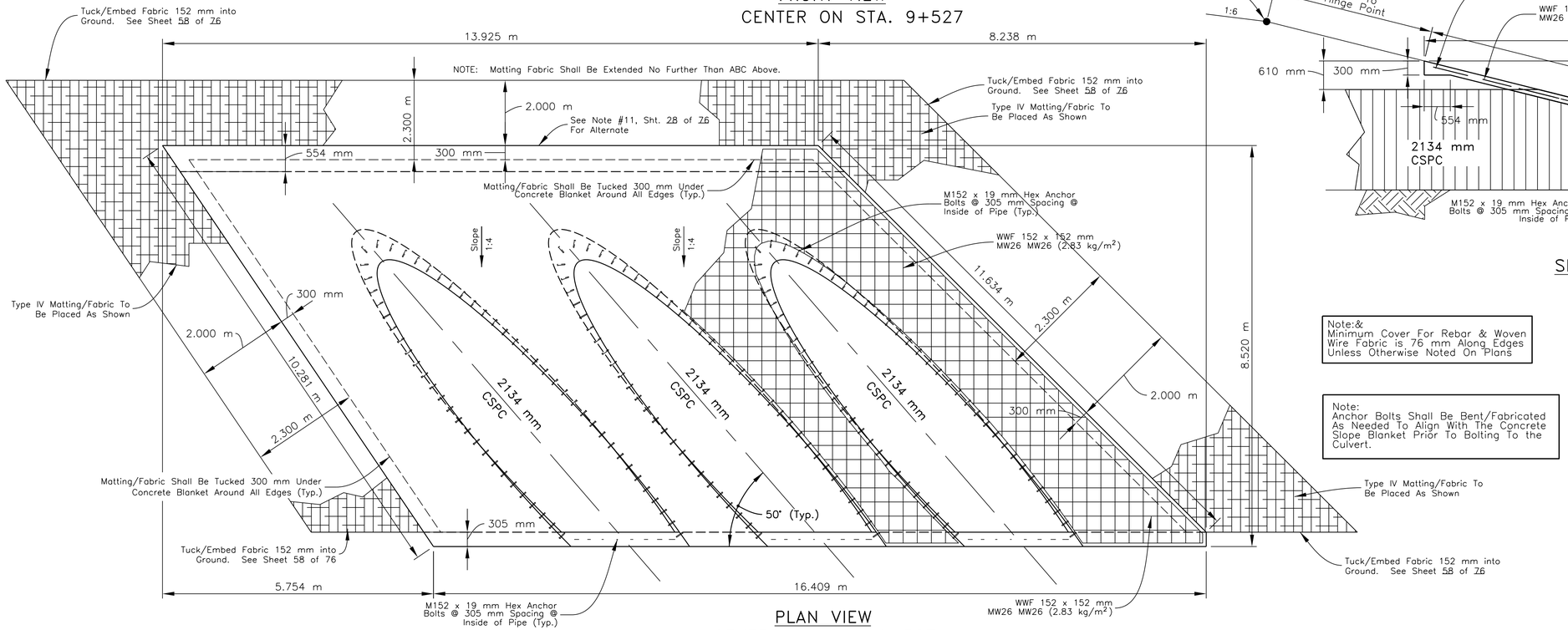
See Sheets 28 And 58 of 76 For Additional Details And Notes.



FRONT VIEW
CENTER ON STA. 9+527



SIDE VIEW



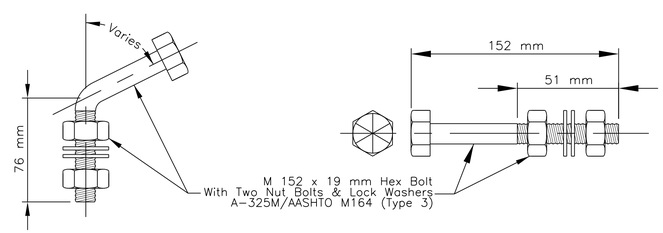
PLAN VIEW
CENTER ON STA. 9+527

Note:&
Minimum Cover For Rebar & Woven Wire Fabric is 76 mm Along Edges Unless Otherwise Noted On Plans

Note:
Anchor Bolts Shall Be Bent/Fabricated As Needed To Align With The Concrete Slope Blanket Prior To Bolting To the Culvert.

ITEM 60101–0000: MINOR CONCRETE ESTIMATED QUANTITY

STATION	CSPC mm	BARRELS	SKEW NO.	VOLUME (m^3)	WWF 2.83 kg/m^3	WWF Area (m^2)
9+527	2134	3	50°	20.48	227.65	80.44
		GRAND TOTAL :	(Inlet Only)	20.48		



BENT AND STRAIGHT ANCHOR BOLT DETAIL
(nts)

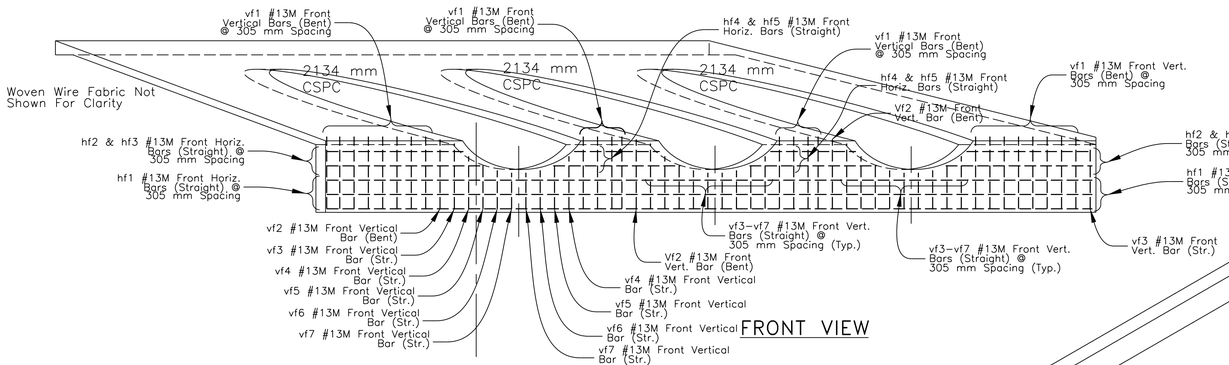
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE SLOPE PAVING
FOR 3–2134 mm RISE CSPc
AT STA. 9+924.00

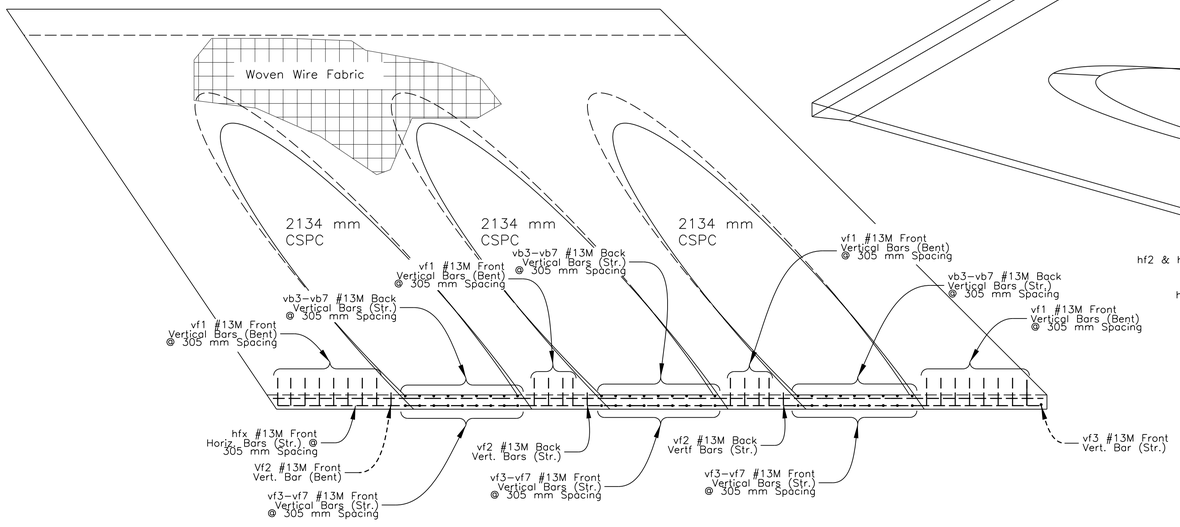
DRAWN BY: NRDOT	DATE: 7/14/2011
DESIGNED BY: NRDOT	DATE: 7/14/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 32 SlpPvg1 3p34_072911.dgn

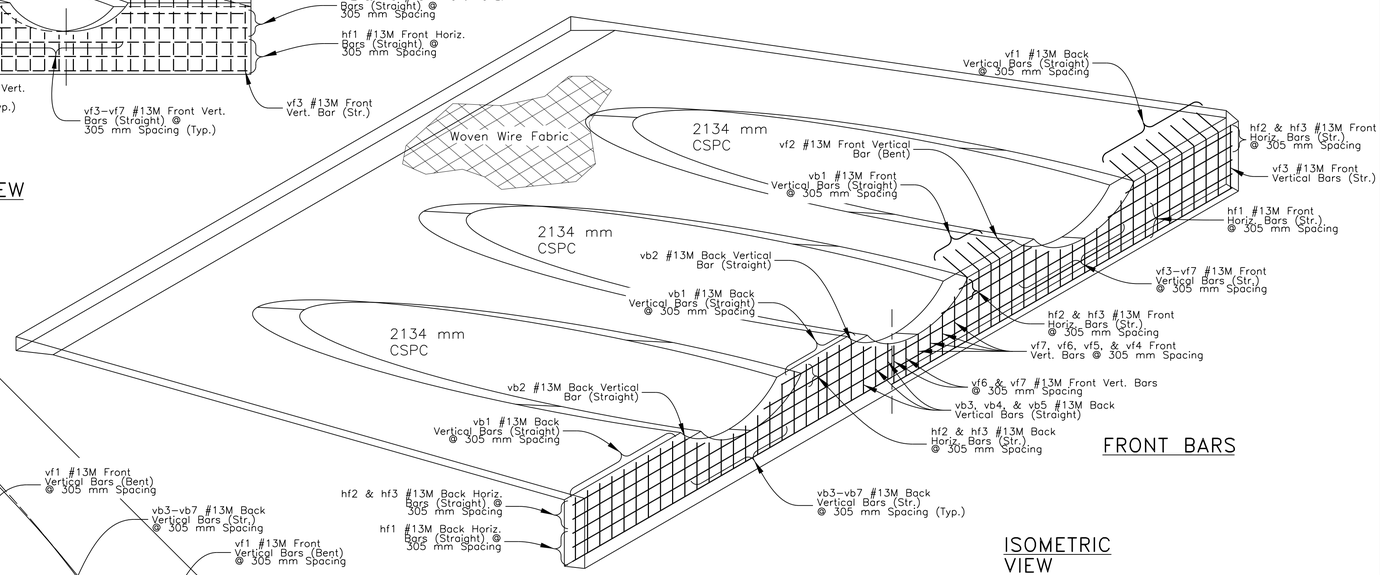
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	33	76



FRONT VIEW



PLAN VIEW



FRONT BARS

BACK BARS

ISOMETRIC VIEW

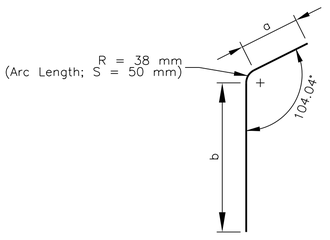
GENERAL NOTES

See Sheet 28 of 76 For Additional Details And Notes.

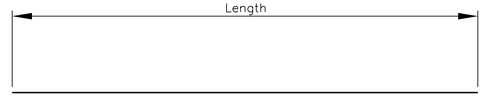
Note:
Minimum Cover For Rebar & Woven Wire Fabric Is 76 mm Along Edges Unless Otherwise Noted On Plans

REINFORCING BAR SCHEDULE

Mark	No. of Bars	Length (m)	Size	kg/m	Total Wt. (kg)	Remarks
hf1	3	16.31	#13M	0.994	48.64	Front Horizontal Straight Bars, Bottom of Pipes
hf2	2	3.36	#13M	0.994	6.68	Front Horizontal Straight Bars, Outside of Pipes
hf3	2	2.91	#13M	0.994	5.79	Front Horizontal Straight Bars, Outside of Pipes
hf4	2	2.71	#13M	0.994	5.39	Front Horizontal Straight Bars, Between Pipes
hf5	2	1.83	#13M	0.994	3.64	Front Horizontal Straight Bars, Between Pipes
hb1	3	16.41	#13M	0.994	48.93	Back Horizontal Straight Bars, Bottom of Pipes
hb2	2	3.33	#13M	0.994	6.62	Front Horizontal Straight Bars, Outside of Pipes
hb3	2	2.89	#13M	0.994	5.75	Front Horizontal Straight Bars, Outside of Pipes
hb4	2	2.71	#13M	0.994	5.39	Front Horizontal Straight Bars, Between Pipes
hb5	2	1.83	#13M	0.994	3.64	Back Horizontal Straight Bars, Between Pipes
vf1	24	1.99	#13M	0.994	47.47	Front Vertical Bent Bars, Left, Right, & Between Pipes a = 580 mm b = 1361 mm
vf2	3	1.75	#13M	0.994	5.22	Front Vertical Bent Bars, Left of all Pipes, a = 335 mm b = 1361 mm
vf3	4	1.39	#13M	0.994	5.53	Front Vertical Straight Bars, Under Pipes & Right End (1) of Wall
vf4	3	1.12	#13M	0.994	3.34	Front Vertical Straight Bars, Under Pipes
vf5	6	0.93	#13M	0.994	5.55	Front Vertical Straight Bars, Under Pipes
vf6	6	0.82	#13M	0.994	4.89	Front Vertical Straight Bars, Under Pipes
vf7	6	0.77	#13M	0.994	4.59	Front Vertical Straight Bars, Under Pipes
vb1	28	1.36	#13M	0.994	37.85	Back Vertical Straight Bars, Left, Right, & Between Pipes
vb2	3	1.30	#13M	0.994	3.88	Back Vertical Straight Bars, Outside & Left of Pipes
vb3	6	1.03	#13M	0.994	6.14	Back Vertical Straight Bars, Under Pipes
vb4	6	0.87	#13M	0.994	5.19	Back Vertical Straight Bars, Under Pipes
vb5	6	0.79	#13M	0.994	4.71	Back Vertical Straight Bars, Under Pipes
vb6	6	0.76	#13M	0.994	4.53	Back Vertical Straight Bars, Under Pipes
vb7	6	0.78	#13M	0.994	4.65	Back Vertical Straight Bars, Under Pipes
GRAND TOTAL: (Per Inlet)					284.00	



BENT BAR
(nts)



STRAIGHT BARS
(nts)

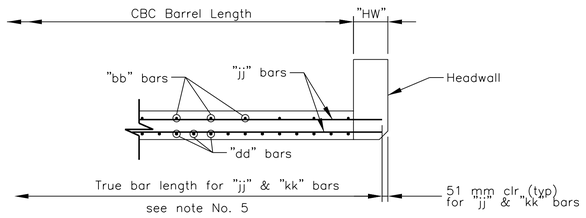
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE SLOPE PAVING
FOR 3–2134 mm CSPC
AT STA. 9+527.00

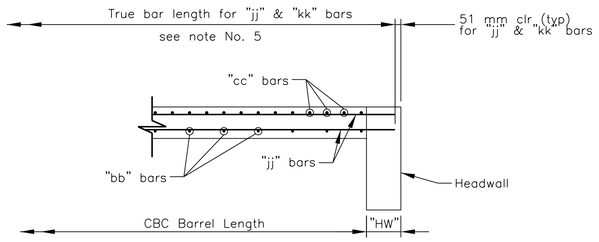
DRAWN BY: NRDOT	DATE: 7/14/2011
DESIGNED BY: NRDOT	DATE: 7/14/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Snt 33 SlpPvg2 3p34_072911.dgn

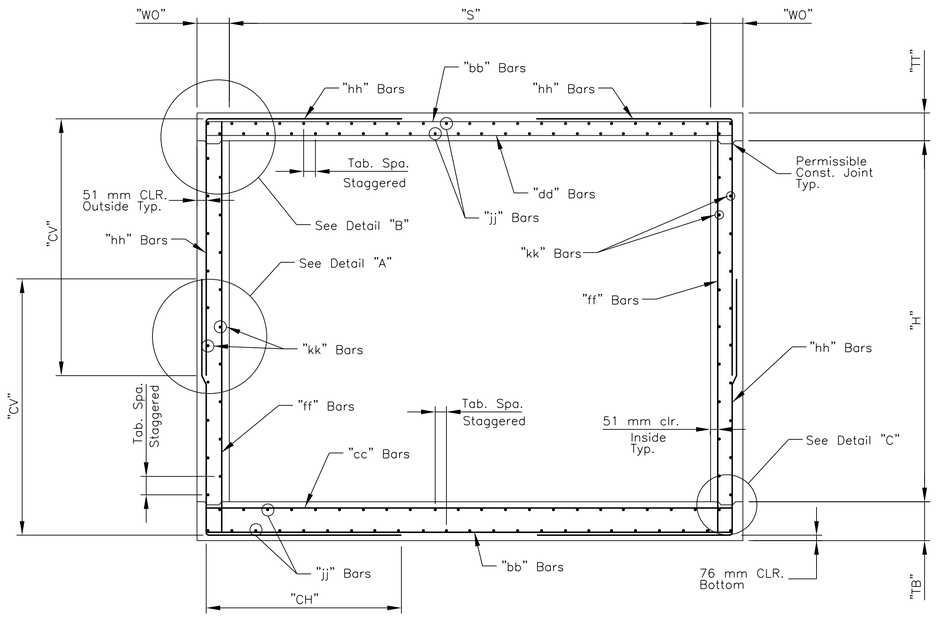
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	34	76



NOTE: See sheet 38 for Headwall dimension and bar sizes and layout.



SECTION A–A



SECTION B–B

SINGLE OPENING BOX CULVERT STRUCTURE DIMENSIONS					
STATION	DIMENSIONS		0.00 m – 3.048 m. BURIAL DESIGN FILL "A"		
	SPAN "S" INSIDE	HEIGHT "H" INSIDE	TOP SLAB "TT"	BOTTOM SLAB "TB"	WALL OUTER :WO:
12+020.00	3.658	3.048	254 mm	279 mm	241 mm
13+529.50	3.658	2.438	254 mm	279 mm	241 mm

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP–03), ALONG WITH THE SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. ALL CONCRETE SHALL BE CLASS "A(AE)" WITH CLASS 1 FINISH. CHAMFER ALL EXPOSED EDGES 19 mm. ALL CONCRETE SHALL CONFORM TO SECTION 552 & 601 OF THE FP–03. ALL CONCRETE SHALL HAVE A MINIMUMCOMPRESSIVE STRENGTH OF F'c = 27.58 MPa IN 28 DAYS.
3. ALL REINFORCING STEEL TO BE DEFORMED BARS AND SHALL CONFORM TO AASHTO SPECIFICATION M–31(ASTM A 615M), GRADE 420, AND SECTION 554 OF FP–03. ALL DIMENSIONS REFER TO THE CENTERLINE OF BAR. ALL BEND DIMENSIONS FOR REINFORCING STEEL SHALL BE OUT TO OUT OF BARS. ALL REINFORCING STEEL SHALL HAVE 51 mm CLEARANCE COVER UNLESS OTHERWISE NOTED. ALL REINFORCING STEEL, ANCHOR BOLTS, AND RODS SHALL BE PAID FOR UNDER CONTRACT ITEM 55401–1000.
4. CBC'S SHALL BE CONSTRUCTED TO THE SPAN, HEIGHT, NUMBER OF BARRELS, SKEW, ALIGNMENT, AND FLOWLINE GRADE AS SPECIFIED ON THE PLAN AND PROFILE, SHEET __, AND CULVERT CROSS SECTION ON SHEET __, WITH ONLY MINOR CORRECTIONS IN LOCATION, SKEW, AND INVERT ELEVATIONS AS NEEDED TO FIT DRAINAGE CHANNEL CONDITIONS. ALL ADJUSTMENTS SHALL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE WORK AND NO ADDITIONAL PAYMENT SHALL BE MADE THEREFOR.
5. "COVER" IS HEIGHT OF FILL FROM TOP OF BOX TO THE TOP OF PAVEMENT. ORIGINAL HEIGHT OF COVER MAY NOT BE EXCEEDED IN THE FUTURE OR WILL REQUIRE REMOVAL AND REPLACEMENT WITH PROPER DESIGN FILL.
6. ALL CONSTRUCTION JOINTS SHALL BE AS PER DETAIL ON SHEET __. CONSTRUCTION JOINTS ARE PERMISSIBLE AND SHALL BE LOCATED AT WALL/SLAB HORIZONTAL INTERFACE.
7. DO NOT BACKFILL TOP SLAB UNTIL SLAB HAS REACHED 27.58 MPa DESIGN STRENGTH.
8. EXCAVATION AND BACKFILL OF CBC'S SHALL BE IN ACCORDANCE WITH THE DETAILS SHOWN ON THE APPROVED SHOP PLANS AND SECTION 208 AND 209 OF FP–03.
9. CHANNEL AND SLOPES RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE PLANS AND AS DETERMINED BY THE COR/AOTR. ANY WASTE MATERIAL SHALL BE USED AS BORROW WHERE NEEDED IN OTHER PROJECT LOCATION AS DESIGNATED AND APPROVAL BY THE COR/AOTR. ALL EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
10. DO NOT BACKFILL AROUND ALL CBC WALLS UNTIL THE CONCRETE HAS ATTAINED A DESIGN STRENGTH 18.4 MPa.
11. THE CONTRACTOR HAS THE OPTION TO USE PRECAST CONCRETE BOX CULVERT. IF THE CONTRACTOR ELECTS TO SUBSTITUTE FOR THE PRECAST CBC'S, THE CONTRACTOR SHALL SHOW THAT PRECAST CBC'S ARE MORE COST EFFECTIVE WITH SUPPORTING DATA AND MUST MEET THE REQUIREMENTS UNDER SECTION 602 OF THE SUPPLEMENTAL SPECIFICATIONS.

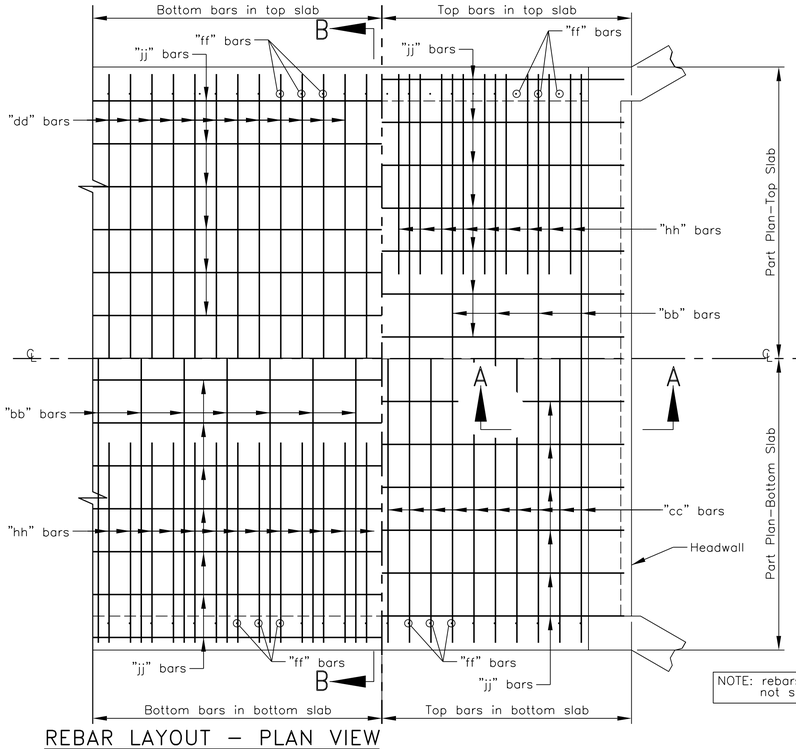
DESIGN

DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, THIRD EDITION.

f'c = 27.58 MPa AT 28 DAYS, fy = GRADE 420
CULVERT DESIGNED FOR DESIGN FILL "A" 0–3.0m HEIGHT
Ɣ soil = 1922 kg/cubic meter, K* = 0.69, ø = 18°

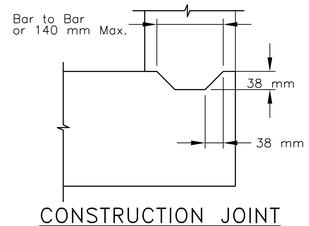
PAYMENT

PAYMENT FOR CBC'S IS BASED ON THE METER UNIT OF MEASUREMENT FOR THE TOTAL LENGTH OF ALL NEW BARRELS CONSTRUCTED AT THE CENTERLINE OF THE CBC. CONCRETE, REBAR, FORMING, WINGWALLS, APRONS, BACKFILLING, DECK DRAINS, WATERPROOF MEMBRANE AND OTHER WORK AND MATERIAL SHALL BE INCLUDED IN THE PER METER COST FOR THE CBC AND NO FURTHER PAYMENT SHALL BE MADE FOR THESE INCIDENTAL ITEMS.

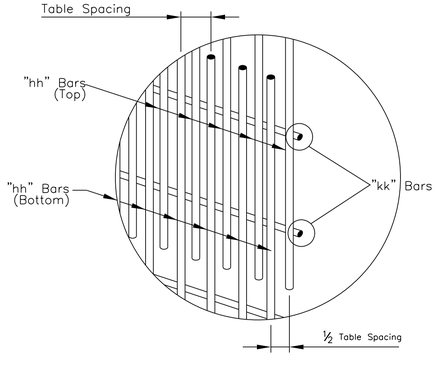


REBAR LAYOUT – PLAN VIEW

NOTE: rebars in Headwall not shown for clarity

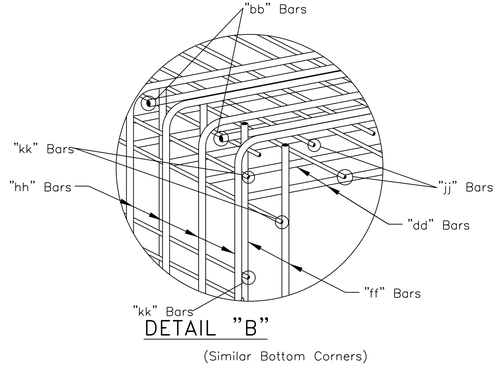


CONSTRUCTION JOINT DETAIL "C"



DETAIL "A'

(Inside Face Omited For Clarity)



DETAIL "B"

(Similar Bottom Corners)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CBC–SINGLE OPENING DESIGN
STRUCTURAL SECTION & REBAR
FOR STA. 12+020.00 & 13+529.50

DRAWN BY: NRDOT	DATE: 1/14/2011
DESIGNED BY: NRDOT	DATE: 1/14/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 34_CBC_singlebarrel.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	35	76

GRADE 60 REINFORCING BAR SCHEDULE FOR SINGLE BARREL 3.658 m x 3.048 m CBC At Sta. 12+020.00

MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	c* (mm)	d* (mm)	REMARKS
STRAIGHT BARS (TYPE 1)												
"bb"	#25M	305	1	180	4.038	3.973	2,887.735					top & bottom longitudinal bars in top & bottom slab
"bb"_1 to "bb"_9	#25M	305	1	18	0.780 to 3.686 (by 363 mm)	3.973	159.692					top & bottom longitudinal bars in top & bottom slab @ skewed end of CBC
"cc"	#29M	152	1	179	4.038	5.060	3,657.378					top longitudinal bars in bottom slab
"cc"_1 to "cc"_19	#29M	152	1	19	0.698 to 3.867 (by 182 mm)	5.060	214.622					top longitudinal bars in bottom slab @ skewed end of CBC
"dd"	#29M	152	1	179	4.038	5.060	3,657.378					top longitudinal bars in top slab
"dd"_1 to "dd"_19	#29M	152	1	19	0.698 to 3.867 (by 182 mm)	5.060	214.622					top longitudinal bars in top slab @ skewed end of CBC
"ff"	#13M	152	1	198	0.994	3.454	679.789					vertical bars in side wall
"ff"	#13M	152	1	177	0.994	3.454	607.690					vertical bars in opposite side wall
BENT BARS (TYPE 2)												
"hh"	#25M	152	2	380	3.973	3.581	5,406.379	"CH"= 1.422 m	"CV"= 2.159 m			top & bottom vertical bent bars in side wall
"hh"_1	#25M	152	2	2	3.973	3.563	28.312	"CH"= 1.395 m	"CV"= 2.159 m			top & bottom vertical bent bars in side wall
"hh"_2	#25M	152	2	2	3.973	3.381	26.865	"CH"= 1.214 m	"CV"= 2.159 m			top & bottom vertical bent bars in side wall
"hh"_3	#25M	152	2	2	3.973	3.199	25.419	"CH"= 1.032 m	"CV"=2.159 m			top & bottom vertical bent bars in side wall
"hh"_4	#25M	152	2	2	3.973	3.018	23.981	"CH"= 0.850 m	"CV"=2.159 m			top & bottom vertical bent bars in side wall
"hh"_5	#25M	152	2	2	3.973	2.836	22.535	"CH"= 0.669 m	"CV"=2.159 m			top & bottom vertical bent bars in side wall
"hh"_6	#25M	152	2	2	3.973	2.655	21.097	"CH"= 0.487 m	"CV"=2.159 m			top & bottom vertical bent bars in side wall
"hh"_7	#25M	152	2	2	3.973	2.743	21.796	"CH"= 0.305 m	"CV"=2.159 m			top & bottom vertical bent bars in side wall
"hh"_8	#25M	152	2	2	3.973	2.291	18.204	"CH"= 0.124 m	"CV"=2.159 m			top & bottom vertical bent bars in side wall
"hh"	#25M	152	2	352	3.973	3.581	5,008.014	"CH"= 1.422 m	"CV"= 2.159 m			top & bottom vertical bent bars in opposite side wall
STRAIGHT BARS (TYPE 1)												
"jj"_1 to "jj"_27	#13M	152	1	54	27.473 to 29.136 (by 128 mm)	0.994	1,563.881					top bars in top slab and bottom bars in bottom slab
"jj"_1 to "jj"_26	#13M	152	1	52	27.537 to 30.734 (by 128 mm)	0.994	1,505.956					bottom bars in top slab and top bars in bottom slab
"kk"_1	#13M	152	1	21	30.819	0.994	643.316					outer horizontal bars in side wall
"kk"_2	#13M	152	1	20	30.724	0.994	610.793					inner horizontal bars in side wall
"kk"_3	#13M	152	1	20	27.547	0.994	547.634					inner horizontal bars in opposite side wall
"kk"_4	#13M	152	1	21	27.452	0.994	573.033					outer horizontal bars in opposite side wall
						TOTAL	28,126.121					

GRADE 60 REINFORCING BAR SCHEDULE FOR SINGLE BARREL 3.6578 m x 2.438 m CBC At Sta. 13+529.50

MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	c* (mm)	d* (mm)	REMARKS
STRAIGHT BARS (TYPE 1)												
"bb"	#25M	305	1	148	4.038	3.973	2,374.360					top & bottom longitudinal bars in top & bottom slab
"cc"	#29M	152	1	146	4.038	5.060	2,983.113					top longitudinal bars in bottom slab
"dd"	#29M	152	1	146	4.038	5.060	2,983.113					top longitudinal bars in top slab
"ff"	#13M	152	1	146	0.994	3.454	501.258					vertical bars in side wall
"ff"	#13M	152	1	146	0.994	3.454	501.258					vertical bars in opposite side wall
BENT BARS (TYPE 2)												
"hh"	#25M	152	2	584	3.277	3.581	6,853.203	"CH"= 1.422 m	"CV"= 1.854 m			top & bottom vertical bent bars in side wall
STRAIGHT BARS (TYPE 1)												
"jj"_1	#13M	152	1	54	22.738	0.994	1,220.485					top bars in top slab and bottom bars in bottom slab
"jj"_2	#13M	152	1	52	22.738	0.994	1,175.282					bottom bars in top slab and top bars in bottom slab
"kk"_1	#13M	152	1	17	22.738	0.994	384.227					outer horizontal bars in side wall
"kk"_2	#13M	152	1	16	22.738	0.994	361.625					inner horizontal bars in side wall
"kk"_3	#13M	152	1	16	22.738	0.994	361.625					inner horizontal bars in opposite side wall
"kk"_4	#13M	152	1	17	22.738	0.994	384.227					outer horizontal bars in opposite side wall
						TOTAL	20,083.776					

GENERAL NOTES

GENERAL NOTES

1. USE TABLE 1: GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARREL AND DETAIL BELOW TO FORM THE GEOMETRIC SHAPE, SIZE, AND LENGTH OF THE REINFORCING BARS:

   THE LENGTH OF BARS: THE LENGTH OF "mm", "rr", "nn", "ss", & #16HW5 SHALL BE DETERMINED BY:

   LENGTH = [[[("WO" 2) + ("s" N) + ["WI" (N−1)]]/Cos(SKEW ANGLE)] −102 mm (ROUND DOWN TO NEAREST 13 mm)

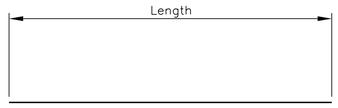
2. THESE BARS SHALL BE FURNISHED IN FULL LENGTH CALCULATED OR BE MECHANICALLY COUPLED BY DEVICES LISTED ON THE APPROVED PRODUCT LIST.
3. N – NUMBER OF BARRELS (1, 2, 3, Or 4)
4. "qq" BAR LENGTH = "H" + 1499 mm

   "pp" Bar = ["H" +(1.63 m Min.)]

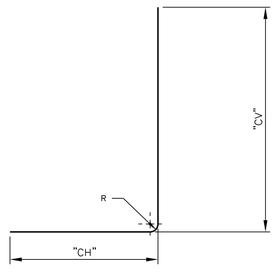
   Or ("TT" + "TB" + 203 mm) IF LARGER)] – 254 mm + 2 STANDARD HOOK LENGTH.

5. ANY OTHER SIZE OF BOX EXTENSIONS NOT COVERED BY THIS MODIFICATION SHALL BE DONE THROUGH SPECIAL DESIGNS.

NOTE: TABLE 1: GRADE 60 REINFORCING BAR SCHEDULEFOR DOUBLE BARRLE IS FOR USE WITH ONE (1) TO FOUR (4) BARRELS. FOR FIVE (5) OR MORE BARRELS USE COMBINATIONS OF ONE TO FOUR BARRELS REPEATINGIN PARALLEL SEQUENCE THE DESIGN.



TYPE 1 BARS
"aa", "bb", "cc", "dd", "ee", "ff", "jj" and "kk" bars



TYPE 2 BARS
"hh" bars

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

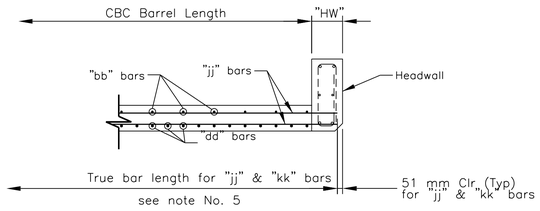
CBC – SINGLE OPENING DESIGN
DIMENSIONS AND REBAR SCHEDULE
For Sta. 12+020.00 & 13+529.50

DRAWN BY: NRDOT	DATE: 2/24/2010
DESIGNED BY: NRDOT	DATE: 2/24/2010
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

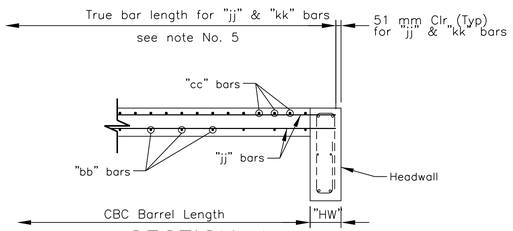
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Snt 35 CBC_1B_dimen_rebarSch.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	36	76

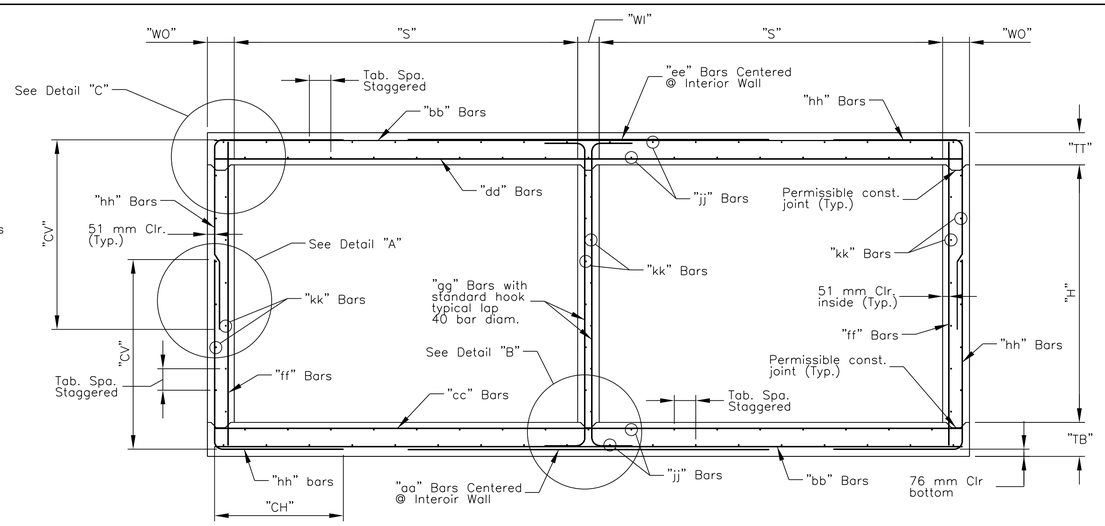
FOR GENERAL NOTES SEE SHEET 34 OF 76.



NOTE: See sheet 38 for Headwall dimension and bar sizes and layout.

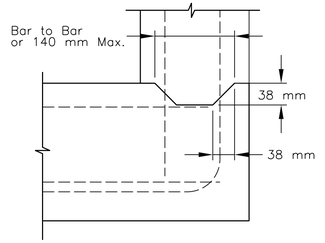


SECTION A–A
(nts)

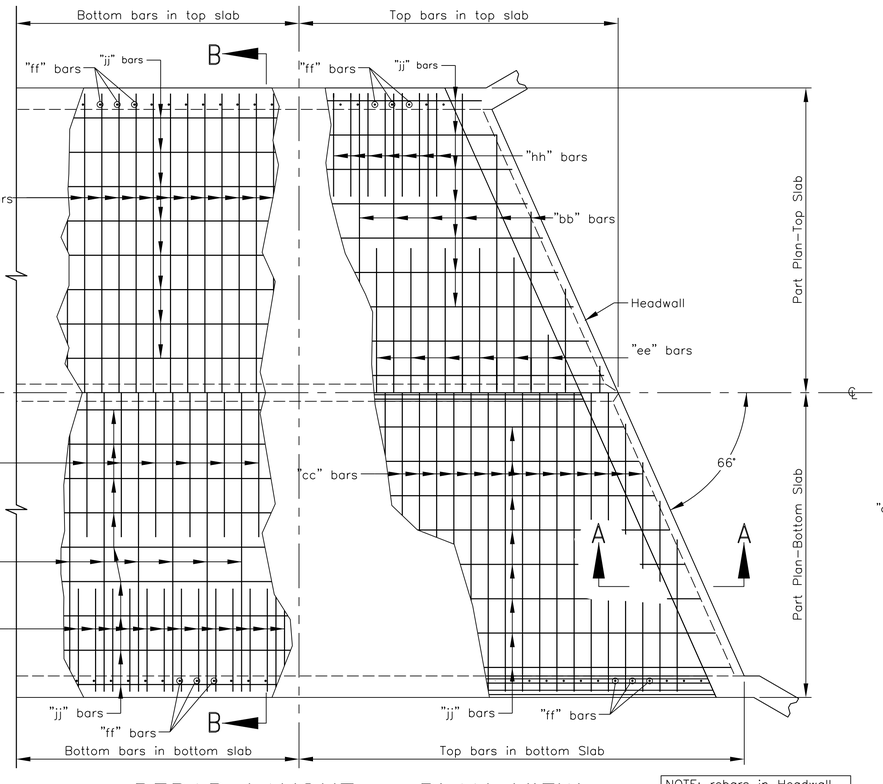


SECTION B–B
(nts)

DOUBLE OPENING BOX CULVERT STRUCTURE DIMENSIONS						
STATION	DIMENSIONS		0.00 m – 3.048 m. BURIAL DESIGN FILL "A"			
	SPAN "S" INSIDE	HEIGHT "H" INSIDE	TOP SLAB "TT"	BOTTOM SLAB "TB"	WALL OUTER :WO:	WALLS INTERIOR "WI"
0+037.45 (N321)	2.438 m	1.829 m	241 mm	228 mm	190 mm	152 mm

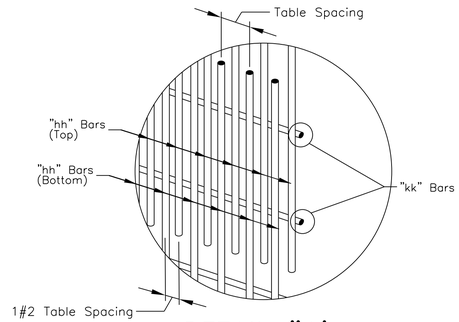


CONSTRUCTION JOINT DETAIL

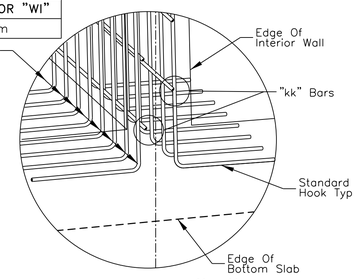


REBAR LAYOUT – PLAN VIEW
(nts)

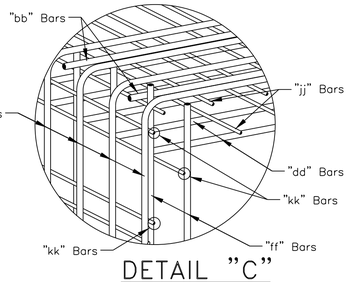
NOTE: rebars in Headwall not shown for clarity



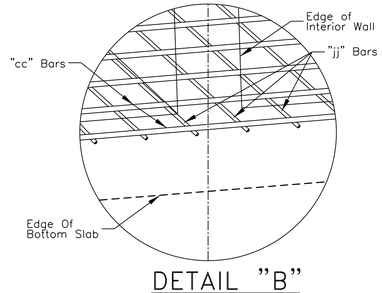
DETAIL "A"
(Inside Face Omited For Clarity)



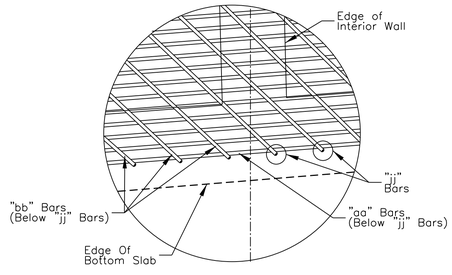
DETAIL "B"
(Wall Reinforcing Only)



DETAIL "C"
(Similar Bottom Corners)



DETAIL "B"
(Bottom Slab – Top Mat)



DETAIL "B"
(Bottom Slab – Bottom Mat)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CBC – DOUBLE OPENING DESIGN
STRUCTURAL SECTIONS & REBAR
For Sta. 0+037.45 (N321)

DRAWN BY: NRDOT	DATE: 1/14/2011
DESIGNED BY: NRDOT	DATE: 1/14/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 36_CBC_doublebarrel.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	37	76

TABLE 1: GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARREL 2.438 m x 1.829 m CBC At Sta. 0+037.45 – N321

MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"aa"	#22M	305	1	34	2.565	3.042	265.293			top longitudinal bars over interior wall
"aa"_1	#22M	305	1	2	2.482	3.042	15.100			top longitudinal bars over interior wall
"aa"_2	#22M	305	1	2	1.798	3.042	10.939			top longitudinal bars over interior wall
"aa"_3	#22M	305	1	2	1.113	3.042	6.771			top longitudinal bars over interior wall
"aa"_4	#22M	305	1	2	0.429	3.042	2.610			top longitudinal bars over interior wall
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"ee"	#22M	305	1	34	2.565	3.042	265.293			bottom longitudinal bars over interior wall
"ee"_1	#22M	305	1	2	2.482	3.042	15.100			bottom longitudinal bars over interior wall
"ee"_2	#22M	305	1	2	1.798	3.042	10.939			bottom longitudinal bars over interior wall
"ee"_3	#22M	305	1	2	1.113	3.042	6.771			bottom longitudinal bars over interior wall
"ee"_4	#22M	305	1	2	0.429	3.042	2.610			bottom longitudinal bars over interior wall
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"bb"	#22M	305	1	66	5.309	3.042	1,065.899			top & bottom longitudinal bars in top & bottom slab
"bb"_1	#22M	305	1	2	4.946	3.042	30.091			top & bottom longitudinal bars in top & bottom slab
"bb"_2	#22M	305	1	2	4.261	3.042	25.924			top & bottom longitudinal bars in top & bottom slab
"bb"_3	#22M	305	1	2	3.577	3.042	21.762			top & bottom longitudinal bars in top & bottom slab
"bb"_4	#22M	305	1	2	2.892	3.042	17.595			top & bottom longitudinal bars in top & bottom slab
"bb"_5	#22M	305	1	2	2.207	3.042	13.427			top & bottom longitudinal bars in top & bottom slab
"bb"_6	#22M	305	1	2	1.523	3.042	9.266			top & bottom longitudinal bars in top & bottom slab
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"cc"	#16M	152	1	65	5.309	1.522	525.219			top longitudinal bars in bottom slab
"cc"_1	#16M	152	1	1	5.288	1.522	8.048			top longitudinal bars in bottom slab
"cc"_2	#16M	152	1	1	5.117	1.522	7.788			top longitudinal bars in bottom slab
"cc"_3	#16M	152	1	1	4.774	1.522	7.266			top longitudinal bars in bottom slab
"cc"_4	#16M	152	1	1	4.432	1.522	6.746			top longitudinal bars in bottom slab
"cc"_5	#16M	152	1	1	4.090	1.522	6.225			top longitudinal bars in bottom slab
"cc"_6	#16M	152	1	1	3.748	1.522	5.704			top longitudinal bars in bottom slab
"cc"_7	#16M	152	1	1	3.405	1.522	5.182			top longitudinal bars in bottom slab
"cc"_8	#16M	152	1	1	3.063	1.522	4.662			top longitudinal bars in bottom slab
"cc"_9	#16M	152	1	1	2.721	1.522	4.141			top longitudinal bars in bottom slab
"cc"_10	#16M	152	1	1	2.378	1.522	3.619			top longitudinal bars in bottom slab
"cc"_11	#16M	152	1	1	2.036	1.522	3.099			top longitudinal bars in bottom slab
"cc"_12	#16M	152	1	1	1.694	1.522	2.578			top longitudinal bars in bottom slab
"cc"_13	#16M	152	1	1	1.351	1.522	2.056			top longitudinal bars in bottom slab
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"dd"	#16M	152	1	65	5.309	1.522	525.219			top longitudinal bars in top slab
"dd"_1	#16M	152	1	1	5.288	1.522	8.048			top longitudinal bars in top slab
"dd"_2	#16M	152	1	1	5.117	1.522	7.788			top longitudinal bars in top slab
"dd"_3	#16M	152	1	1	4.774	1.522	7.266			top longitudinal bars in top slab
"dd"_4	#16M	152	1	1	4.432	1.522	6.746			top longitudinal bars in top slab
"dd"_5	#16M	152	1	1	4.090	1.522	6.225			top longitudinal bars in top slab
"dd"_6	#16M	152	1	1	3.748	1.522	5.704			top longitudinal bars in top slab
"dd"_7	#16M	152	1	1	3.405	1.522	5.182			top longitudinal bars in top slab
"dd"_8	#16M	152	1	1	3.063	1.522	4.662			top longitudinal bars in top slab
"dd"_9	#16M	152	1	1	2.721	1.522	4.141			top longitudinal bars in top slab
"dd"_10	#16M	152	1	1	2.378	1.522	3.619			top longitudinal bars in top slab
"dd"_11	#16M	152	1	1	2.036	1.522	3.099			top longitudinal bars in top slab
"dd"_12	#16M	152	1	1	1.694	1.522	2.578			top longitudinal bars in top slab
"dd"_13	#16M	152	1	1	1.351	1.522	2.056			top longitudinal bars in top slab
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"ff"	#16M	152	1	78	2.159	1.552	261.360			vertical bars in side wall
"ff"	#16M	152	1	78	2.159	1.552	261.360			vertical bars in opposite side wall
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (m)	REMARKS
"gg"	#13M	305	3	39	2.507	0.994	97.186			vertical bent bars in middle wall
"gg"_1	#13M	305	3	39	2.507	0.994	97.186			opposite vertical bent bars in middle wall
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"hh"	#19M	152	2	152	2.236	2.235	759.614	"CH"= 0.914 m	"CV"= 1.346 m	top vertical bent bars in side wall
"hh"_1	#19M	152	2	152	2.236	2.235	759.614	"CH"= 0.914 m	"CV"= 1.346 m	bottom vertical bent bars side wall
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"jj"	#13M	152	1	36	12.404	0.994	443.865			top bars in top slab and bottom bars in bottom slab
"jj"_1	#13M	152	1	34	12.404	0.994	419.206			bottom bars in top slab and top bars in bottom slab
MARK	SIZE	SPACING (mm)	TYPE	No. Req'd	LENGTH (m)	kg/m	WEIGHT (kg):	a* (mm)	b* (mm)	REMARKS
"kk"	#13M	152	1	12	12.404	0.994	147.955			horizontal bars in side wall
"kk"_1	#13M	152	1	12	12.404	0.994	147.955			horizontal bars in middle wall
"kk"_2	#13M	152	1	12	12.404	0.994	147.955			horizontal bars in opposite side wall
						TOTAL	6,513.318			

GENERAL NOTES

1. USE TABLE 1 : GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARREL AND DETAIL BELOW TO FORM THE GEOMETRIC SHAPE, SIZE, AND LENGTH OF THE REINFORCING BARS:

   THE LENGTH OF BARS: THE LENGTH OF "mm", "rr", "nn", "ss", & #16HW5 SHALL BE DETERMINED BY:

   LENGTH = [[[("WO" 2) + ("s" N) + ["WI" (N–1)]]/Cos(SKEW ANGLE)] –102 mm (ROUND DOWN TO NEAREST 13 mm)

2. THESE BARS SHALL BE FURNISHED IN FULL LENGTH CALCULATED OR BE MECHANICALLY COUPLED BY DEVICES LISTED ON THE APPROVED PRODUCT LIST.

3. N – NUMBER OF BARRELS (1, 2, 3, Or 4)

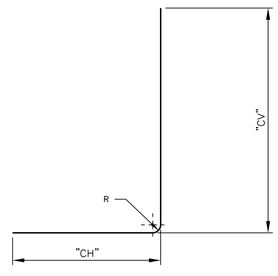
4. "qq" BAR LENGTH = "H" + 1499 mm

   "pp" Bar = ["H" +(1.63 m Min.)]

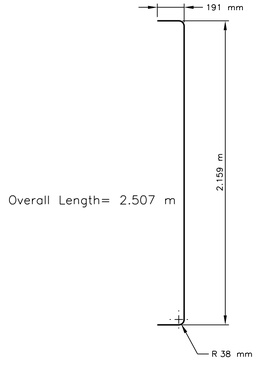
   Or ("TT" + "TB" + 203 mm) IF LARGER)] – 254 mm + 2 STANDARD HOOK LENGTH.

5. ANY OTHER SIZE OF BOX EXTENSIONS NOT COVERED BY THIS MODIFICATION SHALL BE DONE THROUGH SPECIAL DESIGNS.

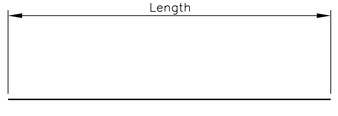
NOTE: TABLE 1: GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARRLE IS FOR USE WITH ONE (1) TO FOUR (4) BARRELS. FOR FIVE (5) OR MORE BARRELS USE COMBINATIONS OF ONE TO FOUR BARRELS REPEATING IN PARALLEL SEQUENCE THE DESIGN.



TYPE 2 BARS
"hh" bars



TYPE 3 BARS
"gg" bars



TYPE 1 BARS
"aa", "bb", "cc", "dd", "ee", "ff", "jj" and "kk" bars

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CBC – DOUBLE OPENING DESIGN
DIMENSIONS AND REBAR SCHEDULE
For Sta. 0+037.45 (N321)

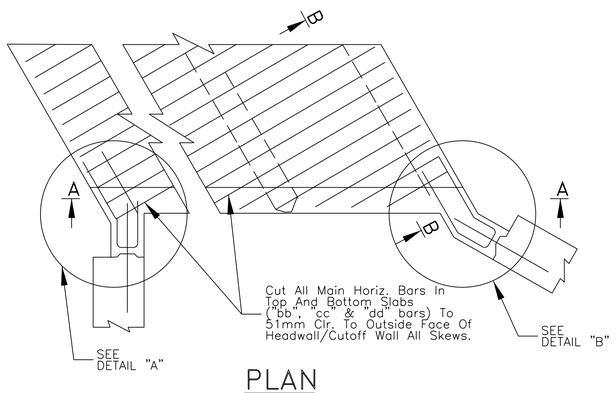
DRAWN BY: NRDOT	DATE: 2/23/2010
DESIGNED BY: NRDOT	DATE: 2/23/2010
REVISED: 11/1/2012	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

i:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Snt 37_CBC_2BDimen_RebarSch.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	38	76

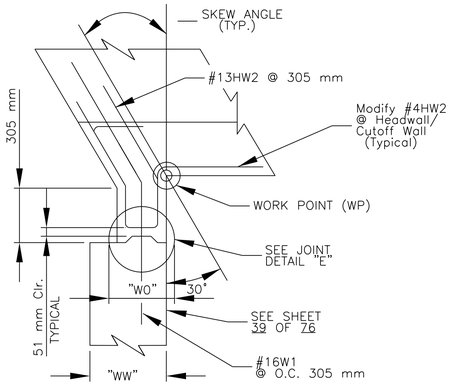
GENERAL NOTES

See Sheet 39 of 76 For Additional Notes & Details.

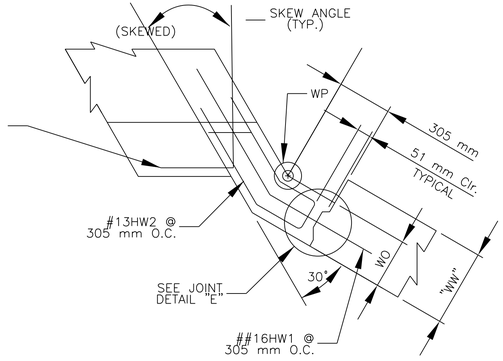


PLAN

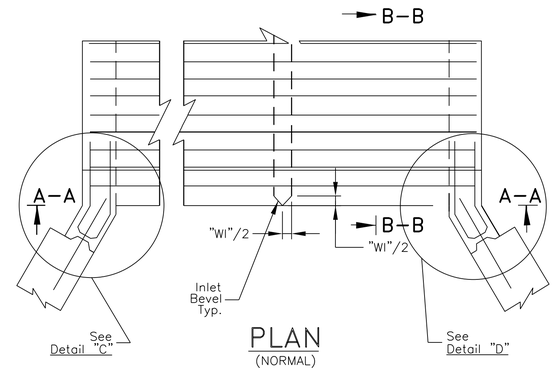
(SKEWED)
Similar For Single Barrel
(Not To Be Used For Skews Over 45) °



DETAIL "A"
(SKEWED)

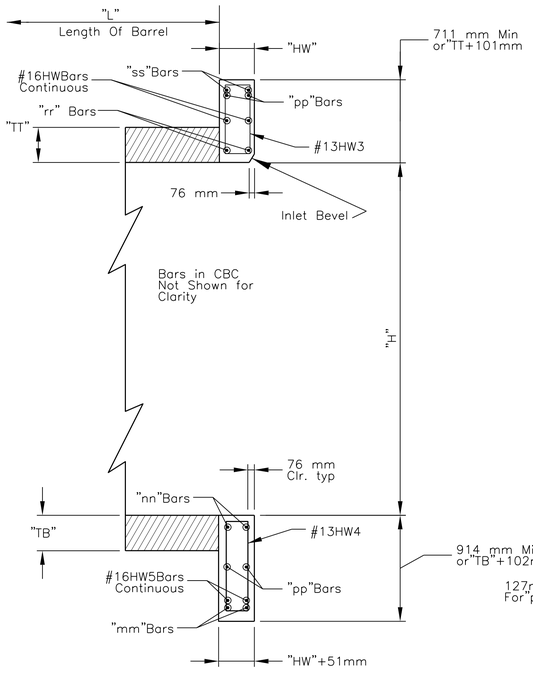


DETAIL "B"

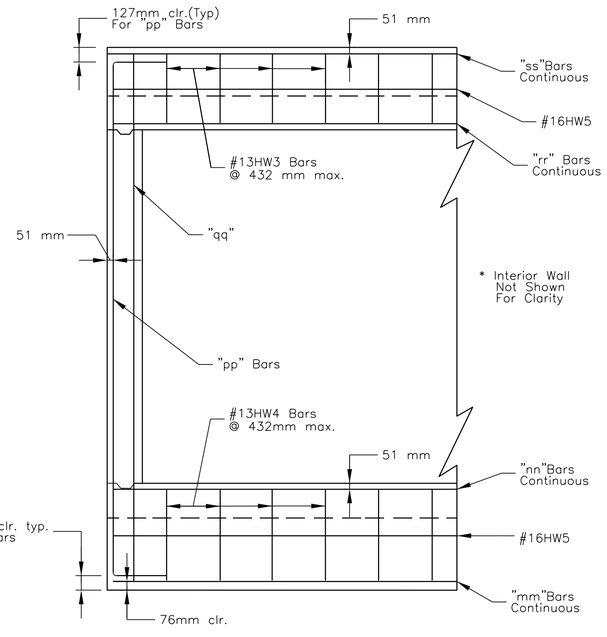


PLAN
(NORMAL)

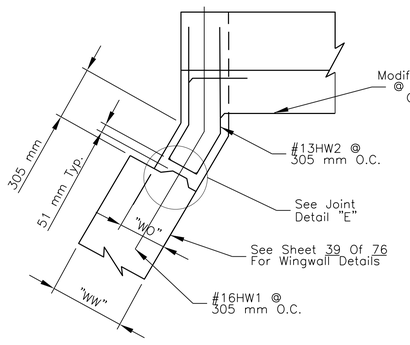
NOTE: See Sheet 35 Of 76 For Bar Sizes, Number Of Bars, And Bar Length Formulas.



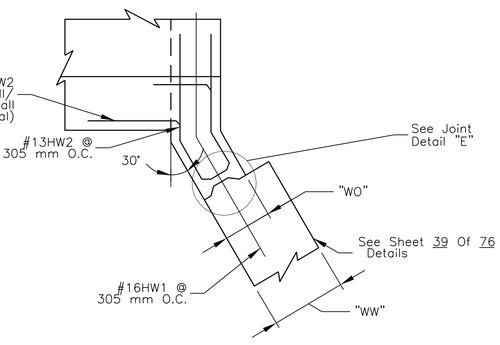
PART SECTION B-B



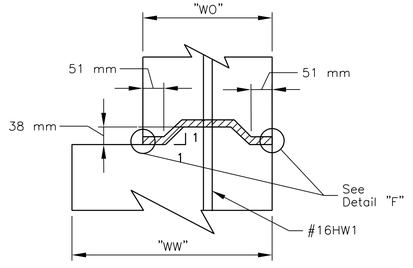
PART SECTION A-A



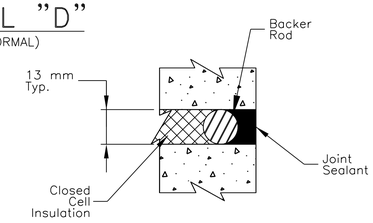
DETAIL "C"
(NORMAL)



DETAIL "D"
(NORMAL)



JOINT DETAIL "E"



DETAIL "F"

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CBC HEAD/CUTOFF WALLS
DESIGN FILLS ALL STRUCTURAL
SECTIONS AND REBAR @ STA 0+037.45

DRAWN BY: NRDOT	**DATE:** 1/31/2013
DESIGNED BY: NRDOT	**DATE:** 1/31/2013
REVISED: 1/31/2013	**BY:** Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Snt 38_CBC_Headwall Dtl.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	39	76

GRADE 60 REINFORCING BAR SCHEDULE FOR SINGLE BARREL 3.658 m x 3.048 m CBC HEADWALL

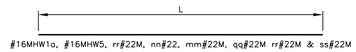
	MARK	No.	SIZE	TYPE	LENGTH Each (m)	kg/m	TOTAL WT (kg)	REMARK
Sta. 12+020.00 Inlet	#16MHW1	24	#16M	3	1.827	1.552	68.052	Bent bars in left & right side of Headwall
	#16MHW1a	6	#16M	1	1.000	1.552	9.312	Straight bars in left & right side of Headwall
	#13MHW2	24	#13M	6	1.767	0.994	42.154	Bent bars in left & right side of Headwall
	#13MHW2a	6	#13M	7	1.767	0.994	10.538	Bent bars in left & right side of Headwall
	#13MHW3	9	#13M	5	1.895	0.994	16.948	Top stirrup bars in Headwall
	#13MHW4	9	#13M	5	2.300	0.994	20.576	Bottom stirrup bars in Headwall
	#16MHW5	2	#16M	1	4.038	1.552	12.535	Top middle horizontal bars in Headwall
	#16MHW5a	2	#16M	1	4.038	1.552	12.535	Bottom middle horizontal bars in Headwall
	mm	2	#22M	1	4.038	3.042	24.568	Bottom horizontal bars in Headwall
	nn	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall
	pp	4	#22M	4	5.607	3.042	68.225	Vertical bent bars in left & right side of Headwall
	qq	4	#22M	1	4.546	3.042	55.321	Vertical straight bars in left & right side of Headwall
	rr	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall
	ss	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall
	MARK	No.	SIZE	TYPE	LENGTH Each (m)	kg/m	TOTAL WT (kg)	REMARK
Sta. 12+020.00 Outlet	#16MHW1	24	#16M	3	1.827	1.552	68.052	Bent bars in left & right side of Headwall
	#16MHW1a	6	#16M	1	1.000	1.552	9.312	Straight bars in left & right side of Headwall
	#13MHW2	24	#13M	6	1.767	0.994	42.154	Bent bars in left & right side of Headwall
	#13MHW2a	6	#13M	7	1.767	0.994	10.538	Bent bars in left & right side of Headwall
	#13MHW3	12	#13M	5	1.895	0.994	22.598	Top stirrup bars in Headwall
	#13MHW4	12	#13M	5	2.300	0.994	27.434	Bottom stirrup bars in Headwall
	#16MHW5	2	#16M	1	5.272	1.552	16.363	Top middle horizontal bars in Headwall
	#16MHW5a	2	#16M	1	5.272	1.552	16.363	Bottom middle horizontal bars in Headwall
	mm	2	#22M	1	5.272	3.042	32.072	Bottom horizontal bars in Headwall
	nn	2	#22M	1	5.272	3.042	32.072	Bottom horizontal bars in Headwall
	pp	4	#22M	4	5.607	3.042	68.225	Vertical bent bars in left & right side of Headwall
	qq	4	#22M	1	4.546	3.042	55.321	Vertical straight bars in left & right side of Headwall
	rr	2	#22M	1	5.272	3.042	32.072	Top horizontal bars in Headwall
	ss	2	#22M	1	5.272	3.042	32.072	Top horizontal bars in Headwall

GRADE 60 REINFORCING BAR SCHEDULE FOR SINGLE BARREL 3.658 m x 2.438 m CBC HEADWALL

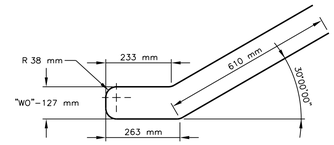
	MARK	No.	SIZE	TYPE	LENGTH Each (m)	kg/m	TOTAL WT (kg)	REMARK
Sta. 13+529.50 Inlet	#16MHW1	20	#16M	3	1.827	1.552	56.710	Bent bars in left & right side of Headwall
	#16MHW1a	6	#16M	1	1.000	1.552	9.312	Straight bars in left & right side of Headwall
	#13MHW2	20	#13M	6	1.767	0.994	35.128	Bent bars in left & right side of Headwall
	#13MHW2a	6	#13M	7	1.767	0.994	10.538	Bent bars in left & right side of Headwall
	#13MHW3	9	#13M	5	1.895	0.994	16.948	Top stirrup bars in Headwall
	#13MHW4	9	#13M	5	2.300	0.994	20.576	Bottom stirrup bars in Headwall
	#16MHW5	2	#16M	1	4.038	1.552	12.535	Top middle horizontal bars in Headwall
	#16MHW5a	2	#16M	1	4.038	1.552	12.535	Bottom middle horizontal bars in Headwall
	mm	2	#22M	1	4.038	3.042	24.568	Bottom horizontal bars in Headwall
	nn	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall
	pp	4	#22M	4	4.997	3.042	60.807	Vertical bent bars in left & right side of Headwall
	qq	4	#22M	1	3.937	3.042	47.903	Vertical straight bars in left & right side of Headwall
	rr	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall
	ss	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall
	MARK	No.	SIZE	TYPE	LENGTH Each (m)	kg/m	TOTAL WT (kg)	REMARK
Sta. 13+529.50 Outlet	#16MHW1	20	#16M	3	1.827	1.552	56.710	Bent bars in left & right side of Headwall
	#16MHW1a	6	#16M	1	1.000	1.552	9.312	Straight bars in left & right side of Headwall
	#13MHW2	20	#13M	6	1.767	0.994	35.128	Bent bars in left & right side of Headwall
	#13MHW2a	6	#13M	7	1.767	0.994	10.538	Bent bars in left & right side of Headwall
	#13MHW3	9	#13M	5	1.895	0.994	16.948	Top stirrup bars in Headwall
	#13MHW4	9	#13M	5	2.300	0.994	20.576	Bottom stirrup bars in Headwall
	#16MHW5	2	#16M	1	4.038	1.552	12.535	Top middle horizontal bars in Headwall
	#16MHW5a	2	#16M	1	4.038	1.552	12.535	Bottom middle horizontal bars in Headwall
	mm	2	#22M	1	4.038	3.042	24.568	Bottom horizontal bars in Headwall
	nn	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall
	pp	4	#22M	4	4.997	3.042	60.807	Vertical bent bars in left & right side of Headwall
	qq	4	#22M	1	3.937	3.042	47.903	Vertical straight bars in left & right side of Headwall
	rr	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall
	ss	2	#22M	1	4.038	3.042	24.568	Top horizontal bars in Headwall

GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARREL 2.438 m x 1.829 m CBC HEADWALL

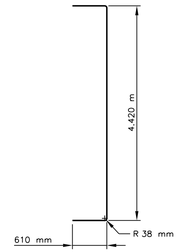
	MARK	No.	SIZE	TYPE	LENGTH Each (m)	kg/m	TOTAL WT (kg)	REMARK
Sta. 0+037.45-N321 Inlet	#16MHW1	16	#16M	3	1.827	1.552	45.368	Bent bars in left & right side of Headwall
	#16MHW1a	6	#16M	1	0.914	1.552	8.511	Straight bars in left & right side of Headwall
	#13MHW2	16	#13M	6	1.767	0.994	28.102	Bent bars in left & right side of Headwall
	#13MHW2a	6	#13M	7	1.767	0.994	10.538	Bent bars in left & right side of Headwall
	#13MHW3	14	#13M	5	1.895	0.994	26.364	Top stirrup bars in Headwall
	#13MHW4	14	#13M	5	2.300	0.994	32.007	Bottom stirrup bars in Headwall
	#16MHW5	2	#16M	1	5.811	1.552	18.036	Top middle horizontal bars in Headwall
	#16MHW5a	2	#16M	1	5.811	1.552	18.036	Bottom middle horizontal bars in Headwall
	mm	2	#22M	1	5.811	3.042	35.351	Bottom horizontal bars in Headwall
	nn	2	#22M	1	5.811	3.042	35.351	Top horizontal bars in Headwall
	pp	4	#22M	4	4.387	3.042	53.383	Vertical bent bars in left & right side of Headwall
	qq	4	#22M	1	3.327	3.042	40.479	Vertical straight bars in left & right side of Headwall
	rr	2	#22M	1	5.811	3.042	35.351	Top horizontal bars in Headwall
	ss	2	#22M	1	5.811	3.042	35.351	Top horizontal bars in Headwall
	MARK	No.	SIZE	TYPE	LENGTH Each (m)	kg/m	TOTAL WT (kg)	REMARK
Sta. 0+037.45-N321 Outlet	#16MHW1	16	#16M	3	1.827	1.552	45.368	Bent bars in left & right side of Headwall
	#16MHW1a	6	#16M	1	0.914	1.552	8.511	Straight bars in left & right side of Headwall
	#13MHW2	16	#13M	6	1.767	0.994	28.102	Bent bars in left & right side of Headwall
	#13MHW2a	6	#13M	7	1.767	0.994	10.538	Bent bars in left & right side of Headwall
	#13MHW3	14	#13M	5	1.895	0.994	26.364	Top stirrup bars in Headwall
	#13MHW4	14	#13M	5	2.300	0.994	32.007	Bottom stirrup bars in Headwall
	#16MHW5	2	#16M	1	5.811	1.552	18.036	Top middle horizontal bars in Headwall
	#16MHW5a	2	#16M	1	5.811	1.552	18.036	Bottom middle horizontal bars in Headwall
	mm	2	#22M	1	5.811	3.042	35.351	Bottom horizontal bars in Headwall
	nn	2	#22M	1	5.811	3.042	35.351	Top horizontal bars in Headwall
	pp	4	#22M	4	4.387	3.042	53.383	Vertical bent bars in left & right side of Headwall
	qq	4	#22M	1	3.327	3.042	40.479	Vertical straight bars in left & right side of Headwall
	rr	2	#22M	1	5.811	3.042	35.351	Top horizontal bars in Headwall
	ss	2	#22M	1	5.811	3.042	35.351	Top horizontal bars in Headwall
						TOTAL	2,486.104	



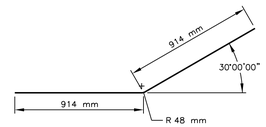
Type 1 Straight Bars



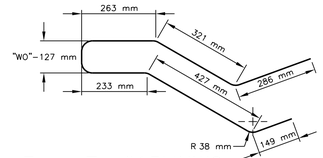
Type 6: #13MHW2 bar



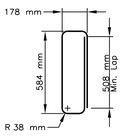
Type 4: pp #22M bar



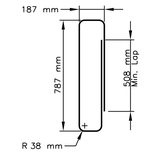
Type 3: #16MHW1 bar



Type 7: #13MHW2a bar

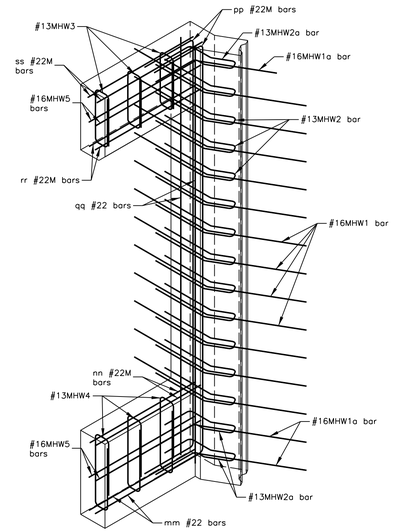


Type 5: #13MHW3 bar



Type 5: #13MHW4 bar

REBAR BENDING DIAGRAM



ISOMETRIC VIEW

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CBC HEADWALL STEEL REINFORCING BAR SCHEDULE

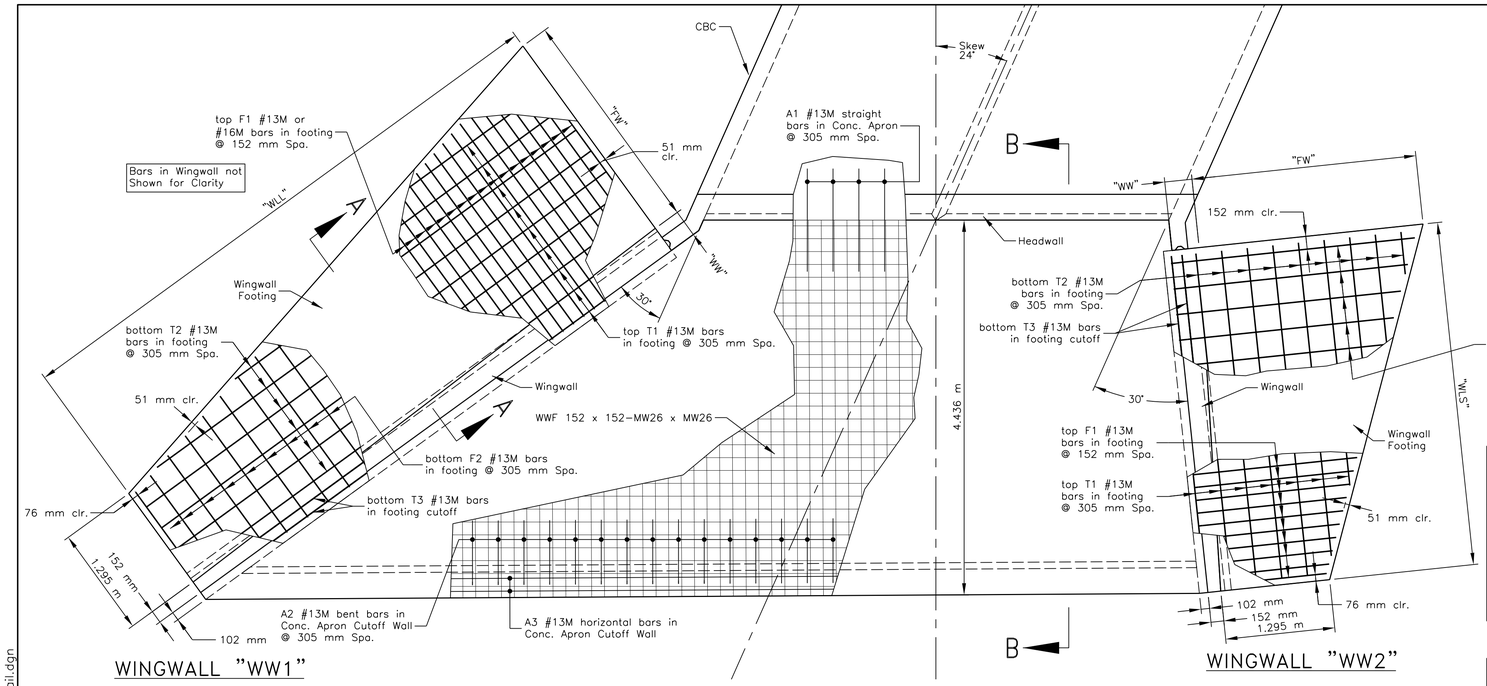
DRAWN BY: NRDOT	DATE: 4/23/2012
DESIGNED BY: NRDOT	DATE: 4/23/2012
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

i:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Snt 39_CBC_HW Bar Sch.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	40	76

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON HIGHWAY FEDERAL PROJECTS (FP-03) AND THE SUPPLEMENTAL SPECIFICATION FOR THIS PROJECT & SPECIAL PROVISIONS.
2. CONCRETE SHALL BE CLASS AA. CHAMFER ALL EDGES OF CONCRETE 19 mm.
3. REINFORCING BARS SHALL CONFORM TO REQUIREMENTS OF AASHTO M 31. REINFORCING BARS SHALL BE GRADE 60. DIMENSIONS SHOWN REFER TO CENTER LINES OF BARS UNLESS NOTED OTHERWISE.
4. MINIMUM SPLICE LENGTH SHALL BE 610 mm ON ALL #13 BARS, AND 762 mm ON ALL #16 BARS. LONGITUDINAL SPLICES SHOULD BE STAGGERED BY A MINIMUM OF TWO TIMES THE SPLICES LENGTH IN ADJACENT BARS. NO SPLICES SHALL BE ALLOWED IN VERTICAL BARS EXCEPT AS SHOWN ON THE DRAWINGS. SPLICES SHALL NOT BE ALLOWED IN TRANSVERSE DIRECTION.
5. R SHALL BE 45 mm FOR #13 BARS AND 57 mm #16 BARS.



WINGWALL "WW1"

WINGWALL "WW2"

PLAN VIEW: WINGWALL, WINGWALL FOOTING & APRON @ OUTLET

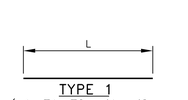
(NOTE: No Concrete Apron @ Inlet)

WINGWALLS "WW1" & "WW2" AND FOOTING DIMENSIONS

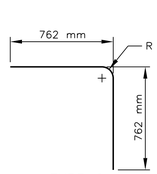
Station	SKEW	"H" (m)	"WW" (mm)	"WF" (mm)	"FW" (m)	"WLL" (m)	"WLS" (m)	REMARKS
13+529.50	0°	2.438	362	483	2.972	5.715	5.715	Inlet Only
0+037.45 (N321)	24°	1.829	324	381	2.667	6.886	4.070	Inlet & Outlet

NOTE: Table Dimensions Shown Are For Slopes Of 1.5:1, For Other Slopes Multipy Table Values Of "WLS" And "WLS" By (Slope/1.5).

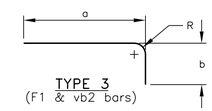
✱See Sheet 34 & 36 Of 76 For "H" Dimension.



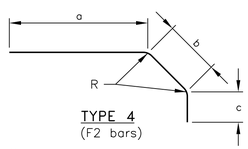
TYPE 1
(A1, T1, T2, vf1, vf2, vb1, vb2, hf1, hb2 bars)



TYPE 2
(A2 bars)



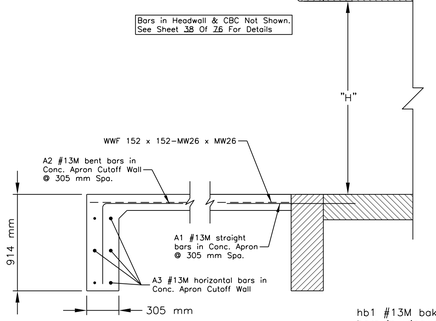
TYPE 3
(F1 & vb2 bars)



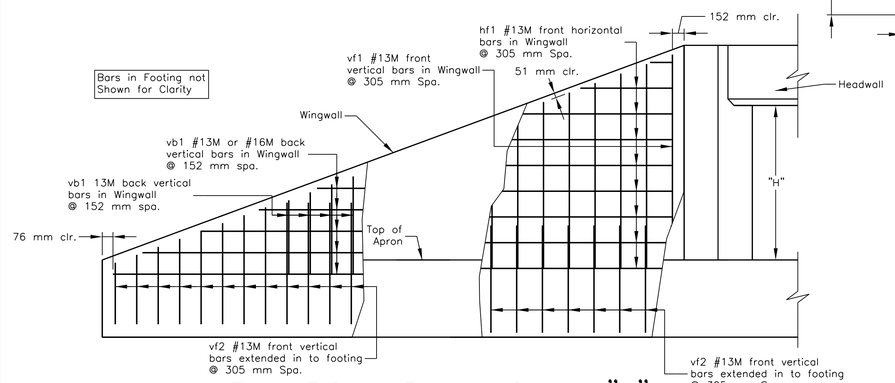
TYPE 4
(F2 bars)

REINFORCING BARS

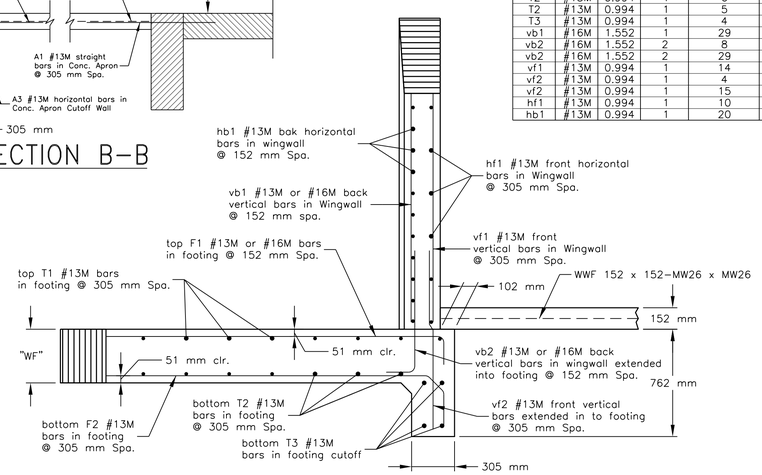
Contractor Shall Be Responsible To Varify All Bar Lengths.



SECTION B-B



ELAVATION VIEW: WINGWALL "A"



SECTION A-A

GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARREL
2.438 m x 1.829 m WINGWALL & FOOTING At Sta. 0+037.45 - N321 (WW1)

Mark	Size	kg/m	Type	No. Req'd	Length Each (m)	Total Wt. (kg)	a*(mm)	b*(mm)	c*(mm)	Remarks:
F1	#13M	0.994	3	45	1.679 to 3.129 (by 34 mm incr.)	106.342	varies	201		Top lateral bars in footing
F2	#13M	0.994	4	23	1.723 to 3.215 (by 683 mm incr.)	56.333	varies	159	240	Bottom lateral bars in footing
T1	#13M	0.994	1	5	0.853 to 6.294 (by 1.360 m incr.)	17.759				Top longitudinal bars in footing
T1	#13M	0.994	1	5	6.734	33.465				Top longitudinal bars in footing
T2	#13M	0.994	1	5	0.853 to 6.294 (by 1.360 m incr.)	17.759				Bottom longitudinal bars in footing
T3	#13M	0.994	1	4	6.734	26.772				Bottom longitudinal bars in footing cutoff
vb1	#13M	0.994	1	37	0.525 to 2.559 (by 57 mm incr.)	56.704				Back vertical bars in wingwall
vb2	#13M	0.994	3	8	0.619 to 1.012 (by 56 mm incr.)	6.483	varies	200		Back vertical bent bars in wingwall/footing
vb2	#13M	0.994	3	37	1.045	38.440	varies	200		Back vertical bent bars in wingwall/footing
vf1	#13M	0.994	1	18	0.623 to 2.531 (by 112 mm incr.)	28.216				Front vertical bars in wingwall
vf2	#13M	0.994	1	5	0.842 to 1.268 (by 112 mm incr.)	5.208				Front vertical bent bars in wingwall/footing
vf2	#13M	0.994	1	18	1.270	22.716				Front vertical bent bars in wingwall/footing
hf1	#13M	0.994	1	9	0.263 to 6.670 (by 826 mm incr.)	31.722				Front horizontal bars in wingwall
hb1	#13M	0.994	1	17	0.327 ti 6.736 (by 413 mm incr.)	61.190				Back horizontal bars in wingwall

GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARREL
2.438 m x 1.829 m WINGWALL & FOOTING At Sta. 0+037.45 - N321 (WW2)

Mark	Size	kg/m	Type	No. Req'd	Length Each (m)	Total Wt. (kg)	a*(mm)	b*(mm)	c*(mm)	Remarks:
F1	#13M	0.994	3	27	1.679 to 3.111 (by 58 mm incr.)	63.395	varies	201		Top lateral bars in footing
F2	#13M	0.994	4	13	1.802 to 3.185 (by 115 mm incr.)	32.223	varies	159	240	Bottom lateral bars in footing
T1	#13M	0.994	1	5	0.503 to 3.727 (by 806 mm incr.)	10.511				Top longitudinal bars in footing
T1	#13M	0.994	1	5	3.928	19.522				Top longitudinal bars in footing
T2	#13M	0.994	1	5	0.503 to 3.727 (by 806 mm incr.)	10.511				Top longitudinal bars in footing
T3	#13M	0.994	1	4	3.928	15.618				Top longitudinal bars in footing cutoff
vb1	#13M	0.994	1	21	0.633 to 2.533 (by 95 mm incr.)	33.049				Back vertical bars in wingwall
vb2	#13M	0.994	3	6	0.619 to 1.012 (by 56 mm incr.)	4.960	varies	200		Back vertical bent bars in wingwall/footing
vb2	#13M	0.994	3	21	1.045	21.818	varies	200		Back vertical bent bars in wingwall/footing
vf1	#13M	0.994	1	11	0.639 to 2.538 (by 190 mm incr.)	17.365				Front vertical bars in wingwall
vf2	#13M	0.994	1	3	0.859 to 1.202 (by 190 mm incr.)	3.054				Front vertical bent bars in wingwall/footing
vf2	#13M	0.994	1	11	1.27	13.882				Front vertical bent bars in wingwall/footing
hf1	#13M	0.994	1	9	0.172 to 3.937 (by 488 mm incr.)	18.874				Front horizontal bars in wingwall
hb1	#13M	0.994	1	17	0.153 to 3.920 (by 244 mm incr.)	35.481				Back horizontal bars in wingwall

GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARREL
2.438 m x 1.829 m WINGWALL & FOOTING At Sta. 0+037.45 - N321 (Apron)

Mark	Size	kg/m	Type	No. Req'd	Length Each (m)	Total Wt. (kg)	a*(mm)	b*(mm)	c*(mm)	Remarks:
A1	0.994	#13M	1	18	1.219	21.814				Straight bars apron/headwall
A1	0.994	#13M	1	1	1.005	0.999				Straight bars apron/headwall
A2	0.994	#13M	2	35	1.507	52.411				Bent bars apron cutoff wall
A2	0.994	#13M	2	1	1.361	1.353				Bent bars apron cutoff wall
A2	0.994	#13M	2	1	1.141	1.135				Bent bars apron cutoff wall
A2	0.994	#13M	2	1	0.922	0.916				Bent bars apron cutoff wall
A3	0.994	#13M	1	3	11.542	34.417				Front horizontal bars in apron cutoff wall
A3	0.994	#13M	1	3	11.314	33.738				Back horizontal bars in apron cutoff wall

GRADE 60 REINFORCING BAR SCHEDULE FOR DOUBLE BARREL
3.658 m x 2.438 m CBC WINGWALL & FOOTING At Sta. 13+529.50 Inlet Only

Mark	Size	kg/m	Type	No. Req'd	Length(m)	Total Wt. (kg)	a*(mm)	b*(mm)	c*(mm)	Remarks:
F1	#16M	1.552	3	38	1.679 to 3.516 (by 50 mm incr.)	152.487	varies	254		Top lateral bars in footing
F2	#13M	0.994	4	19	1.678 to 3.464 (by 102 mm incr.)	48.349	varies	318	328	Bottom lateral bars in footing
T1	#13M	0.994	1	6	0.624 to 5.241 (by 924 mm incr.)	17.487				Top longitudinal bars in footing
T1	#13M	0.994	1	5	5.633	27.646				Top longitudinal bars in footing
T2	#13M	0.994	1	6	0.624 to 5.241 (by 924 mm incr.)	17.487				Bottom longitudinal bars in footing
T2	#13M	0.994	1	5	5.5626	27.646				Bottom longitudinal bars in footing
T3	#13M	0.994	1	4	5.5626	22.117				Longitudinal bars in footing cutoff
vb1	#16M	1.552	1	29	0.800 to 3.150 (by 84 mm incr.)	88.907				Back vertical bars in wingwall
vb2	#16M	1.552	2	8	0.813 to 1.400 (by 84 mm incr.)	13.740	varies	237		Back vertical bent bars in wingwall
vb2	#16M	1.552	2	29	1.4368	64.667	1219	237		Back vertical bent bars in wingwall
vf1	#13M	0.994	1	14	0.925 to 3.108 (by 168 mm incr.)	28.062				Front vertical bars in wingwall
vf2	#13M	0.994	1	4	0.847 to 1.351 (by 168 mm incr.)	4.369				Front vertical bars in wingwall
vf2	#13M	0.994	1	15	1.524	22.723				Front vertical bars in wingwall
hf1	#13M	0.994	1	10	0.739 to 5.563 (by 553 mm incr.)	31.930				Front horizontal bars in wingwall
hb1	#13M	0.994	1	20	0.463 to 5.566 (by 277 mm incr.)	61.305				Back horizontal bars in wingwall

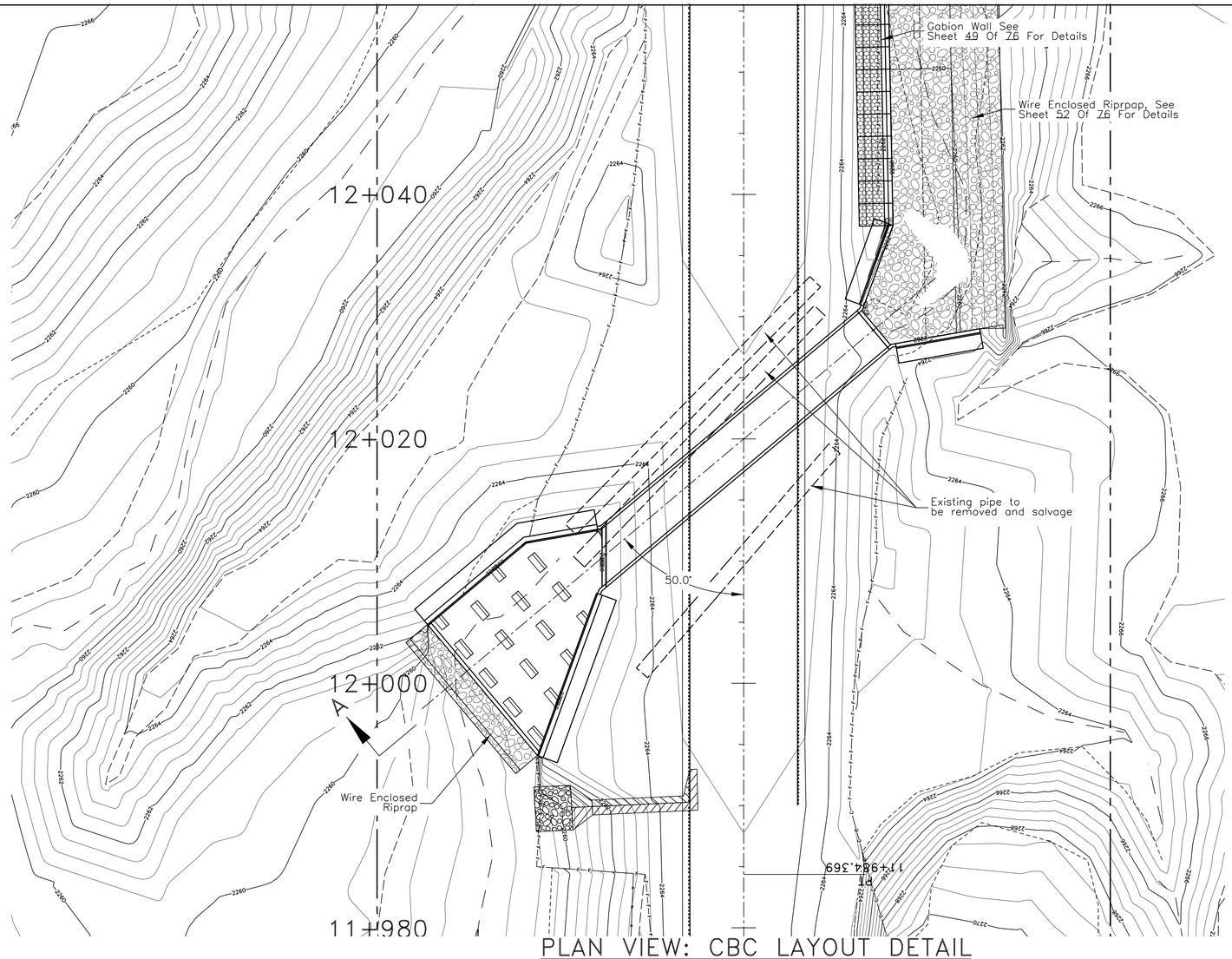
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CBC-HEADWALL,WINGWALL & FOOTING
For Sta. 13+529.50 INLET Only
And Sta. 13+653.97

DRAWN BY: NRDOT	DATE: 4/23/2012
DESIGNED BY: NRDOT	DATE: 4/23/2012
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 40_CBC_WW Detail.dgn

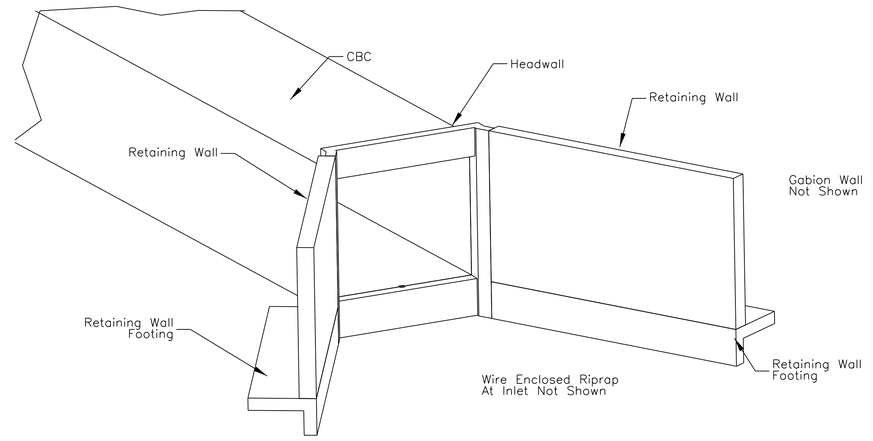
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	41	76



PLAN VIEW: CBC LAYOUT DETAIL
At Sta. 12+020.00

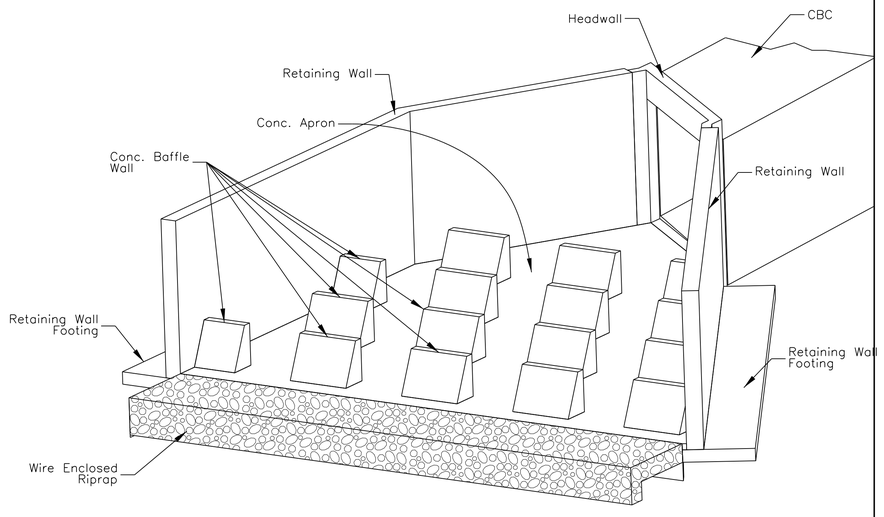
1-Barrel 3.66 m Span x 3.05 m Rise m x 28.55 m CBC
With Concrete Wingwalls, Footing, Apron, Baffle Walls & Retaining Walls
(Scale 1:200)

SECTION A-A:
(Scale 1:200)



ISOMETRIC VIEW: INLET
(NTS)

NOTE: See Sheets 42, 43 And 44 For Additional Notes, Tables And Details.



ISOMETRIC VIEW: OUTLET
(NTS)

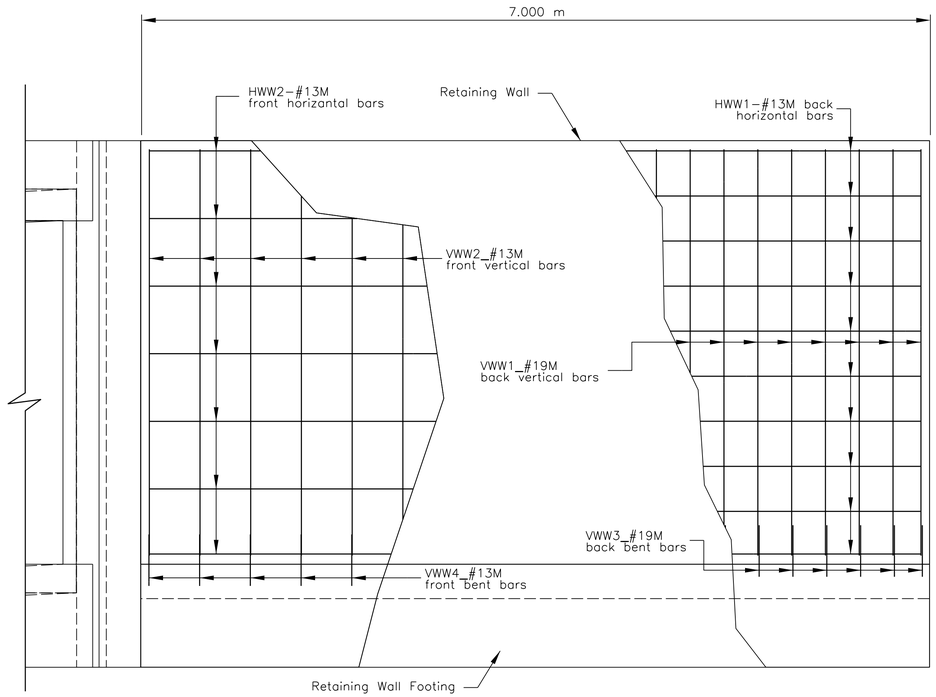
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SINGLE BARREL 3.66 x 3.05 m CBC LAYOUT DETAILS AT Sta. 12+020.00

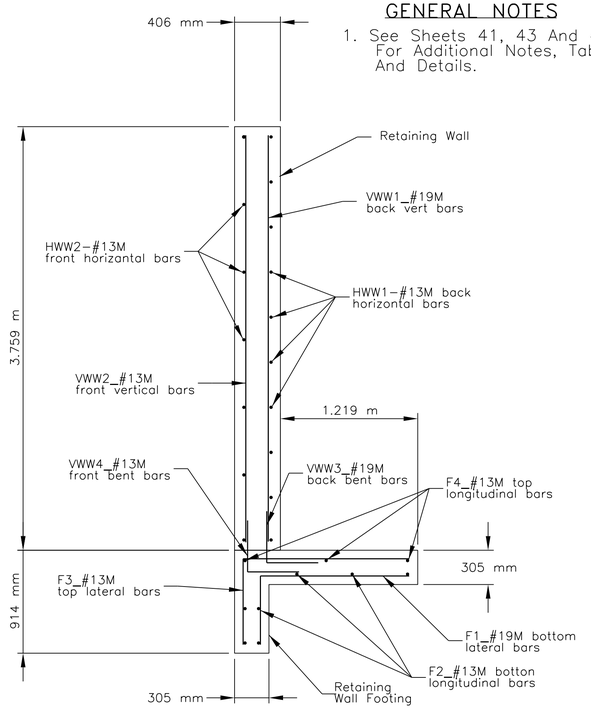
DRAWN BY: NRDOT	DATE: 7/18/2011
DESIGNED BY: NRDOT	DATE: 7/18/2011
REVISED: 8/2/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 41 Sta 12+020 CBC Dtl.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	42	76



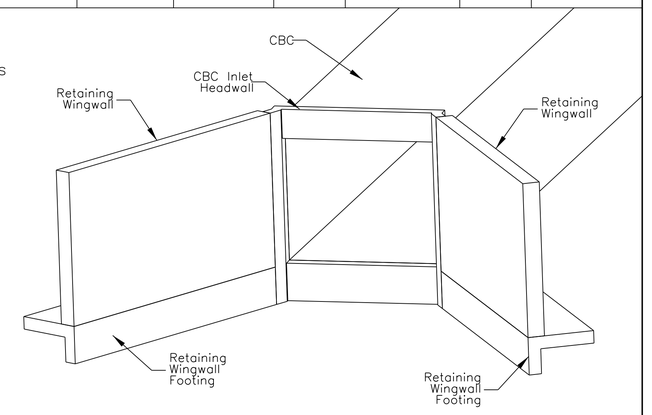
ELEVATION: RETAINING WALL
Sta 12+020.00 CBC INLET
(Scale: 1:25)



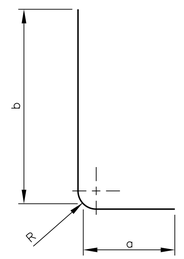
SECTION A–A
(Scale: 1:25)

GENERAL NOTES

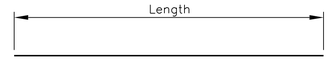
1. See Sheets 41, 43 And 44 For Additional Notes, Tables And Details.



ISOMETRIC VIEW
Sta. 12+020.00 CBC INLET
(NTS)



TYPE 1 BENT BARS
(NTS)



STRAIGHT BARS
(NTS)

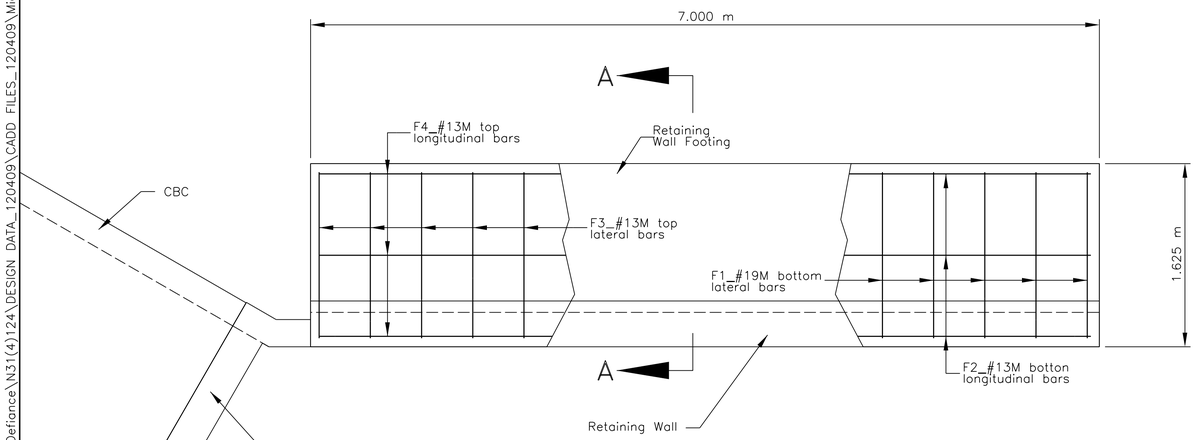
REINFORCING BAR SCHEDULE

Straight reinforcing bars

Mark.	No.	Type	Size	Length Each (m)	kg/m	Total Wt. (kg)	Remarks
F2	5	1	#13M	6.848	0.994	34.035	Botton longitudinal straight bars
F4	5	1	#13M	6.848	0.994	34.035	Top longitudinal straight bars
HWW1	10	1	#13M	6.848	0.994	68.069	Back horizontal straight bars
HWW2	8	1	#13M	6.848	0.994	54.455	Front horizontal straight bars
VWW1	24	1	#19M	3.607	2.235	193.479	Back Vertical straight bars
VWW2	16	1	#13M	3.607	0.994	57.366	Front Vertical straight bars

Bent reinforcing bars

Mark.	No.	Type	Size	Length Each (m)	kg/m	Total Wt. (kg)	a* (mm)	b* (mm)	c* (mm)	d* (mm)	Remarks
F1	24	2	#19M	1.930	2.235	103.514	609	1321			Bottom lateral bent bars
F3	16	2	#13M	2.236	0.994	35.558	762	1474			Top lateral bent bars
VWW3	25	2	#19M	0.914	2.235	51.070	457	457			Back Vertical bent bars
VWW4	16	2	#13M	0.914	0.994	14.536	457	457			Front Vertical bent bars
					SUB–TOTAL	646.117	Per 1 Wall & Footing				
					GRAND–TOTAL	1,292.23	Both Walls & Footings				



PLAN: RETAINING WALL
Sta. 12+020.00 CBC INLET
(Scale: 1:25)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

WINGWALL AND FOOTING
DETAIL FOR STA. 12+020.00

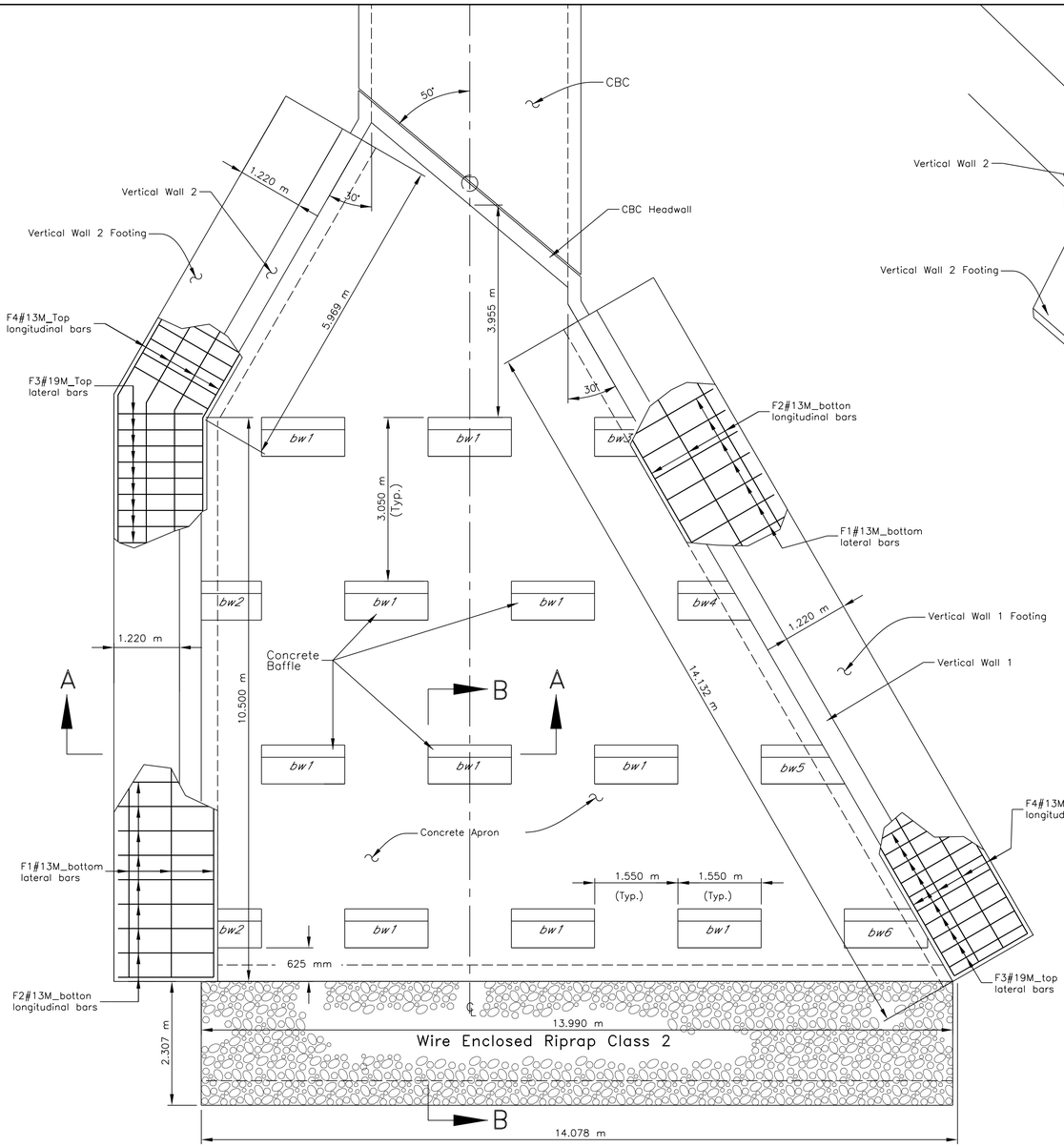
DRAWN BY: NRDOT	DATE: 5/11/2011
DESIGNED BY: NRDOT	DATE: 5/11/2011
REVISED: 7/31/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 42 Retaining Wall Dtl.dgn

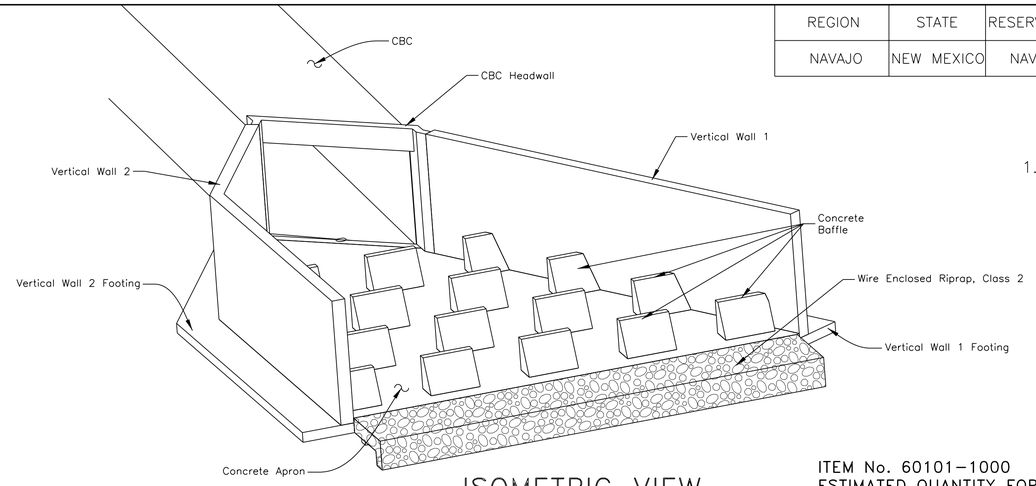
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	43	76

GENERAL NOTES

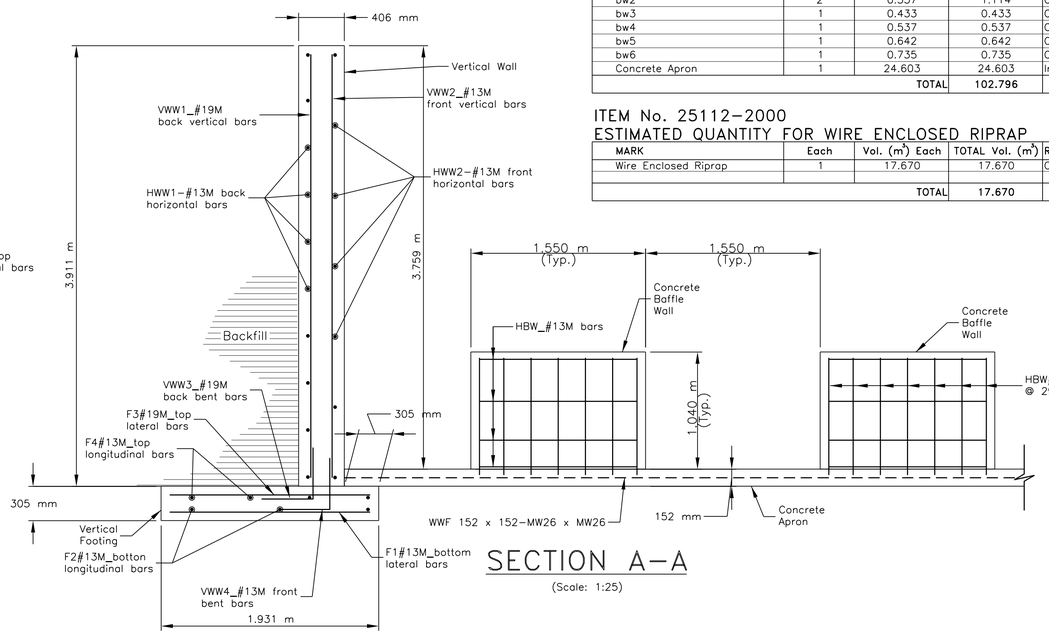
1. See Sheets 41, 42 And 44 For Additional Notes, Tables And Details.



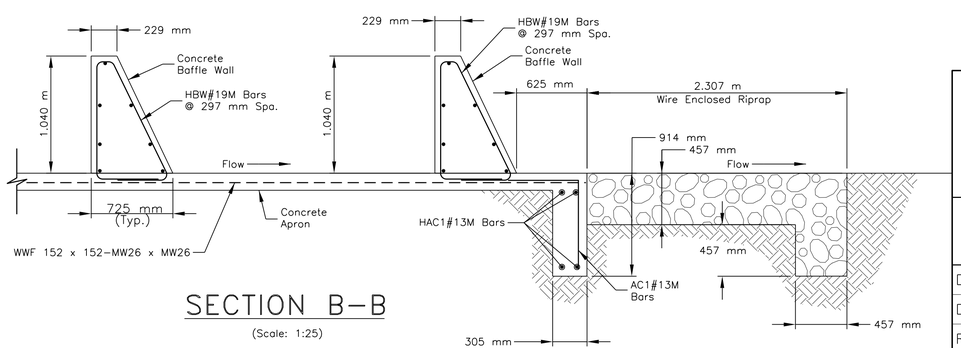
PLAN VIEW
Sta 12+020.00 CBC OUTLET
(Scale: 1:50)



ISOMETRIC VIEW
(NTS)



SECTION A-A
(Scale: 1:25)



SECTION B-B
(Scale: 1:25)

ITEM No. 60101-1000
ESTIMATED QUANTITY FOR CONCRETE

MARK	Each	Vol. (m^3) Each	TOTAL Vol. (m^3)	REMARKS
Vertical Wall 1	1	22.440	22.440	Vertical Wall on CBC Outlet
Vertical Wall 2	1	26.323	26.323	Vertical Wall on CBC Outlet
Vertical Wall 1 Footing	1	8.320	8.320	Footing for Vertical Wall
Vertical Wall 2 Footing	1	9.960	9.960	Footing for Vertical Wall
bw1	10	0.769	7.689	Concrete Baffle Wall
bw2	2	0.557	1.114	Concrete Baffle Wall
bw3	1	0.433	0.433	Concrete Baffle Wall
bw4	1	0.537	0.537	Concrete Baffle Wall
bw5	1	0.642	0.642	Concrete Baffle Wall
bw6	1	0.735	0.735	Concrete Baffle Wall
Concrete Apron	1	24.603	24.603	Including Cutoff Wall
		TOTAL	102.796	

ITEM No. 25112-2000
ESTIMATED QUANTITY FOR WIRE ENCLOSED RIPRAP

MARK	Each	Vol. (m^3) Each	TOTAL Vol. (m^3)	REMARKS
Wire Enclosed Riprap	1	17.670	17.670	Class 2
		TOTAL	17.670	

UNITED STATES DEPARTMENT OF THE INTERIOR
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BAFFLE WALL, APRON, WINGWALL AND WIRE ENCLOSED RIPRAP DETAIL AT STA 12+020 CBC OUTLET

DRAWN BY: NRDOT	DATE: 7/2/2011
DESIGNED BY: NRDOT	DATE: 7/2/2011
REVISED: 10/16/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 43 Conc Baffle & Apron Dtl.dgn

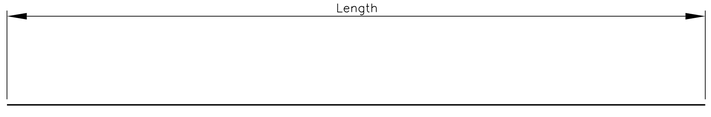
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	44	76

Sta. 12+020.00 CBC OUTLET, CONCRETE VERTICAL WALL, FOOTING BAFFLE WALL AND APRON REIFORCING BAR SCHEDULE

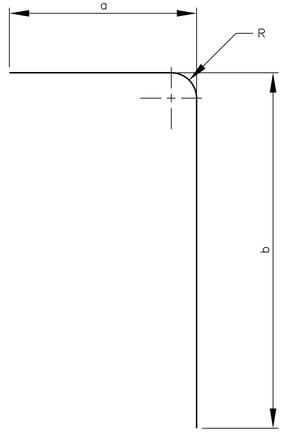
Straight reinforcing bars (Type 1)						Bent reinforcing bars											
mark:	size:	No. req'd	length: +	kg/m	weight (kg):	mark:	size:	type:	No. req'd	length: +	kg/m	weight (kg):	a* (mm)	b* (mm)	c* (mm)	d* (mm)	Remarks:
HBW	#13M	112	1.40	0.994	156.08	BW1	#19M	T10	112	3.25	2.235	813.79	650	1041	137	1171	baffle wall
						WWF						393.00					apron floor; 152x152-MW26xMW26
HAC1	#13M	4	13.68	0.994	54.39	AC1	#13M	2	46	1.41	0.994	64.56	625	787			cutoff wall
VWW1	#19M	56	3.76	2.235	470.60	VWW3	#19M	2	56	0.91	2.235	114.40	457	457			vertical wall-back face; left side
VWW2	#13M	38	3.76	0.994	142.02	VWW4	#13M	2	39	0.91	0.994	35.43	457	457			front face of wall- T&S; left side
HWW1	#13M	10	16.49	0.994	163.91												vertical wall-back; horiz. bars; left side
HWW2	#13M	7	19.49	0.994	135.61												vertical wall-front; horiz. bars; left side
VWW1	#19M	48	3.76	2.235	403.37	VWW3	#19M	2	48	0.91	2.235	98.05	457	457			vertical wall-back face; right side
VWW2	#13M	32	3.76	0.994	119.60	VWW4	#13M	2	32	0.91	0.994	29.07	457	457			front face of wall- T&S; right side
HWW1	#13M	10	13.98	0.994	138.96												vertical wall-back; horiz. bars; right side
HWW2	#13M	7	13.98	0.994	97.27												vertical wall-front; horiz. bars; right side
F1	#13M	37	1.78	0.994	147.11												footing-bottom; left side
F2	#13M	3	17.04	0.994	50.81												footing-bottom; left side
F3	#19M	56	1.78	2.235	99.03												footing-top; T&S; left side
F4	#13M	4	17.04	0.994	67.75												footing-top; T&S; left side
F1	#13M	32	1.78	0.994	127.23												footing-bottom; right side
F2	#13M	3	13.98	0.994	41.69												footing-bottom; right side
F3	#19M	48	1.78	2.235	84.88												footing-top; T&S; right side
F4	#13M	4	13.98	0.994	55.58												footing-top; T&S; right side
				Total	2,555.92						Total	1,548.31					

GENERAL NOTES

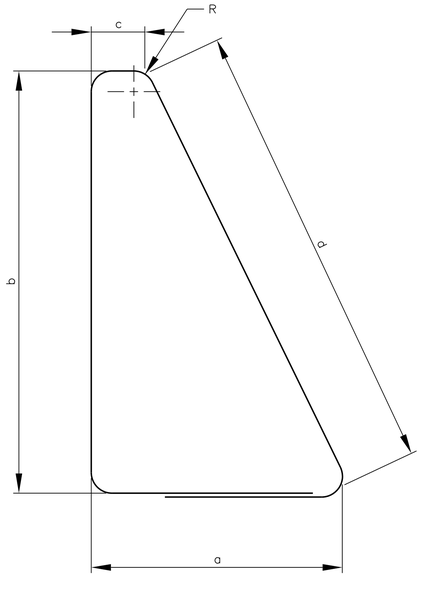
1. See Sheets 41, 42 And 43 For Additional Notes, Tables And Details.



TYPE 1 BAR



TYPE 2 BAR



TYPE T10 BAR

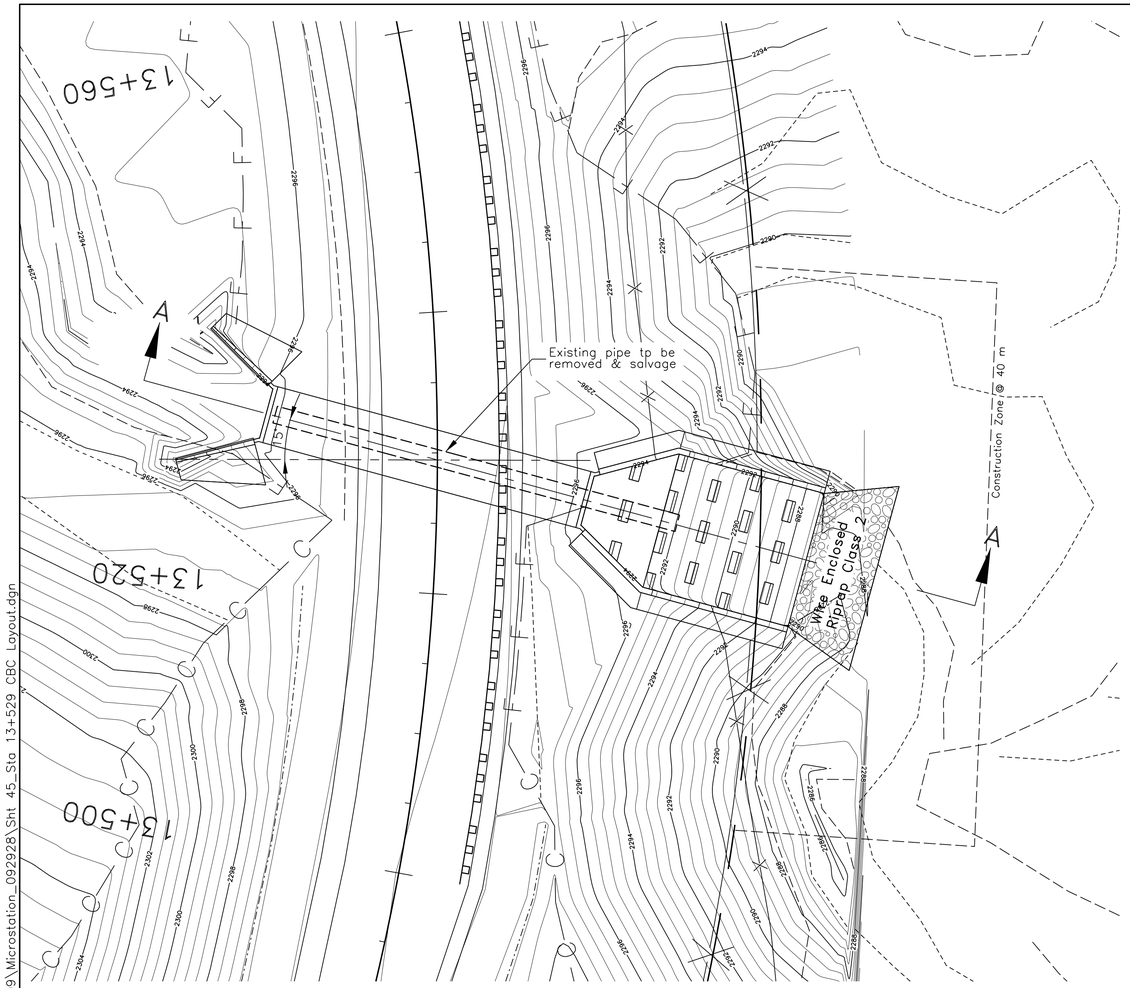
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BAFFLE WALL, WINGWALL, FOOTING & APRON STEEL REBAR SCHEDULE AT Sta. 12+020.00

DRAWN BY: NRDOT	DATE: 7/6/2011
DESIGNED BY: NRDOT	DATE: 7/6/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

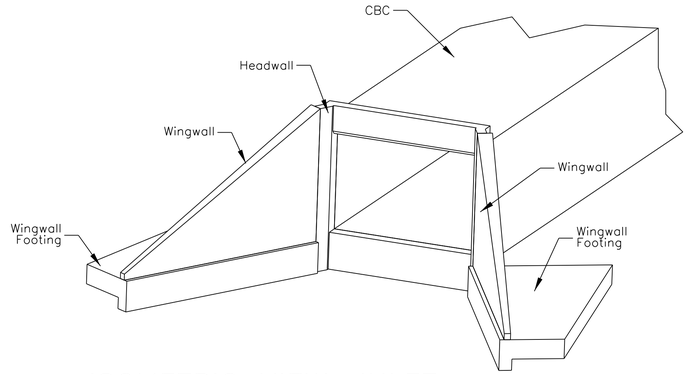
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 44_12+020 WWABFW Bar Sch.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	45	76



PLAN VIEW: CBC LAYOUT DETAIL AT Sta. 13+529.50

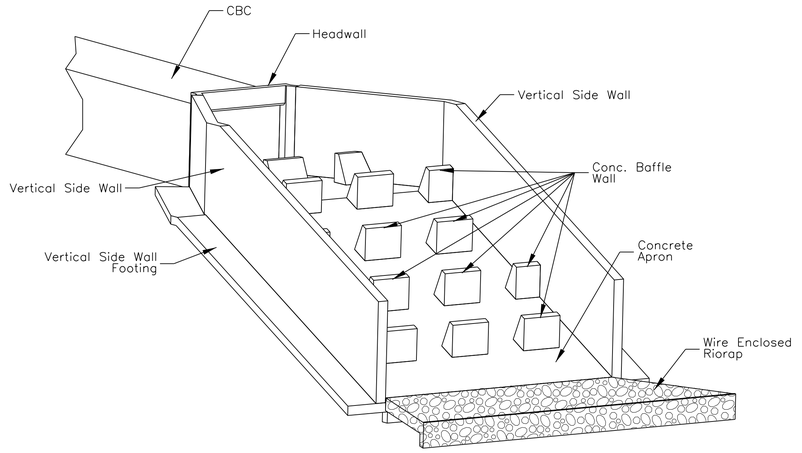
Install 1–Barrel 3.66 m Span x 2.44 m Rise m x 22.23 m CBC
With Wingwall, Footing & Apron on Outlet Side And
Wingwall & Footing On Inlet Side
Skew No. 105.0
(Scale: 1:200)



ISOMETRIC VIEW: INLET

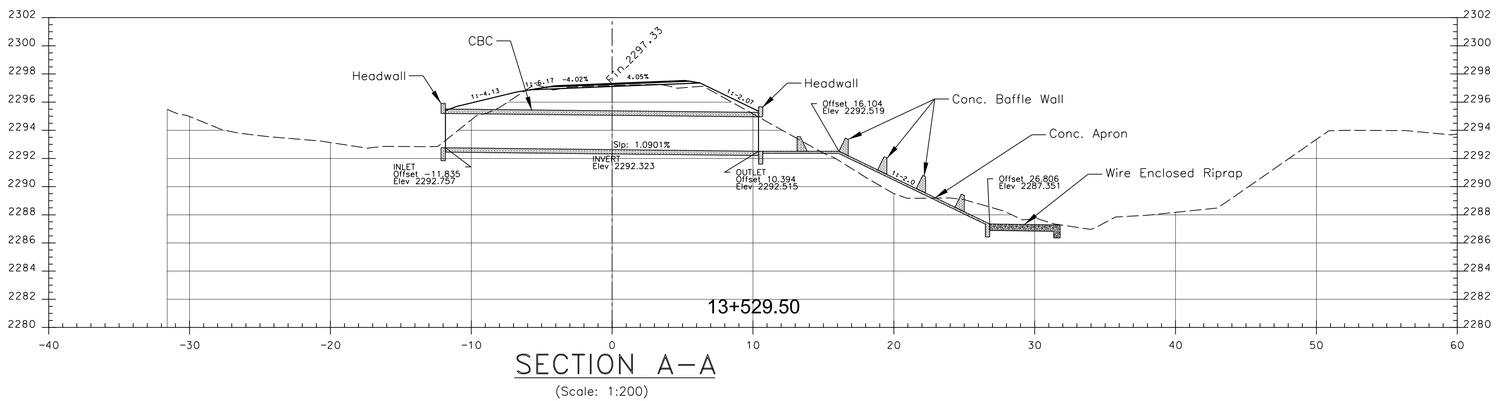
(NTS)

NOTE: See Sheet 39 & 40 of 76 For
Wingwall Details & Rebar And Other Details.



ISOMETRIC VIEW: OUTLET

(NTS)



SECTION A–A

(Scale: 1:200)

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SINGLE BARREL 3.66 X 2.44 CBC LAYOUT DETAIL @ 13+529.50

DRAWN BY: NRDOT	DATE: 2/23/2010
DESIGNED BY: NRDOT	DATE: 2/23/2010
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 45_Sta 13+529 CBC Layout.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	46	76

GENERAL NOTES

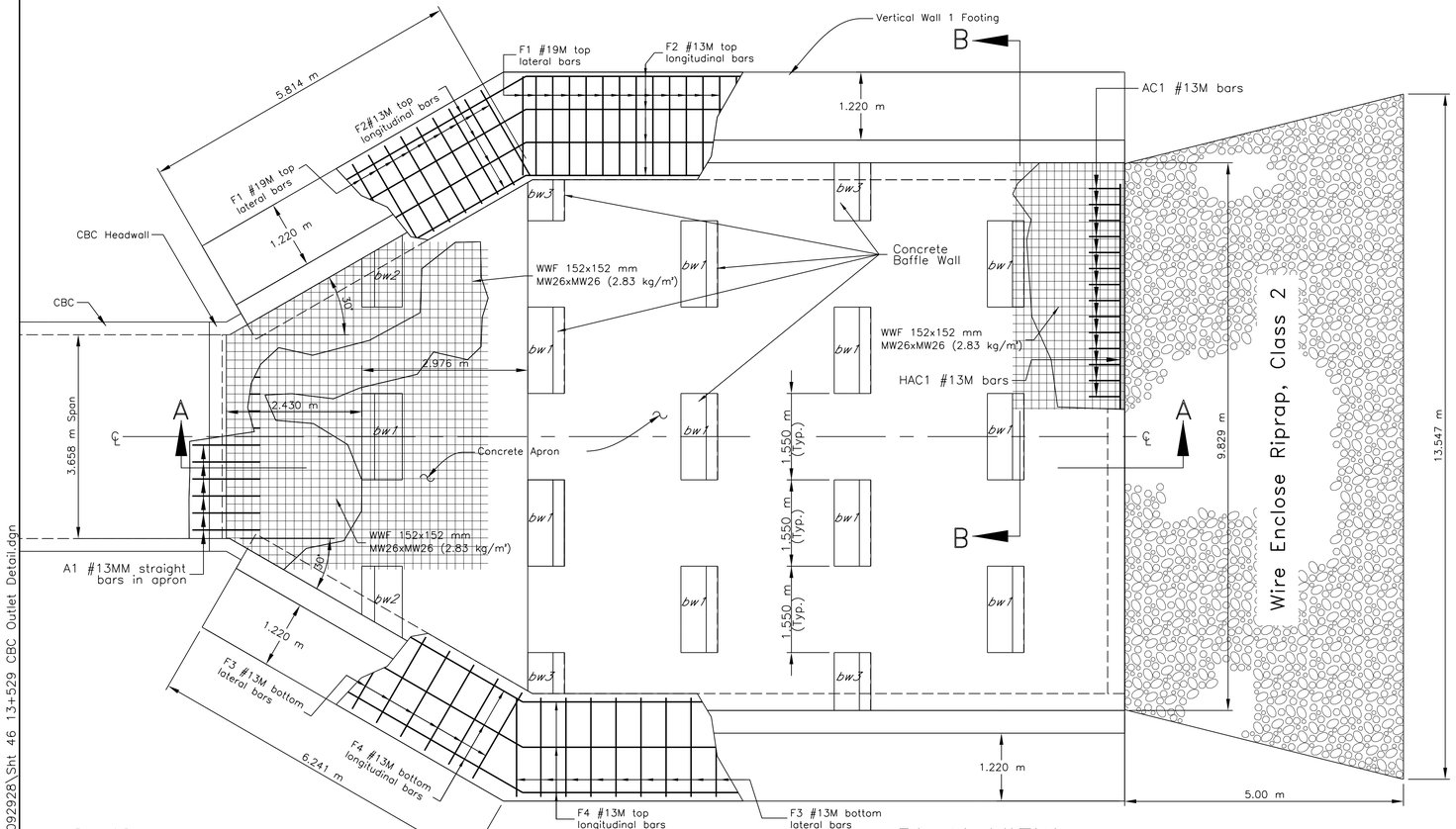
See Sheets 34,35,39,40,45 & 47 For More Details or Additional Notes.

ITEM No. 60101-1000
ESTIMATED QUANTITY FOR CONCRETE

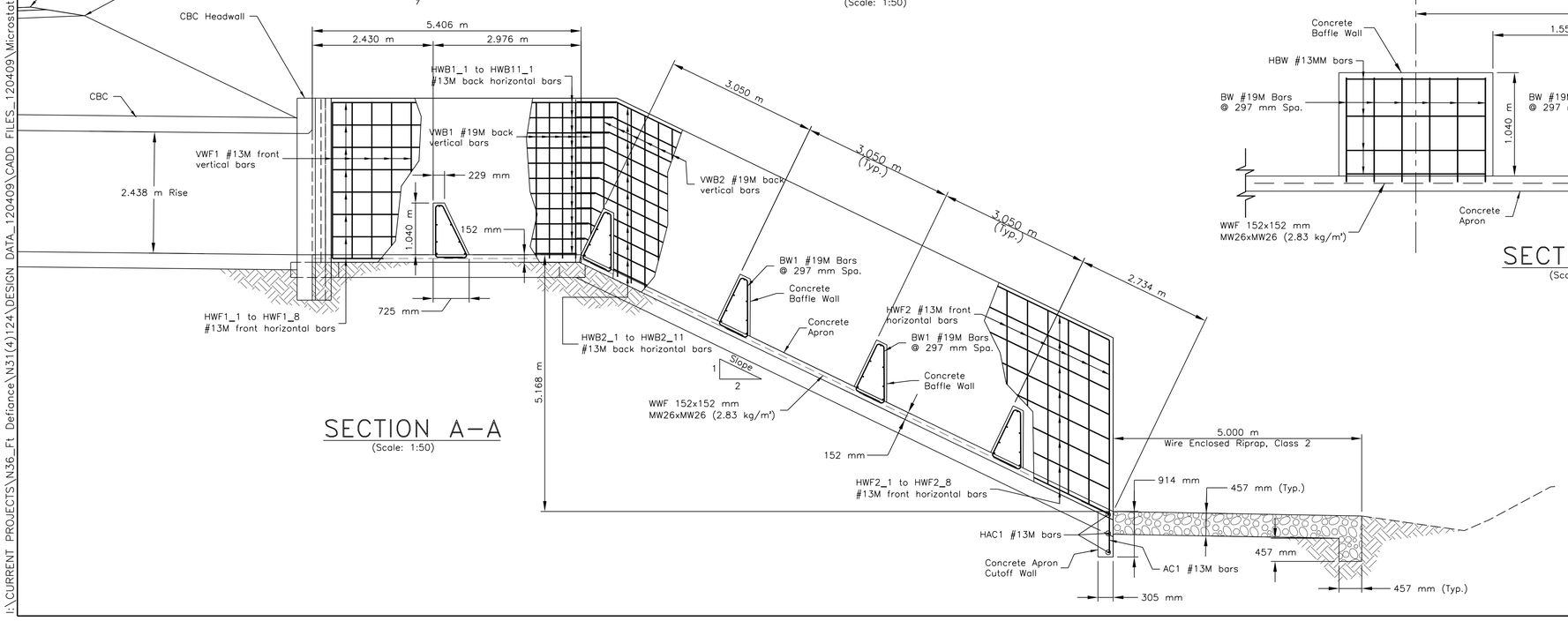
MARK	Each	Vol. (m^3) Each	TOTAL Vol. (m^3)	REMARKS
Vertical Wall	2	23.807	47.614	Vertical Wall on CBC Outlet
Vertical Wall Footing	2	10.629	21.258	Footing for Vertical Wall
bw1	11	0.769	8.458	Concrate Baffle Wall
bw2	2	0.507	1.013	Concrate Baffle Wall
bw3	4	0.516	2.062	Concrate Baffle Wall
Concrete Apron	1	25.572	25.572	Including Cutoff Wall
		TOTAL	105.978	

ITEM No. 25112-2000
ESTIMATED QUANTITY FOR WIRE ENCLOSED RIPRAP

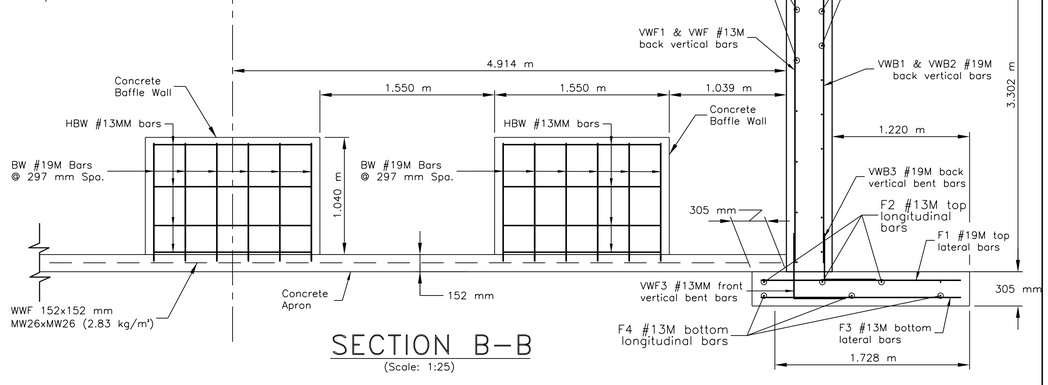
MARK	Each	Vol. (m^3) Each	TOTAL Vol. (m^3)	REMARKS
Wire Enclosed Riprap	1	30.000	30.000	Class 2
		TOTAL	30.000	



PLAN VIEW:
(Scale: 1:50)



SECTION A-A
(Scale: 1:50)



SECTION B-B
(Scale: 1:25)

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BAFFLE WALL, APRON, WINGWALL AND FOOTING DETAIL AT Sta 13+529.50 CBC OUTLET

DRAWN BY: NRDOT	DATE: 4/29/2013
DESIGNED BY: NRDOT	DATE: 4/29/2013
REVISED: 5/21/2013	BY: Allen.Nakaidinae
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 46 13+529 CBC Outlet Detail.dgn

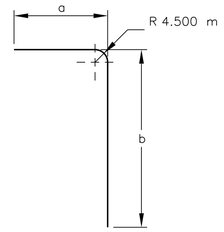
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	47	76

Sta. 13+529.50, CBC OUTLET CONCRETE WINGWALL, FOOTING WAFFLE WALL AND APRON REINFORCING BAR SCHEDULE

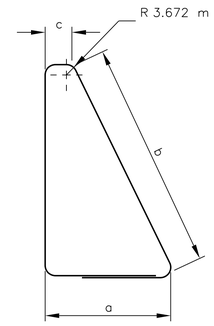
STRAIGHT REINFORCING BARS							BENT REINFORCING BARS									
MARK	SIZE	TYPE	No. req'd	LENGTH (m)	kg/m	Wt. (kg)	SIZE	TYPE	No. req'd	LENGTH (m)	kg/m	Wt. (kg)	a* (mm)	b* (mm)	c* (mm)	d* (mm)	REMARKS
A1	#13M	1	12	1.219	0.994	14.54											straight bars in headwall & apron
HBW	#13M	1	119	1.398	0.994	165.36											horizontal bars in baffle wall
HAC1	#13M	1	3	9.068	0.994	27.04											horizontal bars in apron cutoff wall
BW1							#19M	T10	90	3.251	2.235	653.939	650	1041	137	1171	bent bars in baffle wall
AC1							#13M	3	32	1.415	0.994	45.015	625	790			bent bars in apron cutoff wall
HBW1							#13M	3	22	6.610	0.994	144.55	792	5.818 m			horizontal back bent bars
HBW2							#13M	3	24	11.811	0.994	281.76	792	11.019 m			horizontal back bent bars
HFW1							#13M	3	16	6.473	0.994	102.95	724	5.750 m			horizontal front bent bars
HFW2							#13M	3	16	11.743	0.994	186.76	724	11			horizontal front bent bars
VWB1	#19M	1	40	3.150	2.235	281.57											vertical back bars
VWB2	#19M	1	70	3.498	2.235	547.20											vertical back bars
VWB3							#19M	2	110	0.914	2.235	224.707	457	457			back vertical bent bars
VWF1	#13M	1	26	3.150	0.994	81.40											vertical front bars
VWF2	#13M	1	48	3.498	0.994	166.88											vertical front bars
VWF3							#13M	2	74	1.067	0.994	78.484	610	457			front vertical bent bars
F1	#19M	1	110	1.780	2.235	437.61											top lateral bars in footing
F2_1							#13M	2	2	17.430	0.994	34.65	5.58 m	11.85 m			top longitudinal bent bars in footing
F2_2							#13M	2	2	17.730	0.994	35.25	5.88 m	11.85 m			top longitudinal bent bars in footing
F2_3							#13M	2	2	18.020	0.994	35.82	6.18 m	11.85 m			top longitudinal bent bars in footing
F2_4							#13M	2	2	18.320	0.994	36.42	6.47 m	11.85 m			top longitudinal bent bars in footing
F3	#13M	1	74	1.780	0.994	130.93											bottom lateral bars in footing
F4_1							#13M	3	2	17.480	0.994	34.75	5.57 m	11.91 m			bottom longitudinal bent bars in footing
F4_2							#13M	3	2	18.890	0.994	37.55	5.98 m	11.91 m			bottom longitudinal bent bars in footing
F4_3							#13M	3	2	18.300	0.994	36.38	6.39 m	11.91 m			bottom longitudinal bent bars in footing
					SUB-TOTAL	1,852.54					SUB-TOTAL	1,968.99					
											GRAND TOTAL	3,821.53					

WWF: WOVEN WIRE FABRIC

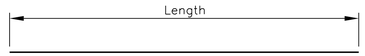
MARK	AREA (m^2)	kg/m^2	Wt. (kg)	REMARKS
MW26xMW26	142.760	2.830	404.011	
		TOTAL	404.011	



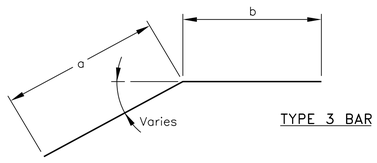
TYPE 2 BAR



TYPE T10 BAR



TYPE 1 BAR



TYPE 3 BAR

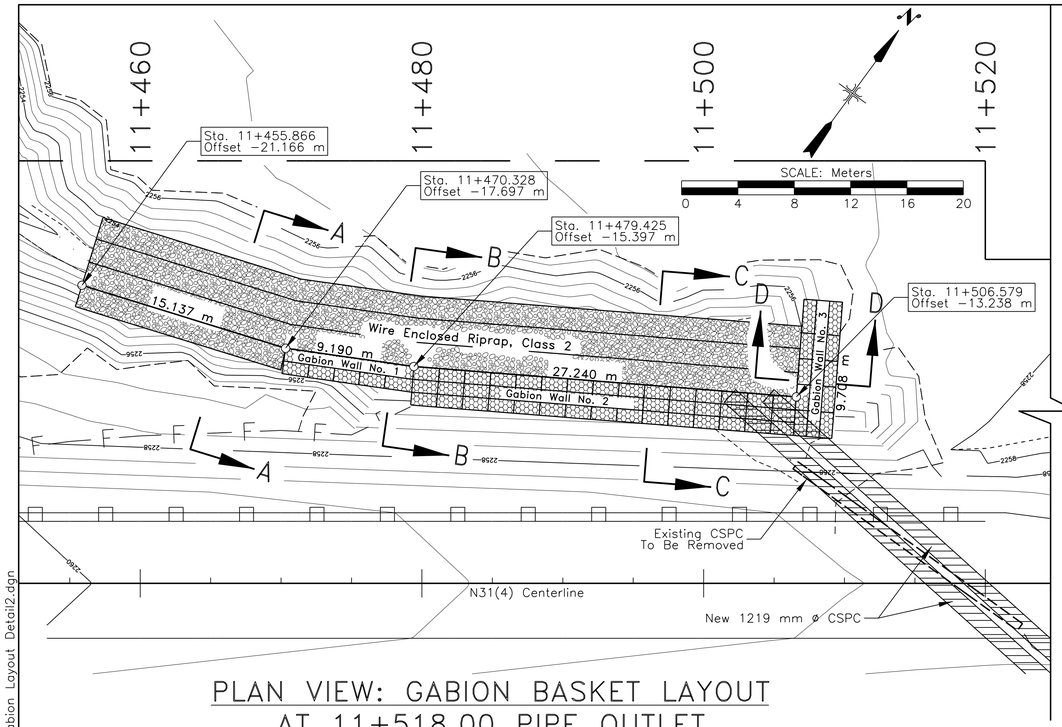
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BAFFLE WALL, WINGWALL, WINGWALL FOOTING AND APRON STEEL REINFORCING BAR SCHEDULE

DRAWN BY: NRDOT	DATE: 8/19/2011
DESIGNED BY: NRDOT	DATE: 8/19/2011
REVISED: 2/1/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 47_13+529 WWABFW Bar Sch.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	48	76



PLAN VIEW: GABION BASKET LAYOUT AT 11+518.00 PIPE OUTLET

GABION WALL LAYOUT TABLE

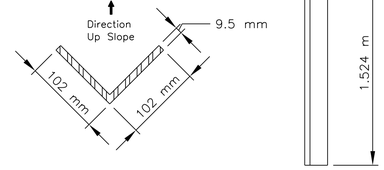
Station	Offset (m)	Length (m)	Vol. (m^3)	Remarks
11+470.328	−17.697			
		9.190	23.030	GABION WALL No. 1
11+479.425	−15.397			
		27.240	136.540	GABION WALL No. 2
15+506.579	−13.238			
15+506.579	−10.495	9.708	48.660	Gabion Wall No. 3, Perpendicular to Gabion Wall No. 2
	Total	46.138	208.230	

WIRE ENCLOSED RIPRAP (Under Gabion Wall) & AS DITCH LINING − 25112−2000

Station	Location	Length (m)	Vol. (m^3)	Remarks
14+455.866				
	Lt.	15.137	51.110	
11+470.328				
	Lt.	9.190	29.750	Part of Riprap Under Gabion No. 1
11+479.425				
	Lt.	27.240	101.900	Part of Riprap Under Gabion No. 2
11+506.579				
11+506.579	Lt.	9.708	12.150	Under Gabion Wall No. 3, Perpendicular to Gabion Wall No. 2
	Total	**9.708**	**194.910**	

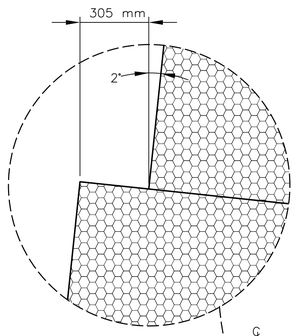
GENERAL NOTES

See Sheet 52 of 76 For Enclosed Riprap Notes.

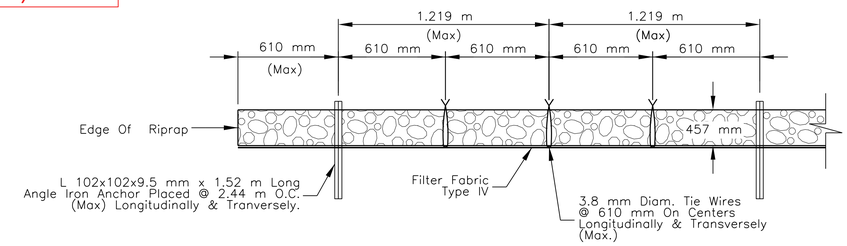


ANGLE IRON ANCHOR DETAIL

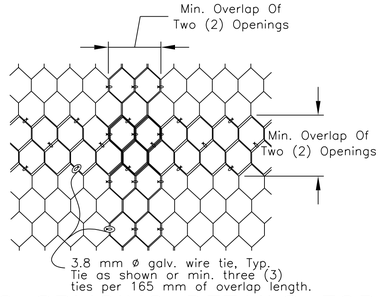
REVISED: 9/5/2013



DETAIL−D3
(NTS)



ACHORING DETAILS FOR WIRE ENCLOSED RIPRAP APRON



FABRIC SPLICING DETAILS FOR WIRE ENCLOSED RIPRAP APRON

SECTION A−A

SECTION D−D

SECTION B−B

SECTION C−C

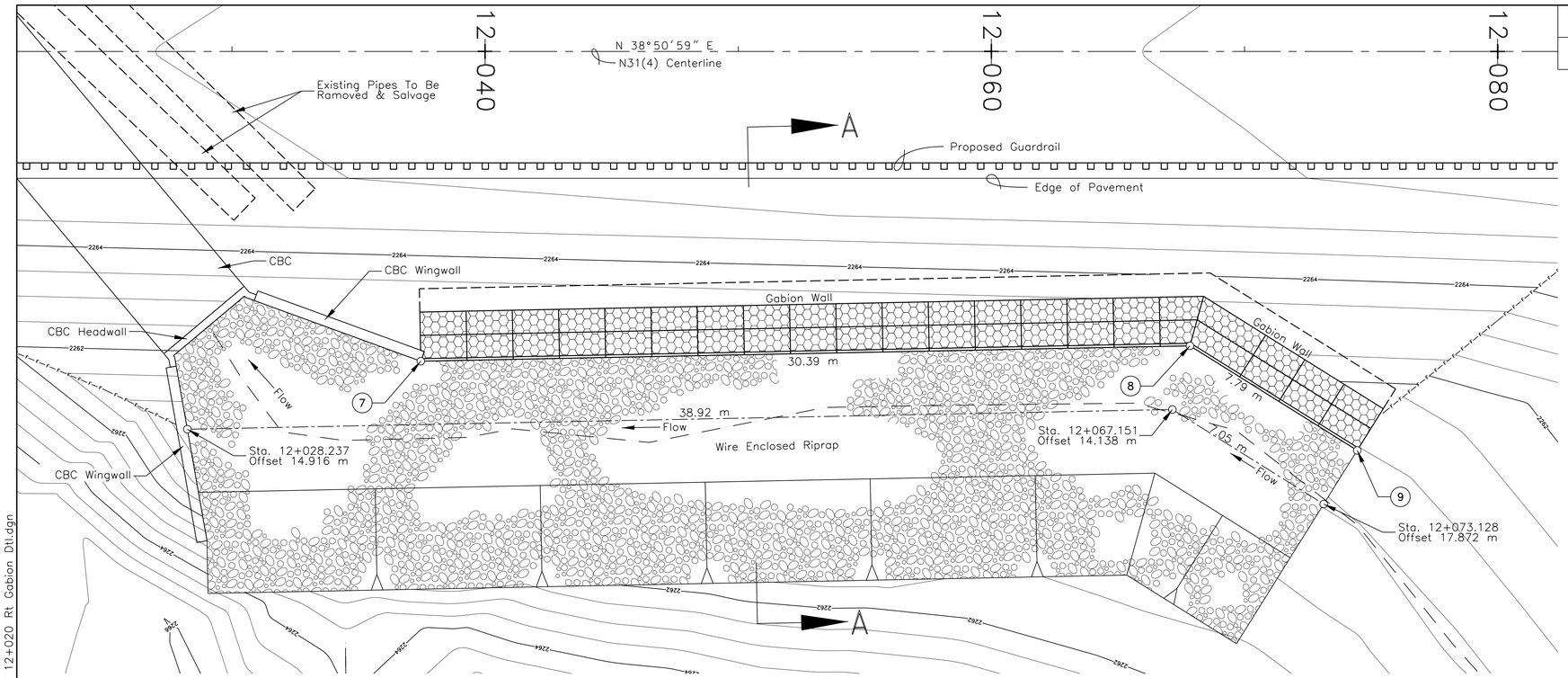
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GABION WALL DETAIL FOR EMBANKMENT PROTECTION, 11+518.00

DRAWN BY: NRDOT	DATE: 7/20/2011
DESIGNED BY: NRDOT	DATE: 7/20/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 48_N31 Gabion Layout Detail2.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	49	76



PLAN VIEW: GABION WALL LAYOUT

(Scale 1:100)

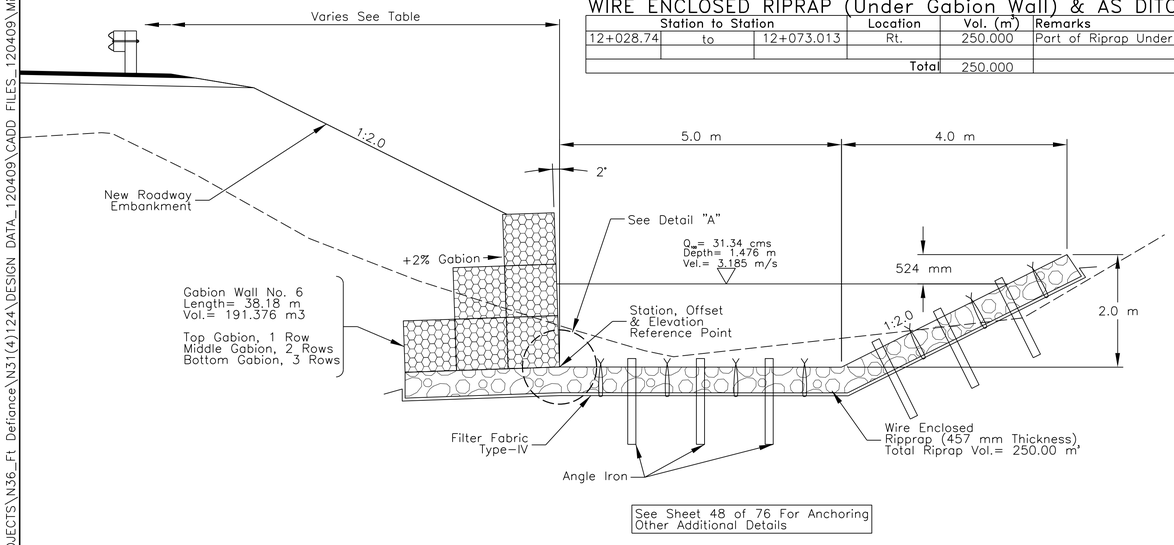
REVISED: 9/5/2013

GABION WALL LOCATION ON RIGHT

Mark	Station	Offset (m)	Northing	Easting	Elevation	Vol. (m³)	Remarks
7	12+037.461	12.231	731,423.786	549,705.195	2,259.841		Begin Gabion Wall
						152.330	
8	12+067.845	11.623	731,442.372	549,729.240	2,260.211		
						39.046	
9	12+074.452	15.752	731,449.732	549,731.796	2,260.298		End of Gabion Wall
					Total	191.376	

WIRE ENCLOSED RIPRAP (Under Gabion Wall) & AS DITCH LINING – 25112-2000

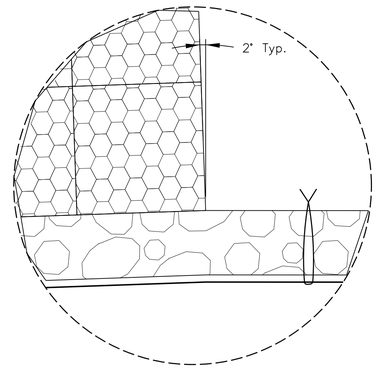
Station to Station			Location	Vol. (m³)	Remarks
12+028.74	to	12+073.013	Rt.	250.000	Part of Riprap Under Gabion No. 6
			Total	250.000	



See Sheet 48 of 76 For Anchoring Other Additional Details

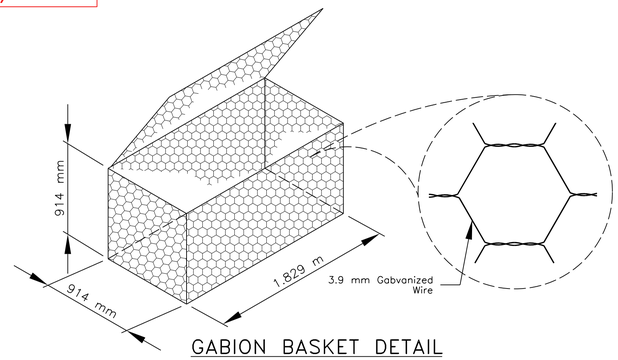
SECTION A–A

(Scale 1:100)



DETAIL "A"

(NTS)



GABION BASKET DETAIL

(nts)

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS OR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) ALONG WITH ALL SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. THE QUANTITIES SHOWN ARE ONLY AN ESTIMATE. ACTUAL QUANTITIES SHALL BE DETERMINED IN THE FIELD. THE CONTRACTOR WILL BE REQUIRED TO MAKE ANY NECESSARY ADJUSTMENTS IN THE FIELD TO MATCH EXISTING FIELD CONDITIONS. THESE FIELD ADJUSTMENTS ARE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
3. GABION MATERIAL SHALL BE RECTANGULAR, COMPARTMENTED CONTAINERS FABRICATED FROM STYLE 1 DOUBLE-TWISTED HEXAGONAL MESH OF GALVANIZED STEEL WIRE.
4. WIRE SHALL CONFORM TO ASTM A-691, GALVANIZED STEEL WIRE, SOFT TEMPER. MESH OPENING OF 83 mm x 114 mm.

   MESH WIRE_____3.05 mm dia.
   WIRE FOR NETTING:_____3.00 mm dia.
   WIRE FOR SELVEDGES & CORNERS:_____3.80 mm dia.
   WIRE FOR BINDING: _____2.20 mm dia.
   ZINC COATING:_____260 g/m²
5. GABIONS SHALL BE PLACED TO THE DETAIL SHOWN. IF UNSUITABLE MATERIAL IS FOUND AT THE FOOTING LOCATION AND ELEVATIONS, THE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED SELECTED BACKFILL AS DESIGNED BY THE C.O.R. ALL SELECTED BACKFILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99 METHOD C, BEFORE AND AFTER FOOTINGS ARE PLACED. THE STRUCTURAL BACKFILL MATERIAL SHALL CONFORM TO AASHTO "A-2-4" SOIL CLASS OR BETTER. THIS WORK AND MATERIAL SHALL BE CONSIDERED INCIDENTAL TO ITEM 25302-1000.
6. ALL FOOTING EXCAVATIONS SHALL BE INSPECTED AND APPROVED BY THE C.O.R. PRIOR TO PLACEMENT OF FORMS, WELDED WIRE FABRIC, HARDWARE AND SUBSEQUENT CONCRETE. ALL FOOTINGS EXCAVATIONS SHALL BE KEPT FREE OF WATER AT ALL TIMES.
7. BACK SLOPES RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE PLANS AND AS DIRECTED BY THE C.O.R. ANY WASTE MATERIAL SHALL BE USED AS BORROW WHERE NEEDED IN OTHER PROJECT LOCATIONS AS DESIGNATED AND APPROVAL BY THE C.O.R. ALL BACK SLOPES EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
8. ALL STONE FOR WIRE ENCLOSED RIPRAP TO BE CLASS 2 MEETING THE GRADING REQUIREMENTS OF TABLE 705-1, AND SECTION 705 OF THE FP-03
9. WARP EXISTING CUT BACK SLOPES AROUND ENDS OF GABION WALLS AND COMPACT SO THAT THE ENDS OF THE GABION STRUCTURE ARE BURIED INTO THE CUT BACK SLOPES. THIS WORK IS AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.
10. FILTER FABRIC SHALL CONFORM TO SECTION 207 AND 714.01(a) OF THE FP-03 FOR TYPE 1V-B MATERIAL AND SHALL BE INCLUDED INTHE UNIT PRICE FOR ITEM 25302-1000.
11. AT PIPE LOCATION, THE GABION WALL SHALL REMAIN OPEN TO WIDTH OF PIPE DIAMETER AS SHOWN. CONTRACTOR CUT OUT AND FABRICATE & PLACE 3 mm ALLUMINUM PLATE AROUND THE PIPE ON BACK SIDE OF GABION WALL AS SHOWN BEFORE BACK FILLING.

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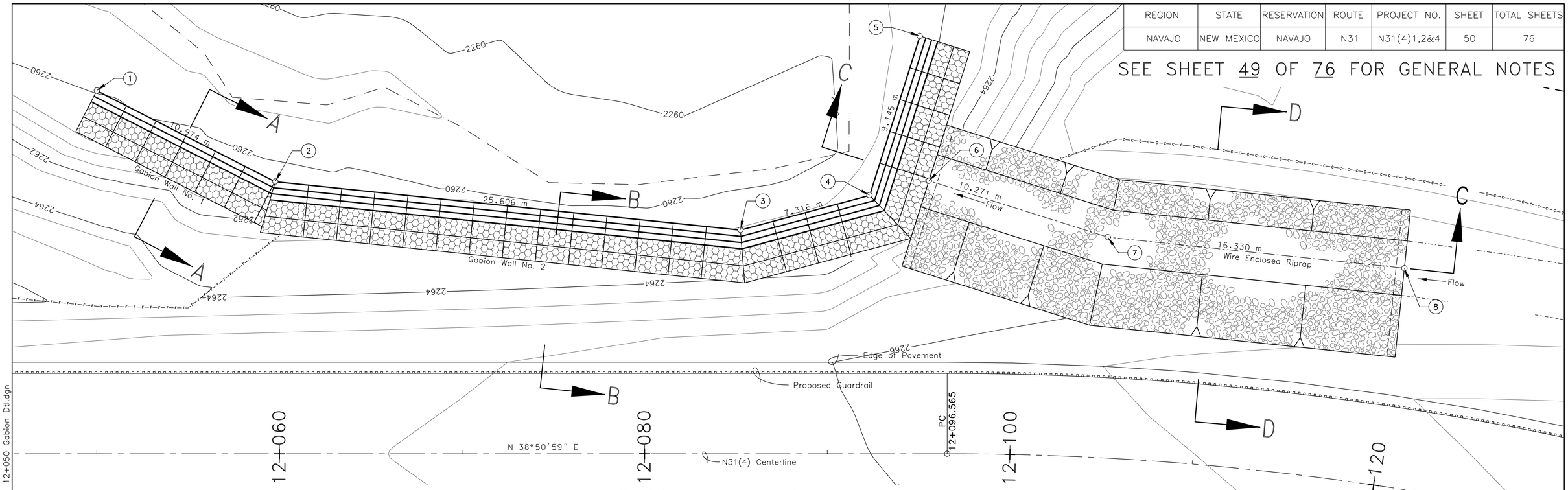
GABION WALL LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 7/20/2011
DESIGNED BY: NRDOT	DATE: 7/20/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 49 Sta 12+020 Rt Gabion Dtl.dgn

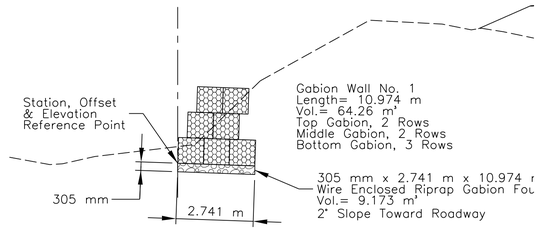
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	50	76

SEE SHEET 49 OF 76 FOR GENERAL NOTES



PLAN VIEW: GABION WALL AND WIRE ENCLOSED RIPRAP LAYOUT DETAIL

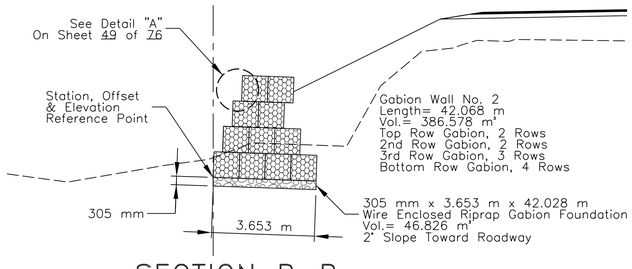
(Scale 1:100)



SECTION A–A

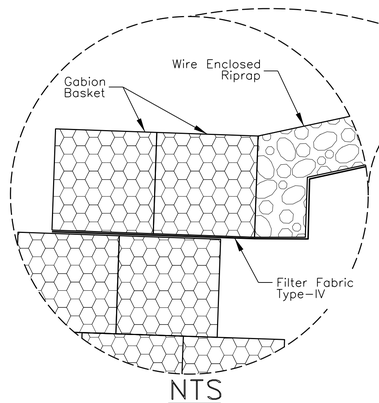
(Scale 1:100)

See Sheet 49 of 76 For Additional Gabion Basket Details

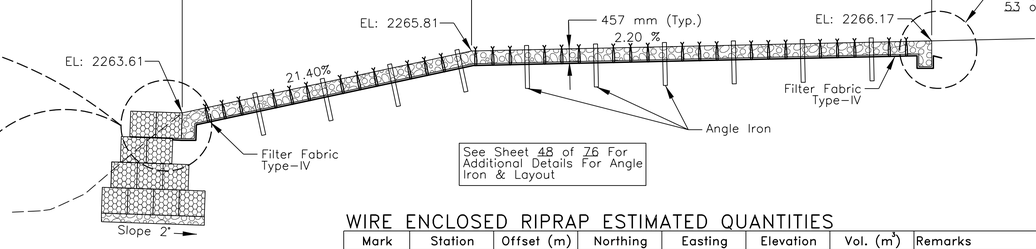


SECTION B–B

(Scale 1:100)



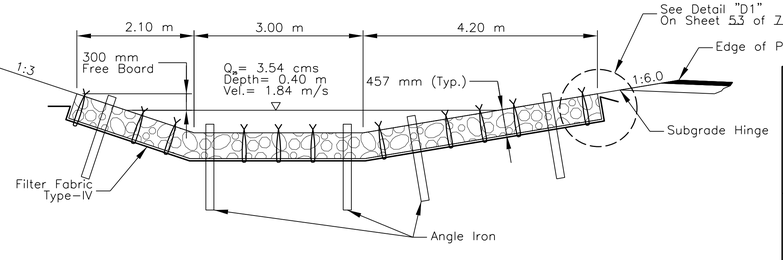
NTS



See Sheet 48 of 76 For Additional Details For Angle Iron & Layout

SECTION C–C

(Scale 1:100)



See Sheet 48 of 76 For Additional Details For Angle Iron & Layout

SECTION D–D

Scale 1:200

GABION WALL LOCATION ON LEFT

Mark	Station	Offset (m)	Elevation	Northing	Easting	Gabion Vol. (m³)	Riprap Vol. (m³)	Remarks
1	12+050.000	−19.900	2,259.285	549,735.116	731,406.628	64.260	9.173	Begin Gabion Wall No. 1
2	12+059.776	−14.914	2,259.440	549,739.602	731,416.644			Begin Gabion Wall No. 2
3	12+085.245	−12.265	2,259.802	549,757.775	731,434.682	387.070	42.028	Gabion Wall No. 2
4	12+092.310	−14.163	2,259.906	549,764.468	731,437.637			Gabion Wall No. 2
5	12+095.061	−22.884	2,260.035	549,772.081	731,432.570			End of Gabion Wall No. 2
					Total	451.330	51.201	

WIRE ENCLOSED RIPRAP ESTIMATED QUANTITIES

Mark	Station	Offset (m)	Northing	Easting	Elevation	Vol. (m³)	Remarks
6	12+095.568	−14.950	549,767.501	731,439.065	2,263.610		Begin Riprap
7	12+104.749	−12.090	549,773.192	731,447.615	2,265.810	119.13	
8	12+120.000	−12.000	549,784.818	731,459.172	2,266.170		End of Riprap
					Total	119.13	Cutoff at both ends Included

UNITED STATES
DEPARTMENT OF THE INTERIOR
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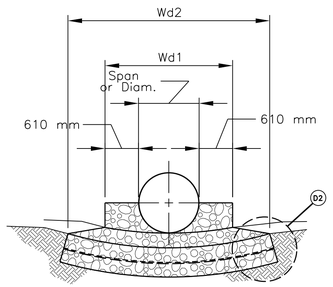
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GABION WALL & WIRE ENCLOSED RIPRAP LAYOUT DETAIL

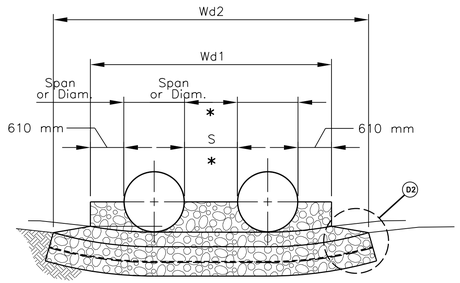
DRAWN BY: NRDOT	DATE: 7/10/2012
DESIGNED BY: NRDOT	DATE: 7/10/2012
REVISED: 5/20/2013	BY: Allen.Nakaidinae
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 50 Sta 12+050 Gabion Dtl.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	51	76



ELEVATION – SINGLE BARREL

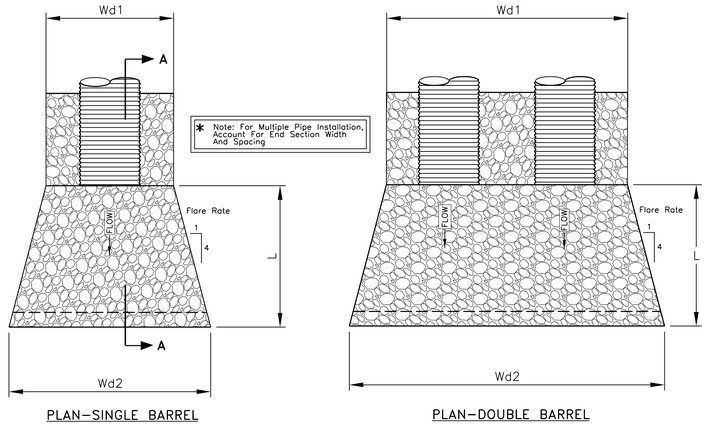


ELEVATION – DOUBLE BARREL

REVISED: 9/5/2013

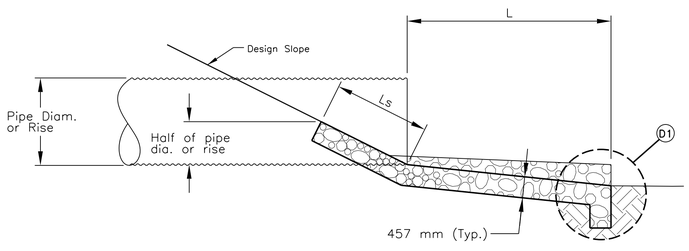
RIPRAP ESTIMATED QUANTITIES

STATION	STRUCTURE	SKEW	LENGTH (m)	Wd1(m)	Wd2(m)	S (mm)	Ls(m)	Thickness (mm)	Total Volume(m^3)
ITEM No 25101–2000: PLACED RIPRAP APRON, CLASS 2									
5+300.00	2–610 mm x 25.30 m CSPC	90.00	2.59	5.29	6.59	610	1.26	457	9.81
5+382.00	4–1067 mm S x 737 mm R x 19.51 m CSPA	105.00	4.42	13.65	15.86	2185	2.28	457	39.40
6+960.00	1–610 mm x 23.77	80.00	2.47	1.85	3.09	0	1.27	457	3.53
7+818.00	2–1067 mm x 21.95 m CSPC	90.00	4.26	5.92	8.05	2642	2.20	457	17.43
8+005.00	2–762 mm x 22.56 m CSPC	90.00	3.04	4.59	6.12	2083	1.57	457	9.67
8+040.00	1–610 mm x 21.95 m CSPC	90.00	2.44	1.83	3.05	0	1.25	457	3.42
8+076.00	1–610 mm x 23.77 m CSPC	90.00	2.44	1.83	3.05	0	1.25	457	3.42
8+141.00	1–610 mm x 20.12 m CSPC	72.00	2.56	1.92	3.20	0	1.32	457	3.78
8+220.00	1–610 mm x 23.77 m CSPC	90.00	2.44	1.83	3.05	0	1.25	457	3.42
8+495.00	1–610 mm x 18.90 m CSPC	90.00	2.44	1.83	3.05	0	1.25	457	3.42
9+040.00	1–610 mm x 24.38 m CSPC	90.00	2.44	1.83	3.05	0	1.25	457	3.42
9+058.00	1–762 mm x 22.56 m CSPC	90.00	3.04	1.98	3.50	0	1.57	457	4.70
9+072.00	2–914 mm x 20.12 m CSPC	90.00	3.65	5.25	7.08	2363	1.88	457	13.27
9+082.00	1–762 mm x 21.34 m CSPC	90.00	3.04	1.98	3.50	0	1.57	457	4.70
9+315.00	1–610 mm x 23.77 m CSPC	90.00	2.44	1.83	3.05	0	1.25	457	3.42
9+590.00	3–2210 mm Span x 1600 mm Rise x 31.09 m CSPA	90.00	8.84	10.06	14.48	1105	2.21	457	78.58
9+620.00	2–2210 mm Span x 1600 mm Rise x 29.29 m CSPA	90.00	8.84	6.74	11.16	1105	2.21	457	26.78
9+670.00	2–2210 mm Span x 1600 mm Rise x 30.48 m CSPA	90.00	8.84	6.74	11.16	1105	2.21	457	26.78
10+060.00	1–610 mm x 17.07 m CSPC	95.50	2.45	1.83	3.06	0	1.26	457	3.45
11+132.00	1–610 mm x 21.34 m CSPC	94.00	2.44	1.83	3.05	0	1.26	457	3.44
11+214.00	1–610 mm x 19.51 m CSPC	90.00	2.44	1.83	3.05	0	1.25	457	3.42
13+150.00	1–711 mm S x 508 mm R x 17.07 m CSPA	90.00	3.55	2.11	3.88	0	1.25	457	5.57
13+340.00	1–610 mm x 20.73 m CSPC	90.00	2.44	1.83	3.05	0	1.25	457	3.42
								TOTAL	278.25
ITEM No 25110–2000: GROUTED APRON, CLASS 2									
9+527.00	3–2134 mm x 32.31 m CSPC LiveStock–Pass	50.00	11.15	18.97	24.54	1067	8.47	457	151.87
								TOTAL	151.87

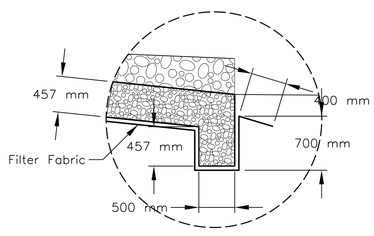


PLAN–SINGLE BARREL

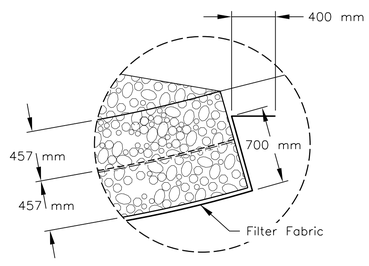
PLAN–DOUBLE BARREL



SECTION A–A



DETAIL – D1



DETAIL – D2

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP–03)

2. ALL STONE FOR RIPRAP SHALL BE CLASS 2 OR CLASS 3 AS NOTED MEETING THE REQUIREMENTS OF TABLES 705–1 OF THE FP–03. THERE SHALL BE NO ROCK LESS THAN 75 mm IN SIZE USED FOR GROUTED RIPRAP.

3. ALL EXCAVATIONS AND BACKFILL OPERATIONS SHALL BE DONE TO NEAT LINES IN ACCORDANCE WITH SECTION 209 OF THE FP–03 AND WILL BE INCIDENTAL TO INSTALLATION OF RIPRAP. SEE SUPPLEMENTAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

4. THE QUANTITIES SHOWN ARE ONLY AN ESTIMATE, ACTUAL QUANTITIES SHALL BE DETERMINED IN THE FIELD. THE COR/ATOR AND CONTRACTOR SHALL REVIEW ALL ROCK CUT AREAS THAT ARE TO RECEIVE RIPRAP AFTER THEY HAVE BEEN "ROUGHED–IN", IF IN THE OPINION OF THE COR/AOTR, THE ROCK CUT IS STABLE, THE COR/AOTR MAY ELECT TO DELETE SECTIONS OF THE RIPRAP PROTECTION.

5. ANY FILL MATERIAL NEEDED TO BRING EXISTING OUTLET CHANNEL UP TO GRADE SHALL BE TAKEN FROM AREAS ADJACENT TO THE STRUCTURE AS DIRECTED BY THE COR/AOTR.

6. SHOWN RIPRAP LAYOUT DIMENSIONS AND SHAPES ARE APPROXIMATE, THE CONTRACTOR SHALL ADJUST AS NESESSARY TO FIT FIELD CONDITIONS. ADJUSTMENTS AND/OR THE FINAL RIPRAP LAYOUT SHALL BE APPROVED BY THE COR/AOTR. SAID ADJUSTMENTS ARE INCIDENTAL TO THE RIPRAP ITEMS AND NO ADDITIONAL PAYMENT WILL BE MADE.

7. PRIOR TO PLACING RIPRAP, THE GROUND AT THE RIPRAP PLACEMENT AREA SHALL BE AT THE FINAL GRADE AND/OR SLOPE. IF DURING FINAL GROUND SHAPING THE RIPRAP IS FOUND TO BE INCORRECTLY PLACED/SHAPED, AS PER THE COR/AOTR, THE RIPRAP SHALL BE REMOVED AND REPLACED TO FIT THE FINISH GROUND PROFILE.

8. FILTER FABRIC SHALL BE INSTALLED UNDER ALL RIPRAP EXCEPT GROUTED RIPRAP AND CHECK DAMS AND SHALL CONFORM TO SECTION 714, TYPE IV–B AND SHALL BE CONSIDERED INCIDENTAL TO RIPRAP BID ITEMS. FILTER FABRIC SHALL TUCKED OR EMBEDDED 400 mm INTO THE GROUND ALONG ALL EDGES AS SHOWN.

9. AT ALL LOCATIONS WHERE RIPRAP DITCH LINING CONNECTS TO CULVERTS OR CULVERT RIPRAP INLET/OUTLET STRUCTURE, THE CONTRACTOR SHALL SHAPE THE DITCH LINING TO CONNECT TO THE DRAINAGE STRUCTURE(s) AS DIRECTED BY THE COR/AOTR. THIS WORK SHALL BE CONSIDERED INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.

10. THE FINISHED SURFACE OF ALL RIPRAP SHALL BE SET 30 mm BELOW THE GROUND SURFACE EXCEPT AT RIPRAP DISCHARGE ENDS, WHICH SHALL BE SET 30 mm ABOVE THE GROUND SURFACE.

11. THE RIPRAP LENGTHS GIVEN FOR CUT–TO–FILL TRANSITIONS, FURROW DITCHES, OUTLET PROTECTION AND CHECK DAMS ARE APPROXIMATE, THE ACTUAL LENGTHS WILL BE DETERMINED UPON COMPLETION OF FINISHED SUBGRADE CONSTRUCTION.

12. SEE SHEET 52 FOR ADDITIONAL WIRE ENCLOSED RIPRAP NOTES.

13. SEE SHEET 53 & 54 FOR GROUTED RIPRAP DETAILS, EXCEPT GROUTED RIPRAP APRONS TO BE 457 mm THICK.

UNITED STATES
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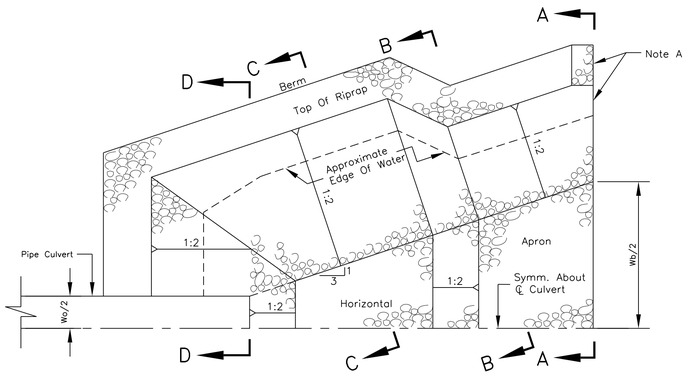
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PLACE AND GROUTED RIPRAP APRON DETAILS

DRAWN BY: NRDOT	DATE: 7/20/2011
DESIGNED BY: NRDOT	DATE: 7/20/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 51_N31_Riprap Apron.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	52	76



PLAN VIEW

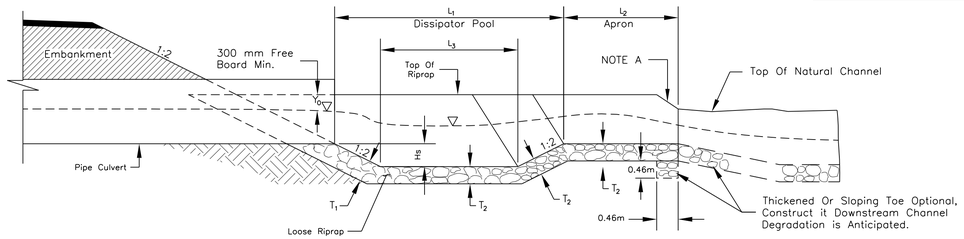
NOTE:

W_o = Diameter For Pipe Culvert, Barrel Width for Box Culvert And Span Of Pipe-Arch Culvert.

∇ = Water Surface Profile

Y_o ∇ = Estimated Outlet Depth

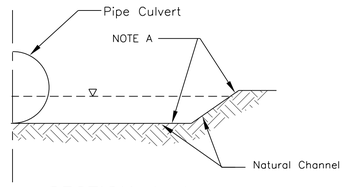
W_b = Width of Basin



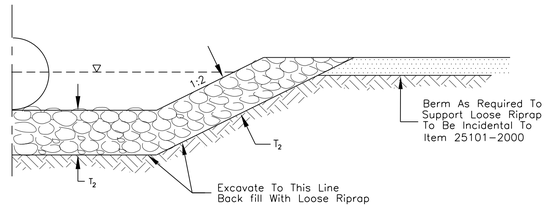
PROFILE VIEW

NOTE A: Warp Basin To Conform To Natural Stream Channel. Top Of Riprap In Floor Of Basin Should Be At The Same Elevation Or Lower Than Natural Channel Bottom At Section A-A.

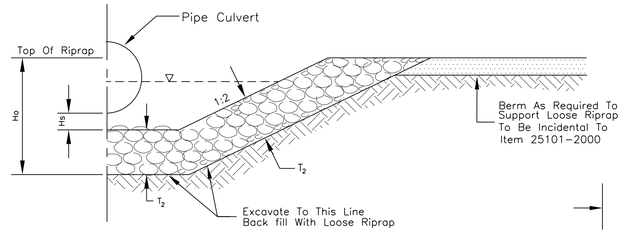
NOTE B: For Multiple Pipes Or Culverts, (Wo)=Sum Of Each Pipe (Wo)+ Spacing Between Each Pipe Or Culvert.



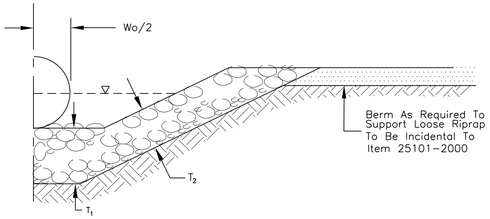
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

GENERAL NOTES

1. SEE SHEET 51 FOR ADDITIONAL NOTES.

2. SHAPE ALL SHARP CONTOURS AS REQUIRED TO FIT THE SOIL EROSION MATERIAL FLUSH WITH THE EXISTING GROUND.

3. WIRE ENCLOSED RIPRAP SHALL CONFORM TO SECTION 251 OF THE FP-03 AND THE SUPPLEMENTAL SPECIFICATIONS. WIRE MESH SHALL BE PLACED TO ENCLOSE THE STONE LAYER ON ALL SIDES AND FACES. THE WIRE MESH SHALL BE SPLICED ON ALL EDGES AND SHALL BE DRAWN TIGHTLY AGAINST THE STONE BE MEANS OF 3.8 mm WIRE TIES SPACED 0.61 METER LONGITUDINALLY AND TRANSVERSELY.

4. THE WIRE FABRIC SHALL BE GALVANIZED AND BE OF THE CONFIGURATION SHOWN ON THIS SHEET. AN ALTERNATE WIRE FABRIC MAY BE SUBMITTED FOR REVIEW AND APPROVAL. ANY WIRE FABRIC USED SHALL HAVE A MINIMUM WIRE DIAMETER OF 2.8 mm, A CLASS 3 ZINC COATING(GALVANIZED), SHALL HAVE A MINUMUM OPENING DIMENSION OR 100 mm, AND SHALL NOT ALLOW A 75 mm o SPHERE TO PASS THROUGH WIRE FABRIC OPENING.

5. WIRE ENCLOSED RIPRAP SHALL BE ANCHORED AS SHOWN WITH L 102 mm x 102 mm x 9.5 m STEEL ANGLES AND SHALL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE WORK AND NO PAYMENT SHALL BE MADE. STEEL ANGLES SHALL EXTEND 100 mm ABOVE THE TOP OF THE RIPRAP.

6. ANY MATERIAL NEEDED TO CONSTRUCT BERMS FOR BASIN SHALL BE TAKEN FROM A DESIGNATED AREA WITHIN THE RIGHT-OF-WAY. THIS WORK SHALL BE INCIDENTAL TO ITEM 25101-2000 OR 25112-2000.

7. SEE SHEET #48 FOR WIRE AND ANCHOR DETAILS.

ITEM No. 25101-2000: PLACED RIPRAP, STILLING BASIN, CLASS 2

Station:	Structure:	L_1 (m)	L_2 (m)	L_3 (m)	h_s (mm)	t_1 (mm)	t_2 (mm)	W_1 (m)	W_2 (m)	W_3 (m)	W_{3o} (m)	W_4 (m)	W_{4o} (m)	W_5 (m)	W_{5o} (m)	Estimated Quantity (m^3)
8+285.00	1-610 mm CSPC	1.83	0.77	1.21	155	458	344	0.61	0.82	1.62	2.24	1.83	2.14	2.34	2.65	15.18
8+527.00	1-610 mm CSPC	1.83	0.68	1.29	136	458	344	0.61	0.79	1.65	2.24	1.83	2.10	2.28	2.56	14.44
8+627.00	1-610 mm CSPC	1.87	0.94	1.12	187	458	344	0.61	0.86	1.61	2.25	1.86	2.23	2.48	2.86	16.84
11+435.00	1-610 mm CSPC	1.83	0.73	1.25	145	458	344	0.61	0.80	1.64	2.24	1.83	2.12	2.32	2.61	14.85
															TOTAL:	61.31

ITEM No. 25112-2000: WIRE ENCLOSED RIPRAP,STILLING BASIN CLASS 2

Station:	Structure:	L_1 (m)	L_2 (m)	L_3 (m)	h_s (mm)	t_1 (mm)	t_2 (mm)	W_1 (m)	W_2 (m)	W_3 (m)	W_{3o} (m)	W_4 (m)	W_{4o} (m)	W_5 (m)	W_{5o} (m)	Estimated Quantity (m^3)
5+000.00	1-914 mm CSPC	3.20	1.60	2.09	320	458	343	0.41	1.34	2.62	3.63	3.05	3.69	4.11	4.75	36.60
6+728.00	1-610 mm CSPC	1.89	0.95	1.14	190	458	343	0.61	0.86	1.62	2.26	1.87	2.25	2.50	2.88	17.02
8+339.00	1-914 mm CSPC	2.82	1.43	1.71	285	458	344	0.91	1.29	2.43	3.40	2.81	3.38	3.76	4.33	31.97
8+430.00	1-610 mm CSPC	1.87	0.93	1.12	187	458	344	0.61	0.86	1.61	2.25	1.86	2.23	2.48	2.82	16.76
8+740.00	1-762.mm CSPC	2.29	1.05	1.45	209	458	344	0.76	1.04	2.01	2.79	2.29	2.71	2.99	3.41	22.07
8+860.00	2-1067 mm CSPC	3.20	1.11	2.31	222	458	344	4.70	5.00	6.54	7.56	6.83	7.28	7.57	8.02	47.18
11+347.00	1-610 mm CSPC	1.89	0.95	2.09	190	458	343	0.61	0.86	1.62	2.26	1.87	2.25	2.50	2.88	17.02
11+518.00	2-1219 mm CSPC	5.29	2.65	3.17	529	458	344	5.16	5.87	7.98	9.43	8.69	9.74	10.45	11.51	105.63
															TOTAL:	294.25

ITEM No. 25112-2000

WIRE ENCLOSED RIPRAP - CBC OUTLET/DOWNDRAIN

Station:	Structure:	Length (m)	Volume (m^3)	REMARKS
10+317.00	1-711 mm Span x 508 mm Rise CSPA	20.12	50.31	Riprap Downdrain - No End Treatment Needed
		TOTAL	50.31	

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PLACED AND WIRE ENCLOSED STILLING BASIN DETAILS

DRAWN BY: NRDOT DATE: 7/20/2011

DESIGNED BY: NRDOT DATE: 7/20/2011

REVISED: 9/5/2013 BY: Leroy.Toledo

SHEET SIZE: Full Size (24x36) Plot Sheet

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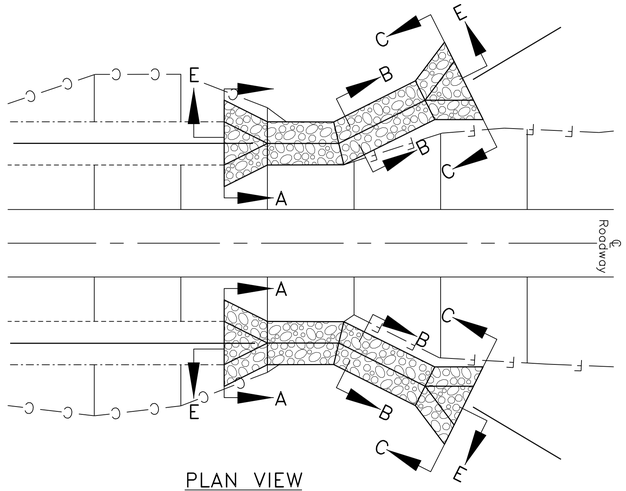
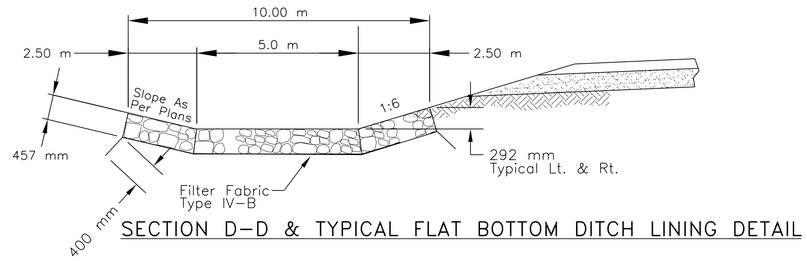
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	53	76

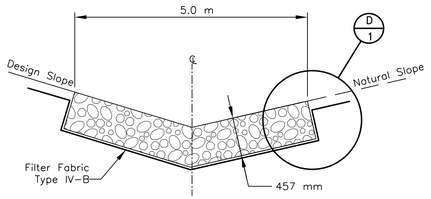


PLAN VIEW

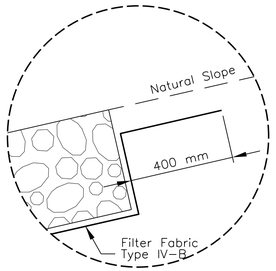
Cut To Fill Transition At Flat Bottom Ditch



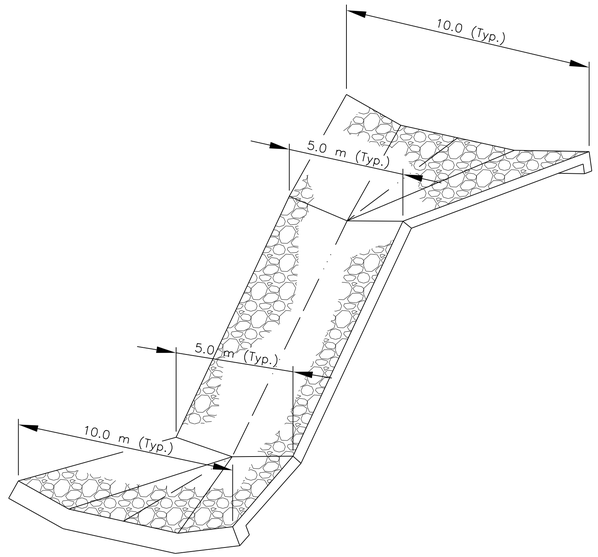
SECTION D–D & TYPICAL FLAT BOTTOM DITCH LINING DETAIL



SECTION B–B

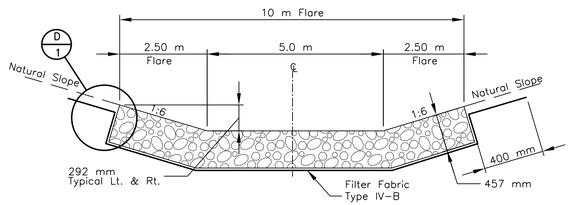


DETAIL D/1

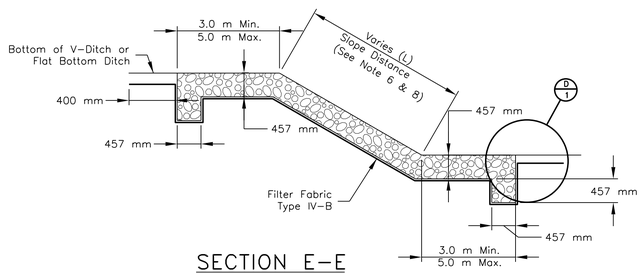


PERSPECTIVE VIEW

Cut To Fill Transition & Down Drains
AT V-Ditch And Flat Bottom Ditch



SECTION C–C



SECTION E–E

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP–03).
2. THE CONTRACTOR SHALL CLEAR AND GRUB ALL DEBRIS, BRUSH AND TREES THAT WILL INTERFERE WITH THE PLACEMENT OF DOWNDRAIN, EMBANKMENT PROTECTION. THIS WORK SHALL BE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR UNDER ITEM 25101–2000.
3. THE CONTRACTOR SHALL BE REQUIRED TO MAKE ANY NECESSARY FIELD ADJUSTMENTS TO MATCH ACTUAL FIELD CONDITIONS. THESE FIELD ADJUSTMENTS ARE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
4. IF UNSUITABLE MATERIAL IS FOUND AT THE FOOTING LOCATION AND ELEVATIONS, THE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED BACKFILL MATERIAL FROM ON–SITE AS DETERMINED BY THE COR/AOTR. ALL BACKFILL MATERIAL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T99 METHOD C. THE BACKFILL MATERIAL SHALL CONFORM TO SECTION 208 AND 209 OF THE FP–03. IF SUITABLE ON–SITE MATERIALS CANNOT BE FOUND, IMPORTED MATERIAL WILL BE NEGOTIATED IN ACCORDANCE WITH SECTION 109.02(m).
5. V–DITCH AND CHANNEL RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE DETAILS SHOWN AND AS ADJUSTED BY THE COR/AOTR. ANY WASTE MATERIAL SHALL BE USED AS BORROW WHERE NEEDED IN OTHER PROJECT LOCATION AS DETERMINED BY THE COR/AOTR. ALL DITCH AND CHANNEL EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
6. THE QUANTITIES SHOWN ARE ONLY AN ESTIMATE. ACTUAL QUANTITIES SHALL BE DETERMINED IN THE FIELD. THE COR/AOTR, AND CONTRACTOR SHALL REVIEW ALL ROCK CUT AREAS AFTER THE CONSTRUCTION OF DITCHES, DOWNDRAINS, AND RIPRAP BASINS HAVE BEEN "ROUGH IN". IF IN THE OPINION OF THE COR/AOTR, THE ROCK CUT IS STABLE, THE COR/AOTR MAY ELECT TO DELETE SECTIONS OF THE RIPRAP PROTECTION.
7. STONE SIZE SHALL CONFORM TO TABLE 705–1, SECTION 705, STONE FOR RIPRAP, CLASS 2, SEE SHEET54 OF76 FOR GROUTED RIPRAP STONE.
8. FILTER FABRIC SHALL BE INSTALLED UNDER ALL RIPRAP (EXCEPT GROUTED RIPRAP) AND SHALL CONFORM TO SECTION 714, TYPE IV–B, AND SHALL BE CONSIDERED INCIDENTAL TO RIPRAP BID ITEMS. ROUND ALL SHARP CONTOURS AS REQUIRED TO FIT THE SOIL EROSION MATERIAL FLUSH WITH THE EXISTING GROUND. EXTEND RIPRAP DOWN THE SHOULDER DITCH UNTIL A 2% SLOPE IS ACHIEVED, OR AS DIRECTED BY THE COR/AOTR BEFORE PLACEMENT OF THE FLARE SECTION.
9. WIRE ENCLOSED RIPRAP SHALL CONFORM TO SECTION 251 OF THE FP–03 AND THE SUPPLEMENTAL SPECCIFICATIONS. WIRE MESH SHALL BE PLACED TO ENCLOSE THE STONE LAYER ON ALL SIDES AND FACES. THE WIRE MESH SHALL BE SPLICED ON ALL EDGES AND SHALL BE DRAWN TIGHTLY AGAINST THE STONE BY MEANS OF 3.8 mm WIRE TIES SPACED 0.61 m LONGITUDINALLY AND TRANSVERSELY.
10. THE WIRE FABRIC SHALL BE GALVANIZED AND BE OF THE CONFIGURATION SHOWN ON THIS SHEET. AN ALTERNATE WIRE FABRIC MAY BE SUBMITTED FOR REVIEW AND APPROVAL. ANY WIRE FABRIC USED SHALL HAVE A MINIMUM WIRE DIAMETER OF 2.8 mm, A CLASS 3 ZINC COATING (GALVANIZED), SHALL HAVE A MINIMUM OPENING DIMENSION OR 100 mm, AND SHALL NOT ALLOW A 75 mm Ø SPHERE TO PASS THROUGH WIRE FABRIC OPENING. SEE SHEET52 OF76 FOR WIRE ENCLOSED RIPRAP DETAILS.
11. RIPRAP SHALL BE ANCHORED AS SHOWN WITH L 102mm x 102mm x 9.5mm STEEL ANGLES SPACED AT 2.44 m EACH WAY. STEEL ANGLE SHALL EXTEND 75mm ABOVE THE TOP OF THE MESH. IN ROCKY AREAS, DRIVEANGLE IRON ANCHORS TO REFUSAL (MIN. EMBEDDED 500mm), THEN CUT AT 75mm ABOVE RIPRAP. ANCHORS SHALL BE SAW CUT TO LEAVE A SMOOTH EDGE. DO NOT USE A CUTTING TORCH. FURNISHING AND PLACEMENT OF STEEL ANGLES SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.

ITEM No. 25101–2000: PLACED RIPRAP, CLASS 2

STATION TO STATION	LOCATION	LENGTH (m)	VOLUME (m3)	REMARKS
6+733.045 – 6+764.709	Rt.	35.00	98.23	At Cut To Fill Transition
6+738.987– 6+765.350	Lt.	25.00	74.51	At Cut To Fill Transition
9+832.270 –9+864.864	Rt.	35.00	98.23	At Cut To Fill Transition
9+804.605 – 9+825.218	Lt.	20.00	62.77	At Cut To Fill Transition
10+305.066 – 10+364.932	Rt.	60.00	149.28	At Cut To Fill Transition & Ditch Lining, No Flare at Outlet
10+547.116 – 10+625.218	Rt.	75.00	192.62	At Cut To Fill Transition & Ditch Lining
11+530.000 – 11+555.000	Rt.	12.50	61.12	Between Pipe To Pipe
		TOTAL	736.76	

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PLACE RIPRAP AT CUT–TO–FILL TRANSITIONS AND DOWN DRAINS

DRAWN BY: NRDOT	DATE: 8/25/2011
DESIGNED BY: NRDOT	DATE: 8/25/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

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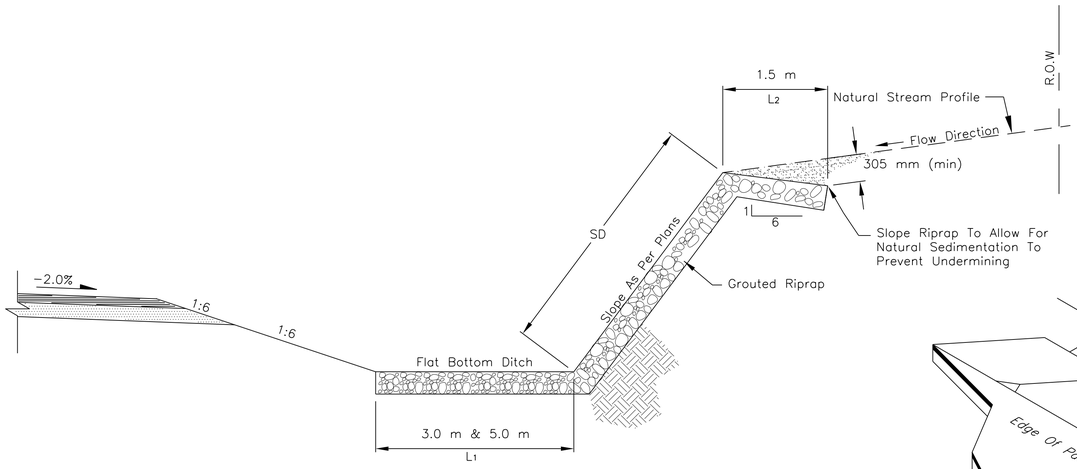
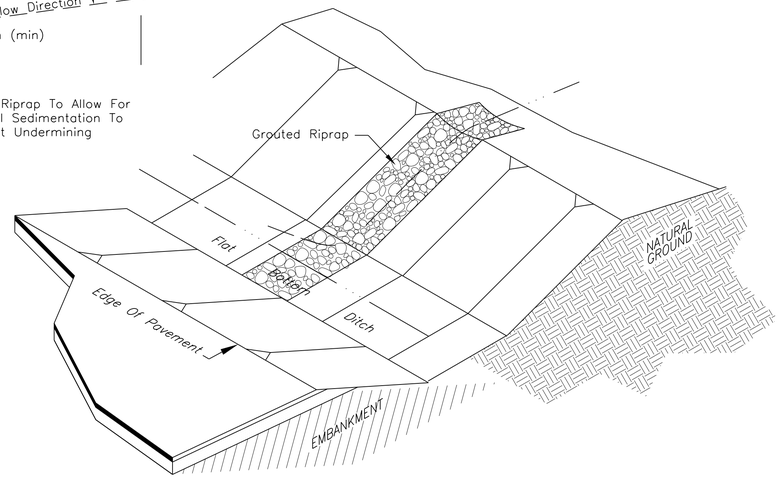
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	54	76



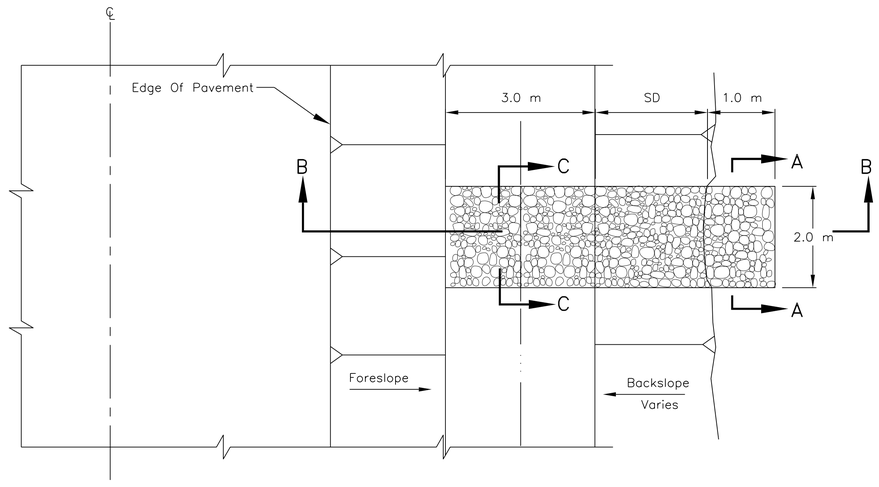
SECTION B–B



ISOMETRIC VIEW

GENERAL NOTES

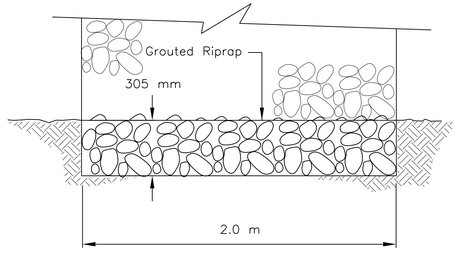
1. SEE SHEET 51 OF 76 FOR GENERAL RIPRAP NOTES.
2. GROUTED RIPRAP ROCK SIZE SHALL CONFORM TO FP-03, TABLE 705-1, CLASS 2; EXCEPT ALL MINUS 75 mm ROCK TO BE REMOVED FROM THE CLASS 2 MATERIAL, SO THAT SUFFICIENT VOIDS EXIST FOR THE INFUSION OF THE MORTAR MIX.
3. FILL ROCK VOIDS FULL DEPTH OF RIPRAP WITH MORTAR PER SECTION 251 & 725.22(e). LEAVE ROCK ON SURFACE EXPOSED ¼ TO ½ THICKNESS OF ROCK.



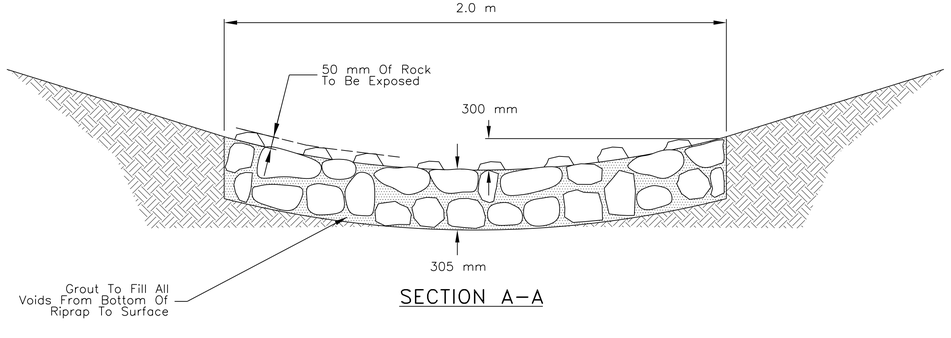
PLAN VIEW

ITEM No. 25110-2000: Grouted RIPRAP, BACKSLOPE DOWNDRAIN

STATION	LOCATION	SD (m)	L1 (m)	L2 (m)	TOTAL LENGTH (m)	THICKNESS (mm)	WIDTH (m)	Estimated Riprap Quantity (m^3)
10+690.00	Rt.	3.24	5.00	1.50	9.74	305	2.00	5.94
10+750.00	Rt.	5.09	5.00	1.50	11.59	305	2.00	7.07
10+800.00	Rt.	8.84	5.00	1.50	15.34	305	2.00	9.36
11+010.00	Rt.	7.83	5.00	1.50	14.33	305	2.00	8.74
12+810.00	Lt.	19.67	3.00	1.50	24.17	305	2.00	14.74
							TOTAL:	**45.85**



SECTION C–C



SECTION A–A

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GROUTED RIPRAP FOR BACKSLOPE PROTECTION

DRAWN BY: NRDOT	DATE: 8/25/2011
DESIGNED BY: NRDOT	DATE: 8/25/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

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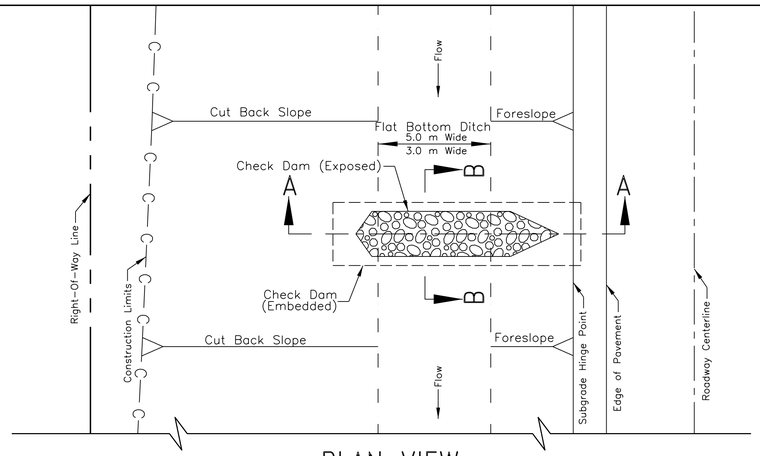
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	55	76

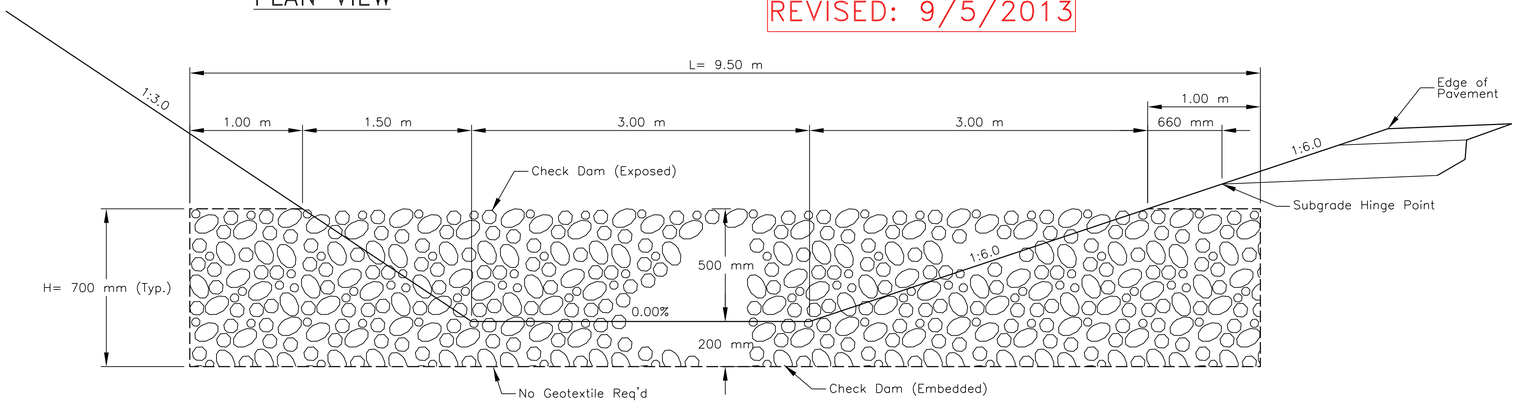


PLAN VIEW

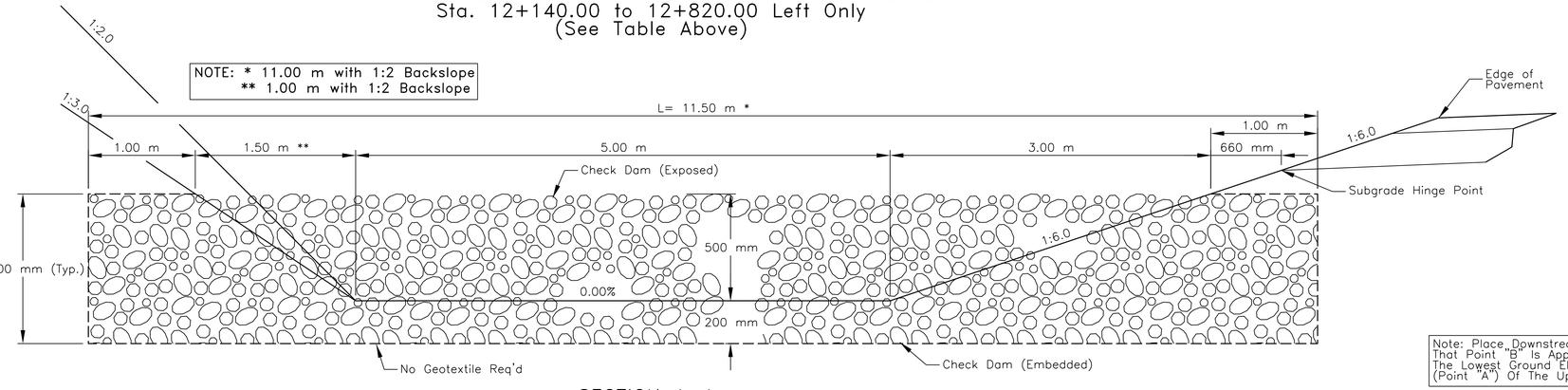
ITEM NO. 25101-3000: PLACED RIPRAP, CLASS 3
CHECK DAM LOCATION AND ESTIMATED QUANTITIES

STATION	LOCATION	L (m)	W (m)	H (mm)	CUT BACKSLOPE	VOLUME (m^3)	REMARKS
12+140	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+180	Left	9.50	2.80	700	1:3	9.31	Shallow FBD
12+220	Left	9.50	2.80	700	1:3	9.31	Shallow FBD
12+260	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+300	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+340	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+380	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+420	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+460	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+500	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+540	Left	9.50	2.80	700	1:3	9.31	Shallow FBD
12+580	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+620	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+660	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+700	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+740	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+780	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
12+820	Left	9.50	2.80	700	1:3	9.31	Flat Bottom Ditch
					TOTAL:	167.58	

REVISED: 9/5/2013



SECTION A-A
3.0 m WIDE FLAT BOTTOM DITCH
WITH CLASS 3 RIPRAP CHECK DAM & 1:3 BACKSLOPE
Sta. 12+140.00 to 12+820.00 Left Only
(See Table Above)



SECTION A-A
5.0 m WIDE FLAT BOTTOM DITCH
WITH CLASS 2 RIPRAP CHECK DAM & 1:2 AND 1:3 BACKSLOPE
Sta. 9+860.00 to 11+040.00 Left & Right
(See Table At Right)

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS [FP-03].

2. ROUND ALL SHARP CONTOURS AS REQUIRED TO FIT THE SOIL EROSION MATERIAL FLUSH WITH THE EXISTING GROUND.

3. THE CONTRACTOR SHALL BE REQUIRED TO MAKE FIELD ADJUSTMENTS TO MATCH ACTUAL FIELD CONDITIONS AS DIRECTED BY THE REGIONAL ROAD ENGINEER. NO ADDITIONAL PAYMENT SHALL BE MADE FOR SUCH ADJUSTMENTS.

4. EMBANKMENT SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99, METHOD C AND CONFORM TO SECTION 204 OF FP-03.

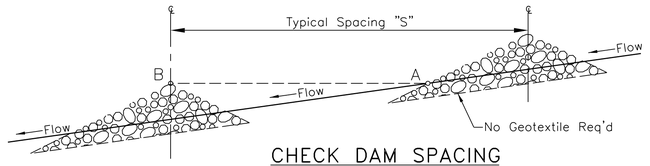
5. EXCAVATION OF RIPRAP TOE TRENCH TO PLACE RIPRAP BELOW FLOW LINE AND OTHER EXCAVATION AND EMBANKMENT NECESSARY TO PLACE RIPRAP AS SHOWN SHALL BE INCIDENTAL TO ITEM 25101-2000.

6. STONE SIZE SHALL CONFORM TO TABLE 705-1, SECTION 705, STONE FOR RIPRAP, CLASS 2 & 3.

7. ROCK CHECK DAM SHALL BE INCLUDED IN BID ITEM 25101-2000.

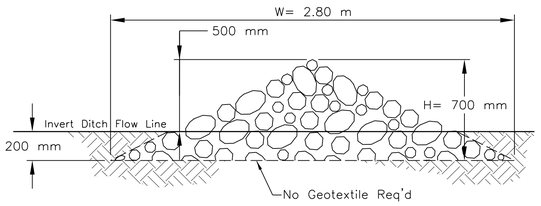
ITEM No. 25101-2000: PLACED RIPRAP, CLASS 2
CHECK DAM LOCATION AND ESTIMATED QUANTITIES

STATION	LOCATION	L (m)	W (m)	H (mm)	CUT BACKLOPE	VOLUME (m^3)
9+860.000	Lt.	11.00	2.80	700	1:2	10.78
9+900.000	Lt.	11.00	2.80	700	1:2	10.78
9+940.000	Lt.	11.00	2.80	700	1:2	10.78
9+980.000	Lt.	11.00	2.80	700	1:2	10.78
10+020.000	Lt.	11.00	2.80	700	1:2	10.78
10+140.000	Lt.	11.00	2.80	700	1:2	10.78
10+200.000	Lt.	11.00	2.80	700	1:2	10.78
10+260.000	Lt.	11.00	2.80	700	1:2	10.78
10+640.000	Rt.	11.00	2.80	700	1:2	10.78
10+680.000	Rt.	11.00	2.80	700	1:2	10.78
10+720.000	Rt.	11.00	2.80	700	1:2	10.78
10+760.000	Rt.	11.00	2.80	700	1:2	10.78
10+810.000	Rt.	11.00	2.80	700	1:2	10.78
10+840.000	Rt.	11.00	2.80	700	1:2	10.78
10+880.000	Rt.	11.00	2.80	700	1:2	10.78
10+920.000	Rt.	11.00	2.80	700	1:2	10.78
10+960.000	Rt.	11.00	2.80	700	1:2	10.78
11+000.000	Rt.	11.00	2.80	700	1:2	10.78
11+040.000	Rt.	11.00	2.80	700	1:2	10.78
10+700.000	Lt.	11.50	2.80	700	1:3	11.27
10+720.000	Lt.	11.50	2.80	700	1:3	11.27
10+760.000	Lt.	11.50	2.80	700	1:3	11.27
10+800.000	Lt.	11.50	2.80	700	1:3	11.27
10+840.000	Lt.	11.50	2.80	700	1:3	11.27
10+880.000	Lt.	11.50	2.80	700	1:3	11.27
10+920.000	Lt.	11.00	2.80	700	1:2	10.78
10+960.000	Lt.	11.50	2.80	700	1:3	11.27
11+000.000	Lt.	11.50	2.80	700	1:3	11.27
11+040.000	Lt.	11.50	2.80	700.00	1:3	11.27
					TOTAL	327.81



CHECK DAM SPACING
S = 60 m For 2% & Less Grade.
S = 40 m For Greater That 2% Grade.

Note: Place Downstream Structure Such That Point "B" Is Approximately Level With The Lowest Ground Elevation (Point "A") Of The Upstream Structure.



SECTION B-B

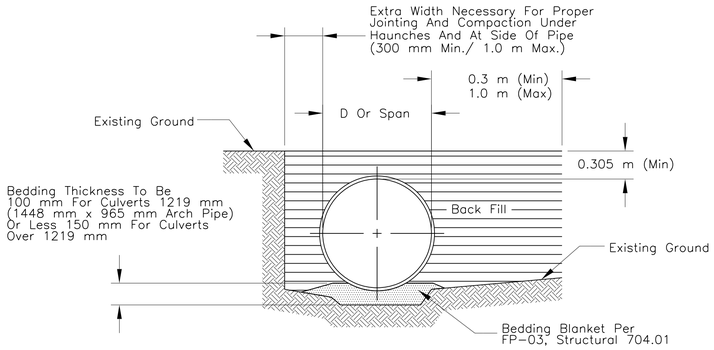
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PLACED RIPRAP CHECK DAM
IN FLAT BOTTOM DITCH

DRAWN BY: NRDOT	DATE: 2/2/2012
DESIGNED BY: NRDOT	DATE: 2/2/2012
REVISED: 6/27/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 55_REV_N31chkdam 02-02-2012.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	56	76



NEGATIVE PROJECTING POSITIVE PROJECTING

FIGURE A: BEDDING

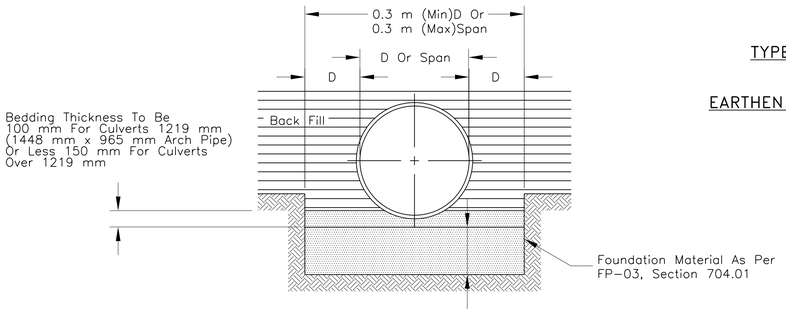


FIGURE B: ROCK BEDDING

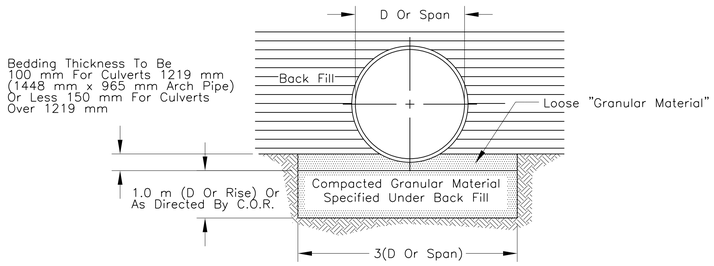
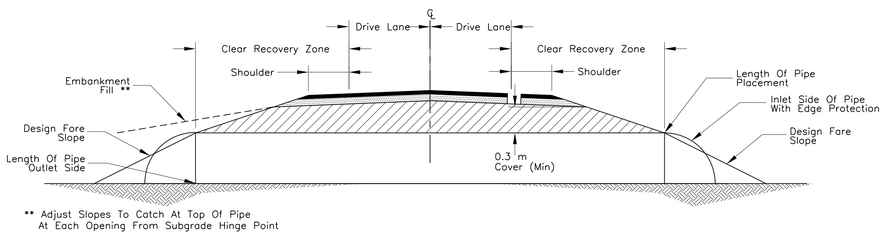
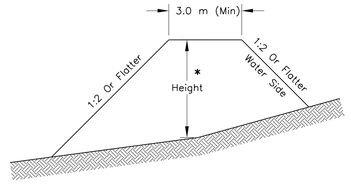


FIGURE C: FOUNDATION STABILIZATION BEDDING

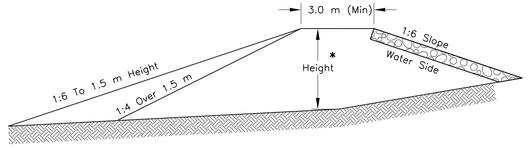


** Adjust Slopes To Catch At Top Of Pipe At Each Opening From Subgrade Hinge Point

TYPICAL PIPE INSTALLATION-(TURNOUT/DRIVEWAY, USE 2-END SECTIONS)

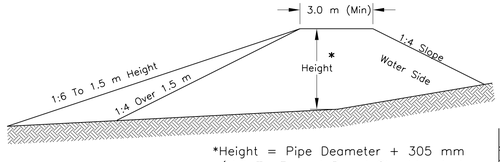


TYPE "A" DIKE/BERM



TYPE "B" DIKE/BERM

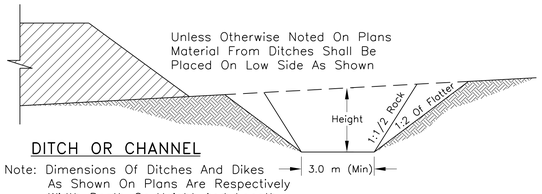
NOTE: When Necessary The Slope May Be Flattened To 1:6 With 457 mm Thick Riprap Protection As Called For On Plans.



*Height = Pipe Deameter + 305 mm (Not To Exceed Paved Shoulder And Elevation Or/As Given On Plans)

TYPE "B" DIKE/BERM

EARTHEN DIKE/BERM DETAILS

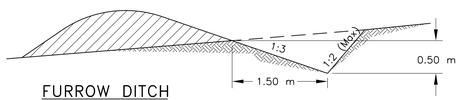


DITCH OR CHANNEL

Note: Dimensions Of Ditches And Dikes As Shown On Plans Are Respectively Width Depth Or Height And Length.

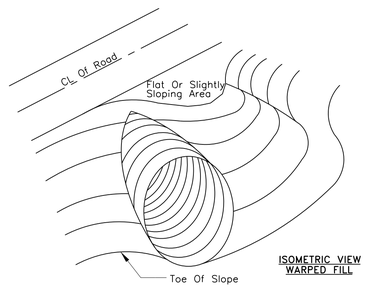
ITEM No.20443-1000: EARTHEN DIKE/BERMS

STATION	LOCATION	ESTIMATED QTY. (m)	REMARKS
8+285.00	Rt.	25.00	At Inlet CSPC
8+740.00	Rt.	25.00	At Inlet CSPC
10+060.00	Lt.	25.00	At Inlet CSPC
10+317.00	Lt.	25.00	At Inlet CSPC
13+150.00	Lt.	25.00	At Inlet CSPC
13+320.00	Lt.	25.00	
	TOTAL	150.00	



FURROW DITCH

1. To Be Paid For, By The meter.
2. Furrow Ditch Sections As Shown Above Or/ And Approved Equivalent Shall Be Built As Directed By The COR/AOTR.
3. See Sheet 53 For Riprap Lined Furrow Ditch Dimensions.

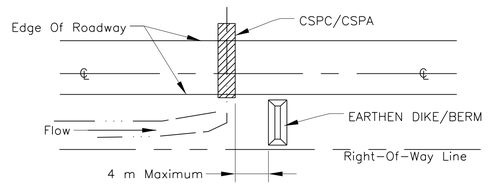


PIPE SKEWS TO THE EMBANKMENT (TYP.)

The Contractor Shall Be Reguired To Build The Warped Embankment Around The Skewed Drainage Pipe(s). This Work Shall Be Incidental To The Earthwork And Installation Of Drainage Pipe Items Shown.

GENERAL NOTES

1. PLACE LOOSE BEDDING ROUGHLY SHAPED TO BOTTOM OF PIPE, THEN COMPACT UNDER HAUNCHES AFTER PIPE PLACEMENT.
2. SEE SECTION 204, 209, 602, AND 704 OF FP-03, INCLUDING THE SUPPLEMENTAL SPECIFICATION FOR ADDITIONAL NOTES.
3. ALL DRAINAGE STRUCTURE MATERIAL SHALL BE UNLOADED AND HANDLED WITH REASONABLE CARE. NO STRUCTURE SHALL BE DRAGGED OR ALLOWED TO STRIKE ANY HARD SURFACE DURING PLACEMENT. ANY DAMAGED STRUCTURE SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE GOVERNMENT.
4. ALL STRUCTURAL PLATE PIPE AND PRECAST BOX STRUCTURES SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE FABRICATORS RECOMMENDATIONS.
5. BACKFILL MATERIAL SHALL BE PLACED PIPE DIAMETER WIDE ON THE SIDES AND 300 mm(MIN)/1.0 m(MAX) OVER THE PIPE. BACKFILL MATERIAL BEYOND THE LIMITS SHALL BE REGULAR EARTHWORK EMBANKMENT MATERIAL, THE BACKFILL MATERIAL SHALL BE APPROVED BY THE C.O.R. PRIOR TO IT'S USE AND SHALL BE PLACED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
6. PONDING OR JETTING PIPE BACKFILL SHALL NOT BE PERMITTED.
7. ALL PIPE EXCAVATION, BACKFILLING, DE-WATERING PUMPING OR COFFERDAMS REQUIRED TO PROPERLY INSTALL THE DRAINAGE PIPE SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE PROJECT AND NO ADDITIONAL PAYMENT SHALL BE MADE.
8. MULTIPLE PIPE INSTALLATIONS SHALL BE PLACED 610 mm BETWEEN END SECTIONS UNLESS OTHERWISE DIRECTED BY THE COR/AOTR OR AS SHOWN ON THE PLANS.
9. ALL PIPES SHALL BE PROTECTED BY A COVER OF NOT LESS THAN 0.91 m OF EMBANKMENT ABOVE PIPE BEFORE ANY HEAVY EQUIPMENT IS ALLOWED TO PASS OVER THE STRUCTURE(S) DURING CONSTRUCTION.
10. ALL CULVERTS SHALL BE INSTALLED AT THE ORIGINAL GROUND LINE AND SLOPE TO ASSURE POSITIVE DRAINAGE UP TO THE R.O.W. LIMITS, IN NO CASE SHALL THE PIPE BE PLACED BELOW THE ORIGINAL GROUND ELEVATIONS, UNLESS DIRECTED BY THE NRDOT DIVISION MANAGER. THIS SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF PROJECT AND NO ADDITIONAL PAYMENT SHALL BE MADE.
11. AT DRAINAGE PIPE REPLACEMENTS, INSTALLATIONS, EXTENSIONS AND IN-PLACE PIPE CLEANING LOCATIONS, THE CONTRACTOR SHALL RESHAPE, REGRADE AND CLEAN THE INLET AND OUTLET CHANNELS TO THE RIGHT-OF-WAY LINE AND/OR EXISTING DRAINAGE CHANNEL, TO PRODUCE SMOOTH FLOWS AT CULVERT INTAKES AND DISCHARGES AS DIRECTED BY THE COR/AOTR. THIS WORK SHALL BE INCIDENTAL TO THE BID ITEMS UNDER SECTIONS 602, 603 AND 607.
12. ALL CULVERTS UNDER TURNOUT AND DRIVEWAYS SHALL BE PLACED AT THE PROPOSED DITCH FLOWLINE. THE CONTRACTOR SHALL BE REQUIRED TO FIELD ADJUST THE PROFILE GRADES OVER THE PIPE AS DIRECTED BY COR/AOTR TO PROVIDE FOR MINIMUM COVER.
13. TYPE "A" DIKE/BERM SHALL BE USED ON THIS PROJECT UNLESS OTHERWISE NOTED ON THE PLANS. EMBANKMENT MATERIAL NEEDED TO BUILD EARTHEN DIKE/BERM SHALL BE CONSIDERED INCIDENTAL TO ITEM 20443-1000.
14. IF DIRECTED BY THE COR/AOTR TO BETTER FIT FIELD CONDITIONS, TO MORE SMOOTHLY DIRECT THE FLOW INTO THE PIPE AND/OR TO LESSEN THE WATER'S IMPACT ON THE FACE OF THE EARTHEN DIKE/BERM. THIS WORK TO BE INCIDENTAL TO BID ITEM 20443-1000.



EARTHEN DIKE/BERM INSTALLATION AT STRUCTURE

1. Earthen Dike/Berm At Structures To Be So Placed That They Create A Water Cushion. Elevation At Top Of Earthen Dike/Berm Shall Be 305 mm Above Elevation Of Top Of Pipe Unless Otherwise Shown Or Directed By The COR/AOTR.
2. Earthen Dike/Berm Shall Be Located A Distance Equal To The Largest Dimension Of Box Culvert Or Pipe From The Face Of The Drainage Structure. In No Case Shall The Distance Exceed 4.0 m.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD PIPE INSTALLATION AND DITCH DETAILS

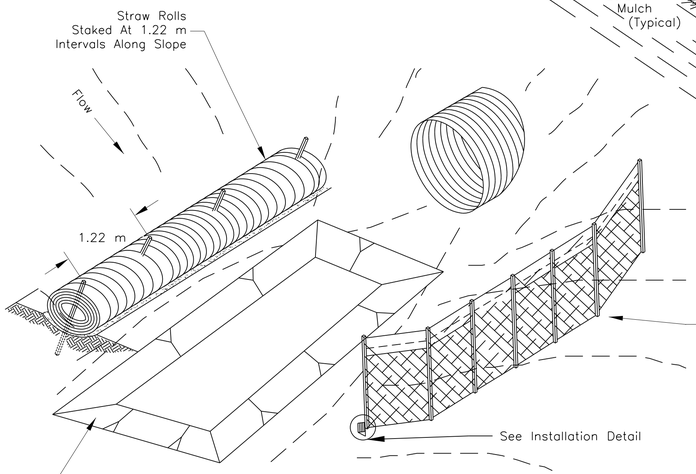
DRAWN BY: NRDOT	DATE: 8/25/2011
DESIGNED BY: NRDOT	DATE: 8/25/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 56_N31pid.dgn

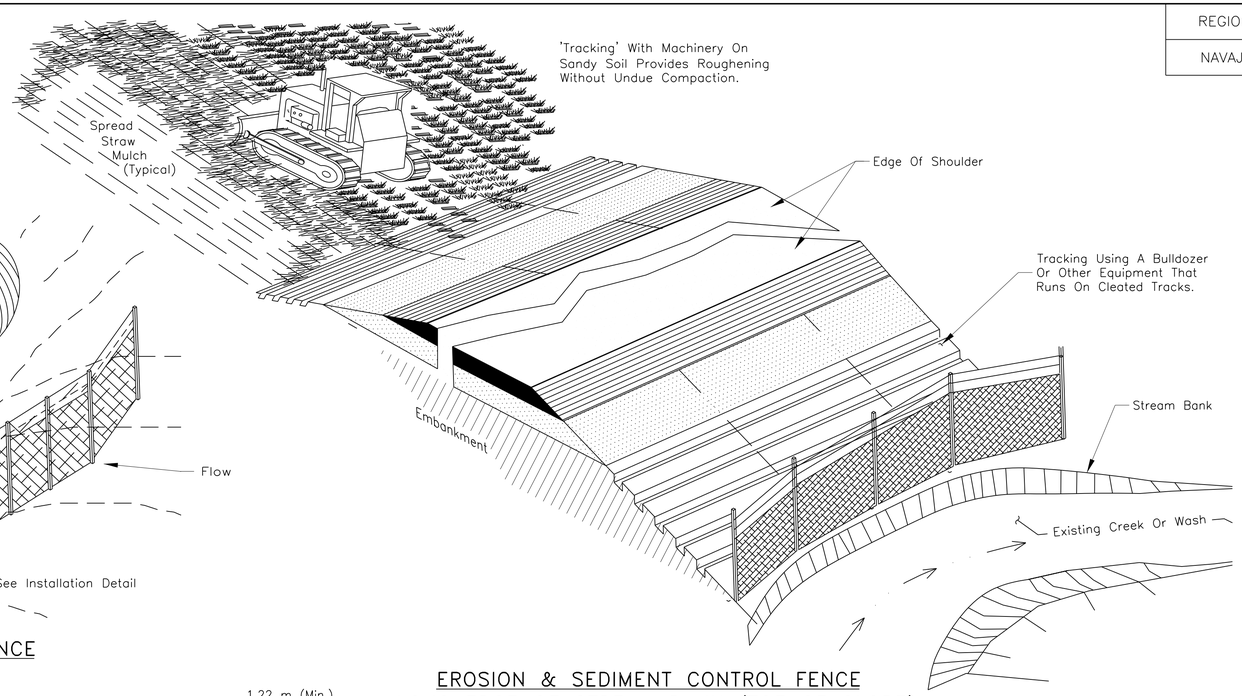
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	57	76

GENERAL NOTES

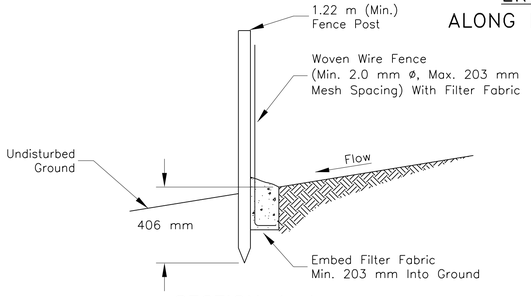
1. THE CONTRACTOR SHALL PREPARE AND SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IN FULL DETAIL FOR ALL PHASES OF THE WORK FOR REVIEW AND APPROVAL AT LEAST 14 CALANDER DAYS BEFORE IMPLEMENTATION. THE PLAN SHALL MEET THE REQUIREMENTS HEREIN AND SECTION 157 OF THE FP-03 AS MODIFIED IN THE SUPPLEMENTAL SPECIFICATION. SEE SPECIAL CONTRACT REQUIREMENTS FOR NPDES PERMIT REQUIREMENTS.
2. THE SILT FENCING CONSISTS OF 914 mm SEDIMENT CONTROL FABRIC CLOTH WITH BURIED-TOE, AND STEEL POSTS (TEE OR U TYPE) SPACED AT 2.0 m WITH 2mm SIZE WELDED WIRE BACK-UP FENCE.
3. WOVEN WIRE FABRIC TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 610 mm AT THE TOP AND MID-SECTION. GEOTEXTILE MATERIAL FOR SILT FENCING SHALL BE TYPE-V UNDER SUB-SECTION 714.01 OF FP-03.
4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 152 mm AND FOLDED. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED BEFORE "BULGES" DEVELOP IN THE SILT FENCE.
5. SILT FENCE SHALL BE INSTALLED PARALLEL TO THE TOE OF ALL ROADWAY EMBANKMENT FILLS IN LOCATIONS WHERE THE TOE OF THE FILLS ARE WITHIN 2.0 m OF EXISTING STREAMS, CREEKS OR WASHES; IN AREAS WITH HIGHLY EROSIVE SOILS AND/OR WHERE EMBANKMENTS ARE AT A 1:3 OR STEEPER SLOPE. THE SILT FENCE SHALL BE PLACED 1 m TO 2 m DOWNHILL FROM THE TOE OF FILL AND IN ACCORDANCE WITH SECTION 157 OF THE FP-03 AND THE SUPPLEMENTAL SPECIFICATIONS.
6. STRAW BALES MAY BE USED AT THE TOP OF CUT BACKSLOPES AND FOR DIKES PROVIDED THEY ARE PROPERLY ANCHORED WITH STEEL FENCE POSTS OR 51 mm X 51 mm X 1.22 m WOOD STAKES (TWO PER BALE) ANCHORED 508 mm INTO THE NATURAL GROUND. STRAW BALES SHALL BE CERTIFIED 0.5% WEED FREE. DO NOT USE STRAW BALES IN AREAS OF CONCENTRATED FLOW AND CUT DITCHES.
7. FURNISHING AND PLACEMENT OF SILT FENCE MATERIAL AND OTHER EROSION CONTROL MEASURES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 15701-0000, AND/OR 15708-1000.
8. SEDIMENT/SILT FENCING SHALL BE PLACED AT ALL LOCATIONS WHERE EMBANKMENTS HAVE SLOPE DISTANCES OF 30.0 m OR GREATER. THE SEDIMENT FENCING WILL BE PLACED AT THE TOE OF SLOPES OFFSET 1-2 METERS.
9. THE CONTRACTOR SHALL INSPECT AND MAINTAIN ALL SWPPP MEASURES WEEKLY AND AFTER EACH SIGNIFICANT STORM EVENT (I.E. 25 mm OF MOISTURE IN 24 HOURS).
10. PRIOR TO ACCEPTANCE, ALL PROJECT AREAS (AS DETERMINED BY THE COR/AOTR) SHOWING EROSION DAMAGE CAUSED BY THE CONTRACTOR'S FAILURE TO PROPERLY MAINTAIN HIS EROSION CONTROL STRUCTURES SHALL BE REPAIRED TO REMOVE DAMAGE, ANY SPECIFIED EROSION CONTROL MATERIALS, STRUCTURES, OR DEVICES DAMAGE OR LOST DUE TO IMPROPER INSTALLATION, THE CONTRACTOR'S NEGLIGENCE OR IMPROPER MAINTENANCE, SHALL ALSO BE REPAIRED AND/OR REPLACE PRIOR TO FINAL ACCEPTANCE AT THE CONTRACTOR'S ENTIRE EXPENSE.



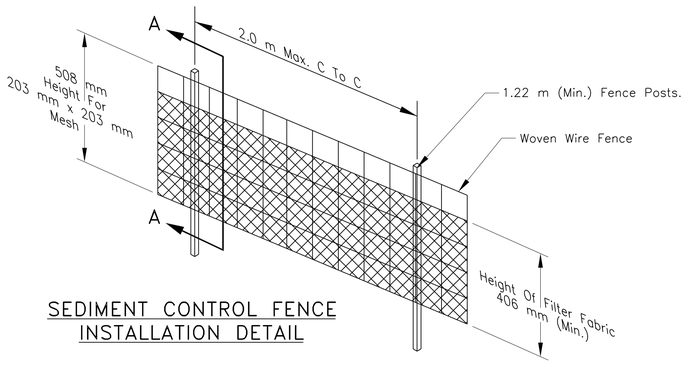
EROSION & SEDIMENT CONTROL FENCE
AT DRAINAGE STRUCTURE



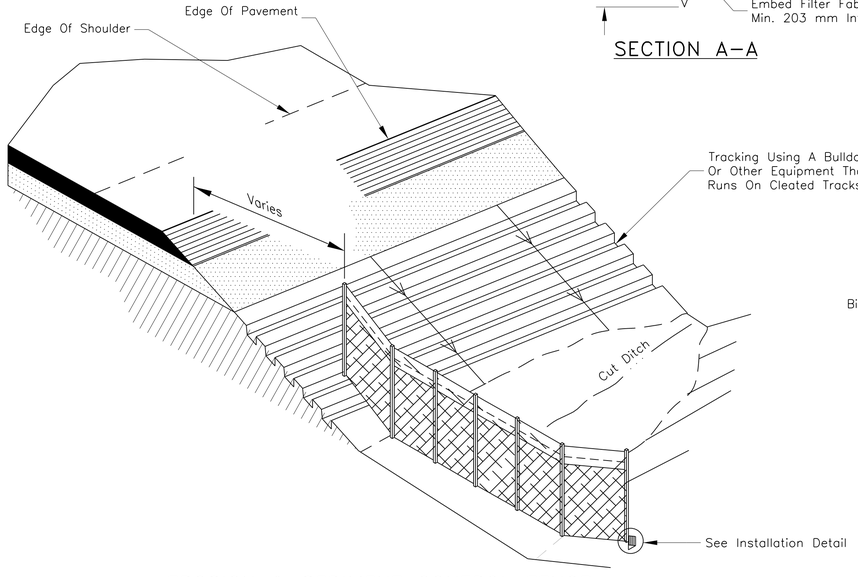
EROSION & SEDIMENT CONTROL FENCE
ALONG EDGE OF STREAM BANK (TOE OF SLOPE)



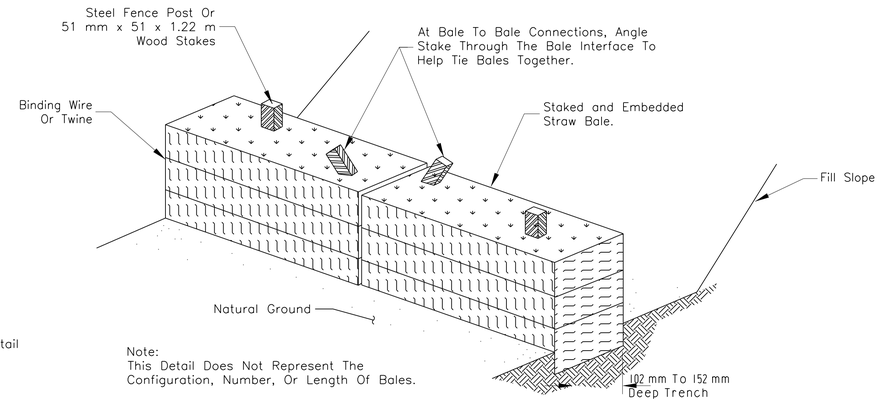
SECTION A-A



SEDIMENT CONTROL FENCE
INSTALLATION DETAIL



EROSION & SEDIMENT CONTROL FENCE
IN MINOR SWALES OR CUT DITCHES
(APPROX. 60 m SPACING FOR FABRIC)



Note:
This Detail Does Not Represent The
Configuration, Number, Or Length Of Bales.

TYPICAL STRAW BALE STAKING
AND TRENCHING DETAIL

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

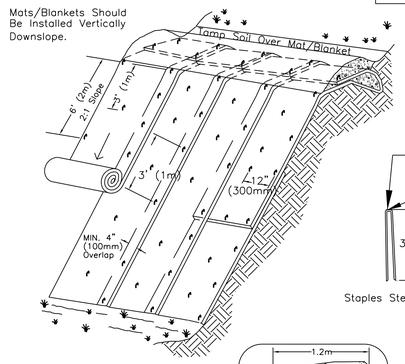
STORMWATER POLLUTION AND
EROSION/SEDIMENT
CONTROL DETAILS

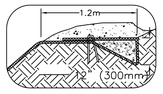
DRAWN BY: NRDOT	DATE: 8/25/2011
DESIGNED BY: NRDOT	DATE: 8/25/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 57_N31ERO1.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	58	76

SHEET REVISED
3-30-09

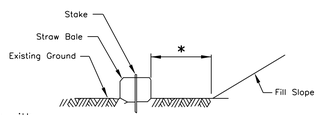




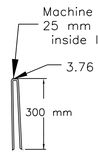
NOT TO SCALE

NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/ BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

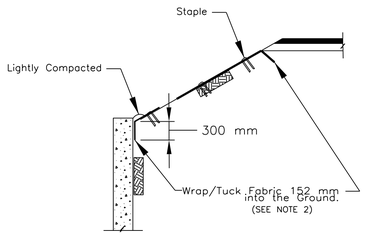
EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION



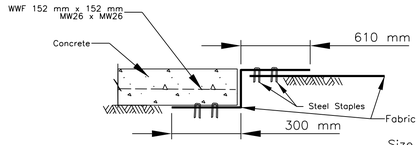
SECTION D–D
* See General Notes.



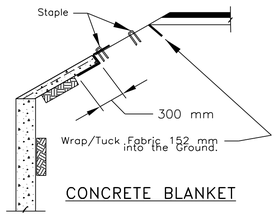
Staples Steel Wire



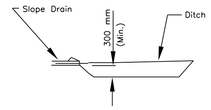
CONCRETE HEADWALL

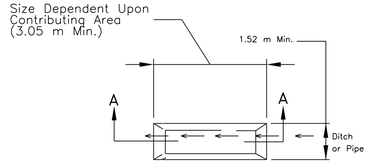


TUCKING of FABRIC AROUND CONCRETE STRUCTURE DETAIL



CONCRETE BLANKET



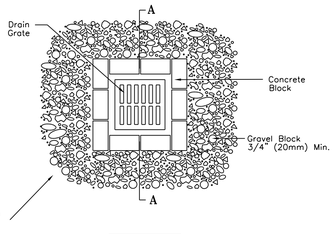


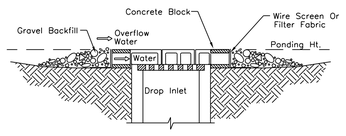
SEDIMENT TRAP
(Traps shall not fill to beyond one–half capacity prior to cleaning)

GENERAL NOTES

1. SEE SHEET 57 OF 76 FOR ADDITIONAL NOTES AND DETAILS.
2. THE CONTRACTOR SHALL INSTALL EROSION CONTROL BLANKETS, TYPE 4, SECTION 713.17(K)
   A. CONSTRUCT FINISH GRADING AROUND STRUCTURE TO BE PLACED.
   B. CUT TRENCHES FOR FOOTING OF SLAB.
   C. INSTALL 2.0 m OF EROSION CONTROL BLANKETS ANCHORED ON FLOOR AND TOP ALONG THE CUT FACE OF TREACH AS SHOWN.
   D. PLACE CONCRETE FORMS, REINFORCEMENTS AND SUBSEQUENT CONCRETE.
3. CONSTRUCT SEDIMENT BASIN AND TRAPS, EROSION CHECKS AND/OR FILTERS IN STRATEGIC LOCATIONS ON THE PROJECT TO FILTER STORM RUNOFF BEFORE IT LEAVES THE PROJECT CONSTRUCTION LIMITS OR ENTERS A STREAM AS SHOWN IN THE APPROVED SWPPP.
4. CLEAN ALL SEDIMENTS BASIN AND TRAPS OF ACCUMULATED SEDIMENT WHEN HALF FULL OF SEDIMENT.
5. USE DRAIN PIPE, RIPRAP, GEOTEXTILE FABRIC, OR GRASS–LINED WATERWAY FOR TEMPORARY SLOPE DRAINS TO CHANNEL RUNOFF DOWN SLOPES, CHANNEL WATER INTO SLOPE DRAINS WITH STRAW BALES, WATTLES, OR EARTH BERMS CONSTRUCTED AT THE TOP OF A CUT SLOPE. ANCHOR SLOPE DRAINS TO THE SLOPE.
6. THE CONTRACTOR SHALL ADJUST THE DIMENSIONS AND/OR LOCATIONS OF TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES TO FIT ACTUAL FIELD CONDITIONS.
7. REMOVE AND DISPOSE OF EROSION CONTROL MEASURES ARE SATISFACTORILY ESTABLISHED DRAINAGE DITCHES AND CHANNELS ARE LINED AND STABILIZED, IN ACCORDANCE WITH SECTION 157 OF FP–03.
8. AT CUT SLOPES SPECIFIED IN THESE PLANE TO BE COVERED WITH EROSION MATTING PROTECTION, THE COR/AOTR SHALL INSPECT THE SLOPES FOR EXISTING AND STABLE ROCK MATERIAL. IF IN THE OPINION OF THE COR/AOTR, THE CUT SLOPES ARE SUFFICIENTLY STABLE DUE TO THE NATURAL ROCK, THE CCOR/AOTR MAY DELETE THE MATTING IN THOSE AREAS.

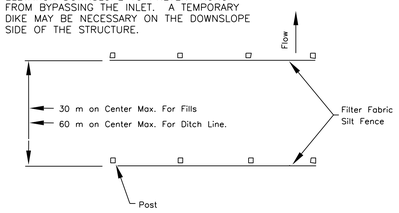
REVISED NOTES
DATE: 02/17/2011



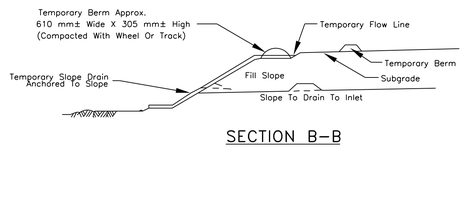


BLOCK AND GRAVEL DROP INLET SEDIMENT BARRIER

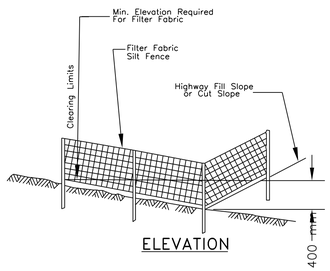
NOTES:
1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. EXCAVATE A BASIN OF SUFFICIENT SIZE ADJACENT TO THE DROP INLET.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.



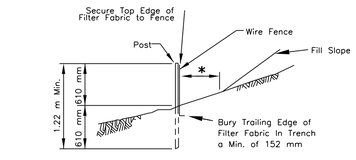
PLAN
SILT FENCE EROSION CHECK

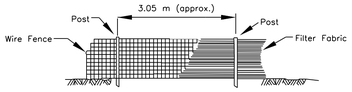


SECTION B–B

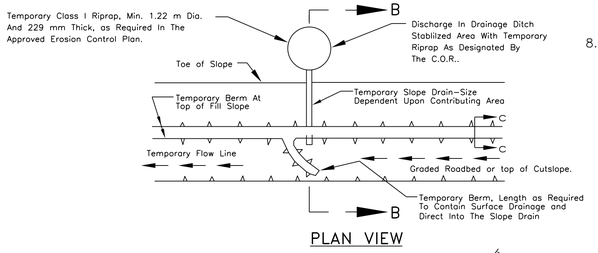


ELEVATION

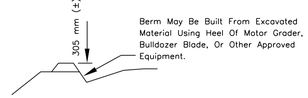




FILTER FABRIC SILT FENCE
* See General Notes.

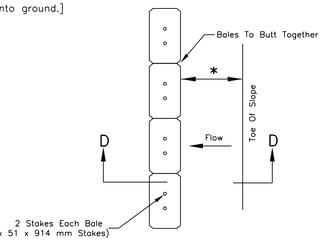


PLAN VIEW

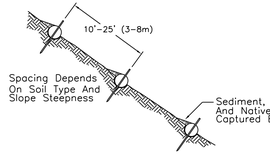


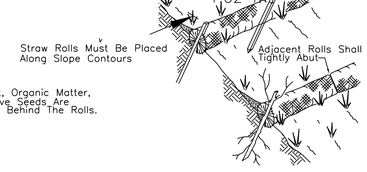
SECTION C–C

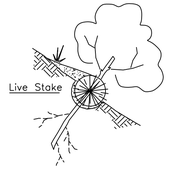
Temporary Slope Drain, Berm. (for fill and cutslopes)
[NOTE: Temporary berms may also be constructed of straw bales set 104–152mm into ground.]

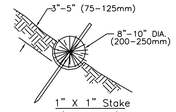


PLAN
STRAW BALE SILT BARRIER
* See general notes.





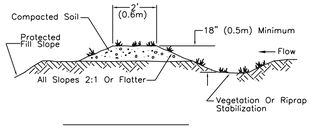


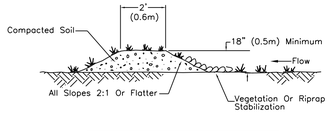


Not To Scale

NOTE:
1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"–5" (75–125mm) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.

STRAW ROLLS





(For Top Of Cut Back Slopes.)

NOTES:
1. THE CHANNEL BEHIND THE DIKE SHALL HAVE POSITIVE GRADE TO A STABILIZED OUTLET.
2. THE DIKE SHALL BE ADEQUATELY COMPACTED TO PREVENT FAILURE.
3. THE DIKE SHALL BE STABILILIZED WITH TEMPORARY OR PERMANENT SEEDING OR RIPRAP.
4. THE DIVERSION DIKE SHALL EXTEND TO THE BOTTOM OF CUT BACK SLOPE AND INTERCEPT THE CUT DITCH.

TEMPORARY DIVERSION DIKE

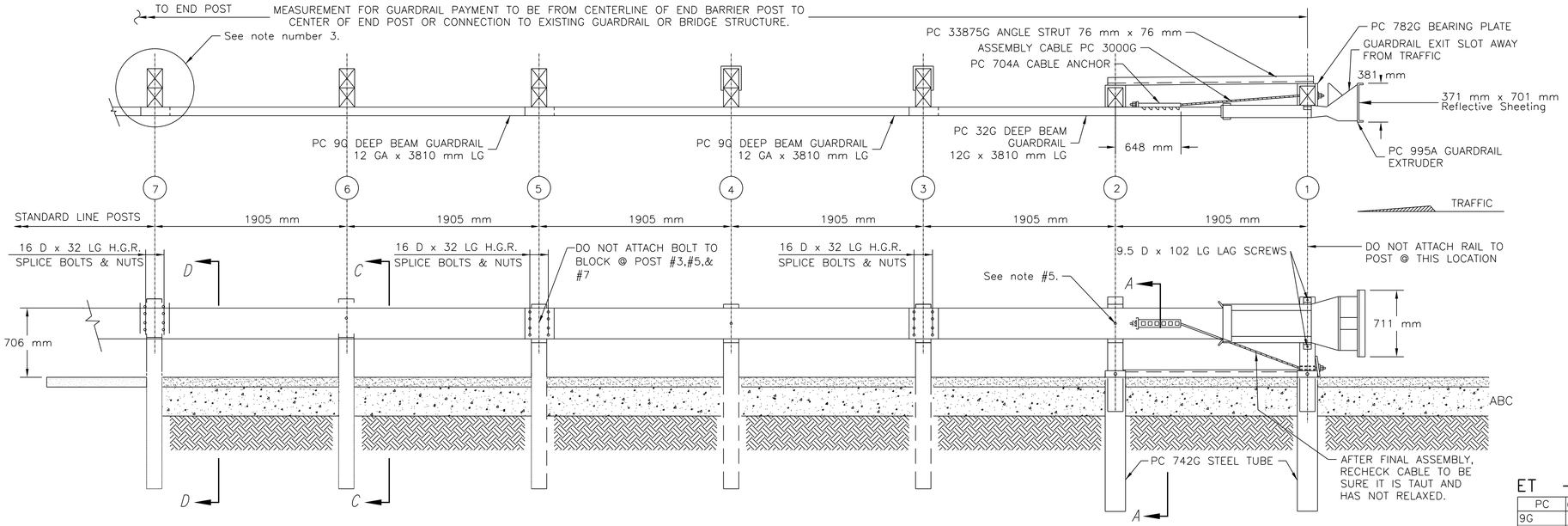
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

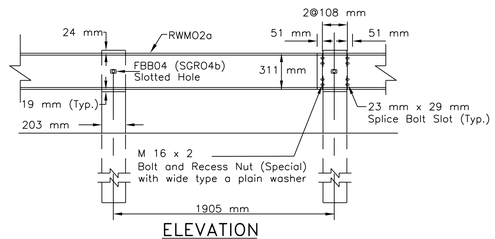
STORMWATER POLLUTION AND EROSION/SEDIMENT CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 1/31/2013
DESIGNED BY: NRDOT	DATE: 1/31/2013
REVISED: 1/31/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

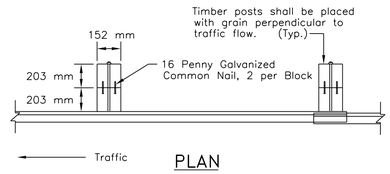
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 58_N31 ERO2.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	59	76

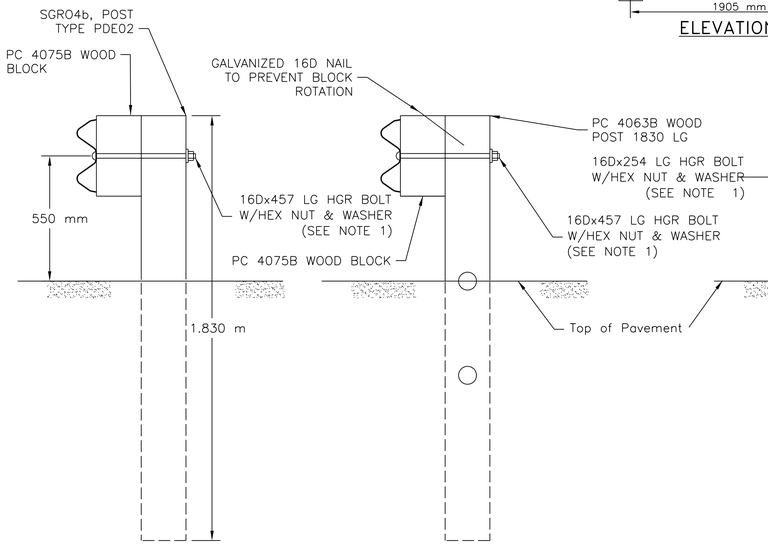




ELEVATION



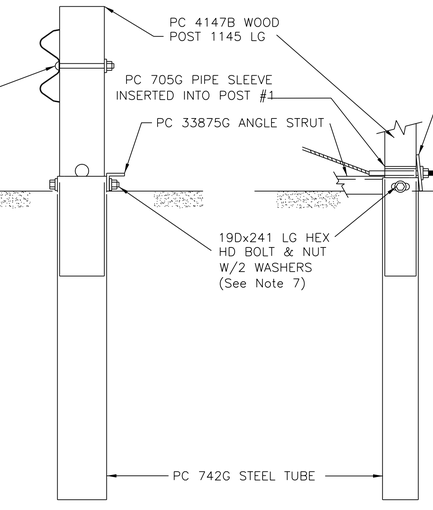
PLAN



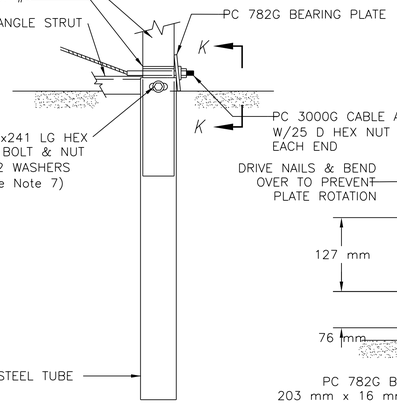
SECTION D–D
(@ POST #7 & STANDARD LINE POST)

NOTES: SECTION C–C IS SIMILAR @ POST #3,#5, & #7 EXCEPT STEEL BOLT IS NOT ATTACHED TO RAIL.

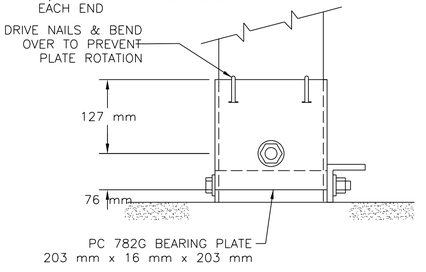
SECTION C–C
(@ POSTS #4 & #6)



SECTION A–A
(@ POST #2)



PARTIAL VIEW @ POST #1



VIEW K
(BEARING PLATE ORIENTATION)

GENERAL NOTES

1. THE 16 D FLAT WASHER IS USED UNDER THE NUT, BEHIND THE POST ONLY. NO WASHER IS USED AT THE RAIL.
2. SEE SHEET 60 OF 76 FOR ADDITIONAL NOTES.
3. THE CONTRACTOR HAS THE OPTION TO USE ALL–STEEL POSTS W/WOODEN BLOCK AFTER POST #8 ON STANDARD LINE POSTS, UNLESS OTEHERWISE NOTED ON THE DESIGN PLANS.
4. IF STEEL POSTS ARE APPROVED THEN RUBBER BLOCKS WILL BE REQUIRED AFTER POST # 8.
5. BEGIN/END ASPHALT CURB AT POST #6.
6. BEGIN REFLECTIVE TABS ON POST #2 PLACE TABS ON THE W–BEAM AT EVERY FOURTH POST. THE COLOR OF THE TABS SHALL CONFORM TO THE COLOR OF THE ADJACENT EDGE LINE.
7. ANGLE STRUT MUST BE ATTACHED USING 19D HIGH STRENGTH BOLTS.
8. BOLT MUST BE HIGH STRENGTH, INSTALL SO NUT & WASHER ARE ON TRAFFIC SIDE OF POST. (SEE VIEW K)

ET – PLUS BILL OF MATERIAL (Per Side)

PC	QTY(min.)	DESCRIPTION
9G	2	2.76/3.81/1.905/S (Guardrail)
32G	1	2.76/3.81/1.905/S ANC (Guardrail)
60G	1	2.76/3.81/1.905/S (Guardrail)
62G	1	2.76/3.81/1.905/S ANC (Guardrail)
704A	1	Cable Anchor Bracket
705G	1	Pipe Sleeve – 60mm STD. PIPE x 140 mm
740G*	2	152 mm x 203 mm x 1375 mm x 4.8 mm Tube Sleeve
742G	2	152 mm x 203 mm x 1830 mm x 4.8 mm Tube Sleeve
769G*	1	460 mm x 610 mm x 6 mm Soil Plate
782G	1	200 mm x 200 mm x 16 mm Bearing Plate
995A	1	Guardrail Extruder
3000G	1	Cable Assembly 19 mm x 1981 mm
3300G	6	16 mm Washers
3340G	30	16 mm Hgr.Nuts
3360G	24	16 mm dia. x 35 mm Hgr. Splice Bolts
3478G	1	16 mm dia. x 190 mm Hex Hd Bolt
3497G*	1	16 mm dia. x 240 mm Hex Hd Bolt
3500G	1	16 mm dia. x 255 mm Hgr Post Bolt
3580G	5	16 mm dia. x 460 mm Hgr Post Bolts
3700G	2	19 mm Hgr Nut
3704G	4	19 mm Washer
3900G	2	25 mm Washer
3910G	2	25 mm Hex Nut
4063B	5	Wood Post – 150 mm x 200 mm x 1830 mm
4075B	5	Wood Post – 150 mm x 200 mm x 350 mm DR
4147B	2	Wood Post – 140 mm x 190 mm x 1145 mm
4228B	2	10 mm x 100 mm Lag Screws
5148G	2	19 mm dia. x 240 mm Hs Hex Hd Bolts
9852A**	1	Strut
33875	1	1980 mm Angle Strut
62066	1	371 mm x 701 mm Reflective Sheeting – Right Side
6207B	1	371 mm x 701 mm Reflective Sheeting – Left Side

* Option to the 1830 mm Post Sleeve Tube
** Option to PC – 33875G

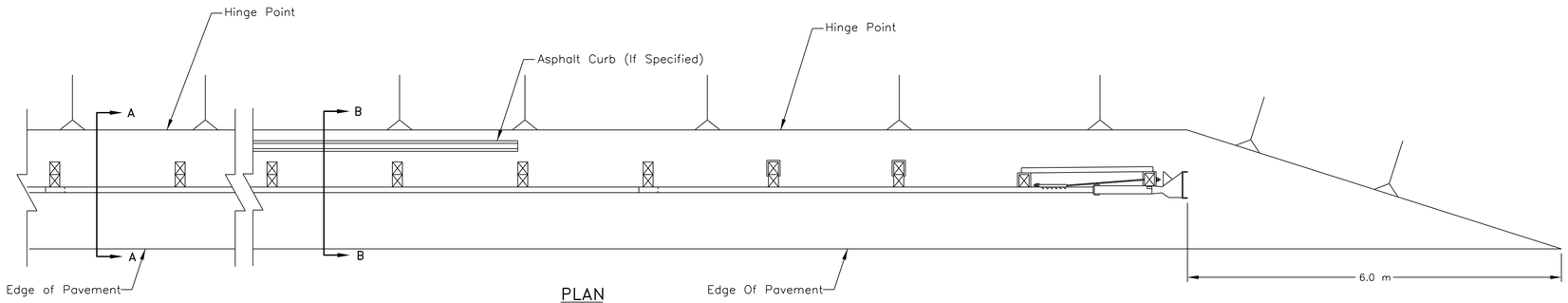
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD GUARDRAIL BARRIER
END TREATMENT ET PLUS
FOR DESIGN SPEED <= 60 km/h

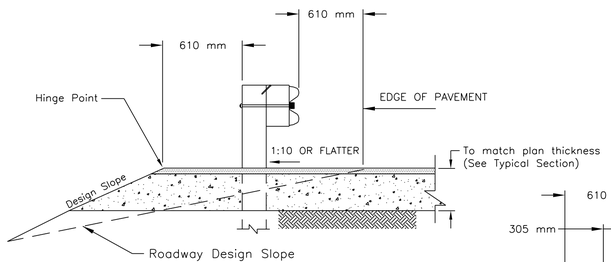
DRAWN BY: NRDOT	DATE: 1/19/2011
DESIGNED BY: NRDOT	DATE: 1/19/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 59_N31ETPlus2.dgn

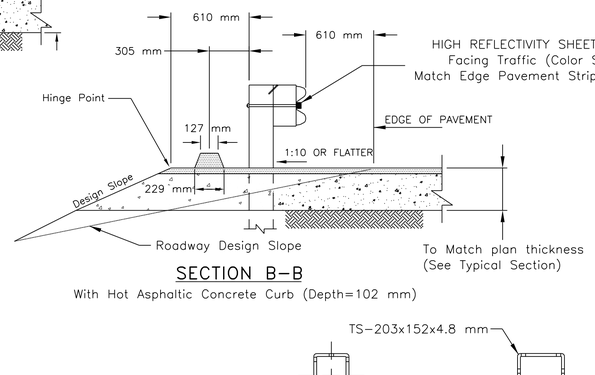
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	60	76



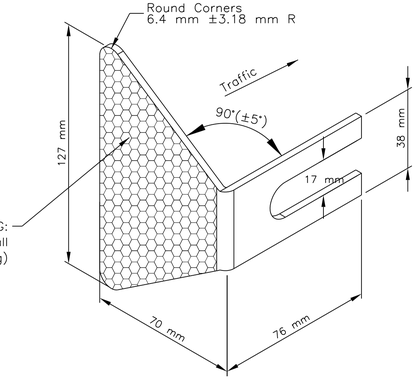
PLAN



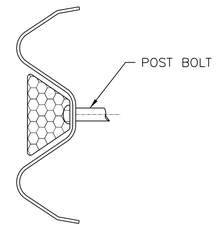
SECTION A–A
Without Asphalt Curb



SECTION B–B
With Hot Asphaltic Concrete Curb (Depth=102 mm)



REFLECTOR TAB



MOUNTING POSTION ON
GUARD RAIL TYPE 3
(Install on Every Fourth
Post Starting w/ Post #2)

GENERAL NOTES

1. ALL GUARDRAIL "W" BEAMS, END TREATMENT, AND TERMINAL CONNECTIONS SHALL BE GALVANIZED IN ACCORDANCE WITH (AASHTO M–180, CLASS A, TYPE 1) SPECIFICATION. ALL HARDWARE SHALL CONFORM TO (ASTM A–325) AND GALVANIZED IN ACCORDANCE WITH (ASTM A–153).

2. ALL STRUCTURAL STEEL ITEMS SHOWN SHALL CONFORM TO (AASHTO N183/ASTM A36) AND BE GALVANIZED IN ACCORDANCE WITH (AASHTO M–111) SPEACIFICATION.

3. WIRE ROPE, FITTINGS AND HARDWARE SHALL CONFORM TO (ASSHTO M–30) SPECIFICATION TYPE II WITH A 19 mm DIAMETER AND A CLASS B ZINC COATING.

4. WOOD POSTS AND BLOCKS SHALL BE ROUGH SAWN LUMBER OR (S4S) HAVING MINIMUM BENDING STRENGTH OF 8.27 MPa (SINGLE MEMBER USE) AND MEETING AASHTO N168 (21TH EDITION), ALL POSTS SHALL BE TREATED IN ACCORDANCE WITH (AASHTO M–133) SPEACIFICATION.

5. ASPHALT CONCRETE CURBING SHALL BE INSTALLED IN ACCORDANCE WITH SECTION B–B, AND THE TABLE SHOWN ON SHEET 5 OF 76 AND CONSIDERED INCIDENTAL TO PAVING ITEMS AND NO DIRECT PAYMENT SHALL BE MADE.

6. ALL EMBANKMENT AND AGGREGATE BASE COURSE MATERIALS SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY.

7. THE EMBANKMENT MATERIALS AND THE PLACING THEREOF SHALL BE INCLUDED IN CONTRACT ITEM 20401–0000 AND NO DIRECT PAYMENT SHALL BE MADE.

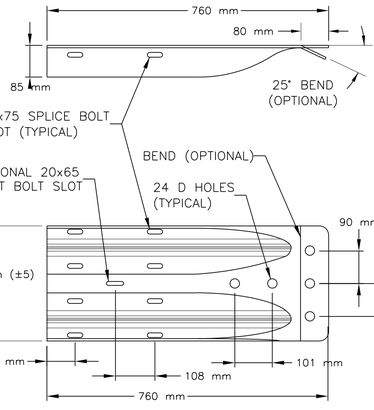
8. THE CONTRACTOR SHALL BE REQUIRED TO COMPACT THE BACKFILL AND THE ASPHALT ALL AROUND EACH GUARD RAIL POST WITH HAND TAMPERS TO INSURE INTEGRITY OF THE PAVEMENT AND GUARDRAIL AND TO PREVENT SEEPAGE OF WATER INTO THE PAVEMENT FROM THE GUARD RAIL POST HOLES. THIS WORK SHALL BE INCIDENTAL OBLIGATIONS OF THE WORK DESCRIBED HEREIN.

9. THE COST OF THE ET PLUS ASSEMBLY AND THE PLACING THEREOF SHALL BE CONSIDERED INCIDENTAL TO ITEM 61701–5000, WHICH INCLUDES BREAKAWAY POSTS, STEEL TUBE ASSEMBLIES AND HARDWARE.

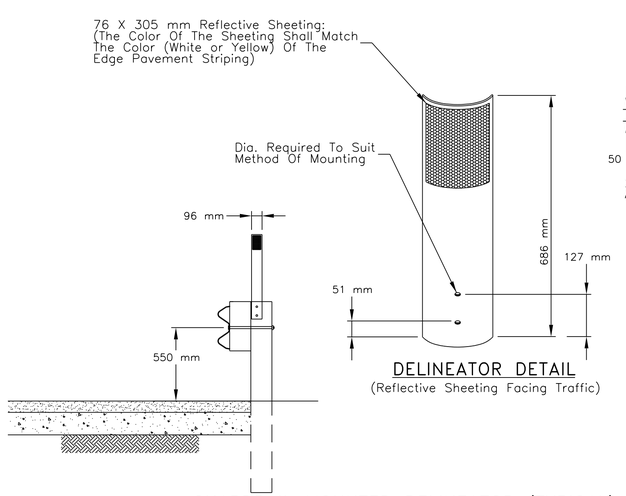
10. PLACEMENT OF HOT ASPHALT AND ABC MATERIAL FOR GUARDRAIL WIDENING SHALL BE INCLUDED WITH ITEMS 30101–2000 AND 40201–0500.

11. FURNISHING & PLACEMENT OF 371 mm x 701 mm REFLECTIVE SHEETING AND REFLECTIVE TABS SHALL BE CONSIDERED INCIDENTAL TO ITEM 61701–5000 AND NO DIRECT PAYMENT SHALL BE MADE.

12. ANY RELATED PATENT RIGHTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AS PER SECTION 107.01 OF THE FP–03.



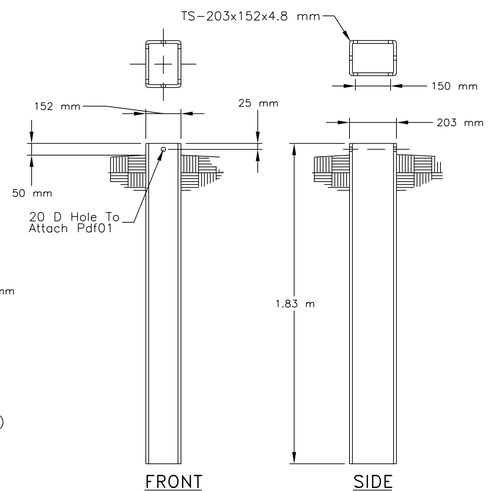
TERMINAL CONNECTOR



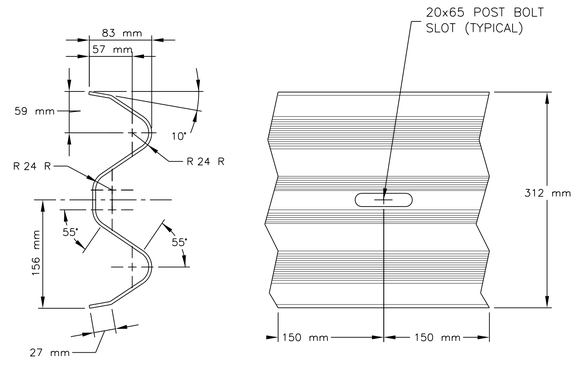
DELINEATOR DETAIL
(Reflective Sheeting Facing Traffic)

GUARDRAIL MOUNTED DELINEATOR (TYPICAL)

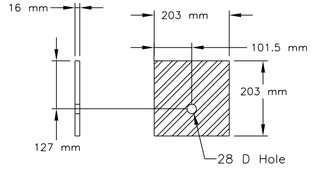
The Delineator Shall Be Placed At 5.72 Meter Spacing, Around The Outside Of Horizontal Curve, Or Where The Guardrail Conflicts With Type "1a" Delineator Located On Tangent Segment Of Roadway.



FOUNDATION TUBE



SECTION THRU GUARDRAIL ELEMENT



BEARING PLATE

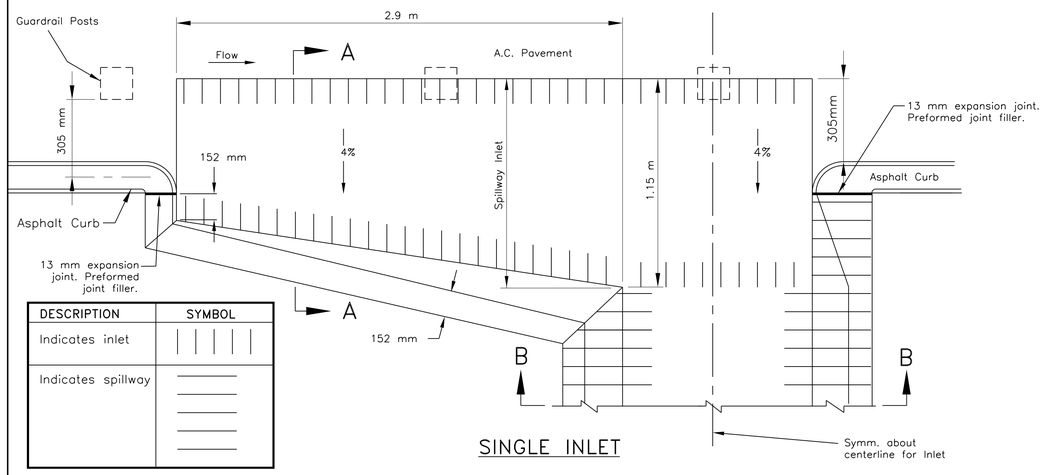
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD GUARDRAIL ET PLUS

DRAWN BY: NRDOT	DATE: 5/15/2013
DESIGNED BY: NRDOT	DATE: 5/15/2013
REVISED: 7/31/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

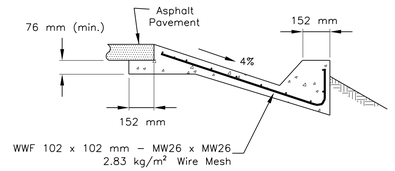
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 60_N31ETPlus3.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	61	76



DESCRIPTION	SYMBOL
Indicates inlet	| | | | |
Indicates spillway	———

SINGLE INLET



SECTION A–A

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS OR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) ALONG WITH ALL SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.

2. ANY UNSUITABLE MATERIAL ENCOUNTERED DURING THE FOOTING EXCAVATIONS SHALL BE REMOVED AS DIRECTED BY THE COR/AOTR AND REPLACED WITH STRUCTURAL BACKFILL MATERIAL CONFORMING TO SECTION 704.04 OF FP-03 AND SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF STRUCTURES.

3. ALL STONE FOR RIPRAP TO BE CLASS II MEETING THE GRADING REQUIREMENTS OF TABLE 705-1; SECTION 251 OF THE FP-03, CLASS 2.

4. ALL EXCAVATION AND BACKFILL OPERATIONS SHALL BE DONE TO NEAT LINES IN ACCORDANCE WITH SECTION 204 OF THE FP-03, AND THE DETAILS SHOWN. THIS WORK SHALL BE INCIDENTAL TO INSTALLATION OF RIPRAP AND SPILLWAY.

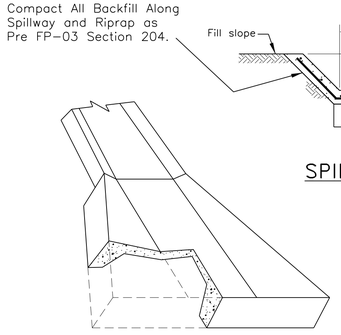
5. THE CONTRACTOR SHALL BE REQUIRED TO MAKE ANY ADJUSTMENTS IN THE FIELD TO MATCH EXISTING FIELD CONDITIONS. THESE FIELD ADJUSTMENTS ARE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.

6. CONCRETE FOR THE SPILLWAY INLET, SPILLWAY AND OUTLET SHALL BE CLASS A(AE) MEETING THE CONSTRUCTION REQUIREMENT OF SECTION 601 OF THE FP-03.

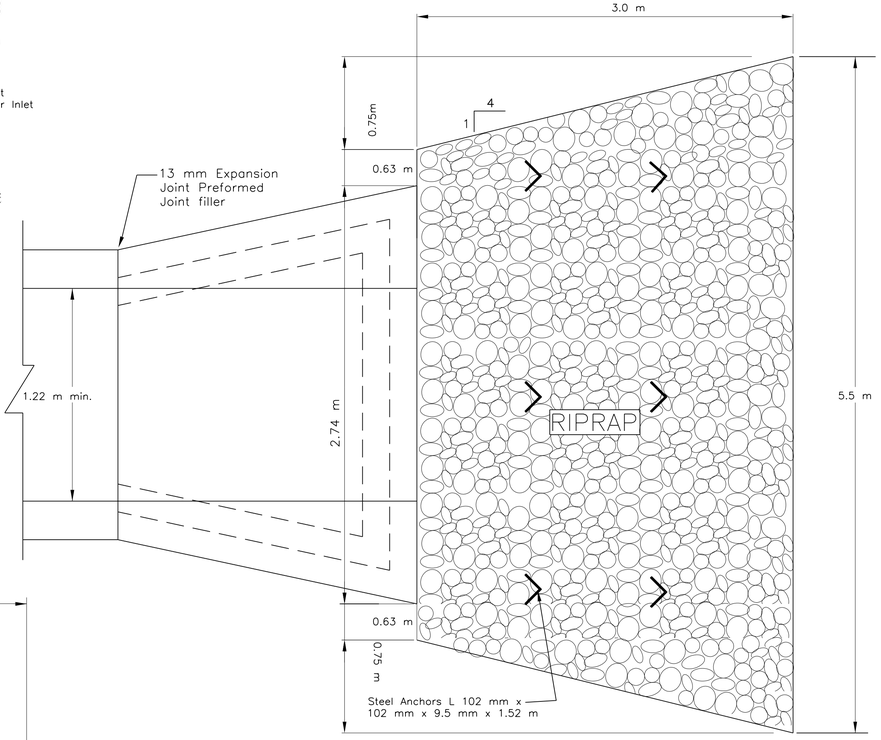
7. WELDED WIRE FABRIC FOR THE SPILLWAY SHALL CONFORM TO ASTM A185; MADE OF SMOOTH WIRE OR A497; IF MADE OF DEFORMED WIRE, FURNISHING AND PLACEMENT OF THE WELDED WIRE FABRIC SHALL BE CONSIDERED INCIDENTAL TO ITEM 60812-0400.

8. WHEN CONSTRUCTING OUTLET, THE WIRE MESH SHALL EXTEND THROUGH THE JOINT INTO THE OUTLET IN LIEU OF BENDING INTO THE KEY.

9. SEE SHEETS 51 OF 76 FOR GENERAL RIPRAP NOTES AND DETAILS.



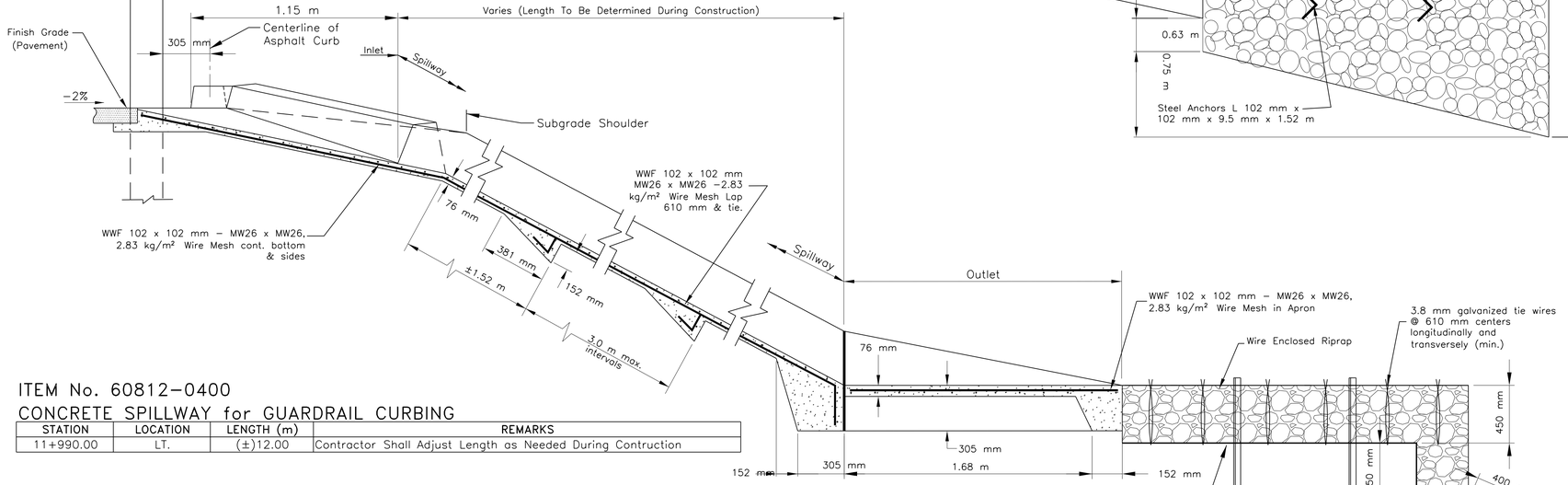
SPILLWAY SECTION B–B



OUTLET DETAIL

ITEM No. 25112-2000, WIRE ENCLOSED RIPRAP, CLASS 2, GUARDRAIL SPILLWAY

STATION	LOCATION	VOLUME (m^3)
11+990.00	LT.	7.20
	TOTAL	7.20



SECTION ON SPILLWAY CENTERLINE

ITEM No. 60812-0400
CONCRETE SPILLWAY for GUARDRAIL CURBING

STATION	LOCATION	LENGTH (m)	REMARKS
11+990.00	LT.	(±)12.00	Contractor Shall Adjust Length as Needed During Contruction

REVISED
02/17/2011

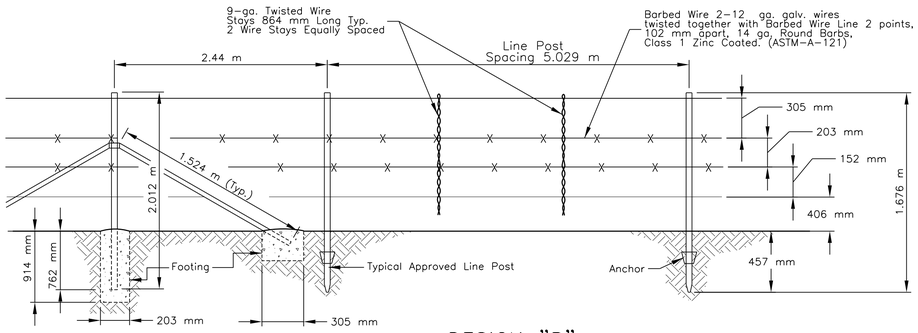
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD GUARDRAIL CONCRETE SPILLWAY DETAIL WITH WIRE ENCLOSED RIPRAP

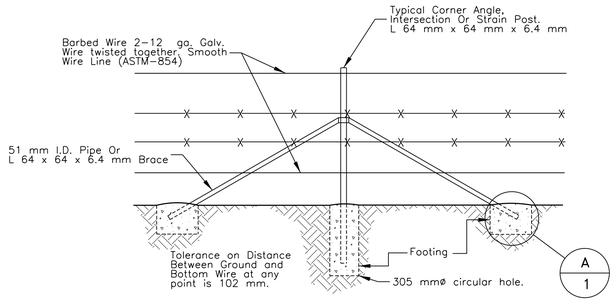
DRAWN BY: NRDOT	DATE: 8/25/2011
DESIGNED BY: NRDOT	DATE: 8/25/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 61_N31 Grail_ConcSPLW.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	62	76

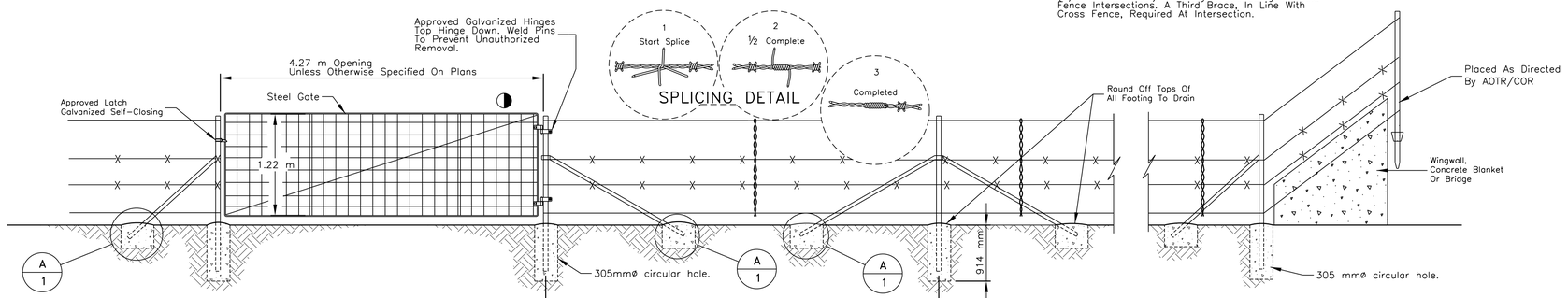


DESIGN "B"



STANDARD STRAIN POST

To Te Placed @ 198 m Max. Intervals. Strain Posts With Braces Shall Be Installed At All Corners (R/W Corners Etc.) And Angles Exceeding 15° And Fence Intersections. A Third Brace, In Line With Cross Fence, Required At Intersection.



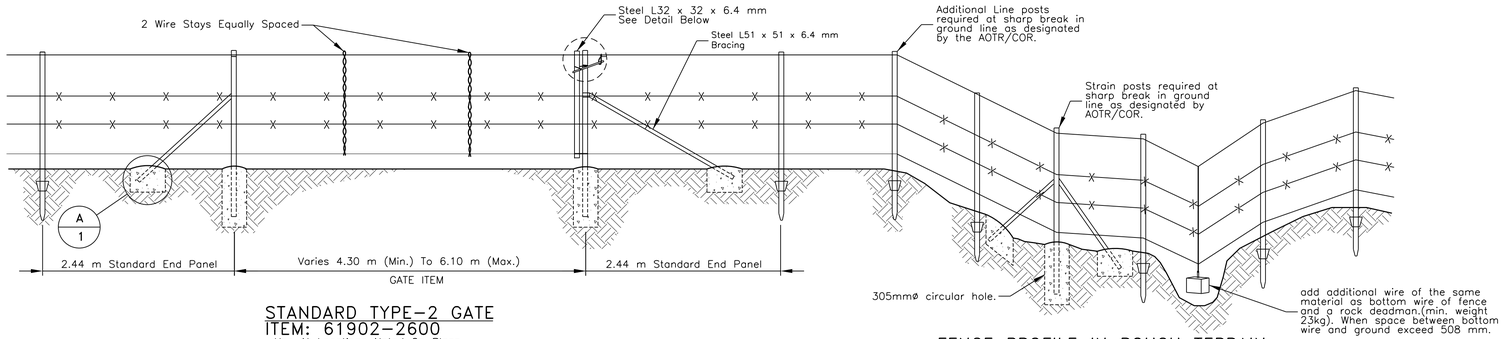
NOTES: When Tubular Post Hangers and/or Latches are used, it shall be drilled for a single 2.38 mm ø Min. drive pin to prevent rotation of the hangers and/or latches.

STANDARD 4.27m TYPE 1 GATE
ITEM: 61902-1300

Set Gate to be self closing (use only when specified by special note in the plans)For Gate Details at Cattle guard location see standard cattle guard drawings.

◑ 35 mmø Tubing 2 Vert. Braces Mesh □, △, ◇, 3.2 mmø Line Wires 2.6 mmø Crosswires. 1 Adjustable Diagonal Guy Fully Galvanized.

END POST



STANDARD TYPE-2 GATE
ITEM: 61902-2600

Use At Locations Noted On Plans

FENCE PROFILE IN ROUGH TERRAIN

In Rough Terrain Post Spacing Shall Be Reduced Where Necessary To Maintain Required Spacing Below Bottom Wire Within The Tolerance Allowed.

GENERAL NOTES

1. CORNER, GATE, INTERMEDIATE BRACE POSTS AND LINE POSTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 281-96. METAL POST AND BRACES SHALL BE FABRICATED FROM RAIL, BILLET, OR COMMERCIAL GRADE STEEL CONFORMING WITH THE REQUIREMENT OF ASTM A 702. ALTERNATIVELY THE POSTS CAN BE PAINTED PER SECTION 710.04(C)(1).

2. LINE POSTS SHALL BE FABRICATED IN ACCORDANCE WITH AASHTO M 281-96, AND SHALL BE A NOMINAL WEIGHT OF 1.98 kg/m, EXCLUSIVE OF ANCHOR PLATES. ANCHOR PLATES SHALL BE CLAMPED, WELDED OR RIVETED TO THE SECTION IN SUCH A MANNER AS TO PREVENT DISPLACEMENT WHEN THE POSTS ARE DRIVEN.

3. WHEN LINE POST ANCHORS ARE OMITTED, DUE TO CHANGE IN SOIL CONDITIONS SUCH AS ROCK, THEN THE POSTS SHALL BE SET IN CONCRETE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 61901-3400.

4. TIE WIRE, WIRE FASTENERS OR WIRE CLIPS FOR FASTENING BARBED AND WOVEN FABRIC FENCING TO THE STEEL POSTS SHALL BE 3.0 mm DIA. STEEL WIRE, CLASS 1 (ZINC COATED), SOFT TEMPER AND MEET THE REQUIREMENTS OF ASTM A 641. FURNISHING AND PLACEMENT OF FASTENERS SHALL BE INCLUDED WITH ITEM 61901-3400.

5. CONCRETE FOR ANCHORS, POST HOLES, ETC. SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa IN 28 DAYS AND SHALL CONFORM TO SECTION 601 OF THE FP-03. FURNISHING AND PLACEMENT OF CONCRETE SHALL BE INCLUDED WITH ITEM 61901-3400.

6. TWO SPLICES ON THE SAME LINE BETWEEN THE STRAIN POST ASSEMBLIES SHALL NOT BE PERMITTED. NO SPLICES SHALL BE PLACED CLOSER THAN 30 METER OF ANY POST ASSEMBLIES.

7. UNLESS NOTED ON THE PLANS AS INSTALLING THE ROW FENCING OVER THE DRAINAGE STRUCTURE, CONNECT ALL R.O.W. FENCING TO CATTLE GUARDS, CULVERTS (GREATER THAN 1524 mm DIA.), AND CONCRETE STRUCTURES AS SHOWN ON THESE PLANS, AND/OR AS DIRECTED BY THE COR/AOTR.

8. ANY CONFLICT IN PLACEMENT OF THE R/W FENCING AT DRAINAGE PIPE LOCATION, DUE TO NARROW R/W WIDTH OR OTHER CONSTRICTIONS, THE FENCE MAY BE PLACED OVER THE DRAINAGE STRUCTURE WITH FENCE POST SPACING BEING REDUCED WHERE NECESSARY SO THAT POSTS ARE DRIVEN BETWEEN PIPES. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 61901-3400.

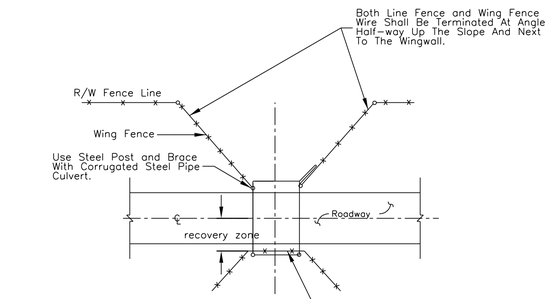
9. CLEARING AND GRUBBING SHALL INCLUDE SHAPING AND/OR REMOVAL OF SMALL MOUNDS NECESSARY TO PRESENT A SMOOTH UNIFORM APPEARANCE OF BOTH GROUND AND FENCING LINE. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING AND NO ADDITIONAL PAYMENT SHALL BE MADE.

10. ALL DRILLING INTO ROCK MATERIAL, ETC. SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING AND NO ADDITIONAL PAYMENT SHALL BE MADE.

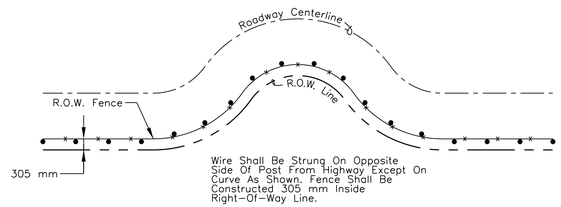
11. GATE CLOSURE DEVICE SHALL BE STEEL PIPE, NPS 3/4 (26.7 mmø) SCHEDULE 40, CONFORMING TO THE REQUIREMENT OF ASTM A 53. THE GATE CLOSURE STEEL CHAIN SHALL BE WELDED TO THE STEEL PIPE AND ANGLE IRON FENCE POST. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING AND NO ADDITIONAL PAYMENT SHALL BE MADE.

12. CONTRACTOR SHALL BE REQUIRED TO INSTALL SAG WEIGHTS WHERE VERTICAL CLEARANCE BETWEEN THE BOTTOM WIRE AND NATURAL GROUND IS 610 mm OR GREATER. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING.

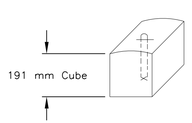
13. THE CONTRACTOR SHALL SUBMIT COMPLETE DETAILED SHOP DRAWINGS FOR PEDESTRIAN GATE, HINGES AND LATCH TO PLANNING AND DESIGN CHIEF, THROUGH THE CO, FOR REVIEW AND APPROVAL. GATE POSTS AND BRACES, HINGES AND HATCH TO MATCH STANDARD TYPE 1 GATES. MINIMUM GATE FRAME TO BE CONSTRUCTED WITH 30 mm DIAMETER PIPE. GATE SHALL E SELF CLOSING.



WING FENCE @ STRUCTURE DETAIL



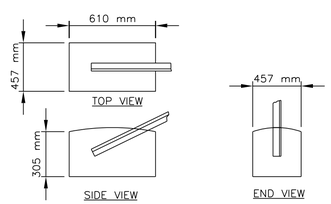
TYPICAL STEEL POST SECTION



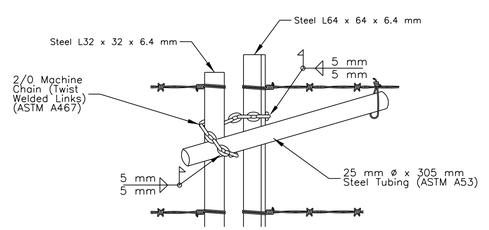
38 mm x 127 mm Doubled and Twisted 3.8 mm(dia.) Wire Loop Centered in Block. 25.4 mm Projection Twisted Ends Down.

CONCRETE SAG WEIGHT DETAIL

Min. Weight Of Concrete Sag Shall Be 16 kg.



CONCRETE FOOTING FOR CORNER & STRAIN POST (A/1)



GATE SECURING DETAIL

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

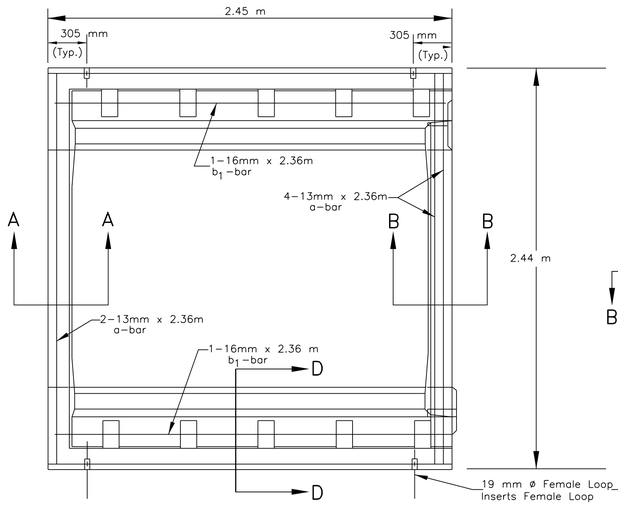
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD WILDLIFE FENCING DETAIL

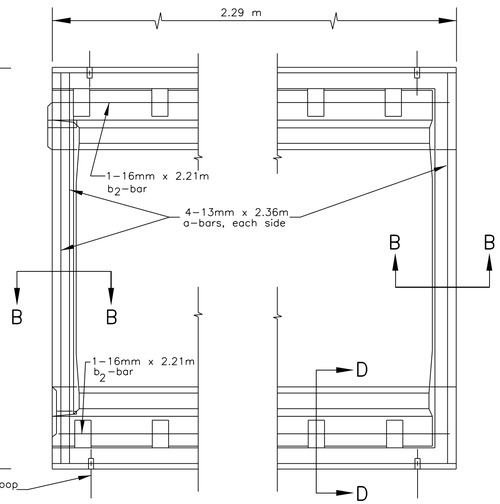
DRAWN BY: NRDOT	DATE: 1/14/2011
DESIGNED BY: NRDOT	DATE: 1/14/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

i:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Snt 62_N31Spl_Wildlife fence.dgn

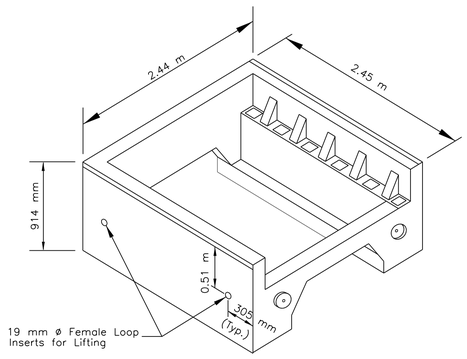
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	63	76



PLAN – END UNIT



PLAN – INTERMEDIATE UNIT



ISOMETRIC VIEW – END UNIT

GENERAL NOTES

1. PRECAST CONCRETE SHALL ATTAIN 28–DAY COMPRESSIVE STRENGTH OF 27.62 MPA (MINIMUM) IN ACCORDANCE WITH AASHTO T22 (ASTM C–39). THE CONCRETE SHALL BE CLASS A(AE) CONFORMING TO SECTION 552 OF FP–03.

2. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 420. ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M–183.

3. THE CONTRACTOR SHALL SLOPE THE BASES OF THE CATTLE GUARDS AS REQUIRED TO PROVIDE ROADWAY CROWNS OR SUPERELEVATION AS SHOWN ON THE PLANS.

4. BOLTS, WASHERS, AND NUTS SHALL BE GALVANIZED TO MEET THE REQUIREMENTS OF AASHTO M111 OR AASHTO M298.

5. ALL TRAFFIC GRILL UNIT, AND WING BRACE STRUCTURAL STEEL AND PIPE, INCLUDING THE STEEL ANGLES SHALL RECEIVE ONE (1) PRIMER COAT, ONE (1) INTERMEDIATE COAT, AND ONE (1) FINISH COAT IN ACCORDANCE WITH SECTION 563, PAINT SYSTEM 2, OF FP–03.

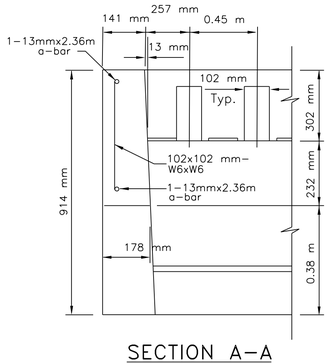
6. WING BRACES SHALL BE CONSIDERED SUBSIDIARY ITEMS TO THE CATTLEGUARD UNIT.

7. THE CONTRACTOR HAS THE OPTION TO USE ALL STEEL FRAME CATTLEGUARD. IF THE CONTRACTOR ELECTS TO SUBSTITUTE FOR THE STEEL FRAME CATTLEGUARD, CONTRACTOR SHALL SHOW THEY ARE MORE COST EFFECTIVE WITH SUPPORTING DATA. THE CONTRACTOR IS RESPONSIBLE FOR ALL PATENT PROTECTION RIGHTS, SHOP DRAWINGS, MATERIAL CERTIFICATIONS, AND MILL TEST REPORTS. HOWEVER, NO STEEL FRAME CATTLEGUARD SHALL BE USED FOR CONCRETE DRAINAGE PAD CATTLEGUARD LOCATIONS.

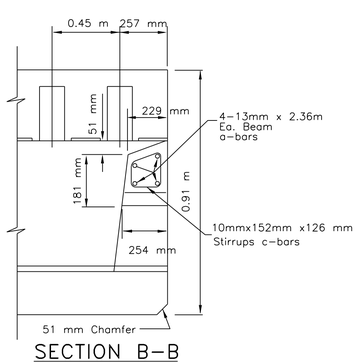
8. ELASTOMERIC BEARING PADS SHALL BE SEAL WITH EPOXY ADHESIVE PRIOR TO THE INSTALLATION OF TRAFFIC GRILL UNIT.

9. DESIGN DATA: DESIGN ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, THIRD EDITION.

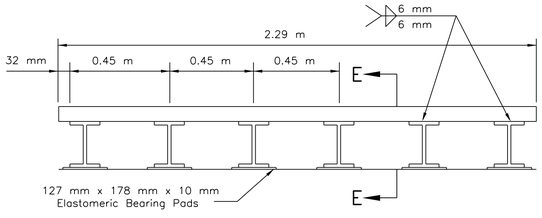
   DESIGN LOADS: HS20 AND DESIGN TANDEM WITH 33% IMPACT.



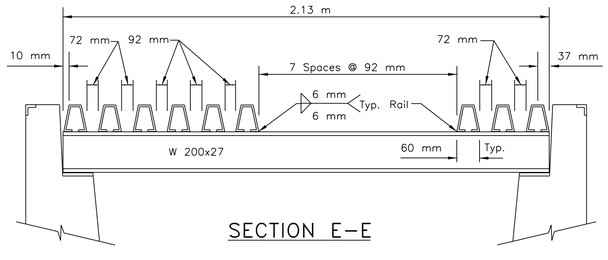
SECTION A–A



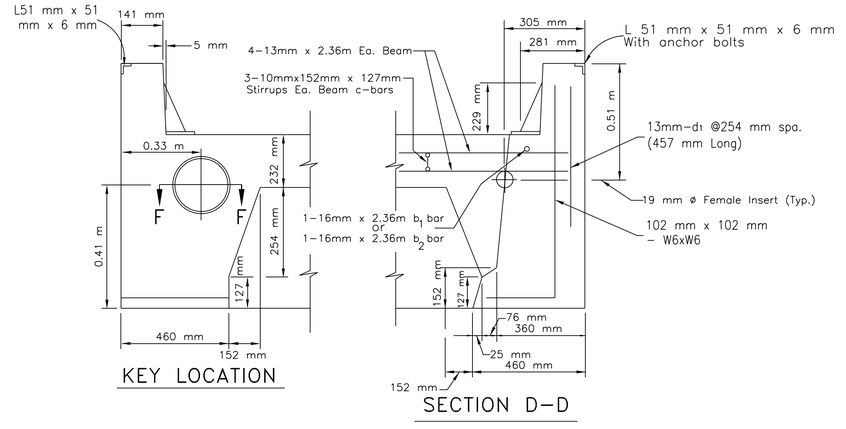
SECTION B–B



TRAFFIC GRILLE UNIT

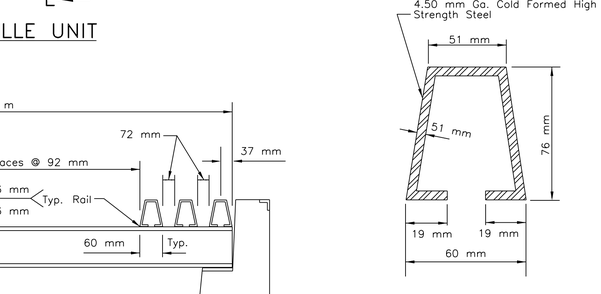


SECTION E–E



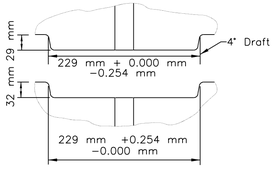
KEY LOCATION

SECTION D–D

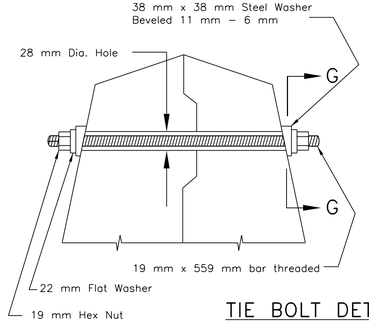


STEEL CROSSBAR SECTION

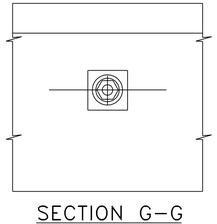
15 Req'd for 1 Grid



SECTION F–F



TIE BOLT DETAIL



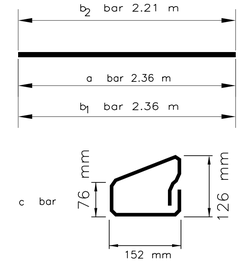
SECTION G–G

REINFORCING STEEL SCHEDULE

STRAIGHT BARS				BENT BARS			
MARK	NO.	SIZE	LENGTH	MARK	NO.	SIZE	LENGTH
END UNIT							
a	6	13	2.36 m				
b_1	2	16	2.36 m				
				c	3	10	0.61 m
D_1	20	13	0.46 m				
INTERMEDIATE UNIT							
a	8	13	2.36 m				
b_2	2	16	2.21 m				
				c	6	10	0.61 m
D_1	18	13	0.46 m				

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRECAST CONCRETE CATTLEGUARD DETAILS

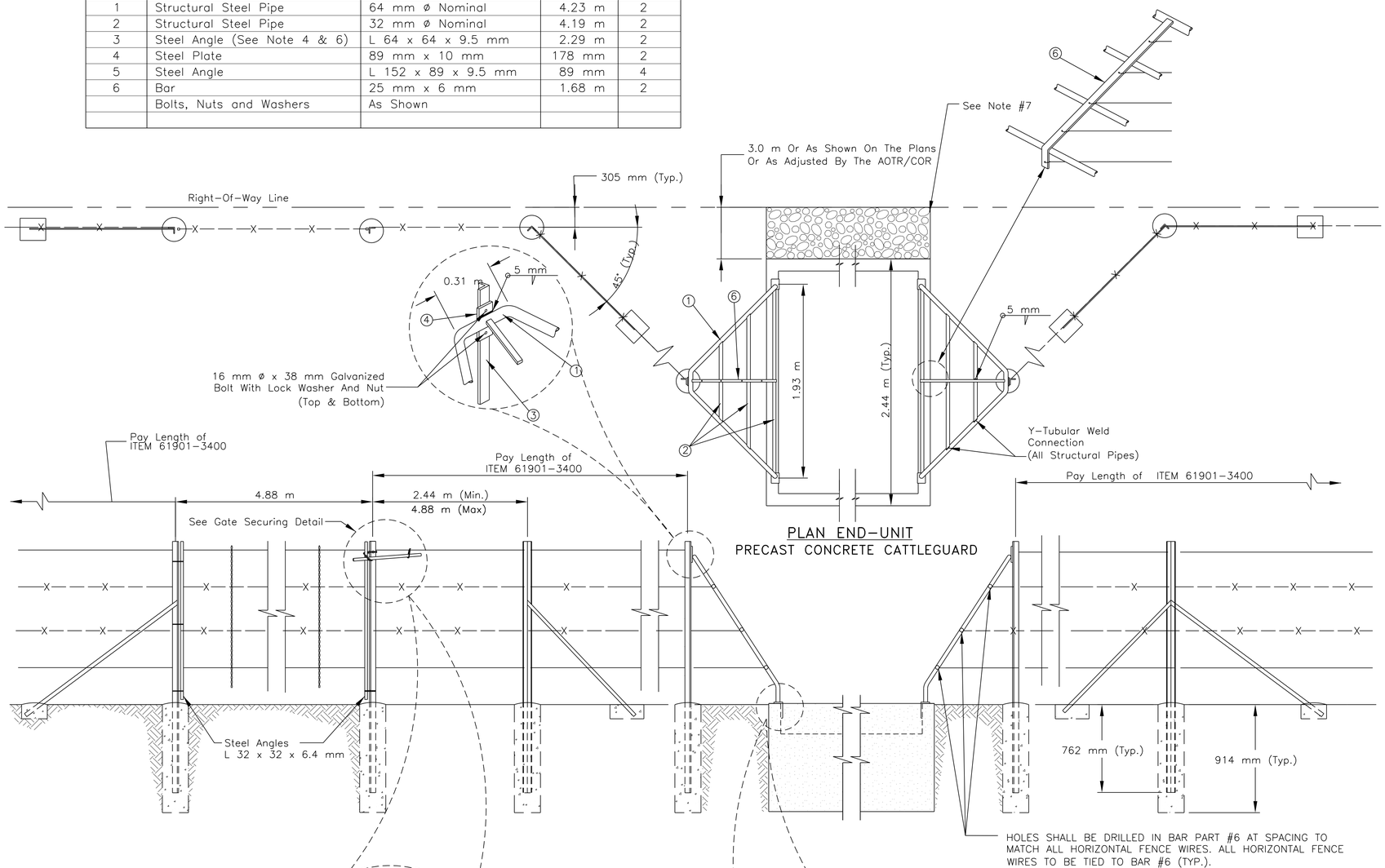
DRAWN BY: NRDOT	DATE: 8/25/2011
DESIGNED BY: NRDOT	DATE: 8/25/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 63_N31 pccg.dgn

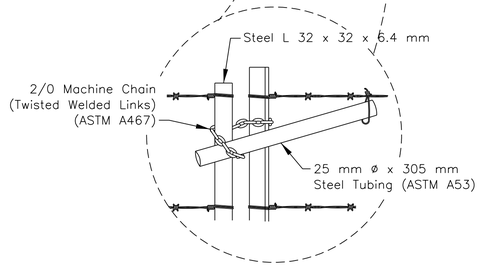
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	64	76

ESTIMATED MATERIAL LIST

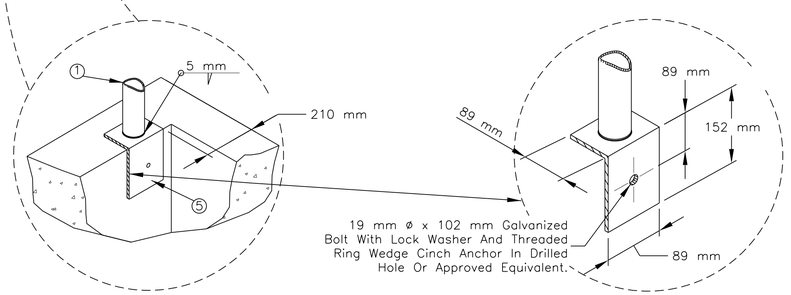
PART NO.	MATERIAL	SIZE AND THICKNESS	LENGTH	QUANTITY
1	Structural Steel Pipe	64 mm ø Nominal	4.23 m	2
2	Structural Steel Pipe	32 mm ø Nominal	4.19 m	2
3	Steel Angle (See Note 4 & 6)	L 64 x 64 x 9.5 mm	2.29 m	2
4	Steel Plate	89 mm x 10 mm	178 mm	2
5	Steel Angle	L 152 x 89 x 9.5 mm	89 mm	4
6	Bar	25 mm x 6 mm	1.68 m	2
	Bolts, Nuts and Washers	As Shown		



PLAN END-UNIT
PRECAST CONCRETE CATTLEGUARD



GATE SECURING DETAIL



GENERAL NOTE:

1. Structural pipe shall conform to ASTM A53-93a, Grade B. All other structural steel shall conform to ASTM-A36.
2. All structural pipe joints shall be fabricated in accordance with AISC Manual of Steel Construction, Latest Edition.
3. Welding shall meet the requirements of AASHTO Standard Specifications for Welding at Structural Steel Highway Bridges, Latest Edition.
4. The supporting wing brace posts length (part 3) shall provide a minimum of 610mm of soil penetration. Under certain conditions (such as drain through cattleguard, high embankment, etc) the length of the post may vary to fully support the wing braces. This work shall be incidental to contract item 61903. Installation of gate shall be subsidiary item to the cattleguard item(s).
5. The COR/AOTR may adjust the finished cattleguard elevation as needed to fit field/drainage conditions. The Contractor shall re-grade the adjoining turnout approaches as required. This work shall be considered incidental to Contract Item 61903 of FP-03. Any mistakes made by COR/AOTR in directing adjustments to the finished grade for the cattle guards and approach roadway will be corrected under subsection 109.02(m).
6. At skewed turnout locations, the cattleguard shall be installed perpendicular to turnout.
7. The Length Of The Turnout Between The Back Edge Of The Cattleguard And The Right-of-Way Limit Shall Be Surfaced With A 100 mm Thickness Of Aggregate Base Course At All 4.5 m Wide Turnouts. For Turnouts Wider Than 4.5 m , Place Aggregate Base Course And Asphalt Surfacing To Match The Turnout Structural Section, Between The Back Of The Cattleguard And The Right-of-Way Line. The Surfacing Material And Work Shall Be included In The Unit Price Bid For The Paving Items Shown In The Bid Schedule. *At Turnout Sta 8+940.00 Rt. And Sta. 13+653.96 Lt., Install New Cattleguard Centerline In-Line With The New ROW fencing. Do Not Offset As Shown In This Detail.
8. At cattleguard locations where the design typical width is wider on one side of the cattleguard than the other side, the narrower roadway width shall flared out to match the wider roadway width using an 8:1 taper or to the length allow by the right-of-way width. This includes at narrow right-of-way width where the turnout radius cannot be completely install between the main road and the cattleguard. This work shall be paid under the earthwork, aggregate base, and paving items included in the bid schedule.

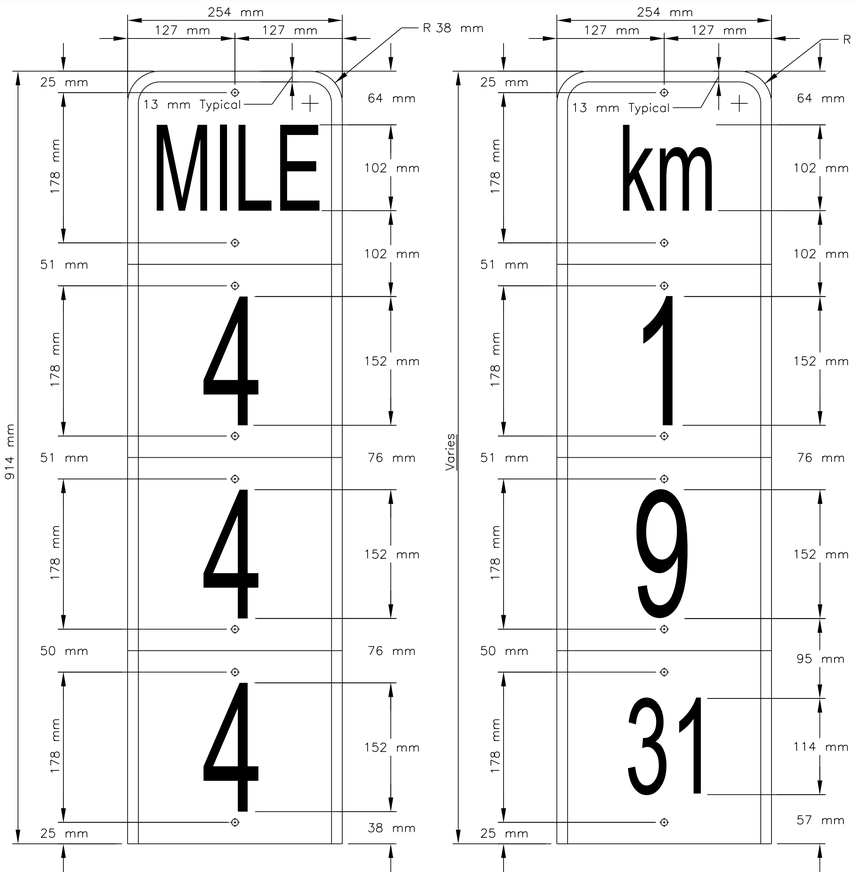
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CATTLEGUARD AND WING BRACE DETAILS

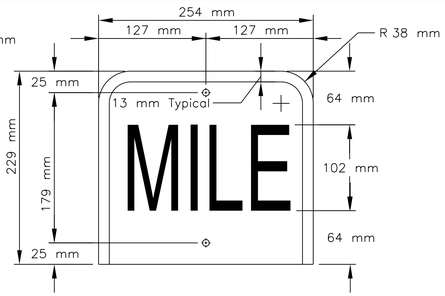
DRAWN BY: NRDOT	DATE: 2/7/2011
DESIGNED BY: NRDOT	DATE: 2/7/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

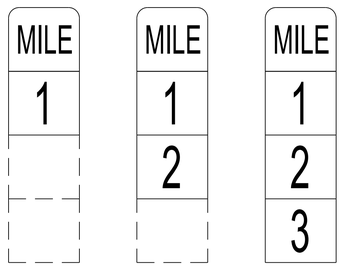
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 64_N31 cgwb.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	65	76

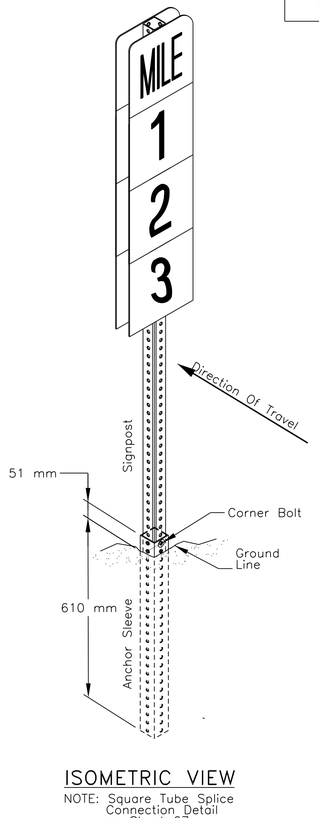


TYPICAL MILEPOST DETAIL



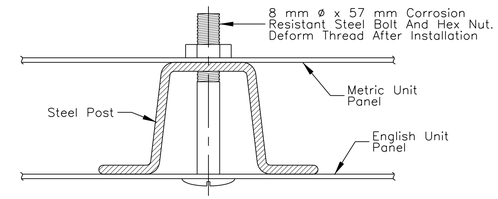


STANDARD NUMERAL POSITION



ISOMETRIC VIEW

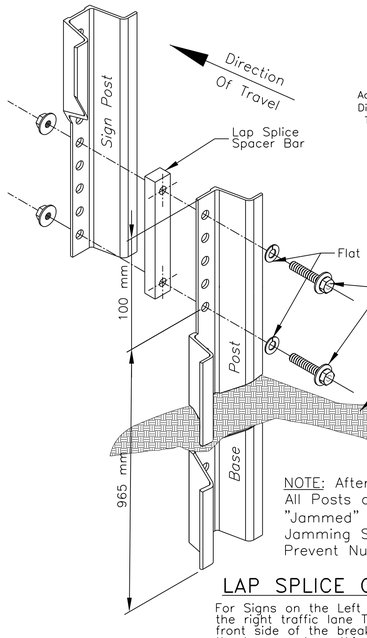
NOTE: Square Tube Splice Connection Detail on Sheet 67



TYPICAL MOUNTING DETAIL FOR BACKPLATE

GENERAL NOTES

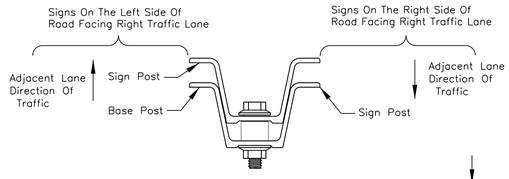
1. THE MILE POSTS SHALL BE PLACED ON BOTH SIDE OF THE ROADWAY WITH ENGLISH UNITS PANEL ON APPROACHING TRAFFIC AND METRIC UNITS PANEL ON OPPOSING TRAFFIC.
2. MILE POST PLATES SHALL BE FABRICATED FROM 16 GAGE MINIMUM THICKNESS 5052–H38 OR 6061–T6 ALUMINUM ALLOY.
3. ALL SURFACE TO BE COVERED WITH REFLECTIVE SHEETING, AND SHALL BE PREPARED IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION SECTION 718.11, TABLE 718–3.
4. THE BORDER AND LEGEND SHALL BE STANDARD REFLECTIVITY SILVER–WHITE. THE BACKGROUND SHALL BE STANDARD REFLECTIVITY GREEN AND MAY BE REVERSE SILK–SCREENED.
5. THE BACK SIDE OF THE ALUMINUM SHEETS SHALL BE ETCHED BY APPROVED METHODS TO REDUCE GLARE FROM REFLECTED SUNLIGHT.
6. STEEL POSTS SHALL CONFORM TO ASTM A499– YIELD POINT AND TENSILE STRENGTH OF STEEL SHALL BE 550 & 689 MPa (MINIMUM) RESPECTFULLY AND SHALL NOT WEIGHT LESS THAN 2.98 kg/m. AN APPROVED ALTERNATE BREAKAWAY ASSEMBLY MAY BE SUBMITTED TO THE COR/AOTR FOR REVIEW AND APPROVAL PRIOR TO IT'S USE. THE POSTS SHALL BE GALVANIZED AFTER FABICATION IN ACCORDANCE WITH ASTM A–123, OR PAINTED WITH A BAKED–ON ALKYD RESIN, OR WITH A POLYESTER POWDER COATING PER SECTION 718.08 OF FP–03 SUPPLEMENTAL SPECIFICATION..
7. INSTALL MILE POST MARKER 1.80 METER (MAXIMUM) FROM ROADWAY SHOULDER. AT GUARDRAIL LOCATIONS, THE MILE POST MARKER SHALL LINE UP WITH THE GUARDRAIL POSTS.
8. THE POSTS LENGTH SHALL BE DETERMINED IN THE FIELD BASED ON FINISH GROUND ELEVATION WITH RESPECT TO EDGE OF PAVEMENT ELEVATION.



NOTE: After Final Installation and Tightened, All Posts and Sign Bolt Threads Shall Be "Jammed" To Help Prevent Loosening. Jamming Shall Not Be So Severe As To Prevent Nut Removal.

LAP SPLICE CONNECTION DETAIL

For Signs on the Left side of the road which face the right traffic lane The sign post is place on the front side of the breakaway post, not on the back of the base post as this detail shows for standard sign installation.



LAP SPLICE – TOP VIEW

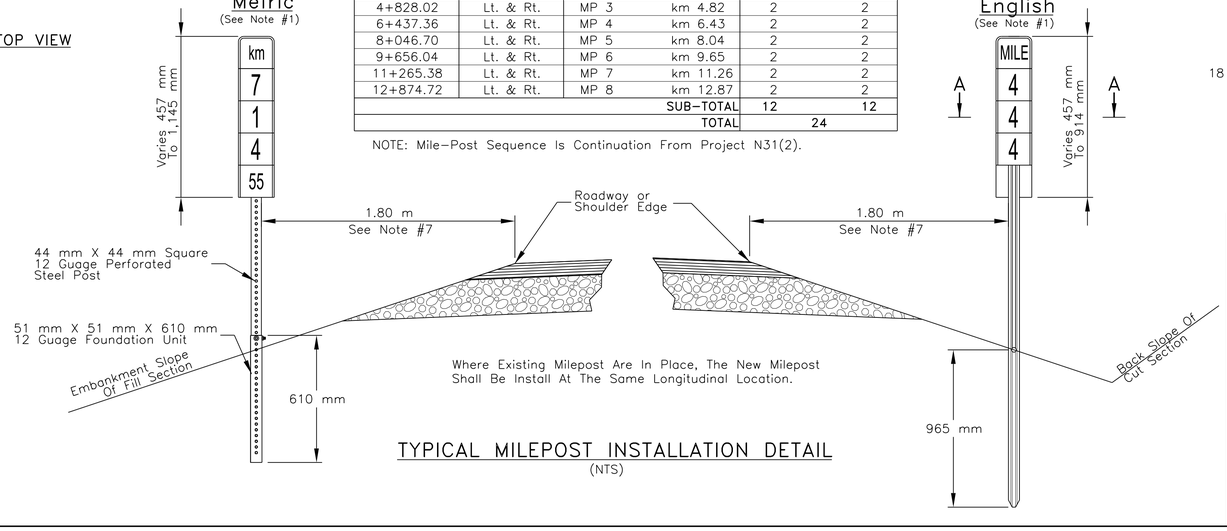
REVISED: 8/13/2013

ITEM: 63318–1000 MILEPOST

1–POST & HARDWARE: 2.98 kg/m

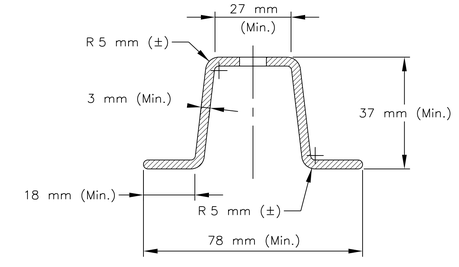
STATION	LOCATION	DESCRIPTION		QUALITY (Each)	
		MILES	KILOMETERS	ENGLISH	METRIC
4+828.02	Lt. & Rt.	MP 3	km 4.82	2	2
6+437.36	Lt. & Rt.	MP 4	km 6.43	2	2
8+046.70	Lt. & Rt.	MP 5	km 8.04	2	2
9+656.04	Lt. & Rt.	MP 6	km 9.65	2	2
11+265.38	Lt. & Rt.	MP 7	km 11.26	2	2
12+874.72	Lt. & Rt.	MP 8	km 12.87	2	2
			SUB–TOTAL	12	12
			TOTAL	24	

NOTE: Mile–Post Sequence Is Continuation From Project N31(2).



TYPICAL MILEPOST INSTALLATION DETAIL

(NTS)



SECTION A–A

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

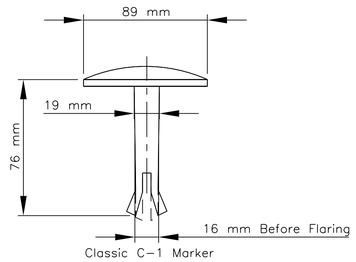
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD MILEPOST WITH U–CHANNEL STEEL POST AND PERFORATED SQUARE STEEL TUBE POST DETAILS

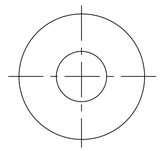
DRAWN BY: NRDOT	DATE: 3/29/2012
DESIGNED BY: NRDOT	DATE: 3/29/2012
REVISED: 8/13/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size Plot Sheet	

I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 65_N31 mp.dgn

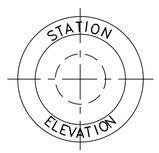
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	66	76



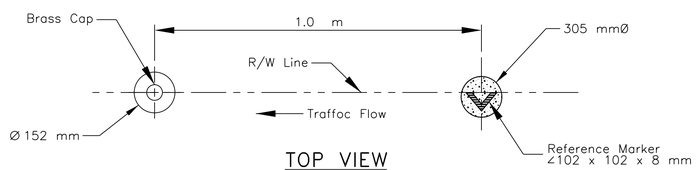
BRASS CAP DETAIL



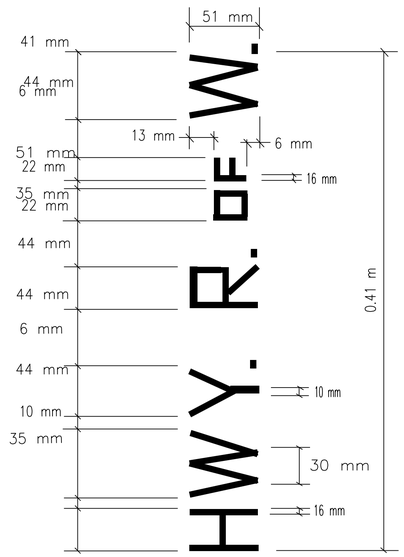
BOTTOM VIEW



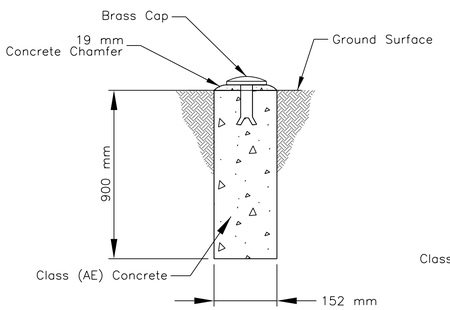
TOP VIEW



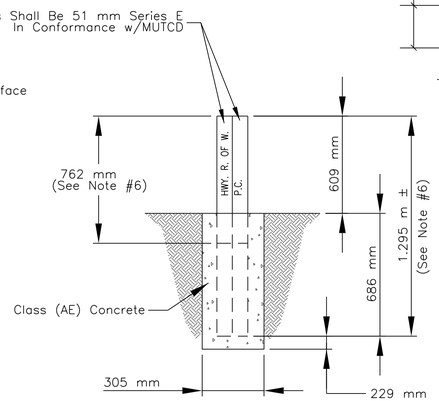
TOP VIEW



DETAIL OF LETTERS



SURVEY MONUMENT
NTS



REFERENCE MARKER
NTS

R/W MONUMENT SYMBOL

ITEM 62101-0000; RIGHT-OF-WAY MONUMENT
ITEM 62102-0000; REFERENCE MARKER

Station	Description	Location	Monument	Marker
4+770.000	Begin R.O.W	23 m Rt & Lt- existing	0	0
4+815.005	PC 1	23 m Rt & Lt	0	0
5+084.531	PT 1	23 m Rt & Lt	2	2
5+219.640	PC 2	23 m Rt & Lt	2	2
5+444.154	PT 2	23 m Rt & Lt	2	2
6+214.857	PC 3	23 m Rt & Lt	2	2
6+372.000	POC	23 m & 50 m Lt.	2	2
6+372.000	POC	23 m & 50 m Rt.	2	2
6+507.000	POC	15 m & 50 m Lt.	2	2
6+507.000	POC	23 m & 50 m Rt.	2	2
6+558.501	PT 3	15 m Lt. & 23 m Rt.	2	2
6+661.460	PC 4	15 m Lt. & 23 m Rt.	2	2
6+710.000	POC	15 m & 23 m Lt.	2	2
6+952.163	PT 4	23 m Rt & Lt	2	2
7+230.993	PC 5	23 m Rt & Lt	2	2
7+318.435	PT 5	23 m Rt & Lt	2	2
7+956.841	PC 6	23 m Rt & Lt	2	2
8+095.257	PT 6	23 m Rt & Lt	2	2
8+320.000	POT	23 m & 30 m Lt.	2	2
8+550.000	POT	23 m & 30 m Lt.	2	2
8+889.587	PC 7	23 m Rt & Lt	2	2
9+095.944	PT 7	23 m Rt & Lt	2	2
9+340.168	PC 8	23 m Rt	1	1
9+340.168	PC 8	23 m & 30 m Lt.	2	2
9+500.000	POC	30 m & 40 m Lt.	2	2
9+536.743	PT 8	23 m Rt & 40 m Lt	2	2
9+600.000	POT	30 m & 40 m Lt.	2	2
9+711.124	PC 9	23 m Rt & 30 m Lt	2	2
10+004.304	PT 9	23 m & 30 m Rt.	2	2
10+004.304	PT 9	30 m Rt & Lt	2	2
10+524.313	PC 10	30 m Rt & Lt	2	2
10+713.126	PT 10	30 m Rt & Lt	2	2
10+856.077	PC 11	30 m Rt & Lt	2	2
10+991.588	PT 11	30 m Rt & Lt	2	2
11+000.000	POT	30 m & 23 m Lt	2	2
11+000.000	POT	30 m & 23 m Rt.	2	2
11+320.000	POT	23 & 30 m Lt	2	2
11+541.058	PC 12	23 m Rt & Lt	2	2
11+705.584	PT 12	23 m Rt & Lt	2	2
11+812.902	PC 13	23 m Rt. & Lt.	2	2
11+812.902	PC 13	30 m Rt.	1	1
11+940.000	POC	23 m & 30 m Lt.	2	2
11+984.369	PT 13	30 m Rt & Lt	2	2
12+096.565	PC 14	30 m Rt & Lt	2	2
12+120.000	POC	30 m & 23 m Lt.	2	2
12+120.000	POC	30 m & 23 m Rt.	2	2
12+425.361	PT 14	23 m Rt & Lt	2	2
12+600.000	POT	23 m & 40 m Lt.	2	2
12+798.905	PC 15	23 m Rt & 40 m Lt	2	2
12+872.774	PT 15	23 m Rt & 40 m Lt	2	2
12+872.774	PT 15	50 m Rt.	1	1
12+910.000	POT	23 m & 50 m Rt.	2	2
12+980.095	PC 16	23 m Rt & 40 m Lt	2	2
13+095.074	PT 16	23 m Rt & 40 m Lt	2	2
13+364.875	PC 17	23 m Rt & 40 m Lt	2	2
13+500.000	POC	23 m & 40 m Rt.	2	2
13+530.000	POC	23 m & 40 m Rt.	2	2
13+592.991	PT 17	23 m Rt & 40 m Lt	2	2
13+600.000	POT	40 m & 23 m Lt	2	2
13+706.724	PC 19/ EOP	23 m Rt & Lt	2	2
		Total:	113	113

GENERAL NOTES

1. Survey monument and reference markers shall be placed as shown on the plans or as directed by AOTR/COR. The cost of supplying all materials and installation of Right-of-Way Monument and Markers shall be included in the unit price bid under Item 62101-0000 & 62102-0000.
2. If rock is encountered when installing the right-of-way monument and reference maker, drill a 152mmø for survey monument and 305mmø for reference marker hole in the rock to the depth required to install the monument and marker to full depth. All hole drilling into rock material, shall be considered incidental to the completion of the work and no additional payment shall be made thereof.
3. Brass caps for the survey monument shall be supplied and installed by the Contractor conforming to the ASTM B-584 specification and shall be considered incidental to Item 62101-0000.
4. All concrete shall be Class A(AE) and shall conform to Section 601 of the FP-03. Furnishing and placing of concrete shall be considered incidental to Items 62101-0000 & 62102-0000.
5. Roadway stationing and elevations shall be stamped on all brass caps by the Contractor after installation, unless otherwise directed in writing by the AOTR/COR.
6. The Contractor shall be required to paint the reference markers per Section 708 and subsection 708.04 of FP-03:
   a) Prime coat entire steel material and shall conform to subsection 708.04(a) or (b) of FP-03.
   b) Coat white finish of paint the top 762mm and shall conform to subsection 708.04(c), (d), or (e) of FP-03.
   c) All letters, numerals, symbols, etc. shall be painted on the reference markers using the dimensions shown using Black Lamp paint conforming to ASTM D 209. The required information to place on the reference markers shall be furnished to the Contractor by the AOTR/COR.
7. The Contractor has the option to use an approved State Highway paint specifications in lieu of that stated in Note (6) above. The Contractor shall submit (in writing) the paint specifications and request for use on the project at least 14 days in advance of the paint use for review and approval. The Contractor shall not be allowed to use any paint until the proper approval has been given by the COR/AOTR. Any painting performed by the Contractor without the proper approval shall cause the work to be rejected.
8. The Contractor shall use glass fiber type highway delineators. The cost of supplying materials and installation of steel U-channel shall be included in the unit price bid under Items 63308-2000, 63309-0010, and 63309-0020.
9. Set Right-of-Way monument at station and offset to match the right-of-way plat. These locations may vary from the stations and offsets shown on the construction plan and profile sheets.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

RIGHT-OF-WAY & REFERENCE MARKERS DETAILS

DRAWN BY: NRDOT	DATE: 1/14/2011
DESIGNED BY: NRDOT	DATE: 1/14/2011
REVISED: 2/4/2013	BY: Leroy.Toledo
SHEET SIZE: Full Size (24x36) Plot Sheet	

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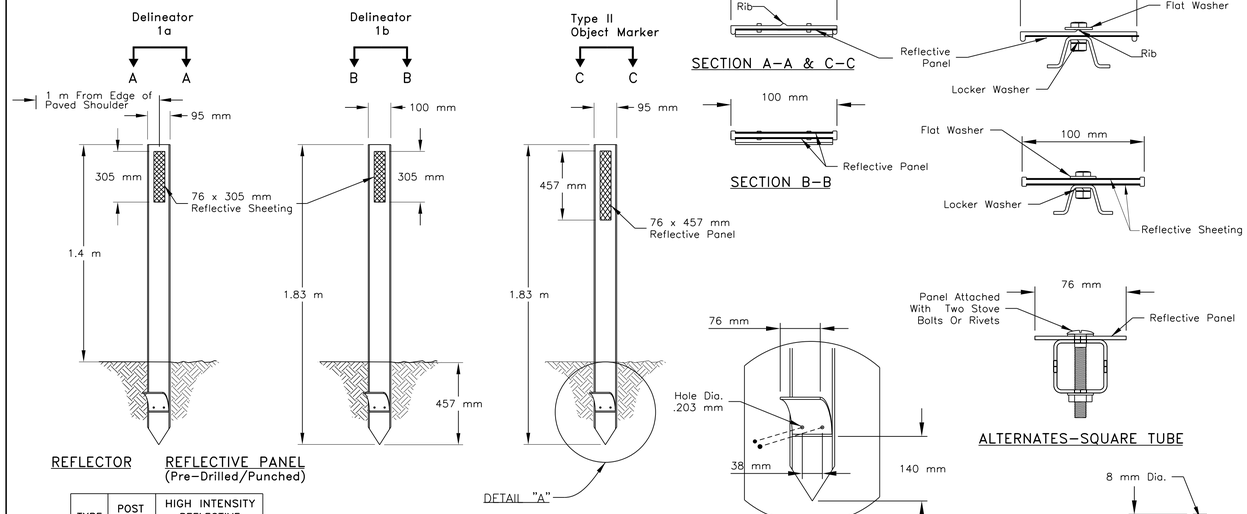
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	67	76

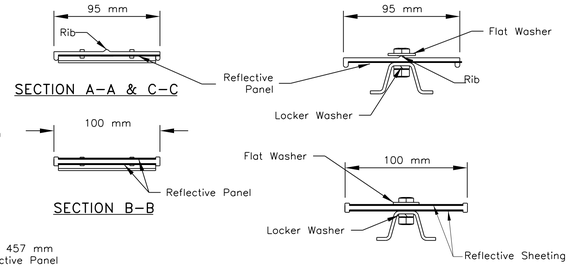
DELINEATOR AND OBJECT MARKER, TYPE GLASS FIBER

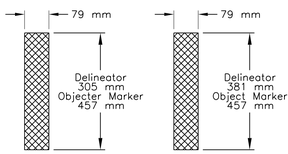


REFLECTOR

REFLECTIVE PANEL (Pre-Drilled/Punched)

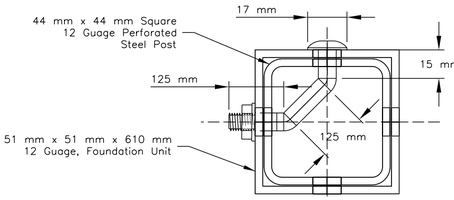
TYPE	POST COLOR	HIGH INTENSITY REFLECTIVE SHEETING
1a	WHITE	WHITE, ONE SIDE
1b	WHITE	WHITE, BOTH SIDES
2	YELLOW	AMBER, ONE SIDE



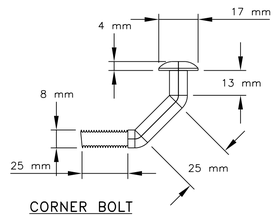


OBJECT MARKERS

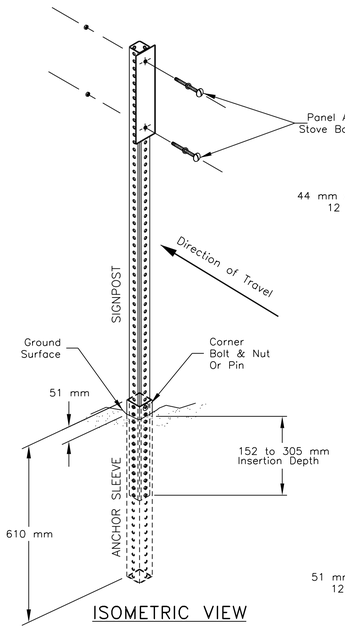
STATION	LOCATION	TYPE 2	TYPE 3
5+000.00	Lt. & Rt.	2	
5+300.00	Lt. & Rt.	2	
5+382.00	Lt. & Rt.	2	
6+411.30	Lt. & Rt.	0	2
6+486.30	Lt. & Rt.	0	2
6+728.00	Lt. & Rt.	2	
6+960.00	Lt. & Rt.	2	
7+818.40	Lt. & Rt.	2	
8+005.00	Lt. & Rt.	2	
8+040.00	Lt. & Rt.	2	
8+076.00	Lt. & Rt.	2	
8+141.00	Lt. & Rt.	2	
8+220.00	Lt. & Rt.	2	
8+285.00	Lt. & Rt.	2	
8+339.00	Lt. & Rt.	2	
8+430.00	Lt. & Rt.	2	
8+495.00	Lt. & Rt.	2	
8+527.00	Lt. & Rt.	2	
8+627.00	Lt. & Rt.	2	
8+670.00	Lt. & Rt.	2	
8+740.00	Lt. & Rt.	2	
8+860.00	Lt. & Rt.	2	
9+040.00	Lt. & Rt.	2	
9+058.00	Lt. & Rt.	2	
9+072.00	Lt. & Rt.	2	
9+082.00	Lt. & Rt.	2	
9+315.00	Lt. & Rt.	2	
9+527.00	Lt. & Rt.	2	
9+590.00	Lt. & Rt.	2	
9+620.00	Lt. & Rt.	2	
9+670.00	Lt. & Rt.	2	
10+060.00	Lt. & Rt.	2	
10+317.00	Lt. & Rt.	2	
11+132.00	Lt. & Rt.	2	
11+214.00	Lt. & Rt.	2	
11+347.00	Lt. & Rt.	2	
11+435.00	Lt. & Rt.	2	
11+518.00	Lt. & Rt.	2	
12+020.00	Lt. & Rt.	2	
13+150.00	Lt. & Rt.	2	
13+340.00	Lt. & Rt.	2	
13+529.50	Lt. & Rt.	2	
0+037.45(N321)	Lt. T/O	2	
	TOTAL	82	4



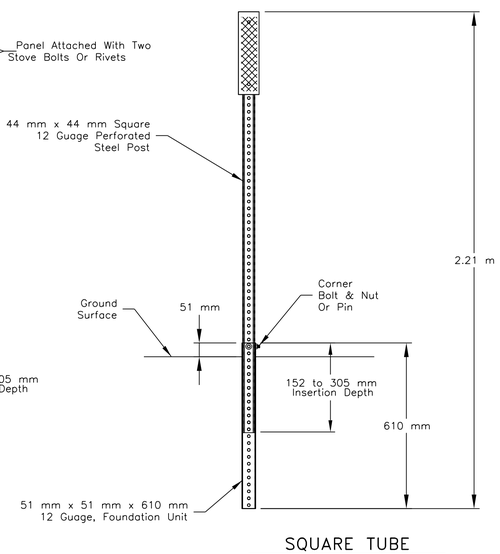
"BREAK-AWAY" VIEW DETAIL



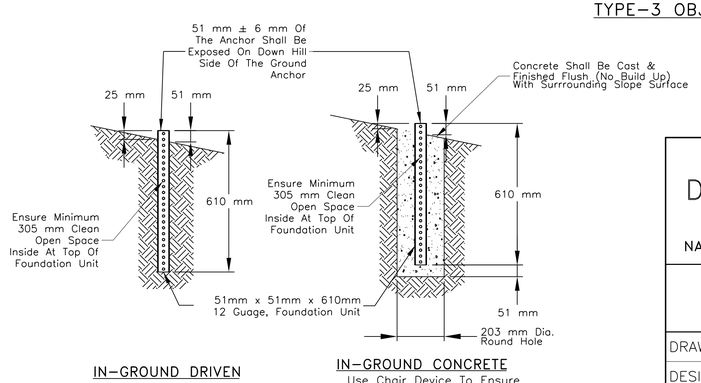
CORNER BOLT



ISOMETRIC VIEW



SQUARE TUBE ALTERNATE ASSEMBLY
(For Delineator Or Object Markers)



IN-GROUND DRIVEN

IN-GROUND CONCRETE
Use Chair Device To Ensure Minimum 51 mm Clearance Above Bottom Of Hole

DELINEATORS

STATION	LOC.	TY-1a	TY-1b
4+815.00	Rt.		1
4+922.52	Rt.		1
4+940.00	Rt.		1
5+010.00	Rt.		1
5+084.52	Rt.		1
5+165.40	Rt.		1
5+219.64	Rt.		1
5+247.64	Rt.		1
5+275.64	Rt.		1
5+303.64	Rt.		1
5+331.64	Rt.		1
5+387.64	Rt.		1
5+418.64	Rt.		1
5+444.15	Rt.		1
5+498.15	Rt.		1
5+579.15	Rt.		1
5+741.15	Rt.		1
5+860.15	Lt./Rt.	2	
5+950.78	Lt.		1
6+080.89	Lt.		1
6+170.89	Lt.		1
6+996.16	Rt.		1
7+080.89	Lt.		1
7+170.89	Lt.		1
7+230.89	Lt.		1
7+260.89	Lt.		1
7+290.89	Lt.		1
7+318.28	Lt.		1
7+378.28	Lt.		1
7+468.28	Lt.		1
7+648.28	Lt.		1
7+796.73	Rt.		1
7+892.73	Rt.		1
7+956.73	Rt.		1
7+991.33	Rt.		1
8+025.93	Rt.		1
8+060.53	Rt.		1
8+095.15	Rt.		1
8+159.15	Rt.		1
8+255.15	Rt.		1
8+447.15	Lt.		1
8+537.48	Lt.		1
8+729.48	Rt.		1
8+825.48	Rt.		1
8+889.48	Rt.		1
8+923.87	Rt.		1
8+965.87	Rt.		1
9+027.04	Rt.		1
9+095.84	Rt.		1
9+159.84	Rt.		1
9+240.84	Rt.		1
9+262.07	Lt.		1
9+340.07	Lt.		1
9+379.39	Lt.		1
9+418.72	Lt.		1
9+458.03	Lt.		1
9+497.35	Lt.		1
9+536.65	Lt.		1
9+614.65	Lt.		1
9+655.04	Rt.		1
9+711.04	Rt.		1
9+737.69	Rt.		1
9+764.34	Rt.		1
9+790.99	Rt.		1
9+790.99	Rt.		1
9+820.64	Rt.		1
9+847.29	Rt.		1
9+873.94	Rt.		1
9+900.59	Rt.		1
9+927.24	Rt.		1
9+950.90	Rt.		1
9+977.55	Rt.		1
10+004.20	Rt.		1
10+072.20	Rt.		1
10+144.20	Rt.		1
10+270.00	Lt./Rt.	2	
10+384.22	Lt.		1
10+468.22	Lt.		1
10+524.22	Lt.		1
10+551.19	Lt.		1
10+578.16	Lt.		1
10+605.13	Lt.		1
10+632.10	Lt.		1
10+659.07	Lt.		1
10+686.04	Lt.		1
10+713.07	Lt.		1
10+769.07	Rt.		1
10+855.92	Rt.		1
10+901.13	Rt.		1
10+946.34	Rt.		1
10+991.57	Rt.		1
11+081.57	Rt.		1
11+171.57	Rt.		1
11+275.32	Rt.		1
11+380.98	Rt.		1
11+470.98	Rt.		1
11+541.05	Rt.		1
11+573.98	Rt.		1
11+606.80	Rt.		1
11+640.76	Rt.		1
11+672.61	Rt.		1
11+705.52	Rt.		1
11+812.74	Lt.		1
11+869.95	Lt.		1
11+927.16	Lt.		1
11+984.39	Lt.		1
12+058.39	Lt.		1
12+470.00	Lt.		1
12+541.00	Lt.		1
12+650.84	Rt.		1
12+798.84	Rt.		1
12+823.48	Rt.		1
12+848.12	Rt.		1
12+872.75	Rt.		1
12+923.44	Rt.		1
12+980.13	Rt.		1
13+008.84	Rt.		1
13+037.56	Rt.		1
13+066.27	Rt.		1
13+094.99	Rt.		1
13+160.99	Rt.		1
13+260.00	Rt.		1
13+321.00	Rt.		1
13+636.00	Rt.		1
	TOTAL	4	122

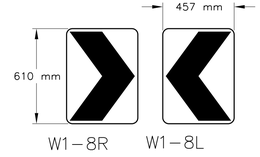
GENERAL NOTES

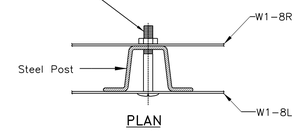
1. ADDITIONAL NOTES ON SHEET 66 OF 76

CHEVRONS

STATION	LOC.	EACH
6+214.85 PC	Lt	2
6+262.00	Lt	2
6+310.00	Lt	2
6+358.00	Lt	2
6+507.00	Lt	2
6+558.42 PT	Lt	2
6+606.00	Lt	2
6+661.46 PC	Rt.	2
6+755.00	Rt.	2
6+793.00	Rt.	2
6+837.00	Rt.	2
6+874.00	Rt.	2
6+908.00	Rt.	2
6+952.16 PT	Rt.	2
12+096.56 PC	Lt.	2
12+140.00	Lt.	2
12+180.00	Lt.	2
12+225.00	Lt.	2
12+265.00	Lt.	2
12+305.00	Lt.	2
12+345.00	Lt.	2
12+385.00	Lt.	2
12+425.36 PT	Lt.	2
13+364.87 PC	Rt.	2
13+407.00	Rt.	2
13+456.00	Rt.	2
13+508.00	Rt.	2
13+550.00	Rt.	2
13+592.99 PT	Rt.	2
	Total	58

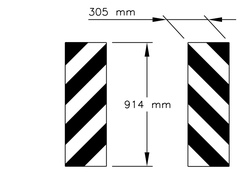
Note: W1-8L/W1-8R Are Mounted "Back-to-Back" On Single Post @ Same Station. Chevron Posts Shall Use BREAKAWAY POST Design.





PLAN
NTS

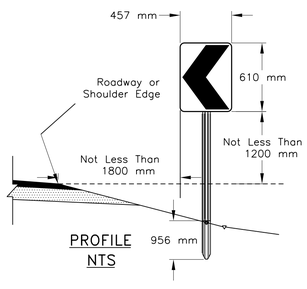
W1-8L & W1-8R Mounted "Back-to-Back" On Single Post @ Same Station



BLACK/YELLOW

TYPE-3 OBJECT MARKER

TYPICAL MOUNTING DETAIL FOR BACKPLATE



PROFILE
NTS

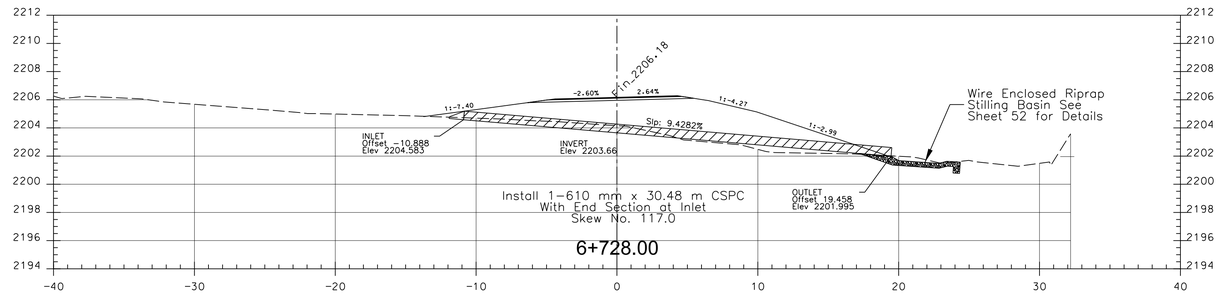
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

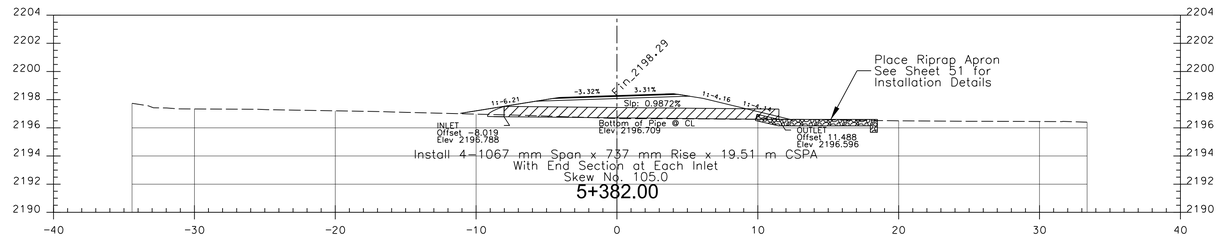
DELINEATOR AND OBJECT MARKER DETAILS

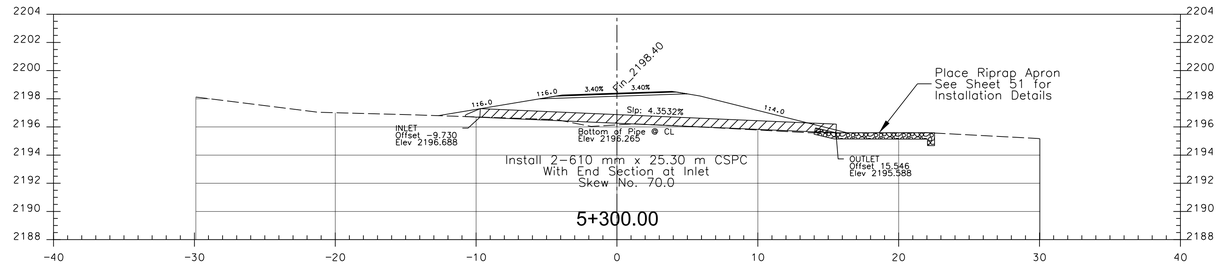
DRAWN BY: NRDOT	DATE: 6/14/2012
DESIGNED BY: NRDOT	DATE: 6/14/2012
REVISED: 4/26/2013	BY: Allen.Nakaidinae
SHEET SIZE: Full Size (24x36) Plot Sheet	

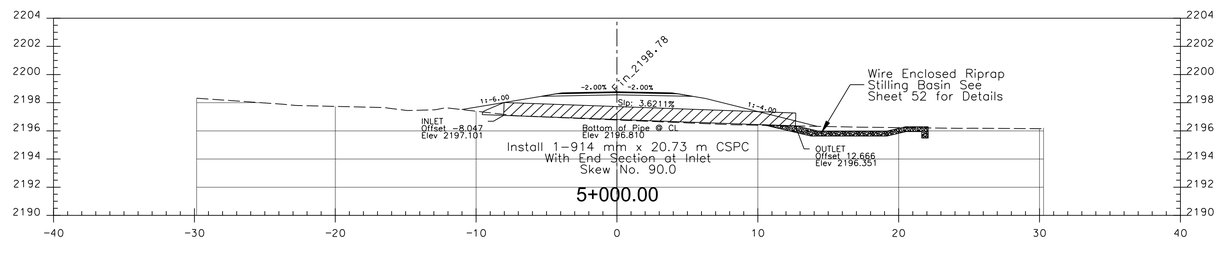
i:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\Sht 67_N31ObjectMkr.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	68	76









GENERAL NOTES

1. DRAINAGE PIPE(S) INVERT ELEVATION AND LENGTHS ARE APPROXIMATE. FINAL ELEVATIONS AND LENGTHS TO BE FIELD DETERMINED BY THE CONTRACTOR AS PART OF THE REVISED PIPE LIST SUBMITTAL PACKAGE. GUIDANCE ON DEVELOPING A REVISED PIPE LIST CAN BE PROVIDED UPON REQUEST OF THE CONTRACTOR.
2. THE REVISED PIPE LIST SURVEY DATA SHALL BE VERIFIED BY THE COR/AOTR AND THE CONTRACTOR'S QCM PRIOR TO SUBMITTAL TO THE REGIONAL DIVISION OF TRANSPORTATION.
3. DO NOT INSTALL PIPE BELOW EXISTING CHANNEL BOTTOM.
4. THE PIPE SECTIONS ARE SHOWN PARELLEL TO PIPE SKEW.

REVISED: 9/5/2013

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PIPE CROSS SECTION

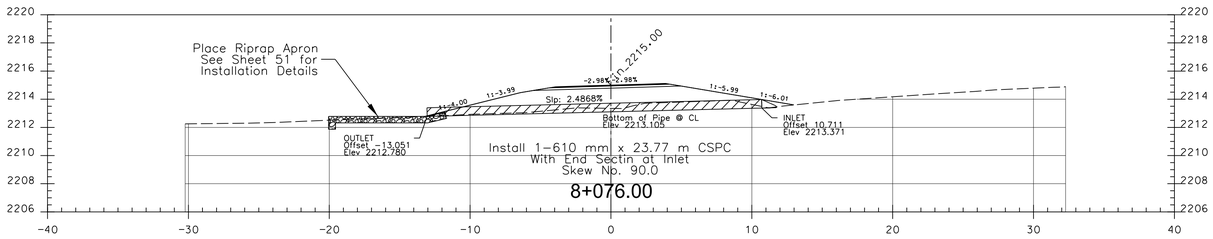
DRAWN BY: NRDOT	DATE: 8/11/2011
DESIGNED BY: NRDOT	DATE: 8/11/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET MODELNAME: Sht 68 PXS	

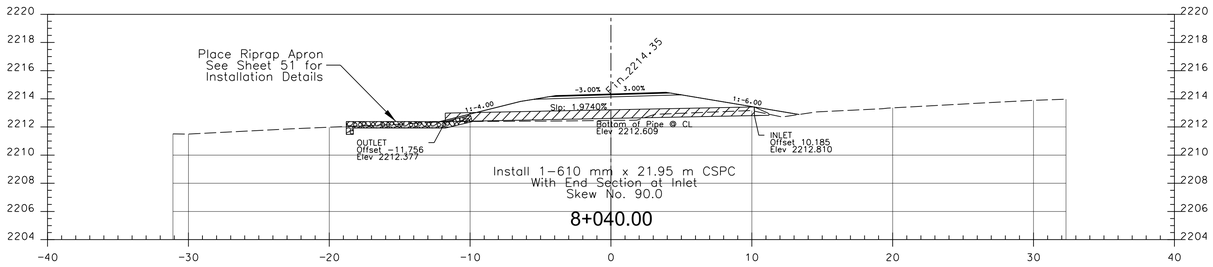
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\REV_PLP Sheets 8 to 21 and PipeXS\REV_Pipe XS_08-11-11.dgn

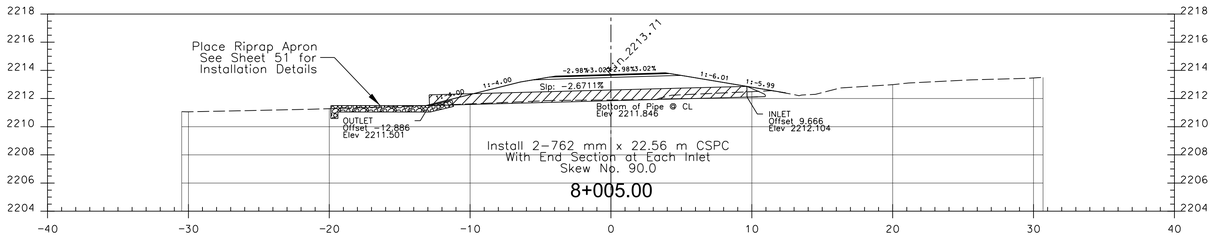
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	69	76

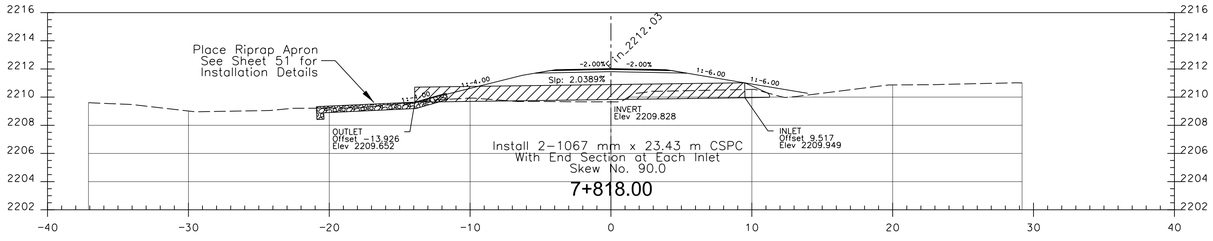
GENERAL NOTES

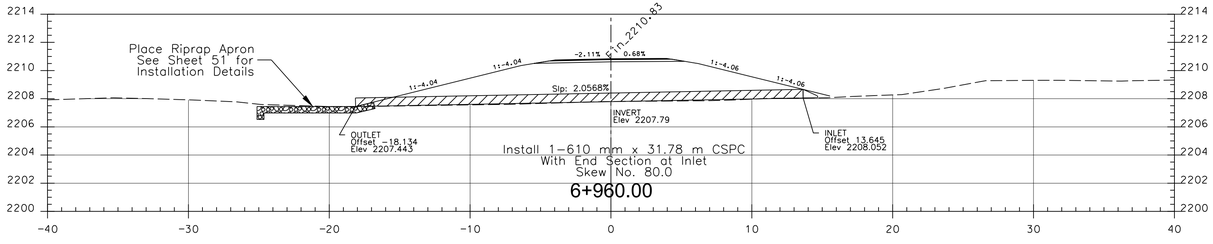
1. SEE SHEET 68 OF 76 FOR ADDITIONAL NOTES.











UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PIPE CROSS SECTION

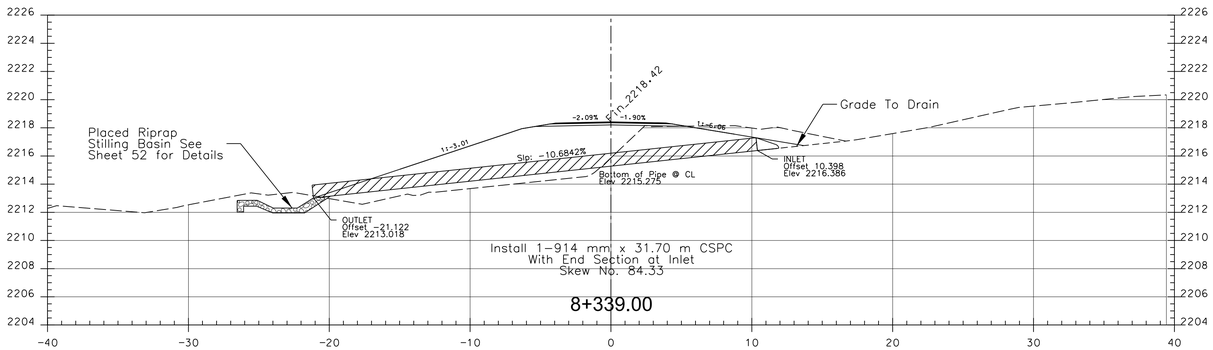
DRAWN BY: NRDOT	DATE: 8/11/2011
DESIGNED BY: NRDOT	DATE: 8/11/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET MODELNAME: Sht 69 PXC	

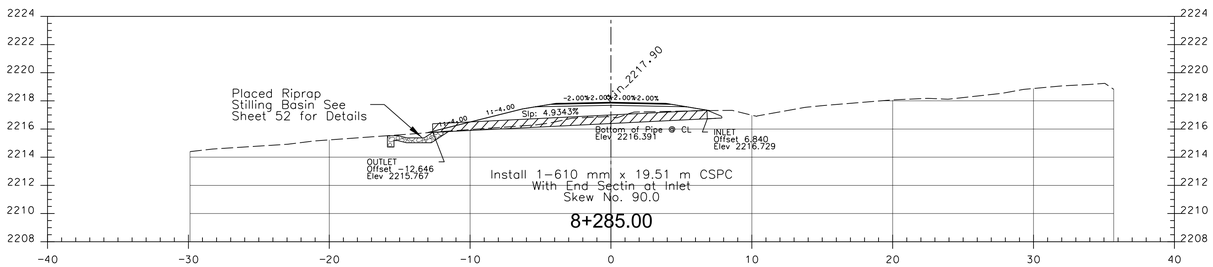
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\REV_PLP Sheets 8 to 21 and PipeXS\REV_Pipe XS_08-11-11.dgn

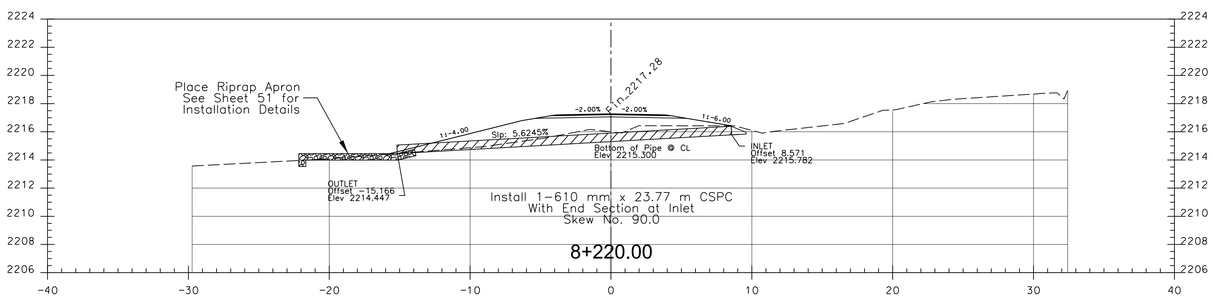
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	70	76

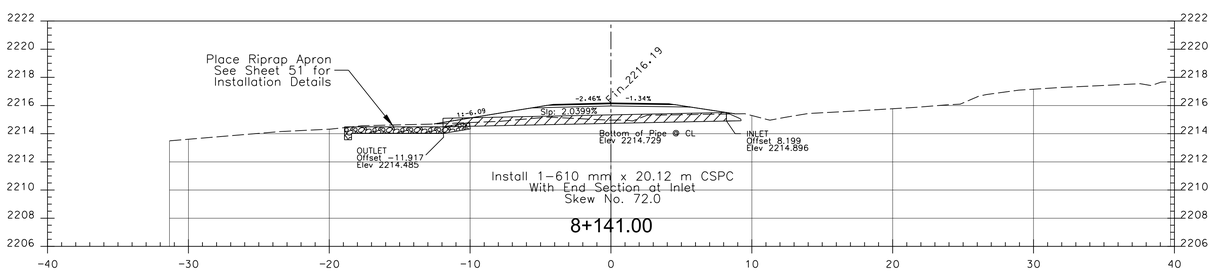
GENERAL NOTES

1. SEE SHEET 68 OF 76 FOR ADDITIONAL NOTES.









UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PIPE CROSS SECTION

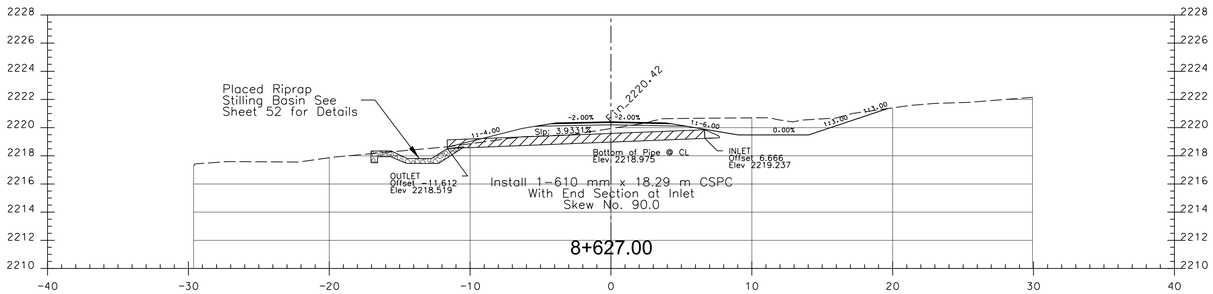
DRAWN BY: NRDOT	DATE: 8/11/2011
DESIGNED BY: NRDOT	DATE: 8/11/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET MODELNAME: Sht 70 PCS	

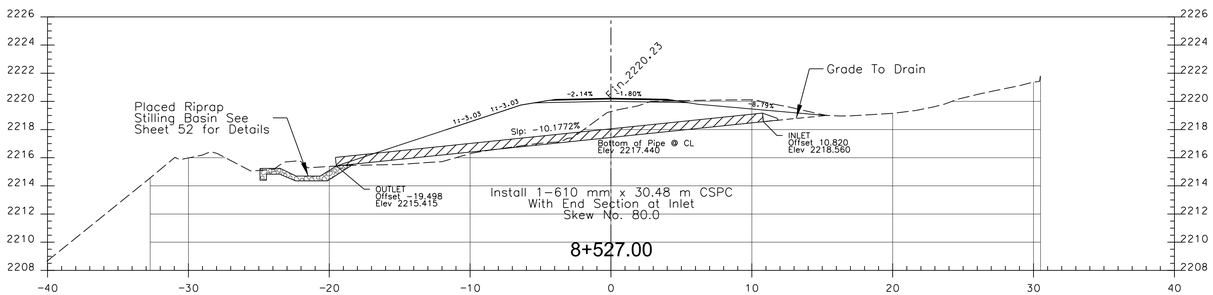
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\REV_PLP Sheets 8 to 21 and PipeXS\REV_Pipe XS_08-11-11.dgn

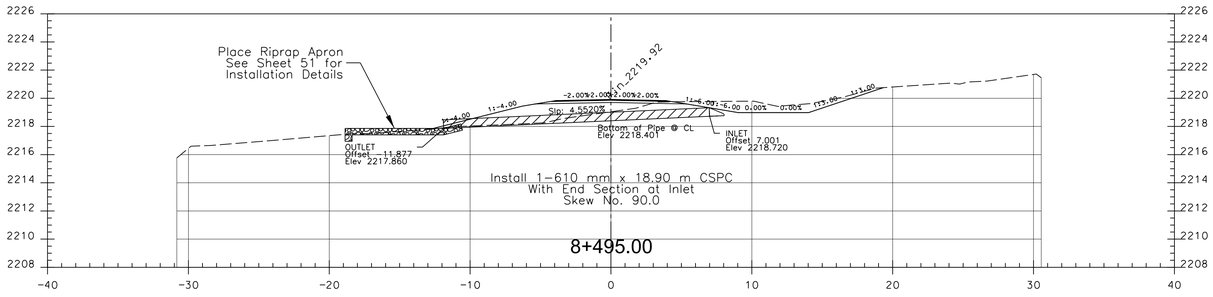
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	71	76

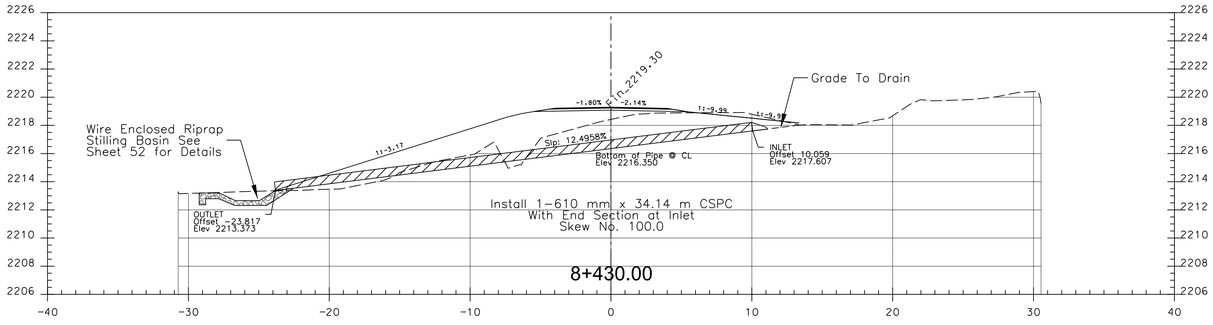
GENERAL NOTES

1. SEE SHEET 68 OF 76 FOR ADDITIONAL NOTES.









UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PIPE CROSS SECTION

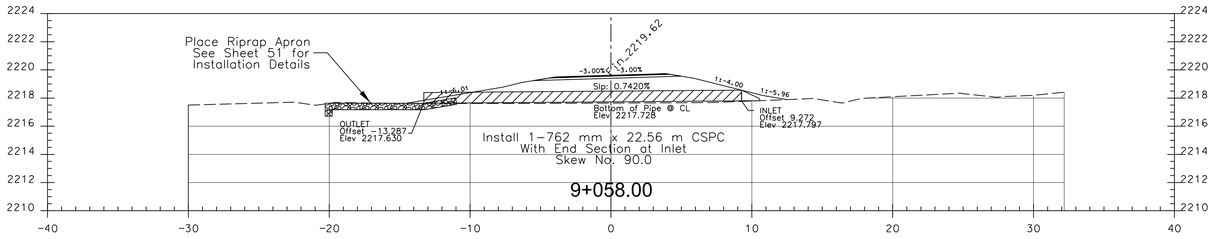
DRAWN BY: NRDOT	DATE: 8/11/2011
DESIGNED BY: NRDOT	DATE: 8/11/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET MODELNAME: Sht 71 PCS	

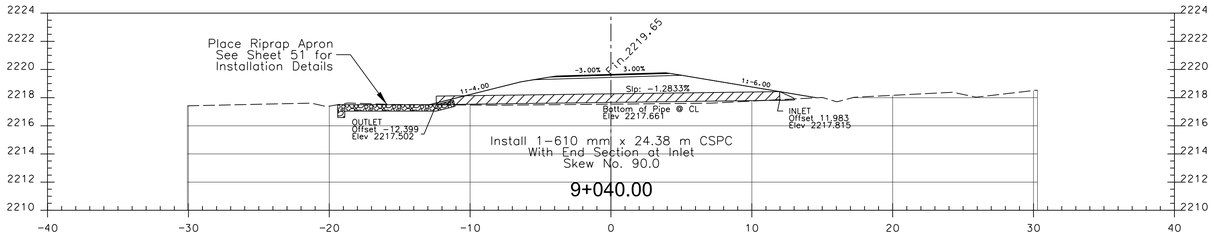
I:\CURRENT PROJECTS\N36_Ft Defiance\N31(4)124\DESIGN DATA_120409\CADD FILES_120409\Microstation_092928\REV_PLP Sheets 8 to 21 and PipeXS\REV_Pipe XS_08-11-11.dgn

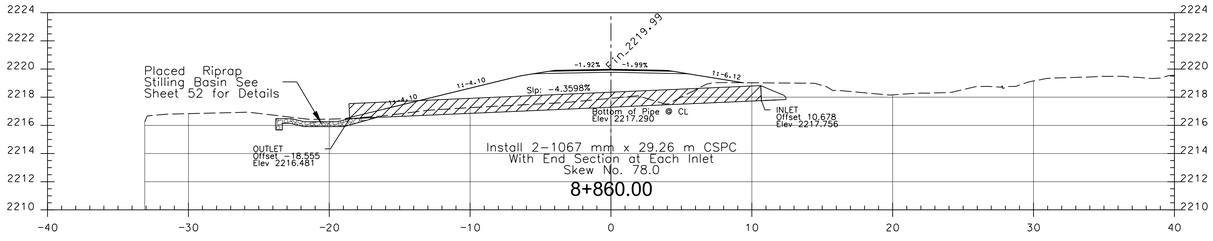
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	72	76

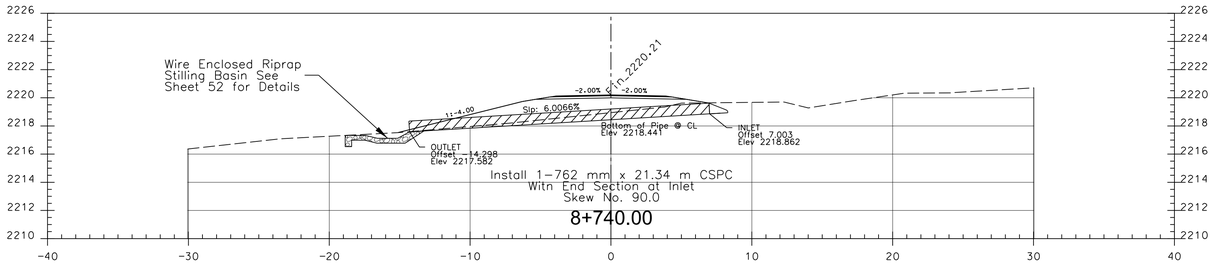
GENERAL NOTES

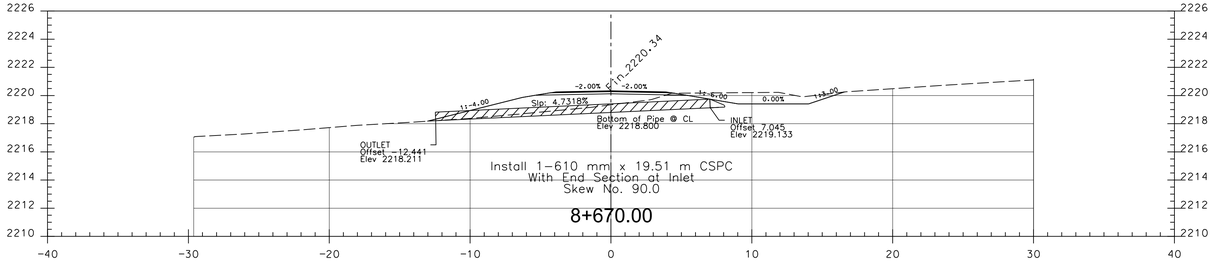
1. SEE SHEET 68 OF 76 FOR ADDITIONAL NOTES.











UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PIPE CROSS SECTION

DRAWN BY: NRDOT	DATE: 8/11/2011
DESIGNED BY: NRDOT	DATE: 8/11/2011
REVISED: 9/5/2013	BY: Leroy.Toledo
SHEET MODELNAME: Sht 72 PCS	

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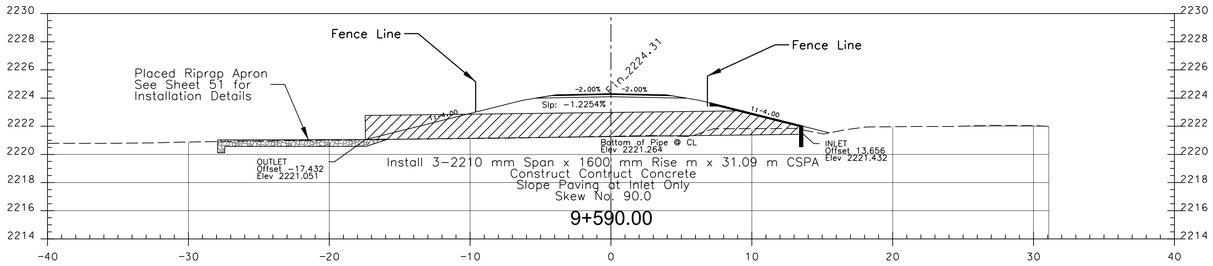
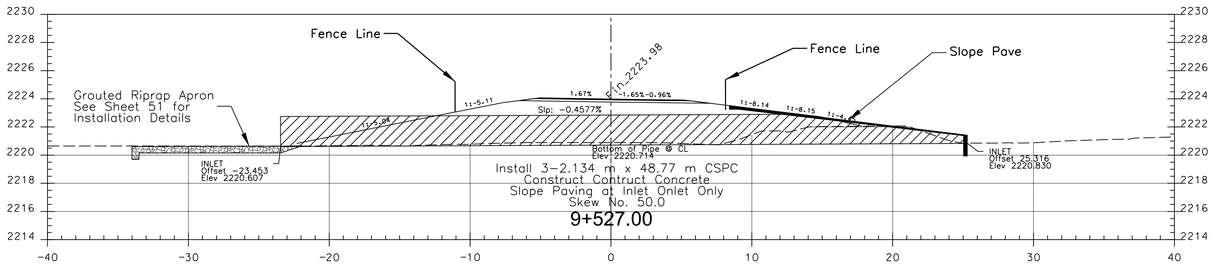
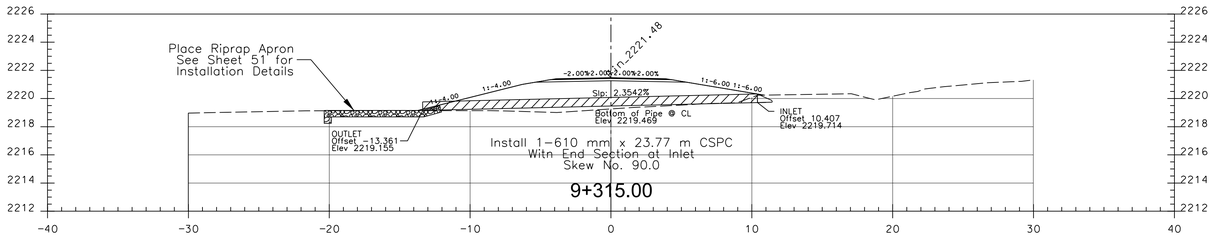
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	73	76

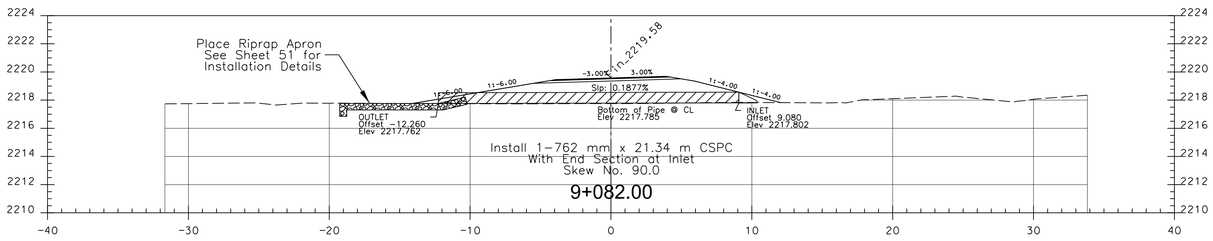
GENERAL NOTES

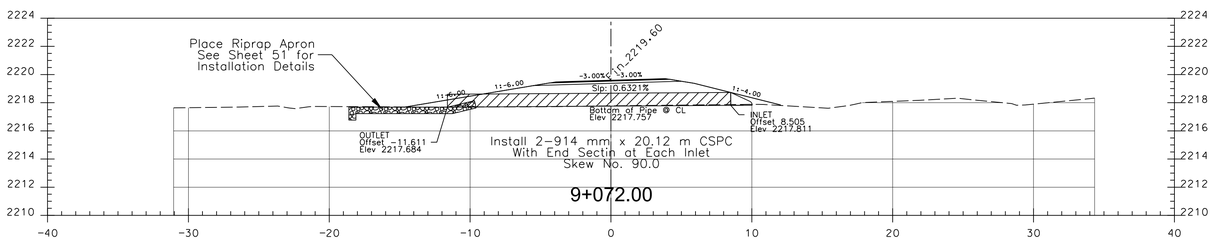
1. SEE SHEET 68 OF 76 FOR ADDITIONAL NOTES.











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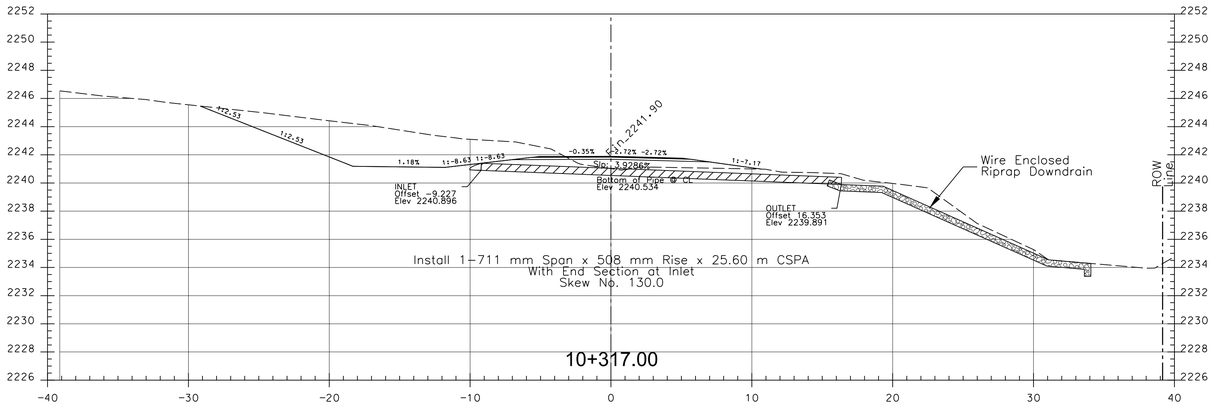
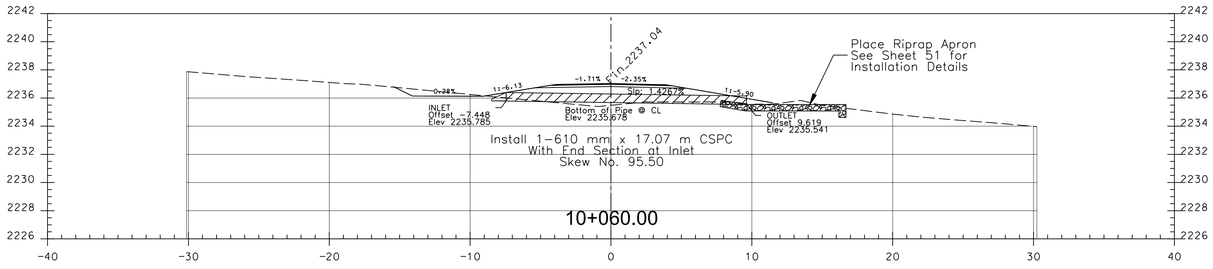
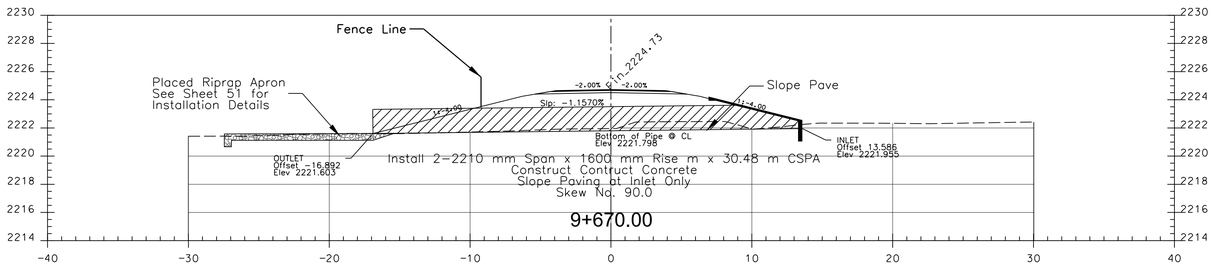
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	74	76

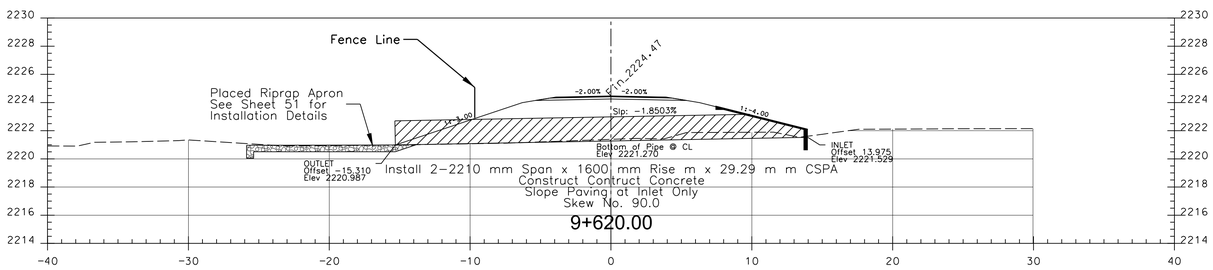
GENERAL NOTES

1. SEE SHEET 68 OF 76 FOR ADDITIONAL NOTES.









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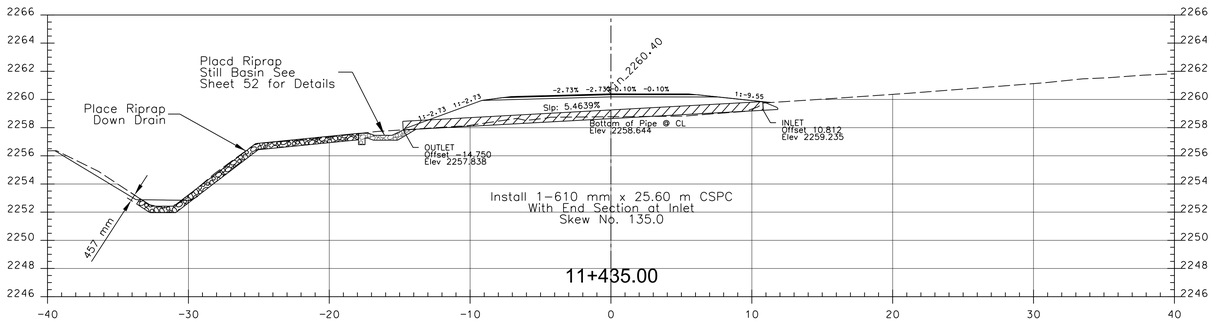
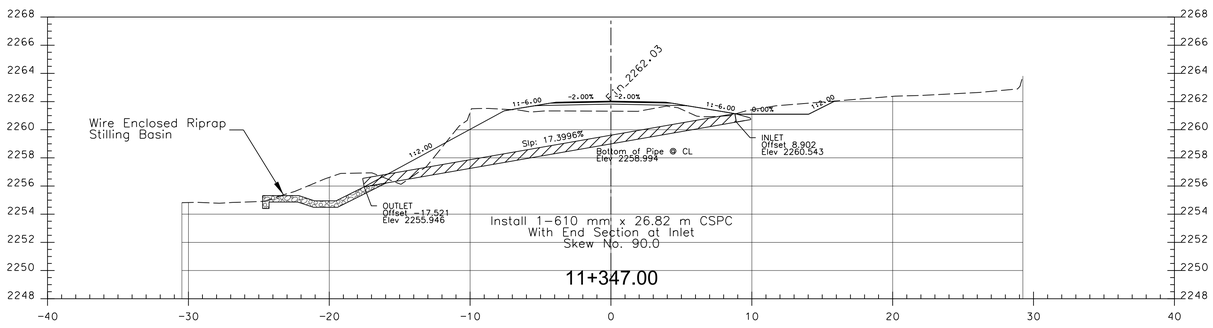
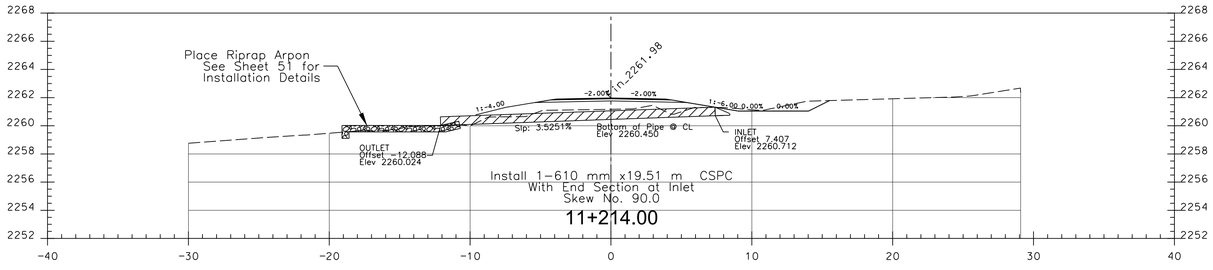
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	75	76

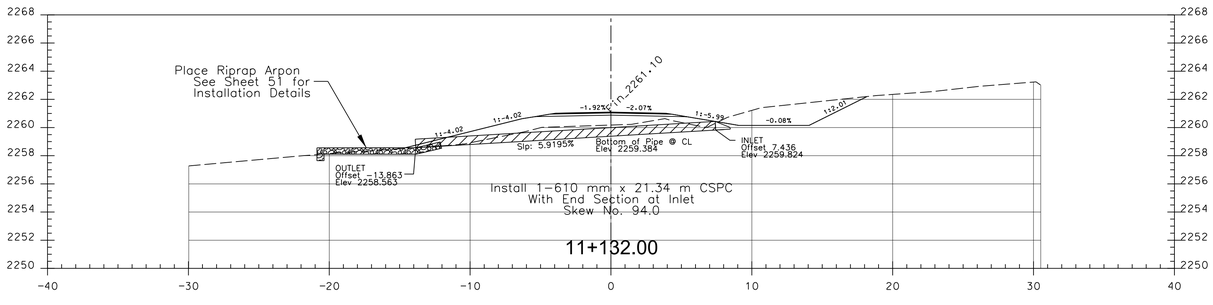
GENERAL NOTES

1. SEE SHEET 68 OF 76 FOR ADDITIONAL NOTES.









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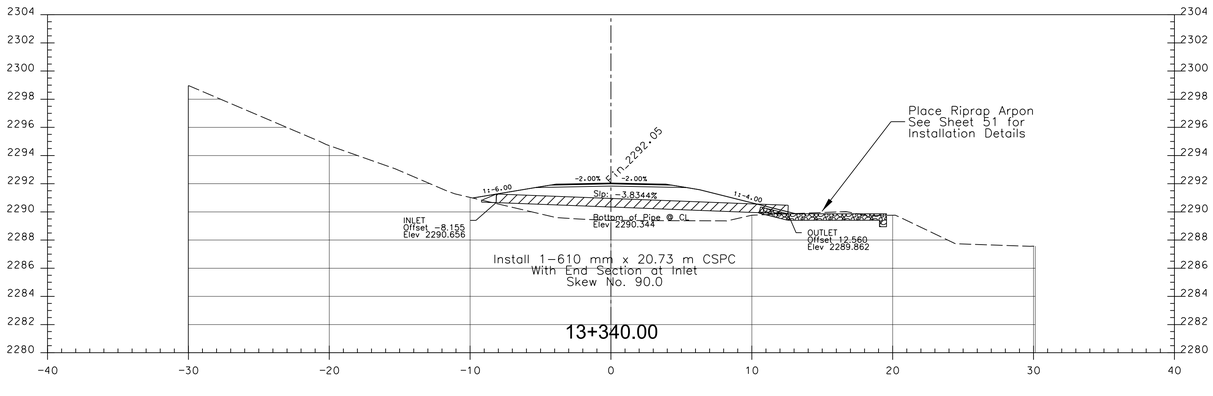
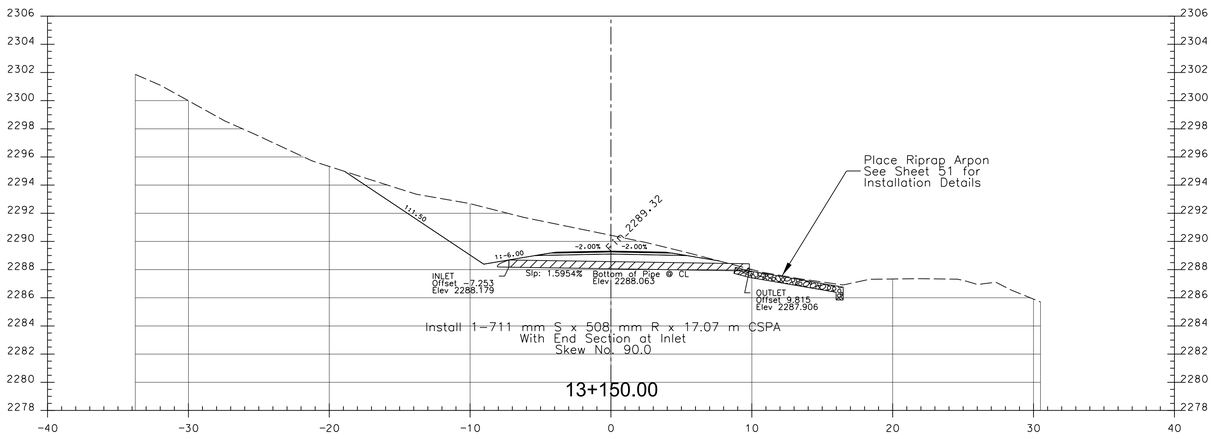
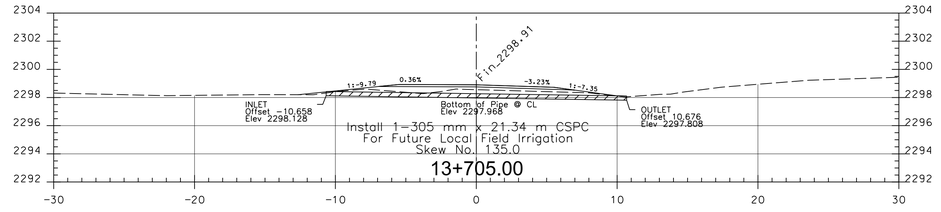
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	NEW MEXICO	NAVAJO	N31	N31(4)1,2&4	76	76

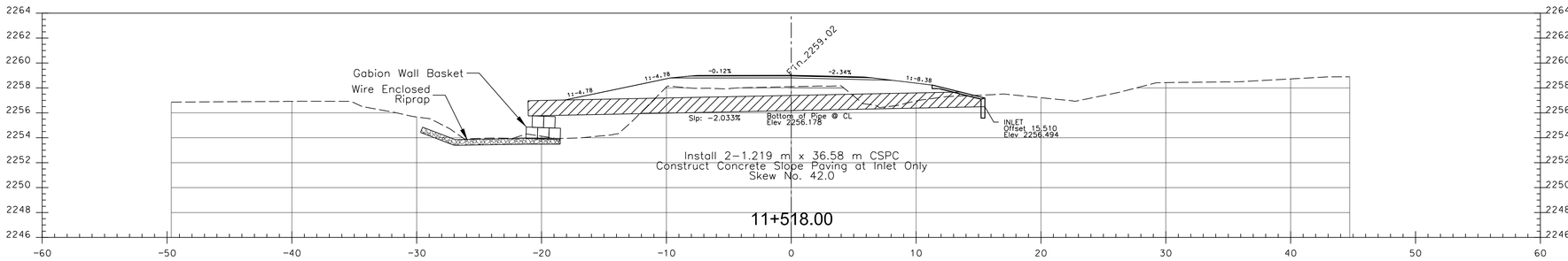
GENERAL NOTES

1. SEE SHEET 68 OF 76 FOR ADDITIONAL NOTES.









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REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
NAVAJO	NM	NAVAJO	N31	N31(4)1,2,&4	B1 OF 93

ESTIMATE OF QUANTITIES FOR BRIDGE WORK

ITEM	DESCRIPTION	QUANTITY	UNITS	AS BUILT
20801-0000	STRUCTURE EXCAVATION	108	m³	
20802-0000	FOUNDATION FILL	34	m³	
25112-2000	WIRE ENCLOSED RIPRAP, CLASS 2	⊡ 363	m³	
55201-0200	STRUCTURAL CONCRETE, CLASS A(AE)	⊡ 339	m³	
55301-3300	PRECAST PRESTRESSED CONCRETE, AASHTO GIRDERS, TYPE V	12	ea	
55401-1000	REINFORCING STEEL	16,981	kg	
55401-2000	REINFORCING STEEL, EPOXY COATED	23,368	kg	
55601-0800	BRIDGE RAILING, CONCRETE, NEW JERSEY SAFETY SHAPE	169	m	
56501-0400	DRILLED SHAFTS, 914 MILLIMETER DIAMETER	121	m	
61707-0000	STRUCTURE TRANSITION RAILING, THRIE BEAM	23	m	
63308-3000	OBJECT MARKER TYPE 3, WITH 1 POST AND HARDWARE, 2.98 kg/m	4	ea	

CROSS HOLE SONIC LOGGING (CSL) CONSULTANT TESTING IS INCLUDED IN ITEM 15301-0020 UNDER ROADWAY ITEMS.

NOTE: NOT ALL ITEMS DESCRIBED ABOVE MAY BE SHOWN IN THE BID SCHEWDULE.
ONLY ITEMS NECESSARY FOR EACH PARTICULAR PROJECT WILL BE SHOWN IN THE BID SCHEDULE.

ESTIMATED RIPRAP EARTHWORK QUANTITIES
(INCIDENTAL TO ITEM 25112-2000, WIRE ENCLOSED RIPRAP)

STATION TO STATION	CUT (m^3)	*FILL (m^3)
6+411.300 to 6+420.341	1015.07	0
6+475.217 to 6+486.300	799.77	69.83
TOTAL:	1814.84	69.83

*25% SHRINKAGE FACTOR APPLIED

ITEM 20801-0000
STRUCTURE EXCAVATION

LOCATION	QUANTITY (m³)	LOCATION	QUANTITY (m³)
ABUTMENT #1		ABUTMENT #2	
APPROACH SLAB	3.3	APPROACH SLAB	-0-
CAP AND BACKWALL	35.4	CAP AND BACKWALL	14.1
WINGWALLS (2)	31.9	WINGWALLS (2)	22.9
ABUTMENT #1 TOTAL	70.6	ABUTMENT #2 TOTAL	37.0
		STRUCTURE EXCAVATION TOTAL	107.6

ITEM 20802-0000
FOUNDATION FILL

LOCATION	QUANTITY (m³)	LOCATION	QUANTITY (m³)
ABUTMENT #1		ABUTMENT #2	
APPROACH SLAB	2.9	APPROACH SLAB	30.3
CAP AND BACKWALL	-0-	CAP AND BACKWALL	-0-
WINGWALLS (2)	-0-	WINGWALLS (2)	-0-
ABUTMENT #1 TOTAL	2.9	ABUTMENT #2 TOTAL	30.3
		STRUCTURE EXCAVATION TOTAL	33.2

ITEM 25112-2000
⊡ WIRE ENCLOSED RIPRAP, CLASS 2

LOCATION	QUANTITY (m³)
ABUTMENT #1	189
ABUTMENT #2	174
WIRE ENCLOSED RIPRAP TOTAL	363

ITEM 55601-0800
BRIDGE RAILING, CONCRETE, NEW JERSEY SAFETY SHAPE

STATION TO STATION	QUANTITY (m)
6+407.606 TO 6+489.994; LEFT	*84.036
6+405.823 TO 6+491.777; RIGHT	*84.232
CONCRETE BRIDGE RAILING TOTAL	168.268

* - Length does not equal Sta. to Sta. difference due to offset on curve.

ITEM 56501-0400
DRILLED SHAFTS 914 MILLIMETER DIAMETER

LOCATION	SINGLE SHAFT LENGTH	NUMBER OF SHAFTS	QUANTITY PER FOUNDATION
ABUTMENT #1	12.900	3	38.7
PIER #1	8.300	3	24.9
PIER #2	9.200	3	27.6
ABUTMENT #2	9.700	3	29.1
DRILLED SHAFTS 914 MILLIMETER DIAMTER TOTAL			120.3

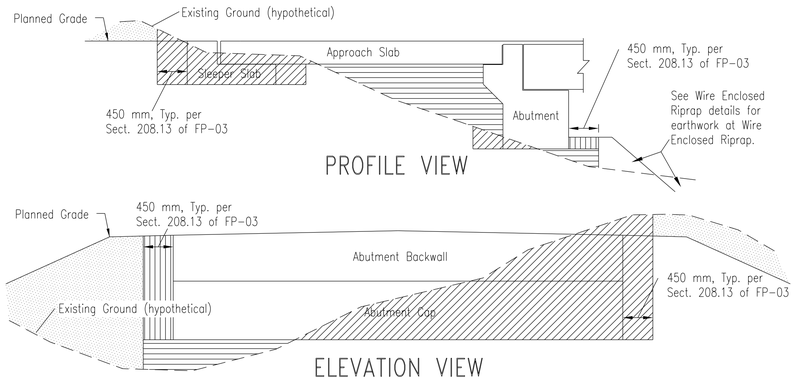
ITEM 61707-0000
STRUCTURE TRANSITION RAILING, THRIE BEAM

STATION TO STATION	QUANTITY (m)
6+402.164 TO 6+407.776; LEFT	*5.718
6+400.185 TO 6+406.013; RIGHT	*5.718
6+489.824 TO 6+495.436; LEFT	*5.718
6+491.588 TO 6+497.412; RIGHT	*5.718
STRUCTURE TRANSITION RAILING TOTAL	22.872

* - Length does not equal Sta. to Sta. difference due to offset on curve.

ITEM 63308-3000
OBJECT MARKERS TYPE 3

LOCATION	QUANTITY (ea)
6+407.4 LEFT	1
6+405.7 RIGHT	1
6+490.1 LEFT	1
6+491.9 RIGHT	1
OBJECT MARKERS TYPE 3 TOTAL	4



Structure Excavation below Existing Ground for placement of structures paid under Item 20801-0000 with resulting Structural Backfill up to Existing Ground considered incidental to Item 20801-0000. Work shall conform to Section 208 of the FP-03.

Foundation Fill from Existing Ground to bottom of structures paid under Item 20802-0000. Work shall conform to Section 208 of the FP-03.

Structural Backfill adjacent to structures above Existing Ground or above Foundation Fill to the Planned Grade considered incidental to the completion of the structure with no separate payment. Work shall conform to Section 208 of the FP-03.

Excavation and/or Embankment outside of the limits for work under Section 208 of the FP-03 to be paid under Items 20402-0000 and/or 20403-0000. Work shall conform to Section 204 of the FP-03.

EXPLANATION AND DETAILS FOR EARTHWORK AT BRIDGES

N31(4)1,2&4 BRIDGE NOTES:

1. SPECIFICATIONS: DESIGN; AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., 2010. CONSTRUCTION; STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-03 AND SUPPLEMENTAL SPECIFICATIONS.

2. UNITS: THIS PROJECT HAS BEEN DESIGNED AND DRAWN USING THE SI (METRIC) SYSTEM OF UNITS. ALL UNIT DIMENSIONS AND ELEVATIONS ARE IN METERS UNLESS NOTED OTHERWISE. ALL REINFORCING MEASUREMENTS ARE TO THE CENTERLINE OF THE BAR UNLESS OTHERWISE SHOWN.

3. DESIGN LOADS: DEAD LOADS; CONCRETE = 23.6 kN/m³, STEEL = 77.0 kN/m³, FUTURE WEARING SURFACE = 1.20 kN/m², PERMANENT STEEL DECK FORMS = 0.745 kN/m², ACTIVE EARTH PRESSURE = 560 kg/m³; PASSIVE EARTH PRESSURE = 4,805 kg/m³. LIVE LOADS; HL-93; TRUCK IMPACT = 1.33, LANE IMPACT = 1.00, STRENGTH II IMPACT = 1.33, FATIGUE IMPACT = 1.15.

4. RATINGS: INVENTORY RATING = MS XX.X; OPERATING RATING = MS XX.X

5. DESIGN CRITERIA: SUPERSTRUCTURE AND SUBSTRUCTURE DESIGNED USING AASHTO LOAD RESISTANCE FACTOR DESIGN (LRFD). MATERIAL STRENGTHS: CAST IN PLACE REINFORCED CONCRETE (INCLUDING DRILLED SHAFTS), F'c = 27.6 MPa; CONVENTIONAL AND EPOXY COATED REINFORCING STEEL, Fy = 413.7 MPa; PRECAST PRESTRESSED CONCRETE, F'c = 41.0 MPa; PRESTRESSED CONCRETE RELEASE STRENGTH, F'ci = 31.05; PRESTRESSING STEEL STRANDS, Fpu = 1861.6 MPa; STRUCTURAL STEEL, Fy = 345 MPa (UNLESS OTHERWISE NOTED).

6. CONCRETE: ALL CAST IN PLACE CONCRETE SHALL BE CLASS A(AE) WITH THE MINIMUM DESIGN STRENGTH INDICATED ABOVE AT 28 DAYS. THE AIR CONTENT FOR CLASS A(AE) CONCRETE SHALL NOT BE LESS THAN THAT SPECIFIED IN THE FP-03. ALL PRECAST, PRESTRESSED CONCRETE FOR AASHTO TYPE V GIRDERS SHALL BE CLASS P(PRESTRESSED) WITH THE RELEASE STRENGTH AND MINIMUM DESIGN STRENGTH INDICATED ABOVE. CAST IN PLACE CONCRETE FOR THE DRILL SHAFTS SHALL BE CLASS A (MODIFIED) WITH 28 DAY MINIMUM STRENGTH OF 27.6 MPa, A SLUMP OF 127mm +/- 25mm, A WATER CEMENT RATIO OF 0.44 AND SHALL CONSIST OF A MAXIMUM AGGREGATE SIZE OF 19mm WITH NO MORE THAN 50% HAVING MORE THAN 1 FRACTURED FACE. ALL CONCRETE CAST ON OR BELOW SOIL OR ROCK SHALL BE MADE WITH TYPE II CEMENT. THE CONTRACTOR MAY USE CONCRETE WITH TYPE II CEMENT ELSEWHERE AT NO ADDITIONAL COST TO THE BIA. CHAMFER ALL EXPOSED CORNERS OF ALL CONCRETE 19mm UNLESS OTHERWISE NOTED. THE TIME LIMITS SPECIFIED IN FP-03 TABLE 552-4 SHALL APPLY. IF CONCRETE CAN NOT BE DISCHARGED WITHIN THE SPECIFIED TIME LIMITS, CONCRETE BATCHING OR TRANSPORTATION ALTERNATIVES SUCH AS; 1) DRY BATCHING, 2) A SITE BATCHING PLANT CONFORMING TO APPLICABLE SPECIFICATIONS, OR 3) RETARDANT ADMIXTURES, SHALL BE USED. ANY CONCRETE BATCHING OR TRANSPORTATION ALTERNATIVES SHALL BE DISCUSSED AT THE PRE-CONSTRUCTION MEETING WITH THE AO/CO. ALTERNATIVE METHODS SHALL BE SUBMITTED AS PART OF THE CONCRETE MIX DESIGN FOR REVIEW. THE SUBMITTAL SHALL CONTAIN HISTORICAL DATA AND TEST RESULTS FOR IDENTICAL STRENGTH CONCRETE PLACED AT SIMILARLY REMOTE LOCATIONS. SUBMITTED HISTORICAL DATA SHALL SHOW CONFORMANCE TO THE REQUIRED SPECIFICATIONS. ALTERNATIVE METHODS SHALL NOT BE USED UNTIL WRITTEN APPROVAL IS GIVEN BY THE AO/CO.

7. CONCRETE FINISHING: SURFACES OF THE VERTICAL EDGES AND BOTTOM OF THE BRIDGE DECK OVERHANG. AND THE EXPOSED SURFACES OF THE SUBSTRUCTURE DOWN TO 300 mm BELOW THE GROUNDLINE SHALL RECEIVE A CLASS 2 SURFACE FINISH AS SPECIFIED IN SECTION 552.16 OF THE FP-03. ALL OTHER CONCRETE SURFACES SHALL BE GIVEN A CLASS 1 ORDINARY FINISH. DRIVING SURFACES OF THE BRIDGE DECK AND APPROACH SLAB SHALL BE GIVEN A FINISH IN ACCORDANCE WITH SECTIONS 552.14 (a), (b) AND (c)(1) OF THE FP-03.

8. REINFORCING STEEL: ALL PLAIN REINFORCING STEEL SHALL CONFORM TO AASHTO M31M, GRADE 420 AND EPOXY COATED REINFORCING SHALL CONFORM TO AASHTO M284M AND AASHTO M31M, GRADE 420. ALL REINFORCEMENT IN DECK, OR PROTRUDING INTO THE DECK SHALL BE EPOXY COATED. THE MINIMUM COVER OF ANY REINFORCING STEEL SHALL BE 51 mm UNLESS OTHERWISE SPECIFIED. LENGTHS OF REINFORCING STEEL BARS SHOWN ON THESE PLANS INCLUDE REQUIRED SPLICE LENGTHS FOR SPLICES SHOWN. SPLICES AT LOCATIONS NOT SHOWN IN THE PLANS SHALL BE REQUESTED FOR APPROVAL BY THE CONTRACTOR AND SHALL NOT BE UTILIZED UNTIL WRITTEN APPROVAL IS GRANTED BY THE AO/CO. ADDITIONAL REINFORCING STEEL QUANTITIES REQUIRED FOR SPLICES AT LOCATIONS NOT SHOWN IN THE PLANS SHALL BE PROVIDED AT THE CONTRACTOR'S EXPENSE.

9. STRUCTURAL STEEL: STRUCTURAL STEEL FOR DIAPHRAGMS, CONNECTION PLATES, MISCELLANEOUS PLATES, GUARD ANGLES, EXPANSION JOINTS, AND ANY OTHER STEEL ITEMS SHALL CONFORM TO AASHTO M270, GRADE 250. SHEAR STUDS, IF USED, SHALL CONFORM TO AASHTO M169, GRADES 1015, 1018 or 1020. ALL OTHER STEEL SHALL CONFORM TO AASHTO REQUIREMENTS AS SHOWN OR NOTED ON THE PLANS.

10. PRESTRESSED CONCRETE GIRDERS: PRESTRESSED CONCRETE BEAMS SHALL BE MANUFACTURED AS DETAILED IN THESE PLANS. ALL CONCRETE, REINFORCED STEEL, PRESTRESSING STEEL STRANDS, LIFTING DEVICES, INSERTS, BEARING PLATES, SOLE PLATES, ANCHOR BOLTS, WASHERS, NUTS, ELASTOMERIC BEARING PADS, AND OTHER MATERIALS NECESSARY FOR THE FABRICATION, TRANSPORTATION, AND PLACEMENT OF THE PRESTRESSED CONCRETE BEAMS SHALL BE CONSIDERED INCIDENTAL TO ITEM 55301-3300, PRECAST, PRESTRESSED CONCRETE AASHTO GIRDERS, TYPE V.

11. STAY-IN-PLACE DECK FORMS: PERMANENT STEEL DECK FORMS MAY BE UTILIZED FOR SLAB CONSTRUCTION PROVIDED THAT BOTH TOP AND BOTTOM MATS OF DECK SLAB REINFORCING BARS ARE EPOXY COATED. COMPLETE SHOP PLANS, DESIGN CALCULATIONS, SPECIFICATIONS, IN ACCORDANCE WITH ALL WORK SHALL BE IN ACCORDANCE WITH THE SUPPLEMENTAL SPECIFICATIONS FOR SECTION 562. THE DESIGN, CALCULATIONS, AND SHOP DRAWINGS FOR THE PROPOSED FORMING SYSTEMS MUST BE APPROVED BY THE CONTRACTING OFFICER PRIOR TO INSTALLATION.

12. DRILLED SHAFTS: CASING OF THE DRILLED SHAFTS MAY BE REQUIRED TO PREVENT CAVING OF SURROUNDING MATERIAL. IF CASING IS USED, IT SHALL BE WITHDRAWN IN A SLOW CONTINUOUS MANNER MAINTAINING A SUFFICIENT HEAD OF CONCRETE TO PREVENT INFILTRATION OF WATER OR CREATION OF VOIDS IN DRILLED SHAFT CONCRETE. PAYMENT FOR WORK RELATED TO CASING INCLUDING FURNISHING, INSTALLING AND REMOVING SHALL BE INCLUDED IN CONTRACT ITEMS 56501-0400 & 56501-0500 DRILLED SHAFTS, WHICH ALSO INCLUDES ALL EXCAVATION, DRILLING, CONCRETE AND REINFORCING STEEL FOR THE DRILLED SHAFTS.

13. STRUCTURE EXCAVATION AND BACKFILL: ALL STRUCTURE EXCAVATION AND BACKFILL SHALL BE DONE ACCORDING TO FP-03, SECTION 208 - STRUCTURE EXCAVATION AND BACKFILL FOR SELECT MAJOR STRUCTURES. PAYMENT FOR STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH THE DETAILS SHOWN ON THIS SHEET.

14. WELDING; ALL BRIDGE RELATED WELDING SHALL BE IN CONFORMANCE WITH THE AASHTO/AWS D1.5M/D1.5 2008 BRIDGE WELDING CODE, INCLUDING INSPECTION OF ALL WELDS. ANY WELDING (EXCEPT TACK WELDING) ON ANY STRUCTURAL MEMBER DESIGNED TO CARRY OR RESIST TRAFFIC OR PEDESTRIAN LOADS SHALL BE SUBJECT TO VISUAL INSPECTION AND MAGNETIC PARTICLE TESTING BY AN APPROVED AWS CERTIFIED WELDING INSPECTOR, AND SHALL PASS TESTING PRIOR TO ACCEPTANCE OF THE WORK UNLESS OTHERWISE DIRECTED BY THE AO/CO. ALL LABOR, EQUIPMENT, MATERIALS AND WORK REQUIRED FOR TESTING BY AN AWS CERTIFIED WELDING INSPECTOR SHALL BE MEASURED AND PAID FOR UNDER ITEM 15301-0000, CONTRACTOR QUALITY CONTROL. REFER TO SPECIAL CONTRACT REQUIREMENT PARAGRAPH 16(k) FOR ADDITIONAL INFORMATION.

15. FIELD VERIFICATION: THE CONTRACTOR SHALL VERIFY IN THE FIELD ALL DIMENSIONS, ELEVATIONS AND DETAILS WHICH WILL BE INVOLVED IN THE NEW CONSTRUCTION BEFORE PROCEEDING WITH NEW WORK.

16. THE CONTRACTOR SHALL HAVE A QUALIFIED GEOLOGIST PRESENT DURING THE DRILLING OF THE SHAFTS AND SHALL VERIFY THAT THE HOLES FOR THE SHAFTS ARE AT LEAST 3 m INTO COMPETENT SANDSTONE BEFORE DRILLING FOR THE NEXT SHAFT.

17. THE CONTRACTOR SHALL BUILDUP THE EMBANKMENT ON ABUTMENT #2 TO ACCEPT THE RIPRAP AT THE SW CORNER ESTIMATED TO BE 70 CUBIC METERS WHICH SHALL BE INCLUDED IN THE UNIT PRICE BID FOR BID ITEM 25112-2000.

* - REVISED 09/16/2013

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

ESTIMATED QUANTITIES AND GENERAL NOTES

Designed by: NRO-DOT Struct Unit	
Drawn by: cdh, dc, rsh	Date: 09/16/2013
Revised by:	Date:
File Name: B1_Estimated Quantities & General Notes	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-2 of 93

RIGHT OF WAY AT BRIDGE		
Station	Left	Right
6+380.000 to 6+515.000	50.0m	50.0m

C3
PI 6+435.863
A 91°34'42" Rt
R 215.000
L 343.644
T 221.006
E 93.332
N 548822.432
E 727164.195

SEE SHEET B-7 FOR ALL RIPRAP DIMENSIONS AND DETAILS

Abut #1 Sta. 6+411.996

9° 48' 28.4"

CL Abut #1 Back

BOB Abut #1 Sta. 6+411.300 Elev. 2203.552

Limits of Rip Rap. Toe of Rip Rap Elev. 2195.6 See Sheet B-7 for all details.

Edge of Bridge Deck

Pier #1 Sta. 6+436.419 Elev. 2203.582

CL Pier #1

3° 17' 57.9"

Edge of Pavement

Approach Slab

CL Roadway & Bridge Route N31(4)1,2&4

6+400

6+420

6+440

6+460

6+480

Out to Out Bridge Deck Width

Limits of Rip Rap. Toe of Rip Rap Elev. 2195.8 See Sheet B-7 for all details.

CL Pier #2

Pier #2 Sta. 6+461.181 Elev. 2203.611

3° 17' 57.9"

SEE SHEET B-7 FOR ALL RIPRAP DIMENSIONS AND DETAILS

CL Abut #2

9° 48' 28.4"

Abut #2 Sta. 6+485.604

EOB Abut #2 Sta. 6+486.300 Elev. 2203.642

Approach Slab

CL Roadway & Bridge Route N31(4)1,2&4

6+500

600 mm Shldr.

6.600 m Driving Lns.

600 mm Shldr.

Edge of Pavement

Limits of Rip Rap. Toe of Rip Rap Elev. 2195.8 See Sheet B-7 for all details.

Limits of Rip Rap. Toe of Rip Rap Elev. 2195.8 See Sheet B-7 for all details.

LIMITS OF RIP RAP

PLAN VIEW
N.T.S.

NOTE: Concrete Barrier Spacing shown is measured along front face at top of barrier, from Edge of Concrete Deck at Abutment 1 to CL Joints along deck to Edge of Concrete Deck at Abutment 2. Barrier Section lengths at edge of deck vary due to skew of edge of deck joint.

Lt. Side 5.693 m
Rt. Side 5.708 m
(Barrier Section plus 25 mm to CL Joint) (see NOTE)

Concrete Barrier Spacing – 11 spa. @ 5.716 m (5.666 m Barrier Section plus 25 mm each end to CL Joint) = 62.876 m

Lt. Side 5.693 m
Rt. Side 5.708 m
(Barrier Section plus 25 mm to CL Joint) (see NOTE)

BOB Sta. 6+411.300 Elev. 2203.552

CL Abut 1 Sta. 6+411.996

CL BEARING Sta. 6+436.087

CL PIER 1 Sta. 6+436.418 Elev. 2203.582

CL BEARING Sta. 6+436.749

CL BEARING Sta. 6+460.851

CL PIER 2 Sta. 6+461.182 Elev. 2203.611

CL BEARING Sta. 6+461.513

CL Abut 2 Sta. 6+485.604

EOB Sta. 6+486.300 Elev. 2203.642

Bridge Grade = 0.12%

Bottom of Cap Elev. 2200.510

Rip Rap Elev. 2200.867

Bottom of Cap Elev. 2200.299

H.W. Elev. = 2199.80

Bottom of Cap Elev. 2200.328

Rip Rap Elev. 2200.867

Bottom of Cap Elev. 2200.599

1.5

1

Construction Joint Elev. 2196.7

Toe of Rip Rap; Elev. 2195.800

OHWM; @ Rdwy. CL Sta. 6+442.5 @ Elev. 2196.2

OHWM; @ Rdwy. CL Sta. 6+447.0 @ Elev. 2196.4

Construction Joint Elev. 2198.4

Existing Ground

6+490

See EROSION PROTECTION DETAIL sheet for wire enclosed riprap details

3 – 914 mm ø Drilled Shafts

3 – 914 mm ø Drilled Shafts

3 – 914 mm ø Drilled Shafts

3 – 914 mm ø Drilled Shafts

Estimated Tip Elev. 2190.9

Estimated Tip Elev. 2187.6

Estimated Tip Elev. 2188.4

Estimated Tip Elev. 2189.2

6+410

6+430

6+450

6+470

2206
2204
2202
2200
2198
2196
2194
2192
2190

PROFILE VIEW @ ROADWAY CL
N.T.S.

100 YEAR FLOW DRAINAGE DATA
Drainage Area = 150.87 km²
Flow = 428 cms
High Water Elev. = 2199.80
Flow Velocity = 5.45 m/sec
Scour Depth = xx.x m

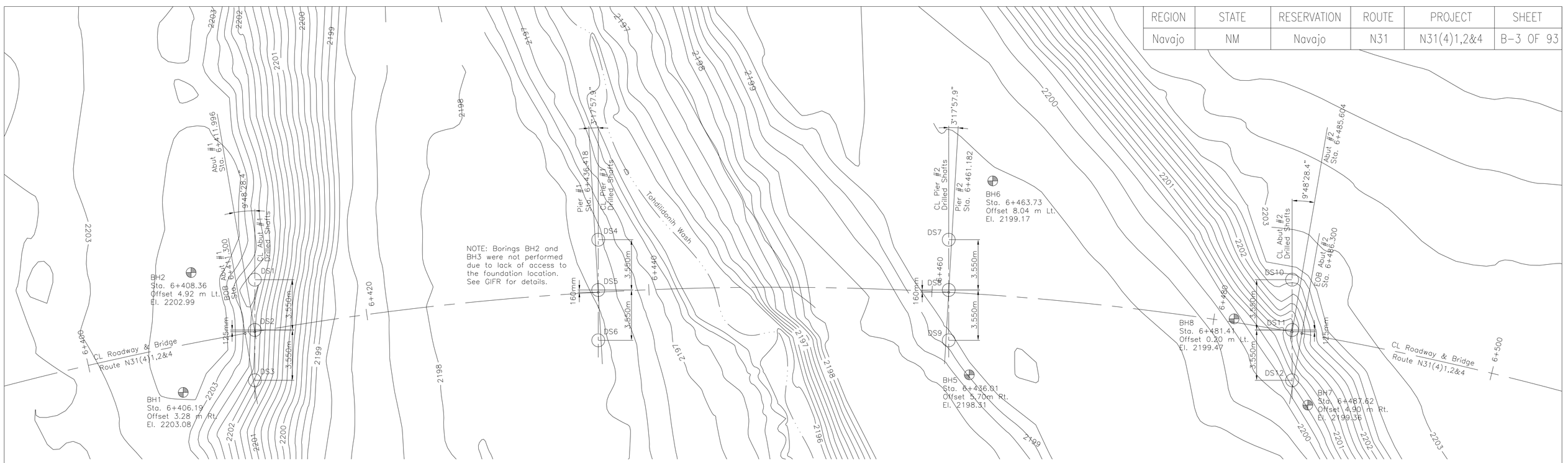
* – REVISED 09/23/2013

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

STRUCTURE LAYOUT

Designed by: cdh Structural Unit	
Drawn by: cdh, rsh, dc	Date: 09/23/13
Revised by:	Date:
File Name: B02_Structure Layout	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-3 OF 93



FOUNDATION LAYOUT

N.T.S

⊕ – Approximate Bore Hole Location.

BH# – Bore Hole number.

BORE HOLE SUMMARY					
BORE HOLE	NORTHING	EASTING	STATION	OFFSET	ELEVATION
BH1	548752.707	727093.421	6+406.19	3.28 m Rt.	2203.08
BH2	548754.629	727101.673	6+408.36	4.92 m Lt.	2202.99
BH5	548699.950	727110.727	6+436.01	5.70 m Rt.	2198.31
BH6	548702.337	727124.295	6+463.73	8.04 m Lt.	2199.17
BH7	548676.456	727115.619	6+487.62	4.90 m Rt.	2199.36
BH8	548683.204	727119.931	6+481.41	0.20 m Lt.	2199.47

FOUNDATION INFORMATION			
ABUTMENT #1	PIER #1	PIER #2	ABUTMENT #2
Foundation Type = Drilled Shafts Foundation Size = 914 mm ø Foundation Number = 3 Applied Structural Load = 3000 kN Ultimate Capacity (Ru) = n/a Estimated Tip Elevation = 2186.00	Foundation Type = Drilled Shafts Foundation Size = 914 mm ø Foundation Number = 3 Applied Structural Load = 4500 kN Ultimate Capacity (Ru) = n/a Estimated Tip Elevation = 2189.00	Foundation Type = Drilled Shafts Foundation Size = 914 mm ø Foundation Number = 3 Applied Structural Load = 4500 kN Ultimate Capacity (Ru) = n/a Estimated Tip Elevation = 2189.00	Foundation Type = Drilled Shafts Foundation Size = 914 mm ø Foundation Number = 3 Applied Structural Load = 3000 kN Ultimate Capacity (Ru) = n/a Estimated Tip Elevation = 2190.00

NOTE:
1. Limited data is shown from the Geotechnical Investigation and Foundation Recommendation (GIFR) report. Upon request, a copy of the GIFR for this project will be furnished to the Contractor. Use of the data shown and contained in the GIFR is at the discretion of the user who shall be responsible for all interpretations and/or assumptions based on the data shown.

2. See sheet B4 for drill shaft details.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

FOUNDATION LAYOUT

Designed by: NRO-DOT Structural Unit

Drawn by: cdh, dc, rsh Date: 02/25/2013

Revised by: Date:

File Name: B03_Foundation Layout

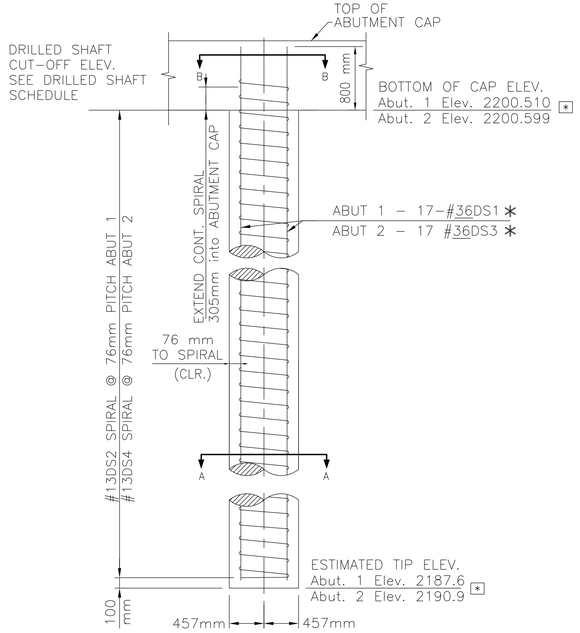
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-4 OF 93

DRILLED SHAFT AND COLUMN NOTES:

1. ABUTMENTS ARE TO BE SUPPORTED ON 914 mm DIAMETER CAST-IN-PLACE CONCRETE DRILLED SHAFTS, WITH AN ALLOWABLE LOAD OF 1475 kN.
2. PIERS ARE TO BE SUPPORTED ON 1.219 m DIAMETER CAST-IN-PLACE CONCRETE DRILLED SHAFTS, WITH AN ALLOWABLE LOAD OF xxxx kN.
3. EXCAVATION OF ADJACENT DRILLED SHAFTS WITHIN 4 SHAFT DIAMETERS CENTER TO CENTER WILL NOT BE PERMITTED UNTIL 48 HOURS AFTER THE ADJACENT DRILLED SHAFT CONCRETE HAS BEEN PLACED.
4. TOPS OF DRILLED SHAFTS SHALL BE WITHIN 50 mm OF PLAN DIMENSIONS AND SHALL NOT DEVIATE MORE THAN 1 1/2 PERCENT FROM PLUMB.
5. CONSTRUCTION JOINTS NOT SHOWN ON THE PROJECT PLANS WILL REQUIRE APPROVAL OF THE BIA AO/CO PRIOR TO CONSTRUCTION.
6. CONSTRUCTION CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SUPPORT OF REINFORCEMENT CAGES DURING FABRICATION, ERECTION AND PLACEMENT OF CONCRETE. PLANS SHOWING REINFORCING CAGE SUPPORT AND METHODS OF ERECTION SHALL BE SUBMITTED TO THE BIA AO/CO FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
7. VERTICAL REINFORCEMENT BARS SHALL CONSIST OF LENGTHS AS LONG AS PRACTICAL, WITH LAP SPLICES PLACED IN LOWER PORTIONS OF SHAFTS.
8. FREE FALL CONCRETE PLACEMENT IN DRILLED SHAFTS SHALL BE IN ACCORDANCE WITH FP-03 565.07. FREE FALL OF CONCRETE DURING PLACEMENT IN DRILLED SHAFTS WILL ONLY BE ACCEPTABLE IF GROUNDWATER IS NOT ENCOUNTERED AND THAT PROVISIONS ARE TAKEN TO AVOID STRIKING THE CONCRETE ON THE SIDES OF THE HOLE OR REINFORCING STEEL.
9. ALL SHAFTS TO BE TESTED BY CROSS-HOLE SONIC LOGGING USING A COMPLETE CIRCUIT WITH 4 CONDUITS FOR SIX PATHS. CONDUITS ARE TO BE SCHEDULE 40 PVC AND PLACED WITHIN THE REINFORCING CAGE. TESTING IS INCIDENTAL TO ITEM 56501-0400.
10. THE COST OF FURNISHING CONCRETE AND REINFORCING STEEL FOR THE DRILLED SHAFT AND ALL MATERIALS SHALL BE CONSIDERED INCIDENTAL TO THE COST OF DRILLED SHAFT, ITEM 56501-0400.
11. FOR CASING, SEE NOTE 12 ON SHEET B1

MECHANICAL REINFORCING STEEL SPLICING NOTES:

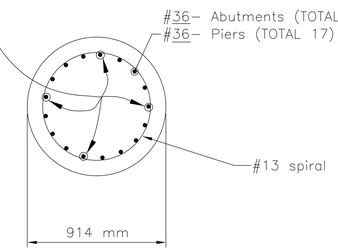
1. LONGITUDINAL REINFORCING STEEL BARS IN DRILLED SHAFTS AND COLUMNS HAVE BEEN DETAILS AS ONE LENGTH FROM BOTTOM TO TOP. AT THE CONTRACTOR'S OPTION A MECHANICAL REINFORCING STEEL SPLICE MAY BE USED UPON WRITTEN APPROVAL BY THE AO/CO.
2. MECHANICAL REINFORCING STEEL SPLICES SHALL BE CAPABLE OF DEVELOPING 125% OF THE YIELD STRENGTH OF THE BAR, AND SHALL BE ONE OF THE FOLLOWING TYPES OR AN APPROVED EQUAL.
   a) LENTON-P9 MANUFACTURED BY ERICO PRODUCTS, INC.
   b) DB-SAE SPLICE SYSTEM, MANUFACTURED BY RICHMOND SCREW COMPANY, INC.
   c) DAYTON SUPERIOR-MRC 150.
3. MECHANICAL SPLICES SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER. ONE COPY OF THE MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES SHALL BE FURNISHED TO THE AOTR/COR AT LEAST TWO WEEKS BEFORE THE WORK OF SPLICING BEGINS. COST OF THE MECHANICAL SPLICES SHALL BE INCIDENTAL TO THE UNIT PRICES BID FOR ITEM 56501-0400.



ABUTMENT DRILLED SHAFT SECTION DETAIL

NOTE: For drilled shaft / column spiral splice, provide 1½ turns of spiral overlap with 135° hook with 254 mm tail at each end of spliced spiral reinforcement.

50mm I.D. SCHEDULE 40 PVC CONDUIT FOR SONIC-INTEGRITY TESTING (TOTAL 4 PER SHAFT). PLACE IN QUADRANTS TO WITHIN 305mm OF BOTTOM OF SHAFT. PIPES TO HAVE GLUED CAP AT BOTTOM, THREADED CAP AT TOP AND BE SECURELY ATTACHED TO ALTERNATE TIES, REQUIRED FOR ALL SHAFTS.

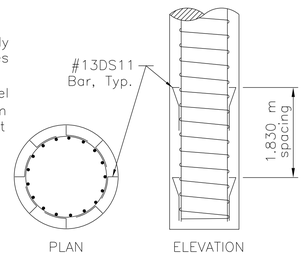


DRILLED SHAFT SECTION A–A

SCALE: NTS

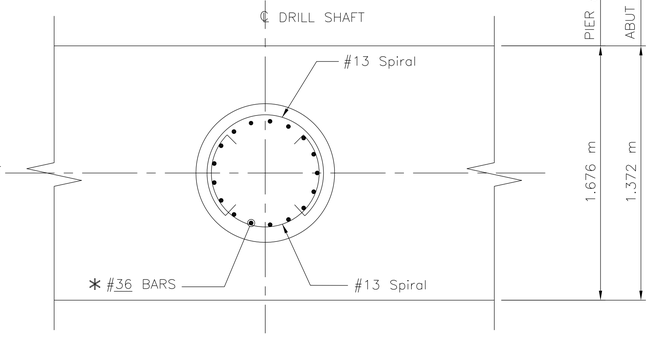
Note: #13 Alignment tie bars are to be epoxy coated. Place eight (8) #13DS11 bars per level spaced evenly around spiral cage. Provide heavy ties at all intersections of #13DS11 bar and spirals/#36 bars. Place first level of eight (8) #13DS11 bars at bottom of drilled shaft as shown. Subsequent level to be placed at spacing of 1.830 m from first level.

Abut. #1 – 7 levels req'd.
Pier #1 – 5 levels req'd.
Pier #2 – 5 levels req'd.
Abut. #2 – 5 levels req'd.



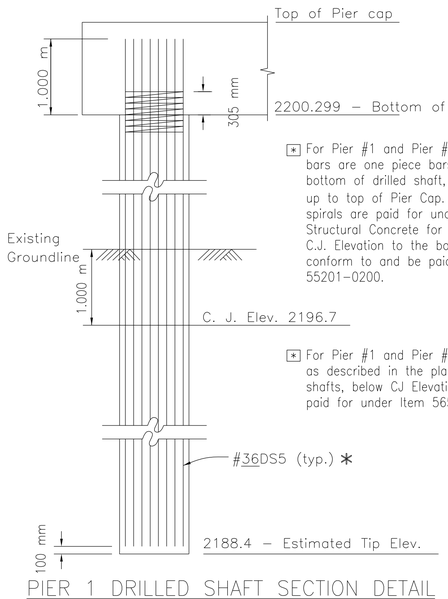
DRILLED SHAFT CAGE ALIGNMENT BAR DETAIL

NOTE: Use this detail at all abutments and piers for drilled shaft cage alignment

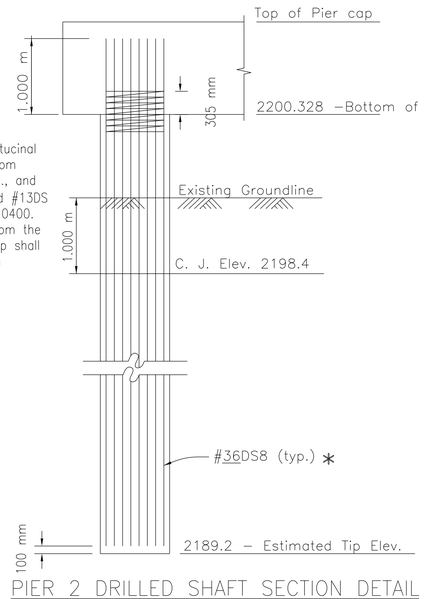


DRILLED SHAFT SECTION B–B

SCALE: NTS



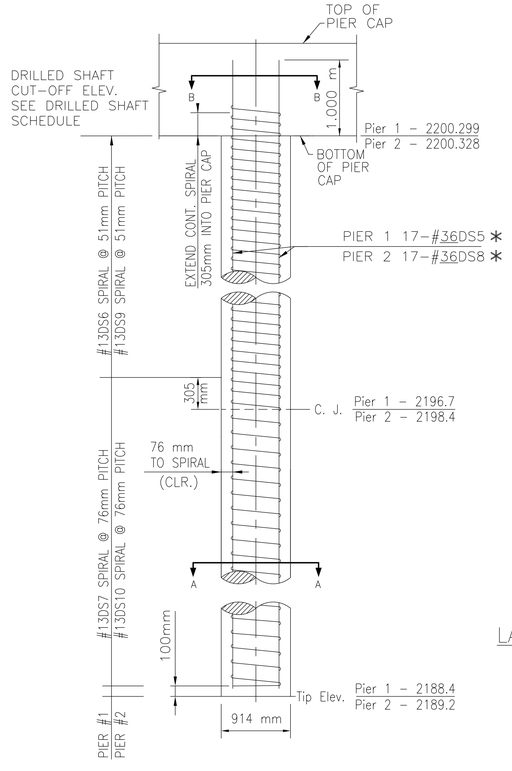
PIER 1 DRILLED SHAFT SECTION DETAIL



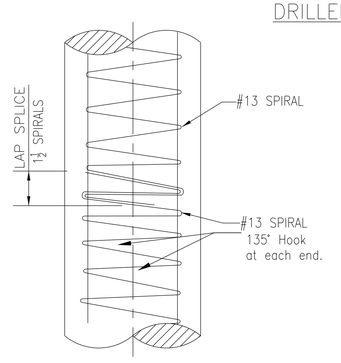
PIER 2 DRILLED SHAFT SECTION DETAIL

For Pier #1 and Pier #2: #29DS longitucinal bars are one piece bars that extend from bottom of drilled shaft, through the C.J., and up to top of Pier Cap. #36DS bars and #13DS spirals are paid for under Item 56501-0400. Structural Concrete for Pier Columns from the C.J. Elevation to the bottom of Pier Cap shall conform to and be paid for under Item 55201-0200.

For Pier #1 and Pier #2: All work, as described in the plans for drilled shafts, below CJ Elevation shall be paid for under Item 56501-0400.



PIER DRILLED SHAFT SECTION DETAIL



LAP SPLICE FOR SPIRAL REINFORCING

SCALE: NTS

NOTE:
1. See sheet B3 for drill shaft locations.
2. See sheets B6, B7 and B9 for more drill shaft details and notes.

* – REVISED 12/06/2013

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

DRILLED SHAFT DETAILS

Designed by: Structural Unit	
Drawn by: cdh, dc, rsh	Date: 12/06/13
Revised by:	Date:
File Name: B04_Foundation Details	

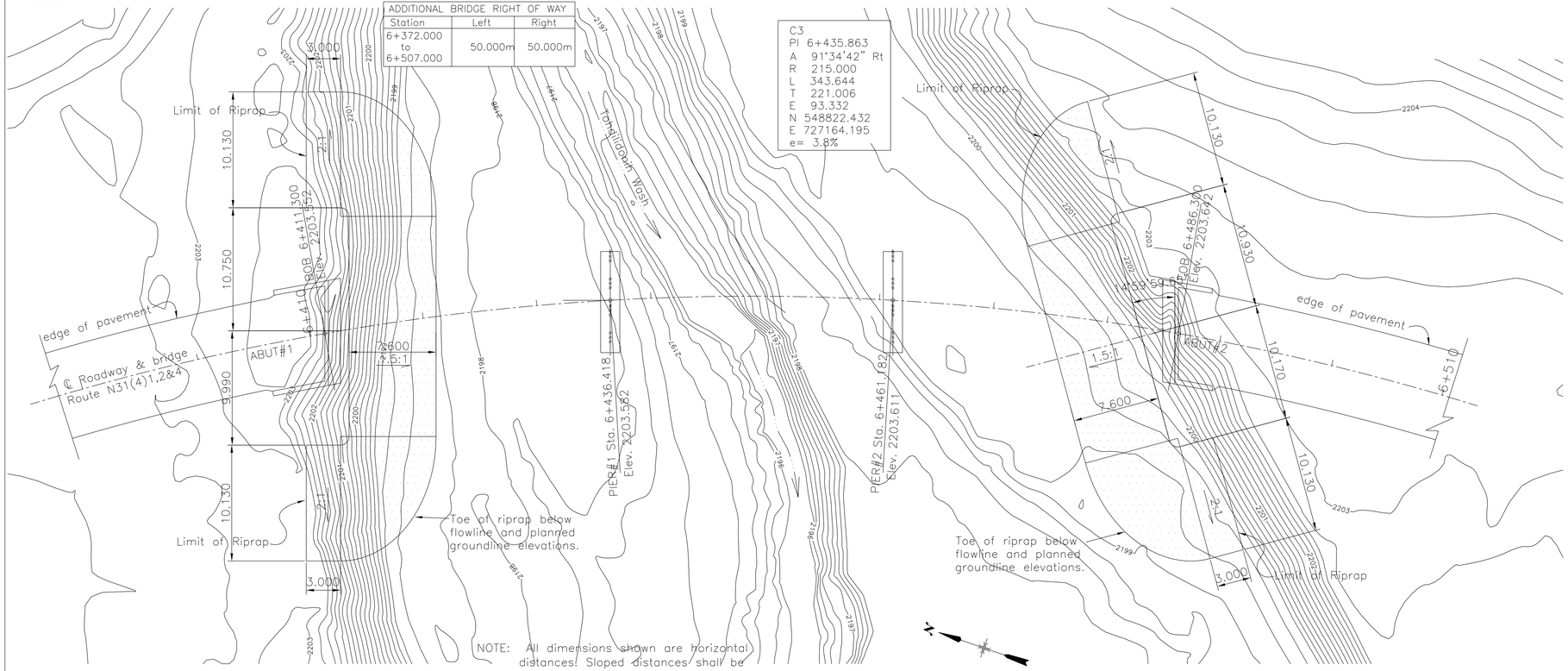
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-5 OF 93

NOTE: Upon completion of riprap work, shape channel as shown on Sheet B-2.

– Limits of Wire Enclosed Riprap

ADDITIONAL BRIDGE RIGHT OF WAY		
Station	Left	Right
6+372.000 to 6+507.000	50.000m	50.000m

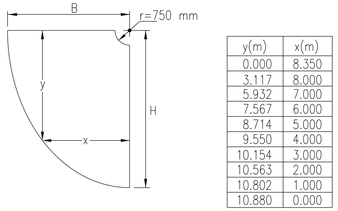
C3
PI 6+435.863
A 91°34'42" Rt
R 215.000
L 343.644
T 221.006
E 93.332
N 548822.432
E 727164.195
e= 3.8%



NOTE: All dimensions shown are horizontal distances. Sloped distances shall be determined from information given.

WIRE ENCLOSED RIPRAP NOTES

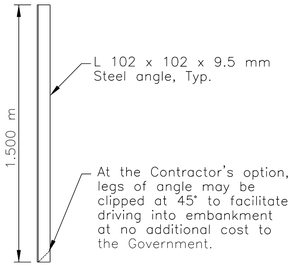
1. Wire Enclosed Riprap Shall Conform to Section 251 of FP-03, the Supplemental Specifications, and the Details Shown in These Construction Plans. Wire Mesh Shall Be Placed To Enclose The Stone Layer On All Sides And Faces. The Wire Mesh Shall Be Joined On All Faces And Shall Be Drawn Tightly Against The Stone By Means Of 3.8 mm Wire Ties Spaced 0.61 Meter Longitudinally And Transversally.
2. Wire Fabric Shall Be Galvanized and Be of the Configuration Shown on This Sheet. An Alternate Wire Fabric May Be Submitted For Review and Approval. Any Wire Fabric Used Shall Have a Class 3 Zinc Coating (Galvanizing), Have a Maximum Opening Dimension of 100 mm, and Shall Not Allow a 75 mm ø Sphere to Pass Through a Wire Fabric Opening.
3. Wire Enclosed Riprap Shall Be Anchored As Shown, By L 102 x 102 x 9.5 mm Steel Angles. Steel Angles Shall Extend 75 mm Above the Top Surface of the Wire Enclosed Riprap When Placed. Steel Angles Will Conform to AASHTO M270M, Grade 250.
4. Embankment Below Riprap Shall Conform to Section 204 of FP-03. Excavation For Riprap Foundations Shall Conform to Section 209 of FP-03. All Embankment For Wire Enclosed Riprap Above Natural Ground and all Excavation For Riprap Construction Shall Be Considered Incidental to Item 25112-2000, Wire Enclosed Riprap.
5. Rock Size Shall Conform to FP-03, Section 705, Table 705-1, Class 2.
6. Erosion Control Geotextile Shall Be Installed Under All Wire Enclosed Riprap As Shown and Shall Be Incidental to Item 25112-2000, Wire Enclosed Riprap. Erosion Control Geotextile Shall Conform to Section 714.01(a)(4) Type IV-B of FP-03. Geotextile To Be Embedded 400 mm Into Ground Along All Riprap Edges at an angle of 45° from the ground surface.
7. In Rock Areas, Drive Angle Iron Anchors To Refusal (Min. embedment 500 mm) Then Cut At 75 mm Above Riprap. Anchors Shall Be Saw Cut To Leave A Smooth Edge, Or Torch Cut and Ground Smooth to the Satisifaction of the COR/AOTR.
8. The Contractor Shall Be Required To Make Field Adjustments To Match Actual Field Conditions As Directed By The AOTR/COR. No Additional Payment Shall Be Made For Such Adjustments. The Quantities Shown Are Only An Estimate. Actual Quantities Shall Be Determined In The Field.



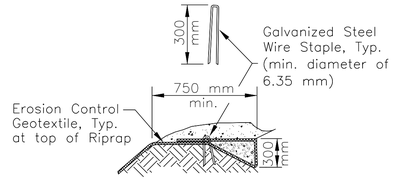
y(m)	x(m)
0.000	8.350
3.117	8.000
5.932	7.000
7.567	6.000
8.714	5.000
9.550	4.000
10.154	3.000
10.563	2.000
10.802	1.000
10.880	0.000

ELLIPTICAL TRANSITION
1/4 LAYOUT

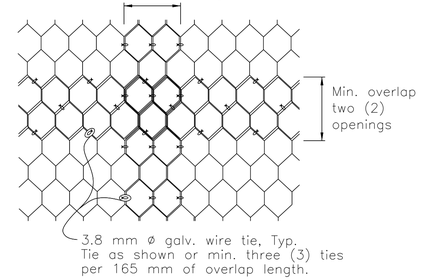
RIPRAP LAYOUT
N.T.S.



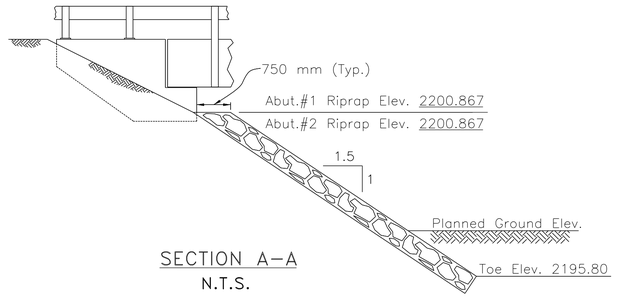
STEEL ANCHOR DETAIL
N.T.S.



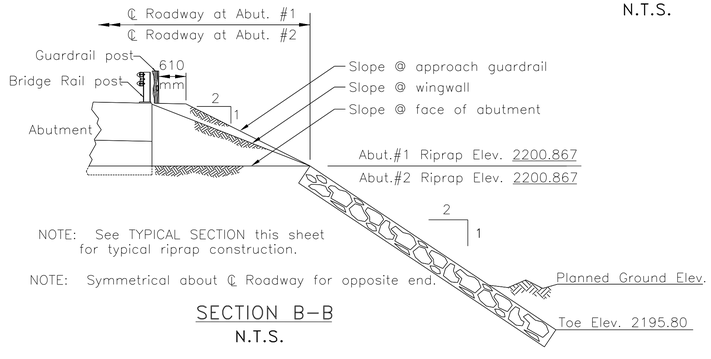
EROSION CONTROL GEOTEXTILE
KEY DETAIL @ TOP OF RIPRAP
N.T.S.



FABRIC SPLICING DETAIL
N.T.S.



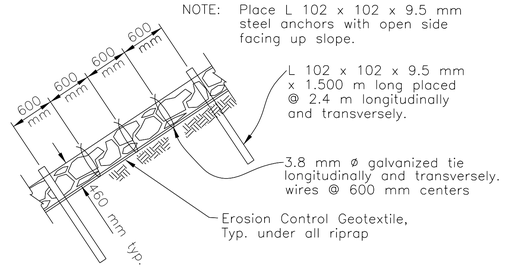
SECTION A-A
N.T.S.



NOTE: See TYPICAL SECTION this sheet for typical riprap construction.

NOTE: Symmetrical about ℄ Roadway for opposite end.

SECTION B-B
N.T.S.



TYPICAL SECTION
N.T.S.

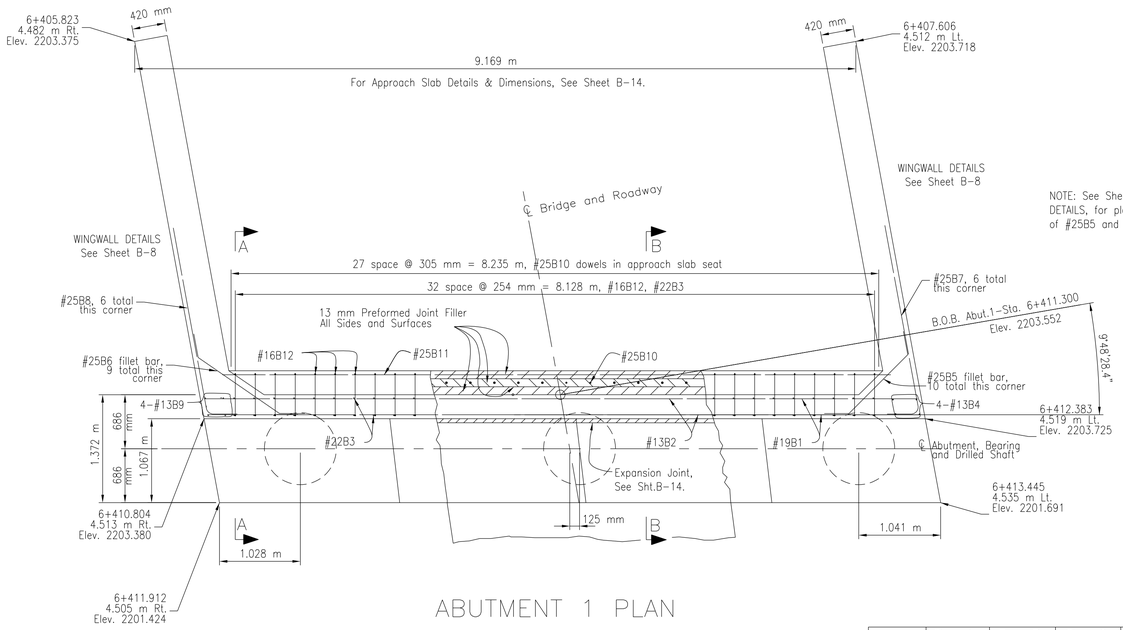
Scales shown are for full sized drawings.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

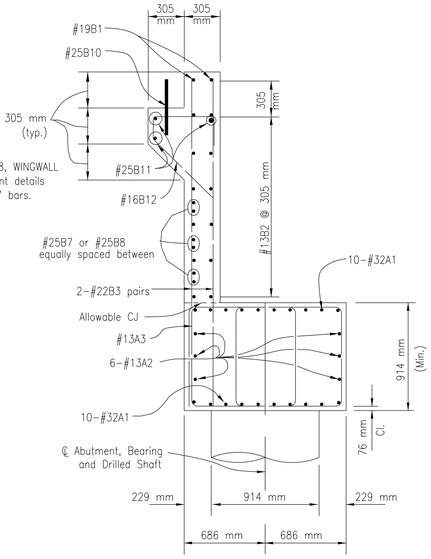
EROSION PROTECTION DETAILS

Designed by: NRO-DOT Structural Unit	
Drawn by: dc, rsh	Date: 3/28/13
Revised by:	Date:--/--/--
File Name: B05_Erosion Protection Details	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-6 OF 93

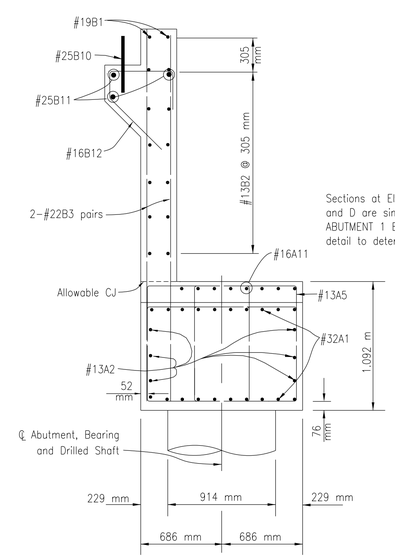


ABUTMENT 1 PLAN



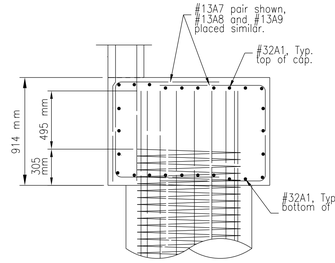
NOTE: See Sheet B-8, WINGWALL DETAILS, for placement details of #25B5 and #25B7 bars.

SECTION A-A



Sections at Elevations B and D are similar. See ABUTMENT 1 ELEVATION detail to determine height.

SECTION B-B

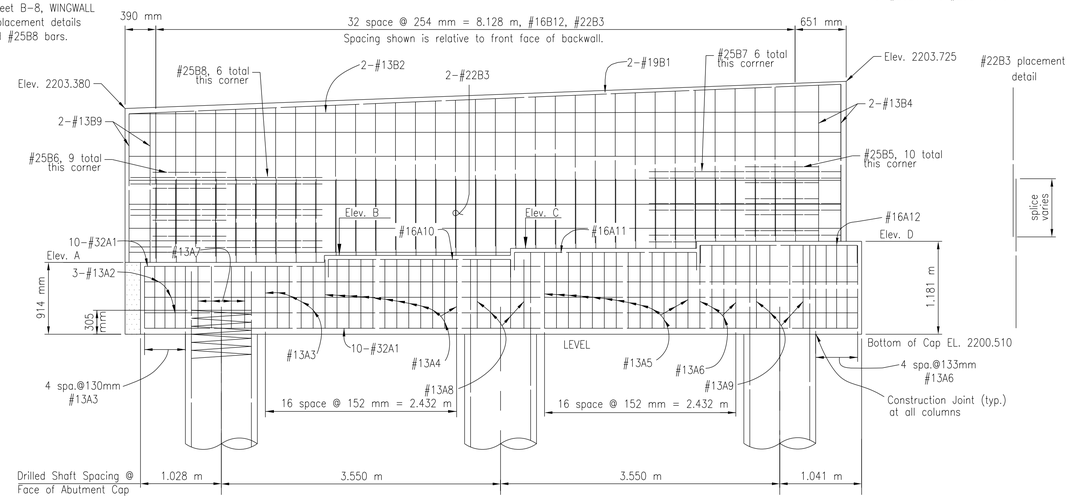


TYPICAL SECTION OVER COLUMNS

	Elev. A	Elev. B	Elev. C	Elev. D
Abut # 1	2201.424	2201.512	2201.602	2201.691

NOTE: See Sheet B-8, WINGWALL DETAILS, for placement details of #25B5 and #25B7 bars.

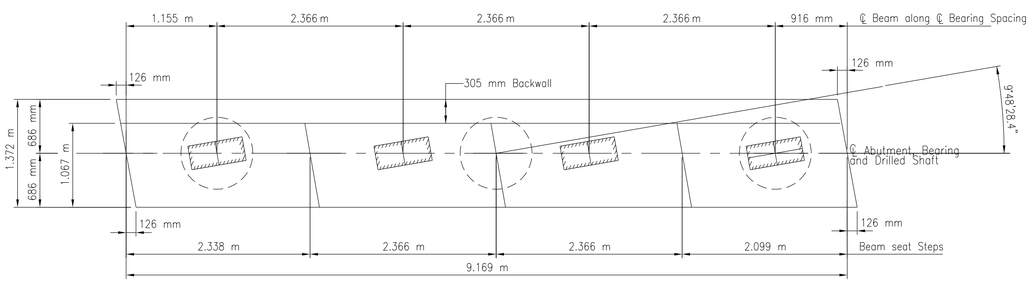
NOTE: See Sheet B-8, WINGWALL DETAILS, for placement details of #25B6 and #25B8 bars.



ABUTMENT 1 ELEVATION

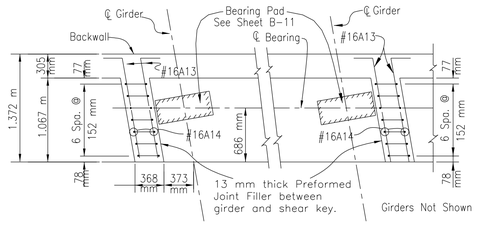
(ABUTMENT 1 SHOWN, LOOKING BACK STATION)

NOTE: See Column Cage Alignment Detail on Sheet B-9 for Cage Alignment bars for Abutment's Drilled Shafts.

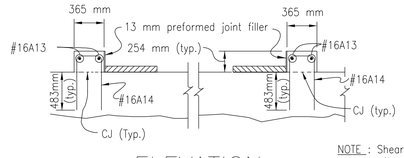


BEARING PAD PLACEMENT DETAILS

NOTE: Place all Bearing Pads Aligned with Beam Centerlines.



SHEAR BLOCK PLAN



ELEVATION

SHEAR BLOCK DETAIL

NOTE : Shear blocks shall be cast only after girders are in place.

NOTES:
1. CJ = Construction Joint
2. See sheet B-4 for Drill shaft details.
3. See sheet B-11 for Beam Diaphragm details.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

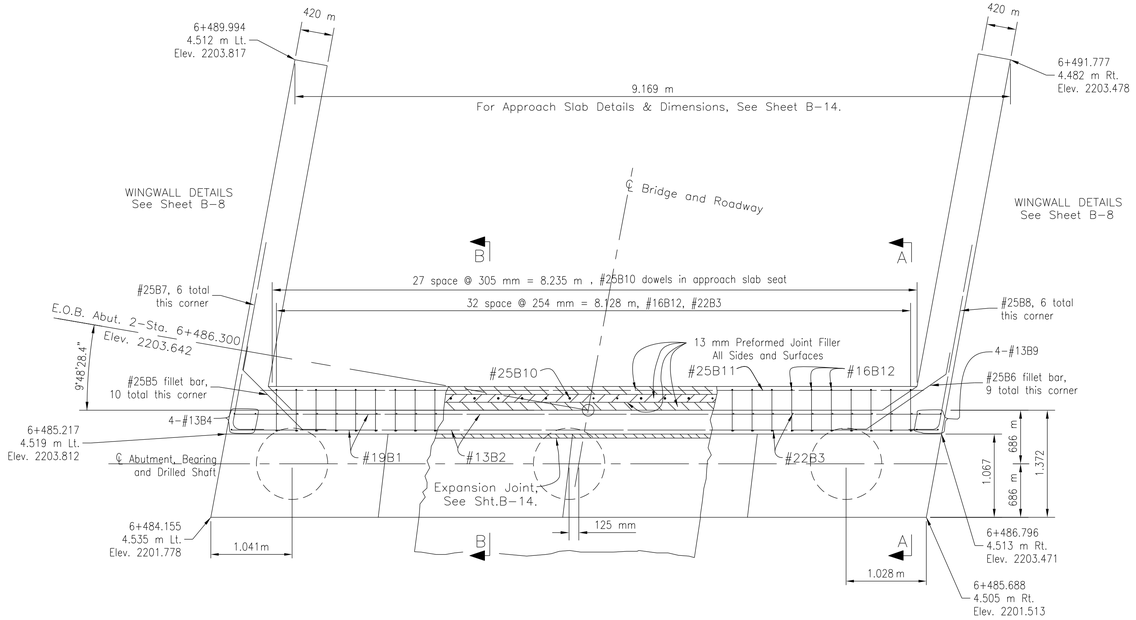
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

TODILDONIH WASH BRIDGE

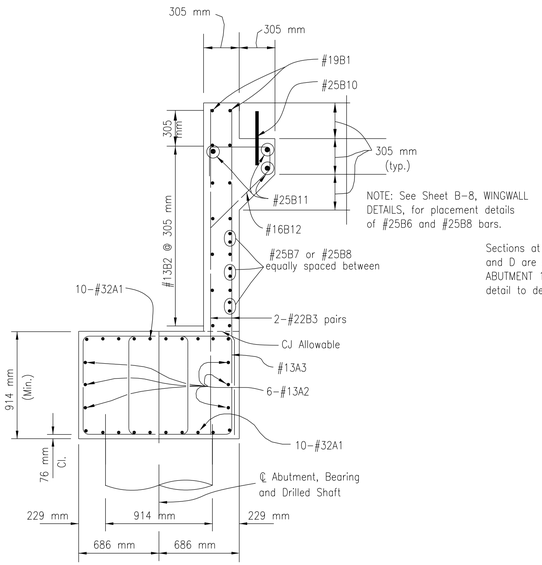
ABUTMENT 1 DETAILS

Designed by: NRO-DOT Structural Unit	
Drawn by: cdh, dc, rsh	Date: 06/04/13
Revised by:	Date:
File Name: B6_Abut 1 Details	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-7 OF 93



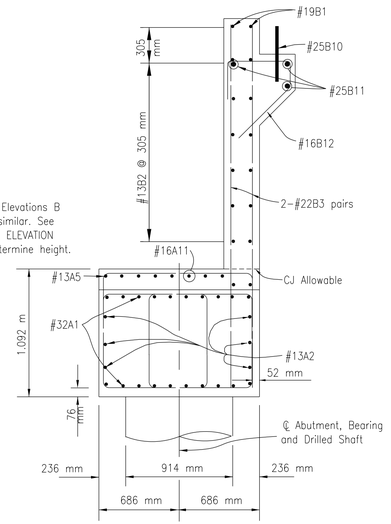
ABUTMENT 2 PLAN



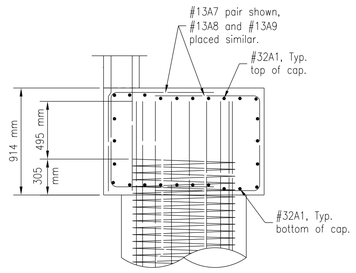
NOTE: See Sheet B-8, WINGWALL DETAILS, for placement details of #25B6 and #25B8 bars.

SECTION A-A

Sections at Elevations B and D are similar. See ABUTMENT 1 ELEVATION detail to determine height.

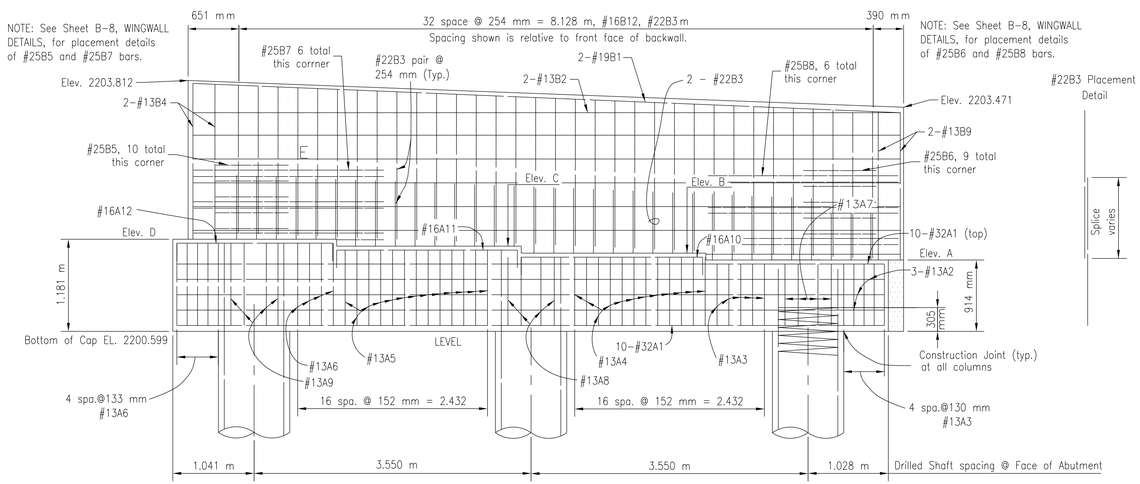


SECTION B-B



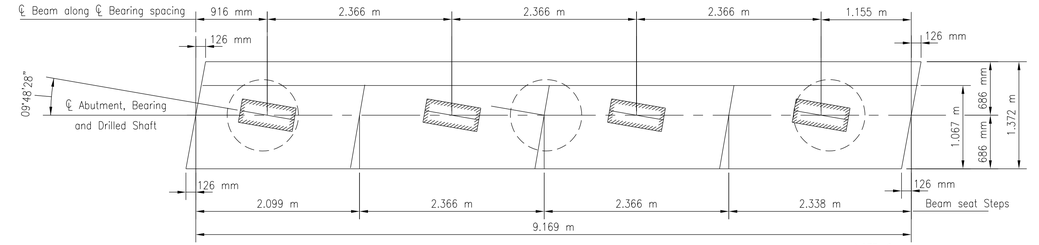
TYPICAL SECTION
OVER COLUMNS

	Elev. A	Elev. B	Elev. C	Elev. D
Abut # 2	2201.513	2201.601	2201.689	2201.778



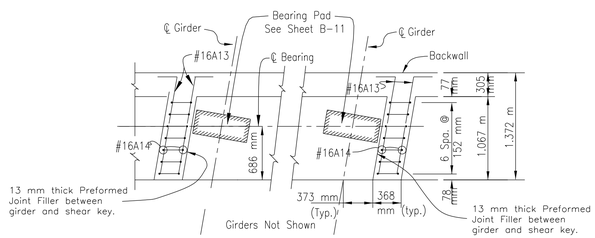
ABUTMENT 2 ELEVATION

(ABUTMENT 2 SHOWN, LOOKING FORWARD STATION)

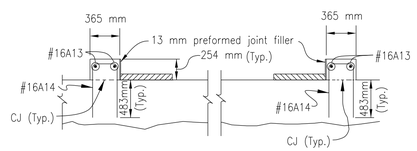


BEARING PAD PLACEMENT DETAILS

NOTE: Shear blocks shall be cast only after girders are in place.



SHEAR BLOCK PLAN



ELEVATION
SHEAR BLOCK DETAIL

NOTE: Shear blocks shall be cast only after girders are in place.

NOTES:
1. CJ = Construction Joint
2. See sheet B-4 for Drill shaft details.
3. See sheet B-11 for Beam Diaphragm details.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

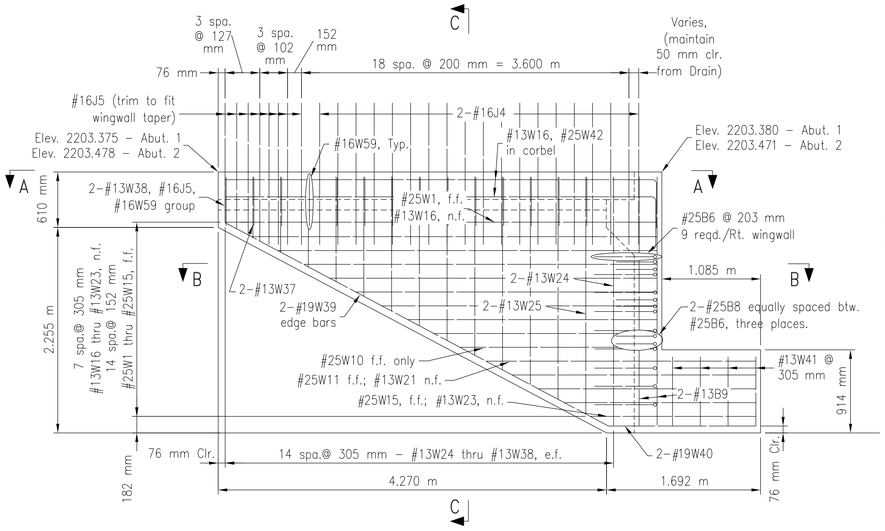
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

TODILDONIH WASH BRIDGE

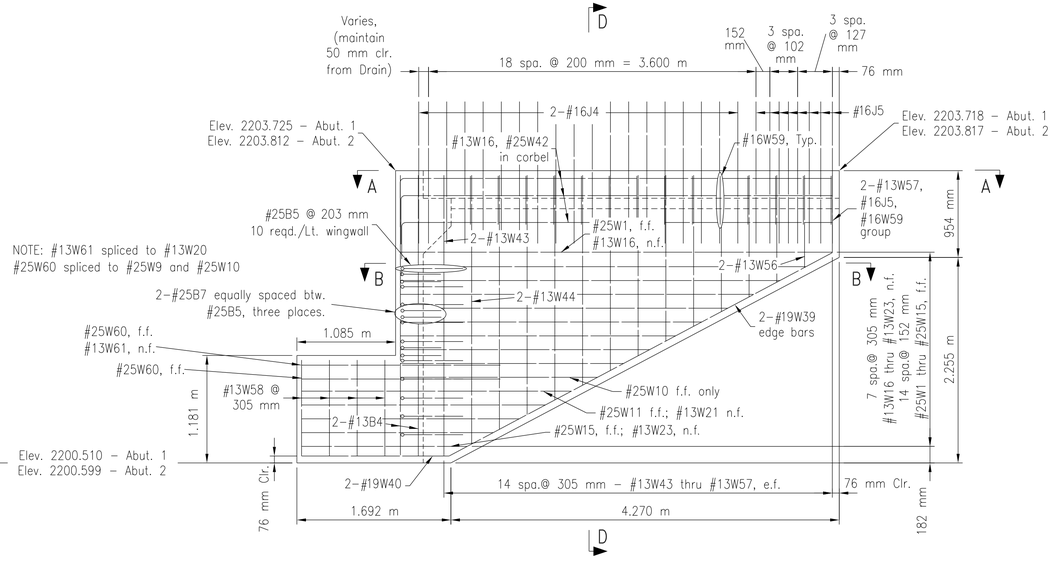
ABUTMENT 2 DETAILS

Designed by: NRO-DOT Structural Unit	
Drawn by: cdh, dc, rsh	Date: 6/04/13
Revised by:	Date:
File Name: B7_Abut 2 Details	

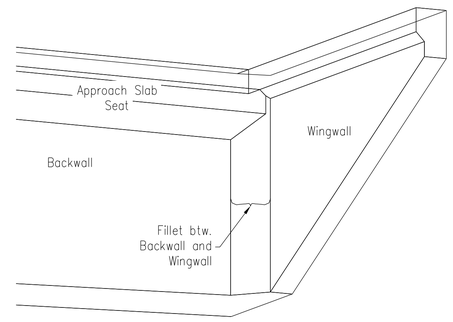
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	AZ	Navajo	N31	N31(4)1,2&4	B-8 OF 93



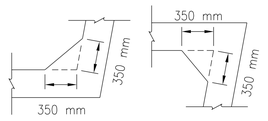
ELEVATION VIEW – RIGHT WINGWALL
ABUT 1 SHOWN – ABUT 2 OPPOSITE HAND



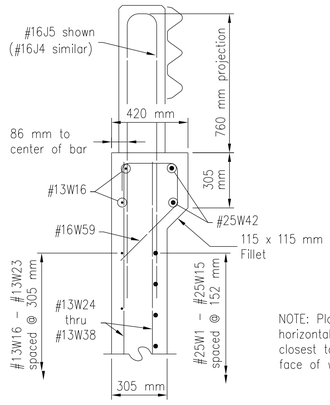
ELEVATION VIEW – LEFT WINGWALL
ABUT 1 SHOWN – ABUT 2 OPPOSITE HAND



VIEW OF FILLET – RIGHT SIDE
LEFT SIDE SIMILAR
ABUT 1 SHOWN – ABUT 2 OPPOSITE HAND

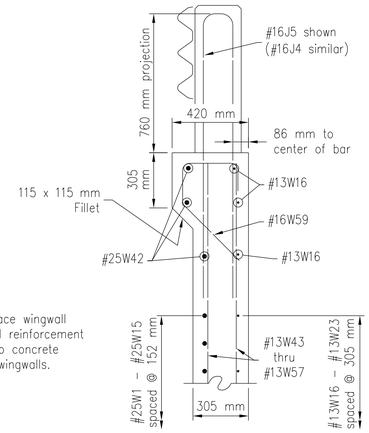


FILLET DIMENSIONS BELOW APPROACH SLAB SEAT
ABUT 1 SHOWN – ABUT 2 OPPOSITE HAND



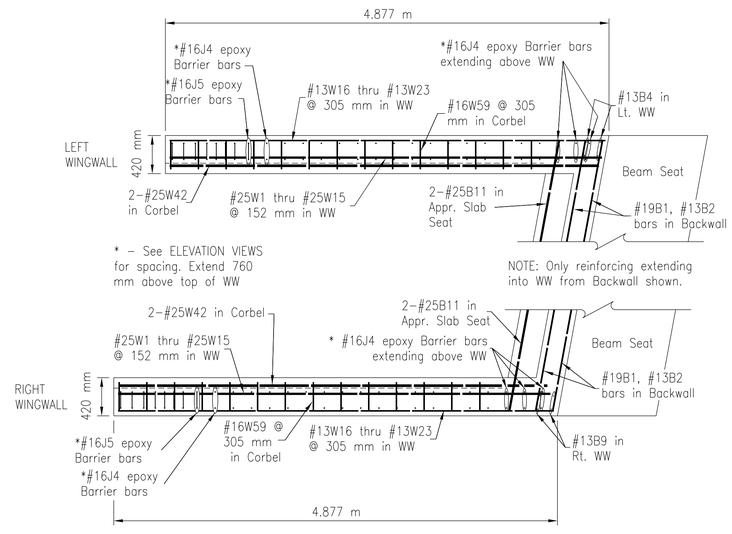
SECTION C–C
RIGHT WINGWALL

NOTE: Place wingwall horizontal reinforcement closest to concrete face of wingwalls.

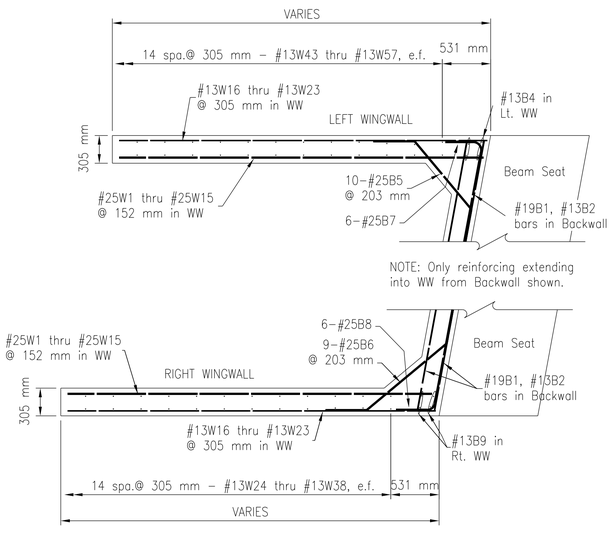


SECTION D–D
LEFT WINGWALL

WW = Wingwall
Rt. = Right
Lt. = Left



SECTION A–A
TOP OF WINGWALL
ABUT 1 SHOWN – ABUT 2 OPPOSITE HAND



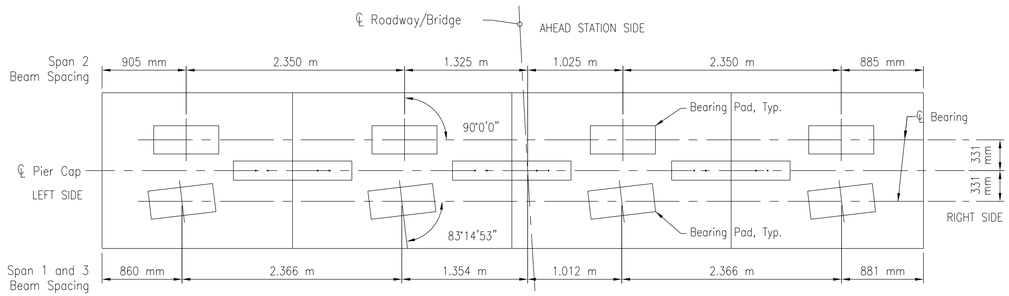
SECTION B–B
BELOW APPROACH SLAB SEAT
ABUT 1 SHOWN – ABUT 2 OPPOSITE HAND

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

WINGWALL DETAILS

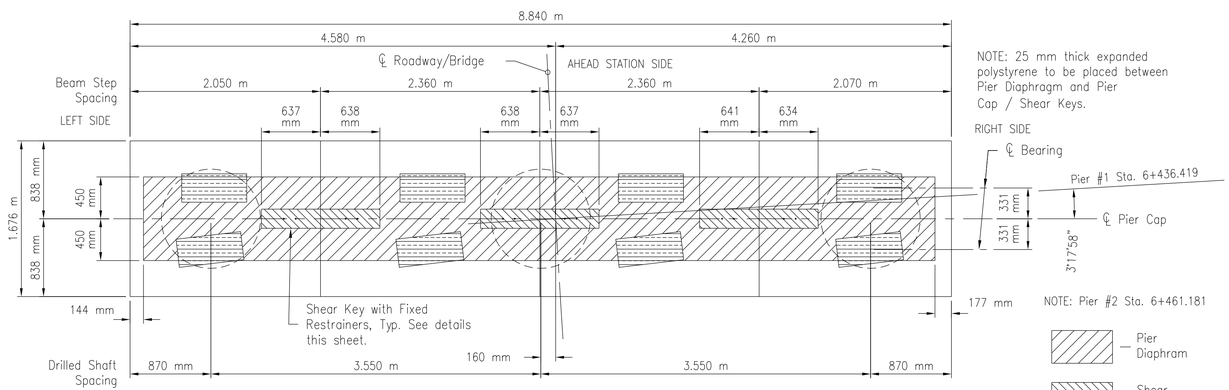
Designed by: NRO–DOT Structural Unit	
Drawn by: cdh, dc, rsh	Date: 06/04/13
Revised by:	Date:
File Name: B08_Wingwall Details	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-9 OF 93



BEAM CENTERLINE LOCATIONS

PIER #1 – AS SHOWN
PIER #2 – MIRRORED ABOUT ℄ PIER CAP



NOTE: 25 mm thick expanded polystyrene to be placed between Pier Diaphragm and Pier Cap / Shear Keys.

NOTE: Pier #2 Sta. 6+461.181

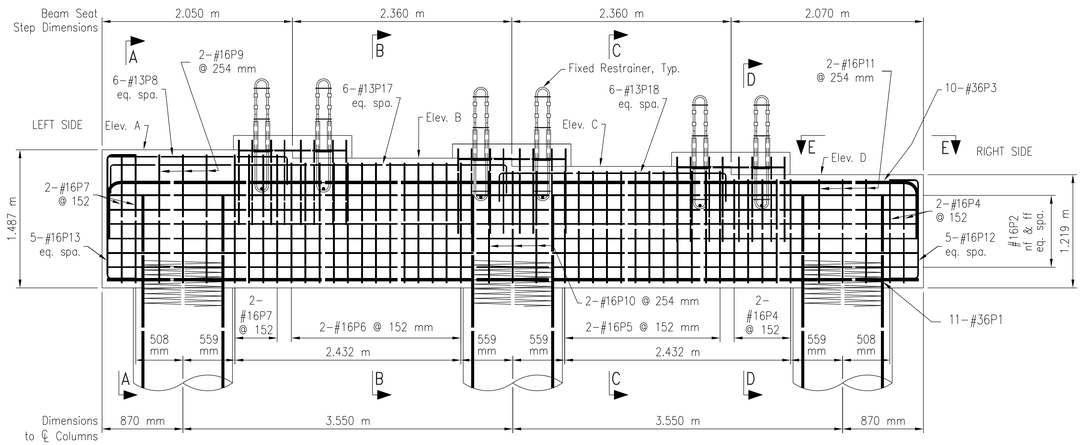
— Pier Diaphram

— Shear Keys

— Bearing Pads

PIER CAP SURFACE PLAN

PIER #1 – AS SHOWN
PIER #2 – MIRRORED ABOUT ℄ PIER CAP

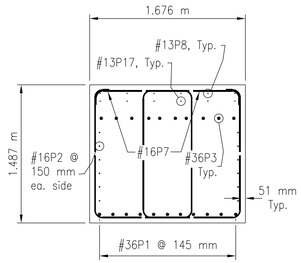


PIER CAP ELEVATION

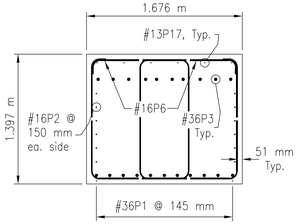
PIER #1 – AS SHOWN, LOOKING AHEAD STATION
PIER #2 – AS SHOWN, LOOKING AHEAD STATION

	Elev. A	Elev. B	Elev. C	Elev. D	CAP BOTTOM
Pier # 1	2201.786	2201.696	2201.607	2201.518	2200.299
Pier # 2	2201.815	2201.725	2201.636	2201.547	2200.328

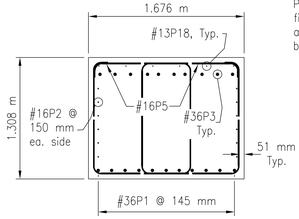
#36P1 spacing is indicated as 145 mm. Actual spacing may be adjusted to fit #36P1 bars between *#36 bars and spirals extending up from the columns.



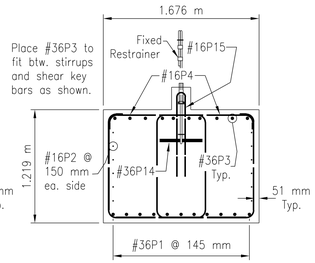
SECTION A–A



SECTION B–B

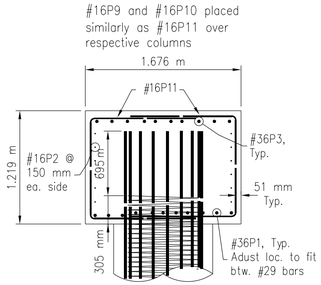


SECTION C–C

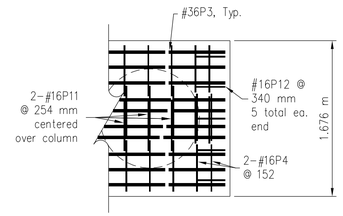


SECTION D–D

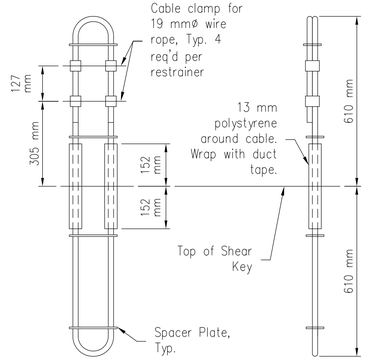
#16P9 and #16P10 placed similarly as #16P11 over respective columns



SECTION OVER COLUMN



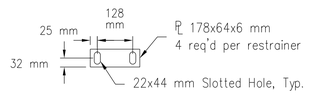
SECTION E–E



ELEVATION VIEW SIDE VIEW

CABLE RESTRAINER DETAIL

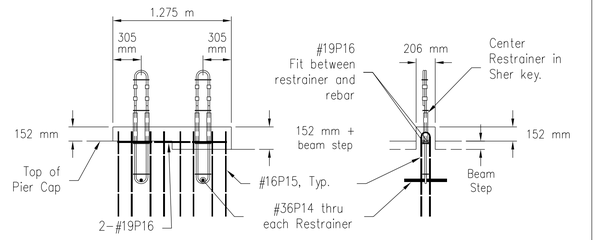
NOTE: Cable Restrainers shall be fabricated from 19 mmø preformed galvanized wire rope conforming to the requirements of AASHTO M30 with a minimum breaking strength of 187 kN.



SPACER PLATE DETAIL

NOTE: Spacer Plate shall be galvanized and meet the requirements of AASHTO M270, Grade 250.

NOTE: Coat all vertical surfaces of shear key with an approved bond prohibitor prior to placement of the pier diaphragm concrete.



ELEVATION VIEW SIDE VIEW

SHEAR BLOCK DETAIL

(looking ahead station)

* – Revised 12/13/13

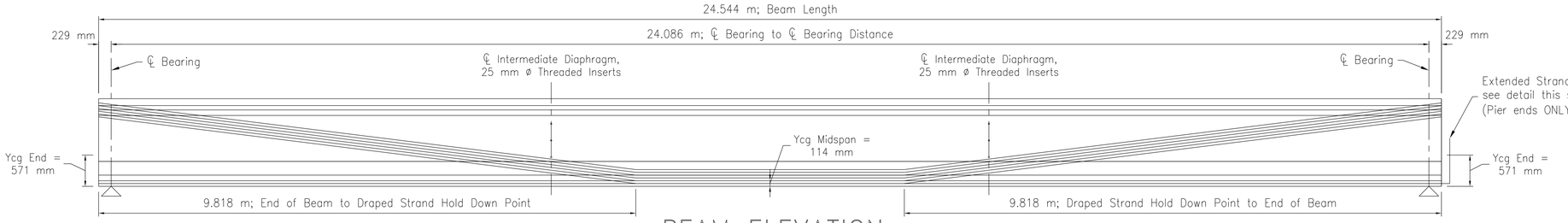
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

PIER 1 AND PIER 2 DETAILS

Designed by: NRO–DOT Structural Unit	
Drawn by: cdh, dc, rsh	Date: 06/06/13
Revised by: cdh	Date: 12/13/13
File Name: B09_Pier Details	

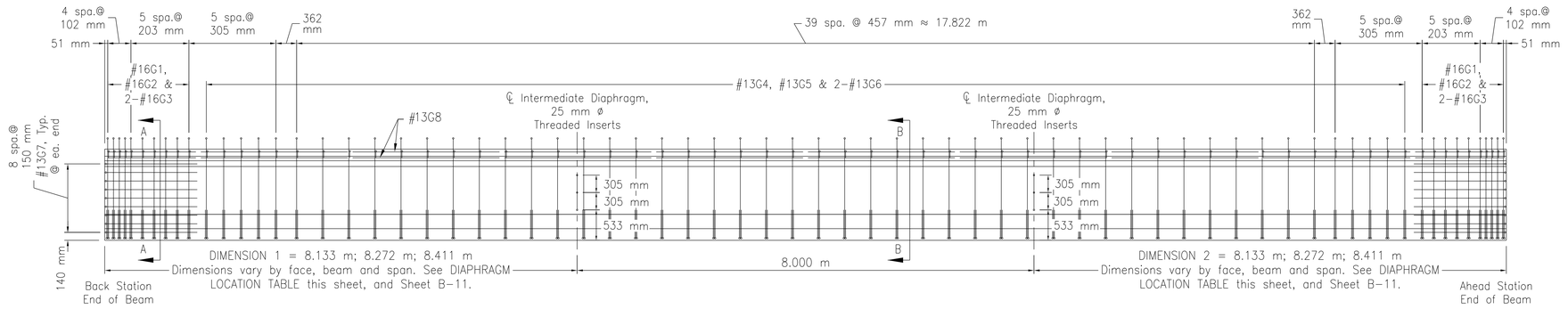
AREA	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2,4	B-10 OF 93



BEAM ELEVATION

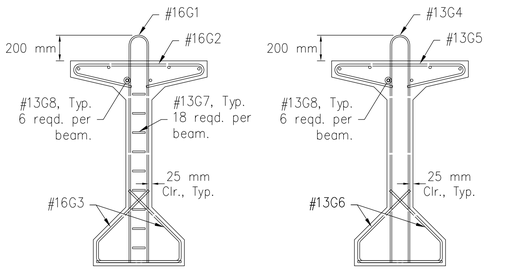
(TYPICAL; VIEW LOOKING UPSTREAM/NORTHEAST)

NOTE: At Pier ends of beam ONLY, extend four (4) prestressing strands and bend as shown in detail on this sheet.



BEAM REINFORCEMENT ELEVATION

(TYPICAL; VIEW LOOKING UPSTREAM/NORTHEAST)



SECTION A–A

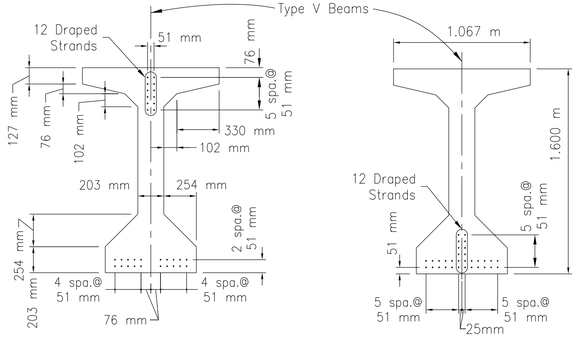
SECTION B–B

NOTE: Adjust beam reinforcement to miss holes and inserts.

INTERMEDIATE DIAPHRAGM CONNECTION LOCATION TABLE

BEAM MARK	FACE	DIMENSION 1	DIMENSION 2
1-A	FF	N/A	N/A
1-A	NF	8.133 m	8.411 m
1-B; 1-C	FF	8.411 m	8.133 m
1-B; 1-C	NF	8.133 m	8.411 m
1-D	FF	8.411 m	8.133 m
1-D	NF	N/A	N/A
2-A	FF	N/A	N/A
2-A	NF	8.272 m	8.272 m
2-B; 2-C	FF	8.272 m	8.272 m
2-B; 2-C	NF	8.272 m	8.272 m
2-D	FF	8.272 m	8.272 m
2-D	NF	N/A	N/A
3-A	FF	N/A	N/A
3-A	NF	8.411 m	8.133 m
3-B; 3-C	FF	8.133 m	8.411 m
3-B; 3-C	NF	8.411 m	8.133 m
3-D	FF	8.133 m	8.411 m
3-D	NF	N/A	N/A

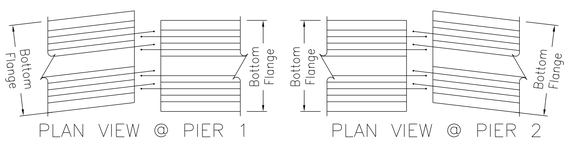
NOTE: FF = Far Face, left or upstream side of beam.
NF = Near Face, right or downstream side of beam.
DIMENSION 1 from Back Station end of beam.
DIMENSION 2 from Ahead Station end of beam.
See Framing Plan Sheet B-11 for additional information.



STRANDS @ ENDS

STRANDS @ MIDSPAN

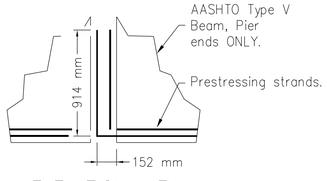
BEAM DIMENSIONS AND STRAND PATTERNS



PLAN VIEW @ PIER 1

PLAN VIEW @ PIER 2

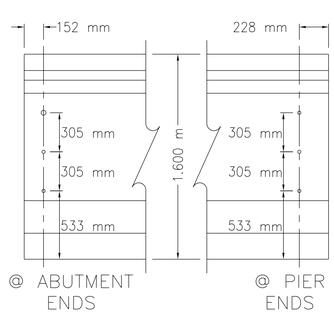
NOTE: Extend four (4) prestressing strands of bottom layer of each beam at Pier ends ONLY. Extend specific strands as shown in PLAN VIEW details above for each beam line. All other strands shall be cut 13 mm back from beam end surface and filled with epoxy mortar.



ELEVATION VIEW

EXTENDED STRAND DETAILS @ PIER ENDS

NOTE: For Spans 1 and 3, holes thru and inserts shall be aligned with skew so that dowels and threaded anchors align with diaphragm reinforcement.

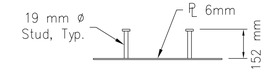


38mm ø HOLES THRU OR 25 mm ø THREADED INSERTS @ BEAM ENDS

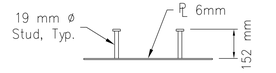
ESTIMATED QUANTITIES FOR ONE (1) BEAM	
CONCRETE, 41 MPa	16.04 m³
REINFORCING STEEL, 414 MPa	404 kg
PRESTRESSING STRAND, 1861 MPa	787.2 m

PRESTRESSED BEAM DIMENSIONS TABLE

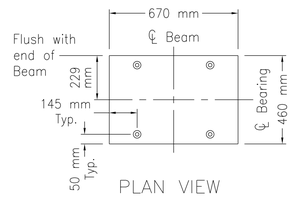
SPAN	L1, Total Length (m)	L2, ℄ to ℄ Bearings (m)	End to ℄ Brg. (mm)	12.7mmø PRESTRESSING STRAND			CONCRETE		Number of Beams
				Total No. of Strands	Ycg Beam End (mm)	Ycg Beam Midspan (mm)	Minimum Compressive Strength @ 28 days	Minimum Compressive Strength @ Release	
1	24.544	24.086	229	32	571	114	41.4 MPa	31.0 MPa	4
2	24.544	24.086	229	32	571	114	41.4 MPa	31.0 MPa	4
3	24.544	24.086	229	32	571	114	41.4 MPa	31.0 MPa	4



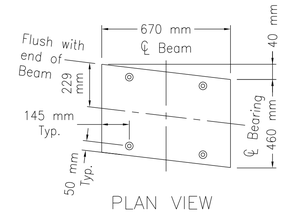
ELEVATION VIEW



ELEVATION VIEW

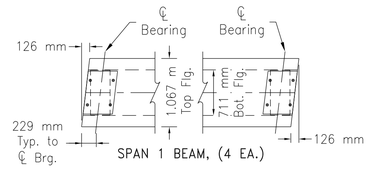


PLAN VIEW (SPAN 2 ONLY)

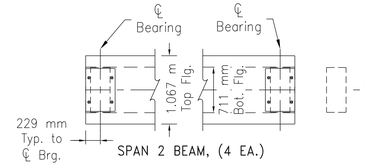


PLAN VIEW (SPAN 1 ONLY, SPAN 3 OPPOSITE HAND)

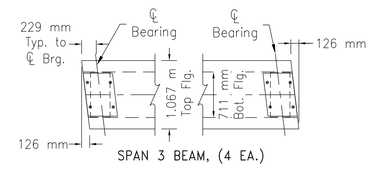
BEARING PLATE DETAILS



SPAN 1 BEAM, (4 EA.)



SPAN 2 BEAM, (4 EA.)



SPAN 3 BEAM, (4 EA.)

BEAM END DETAILS

NOTE: Bearing Plates and Bearing Pads shown for clarity. Position Bearing Plates to align with ends of beams. Position Bearing Pads to be perpendicular to ℄ Beams as shown.

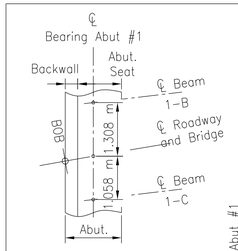
Adjust vertical reinforcemment to miss holes or inserts.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

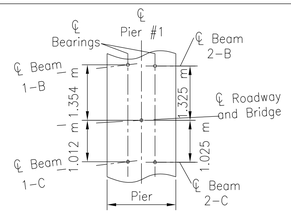
PRESTRESSED CONCRETE GIRDER DETAILS

Designed by: – Structural Unit	
Drawn by: CDH, dc, rsh	Date: 09/06/12
Revised by:	Date:
File Name: B10_Prestress Girder	

AREA	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2,4	B-11 OF 93

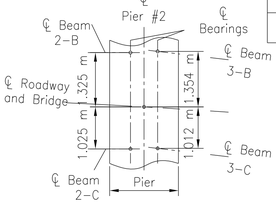


INTERIOR BEAM PLACEMENT @ ABUT 1

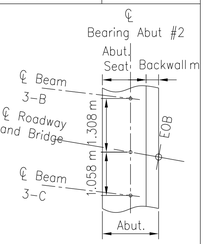


INTERIOR BEAM PLACEMENT @ PIER 1

NOTE: Interior Beam Placement details show locations of interior beams in relation to the centerline of roadway and centerline of bearings for each abutment and pier. Locations of exterior beams are to be determined by the beam spacing of 2.350 m perpendicular to the beam centerline orientation.

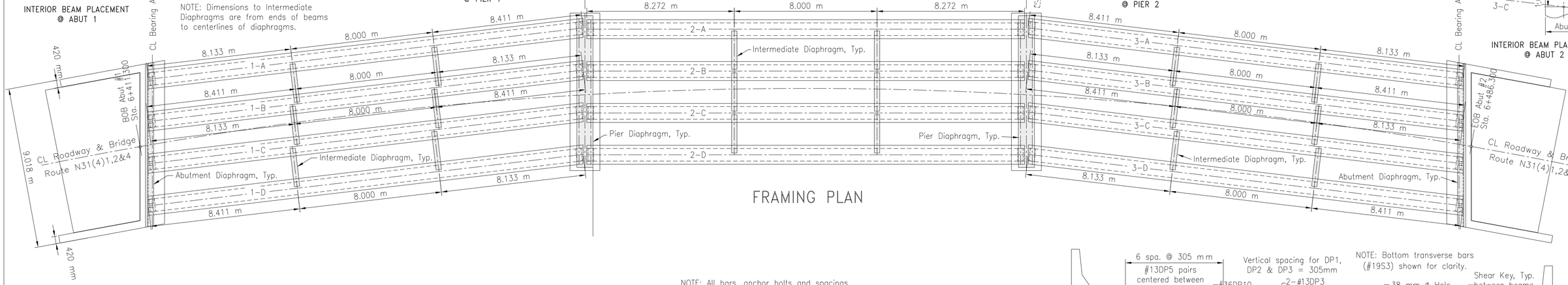


INTERIOR BEAM PLACEMENT @ PIER 2

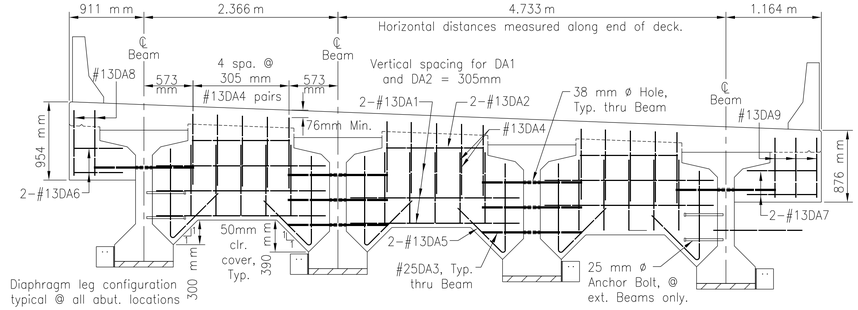


INTERIOR BEAM PLACEMENT @ ABUT 2

NOTE: Dimensions to Intermediate Diaphragms are from ends of beams to centerlines of diaphragms.



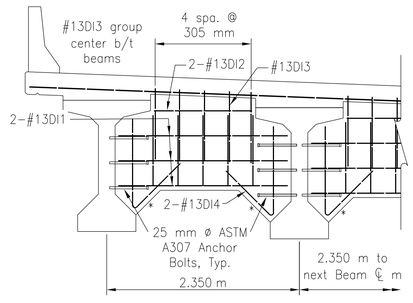
FRAMING PLAN



ABUTMENT DIAPHRAGMS – SECTION ALONG SKEW

(Looking ahead station)

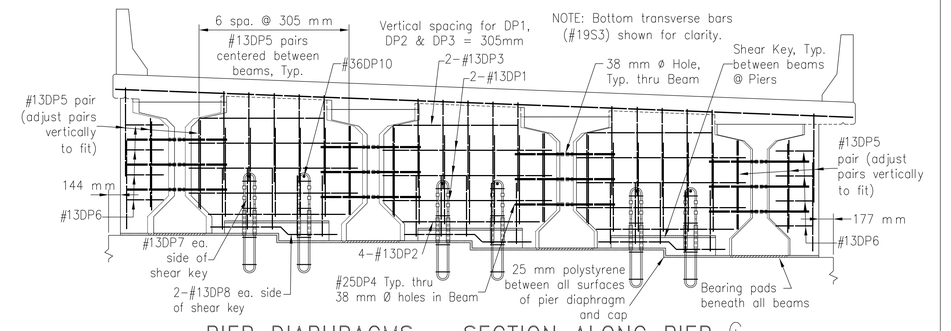
NOTE: All bars, anchor bolts and spacings are similar between all beams.



* – Diaphragm Leg Fillet dimensions:
Left Leg – 300 mm x 300 mm
Right Leg – 390 mm x 390 mm

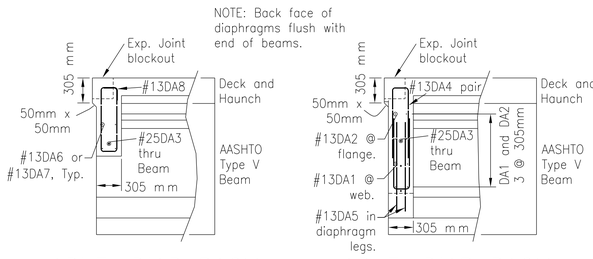
INTERMEDIATE DIAPHRAGMS

(Looking ahead station)



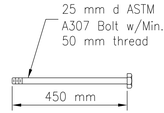
PIER DIAPHRAGMS – SECTION ALONG PIER ℄

(Looking ahead station)

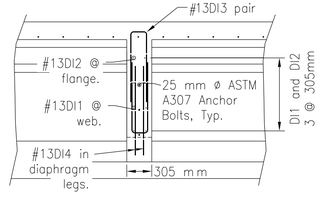


ABUT. DIAPHRAGM @ OVERHANG

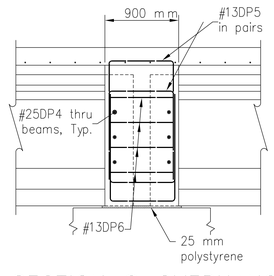
ABUT. DIAPHRAGM BETWEEN BEAMS



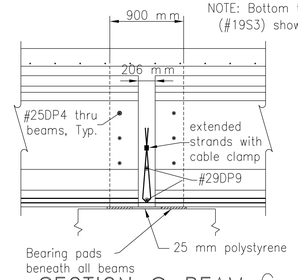
DIAPHRAGM ANCHOR BOLT



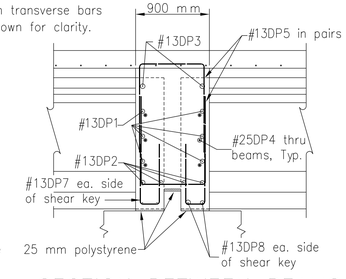
INTERMEDIATE DIAPHRAGM SECTION



SECTION @ OVERHANG

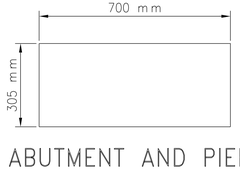


SECTION @ BEAM ℄



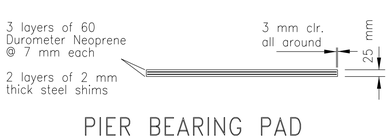
SECTION BETWEEN BEAMS

ELASTOMERIC BEARING PAD SCHEDULE 60 DUROMETER									
LOCATION	DIMENSIONS			NUMBER OF SHIMS	INNER LAMINATION		OUTER LAMINATION		NUMBER REQUIRED
	W	L	T		NUMBER	TKN	NUMBER	TKN	
ABUT NO. 1 & 2	305mm	700mm	89mm	7	6	9.4mm	2	9.4mm	8
PIER NO. 1 & 2	305mm	700mm	25mm	2	1	7mm	2	7mm	16



ABUTMENT AND PIER BEARING PAD – PLAN VIEW

ABUTMENT BEARING PAD ELEVATION VIEW



PIER BEARING PAD ELEVATION VIEW

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

PRESTRESSED CONCRETE GIRDER FRAMING PLAN

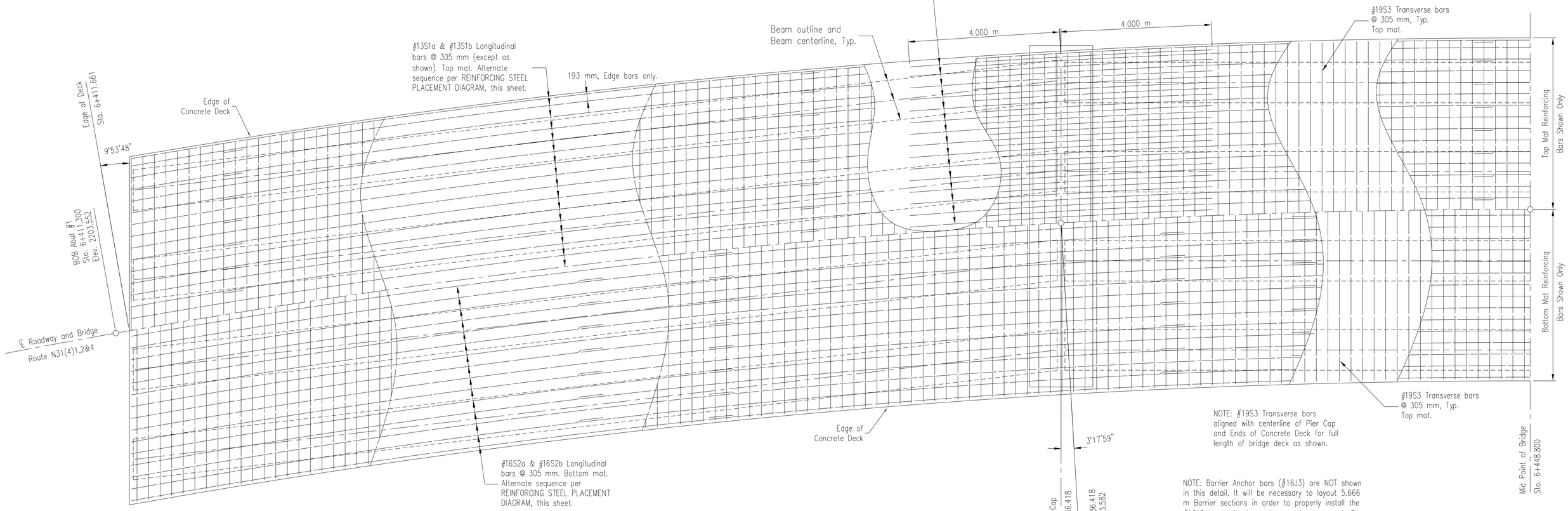
Designed by: Structural Unit

Drawn by: cdh, dc, rsh Date: 08/23/13

Revised by: Date:

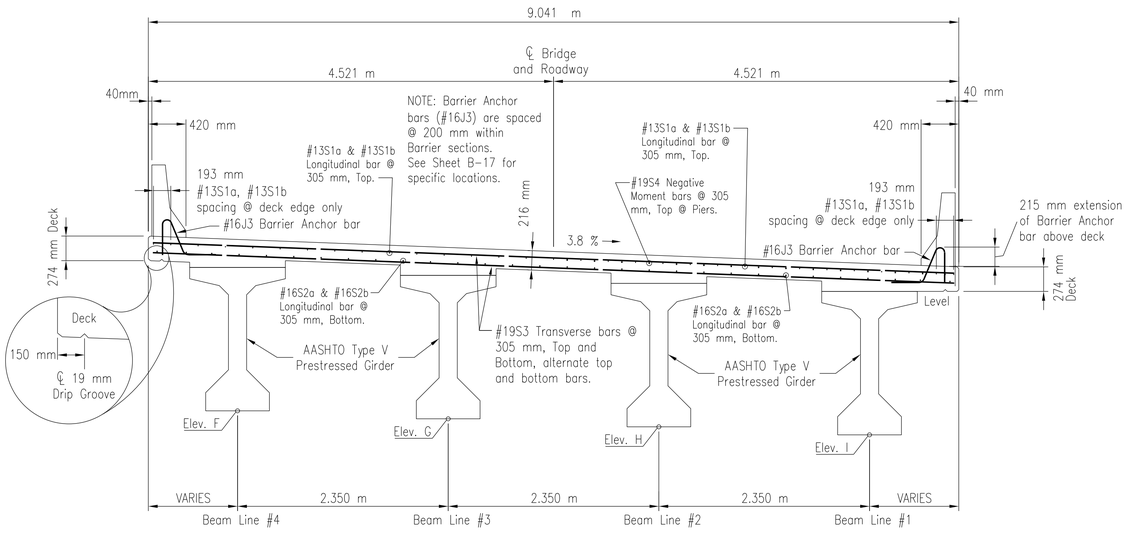
File Name: B11_Framing Plan

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-12 OF 93



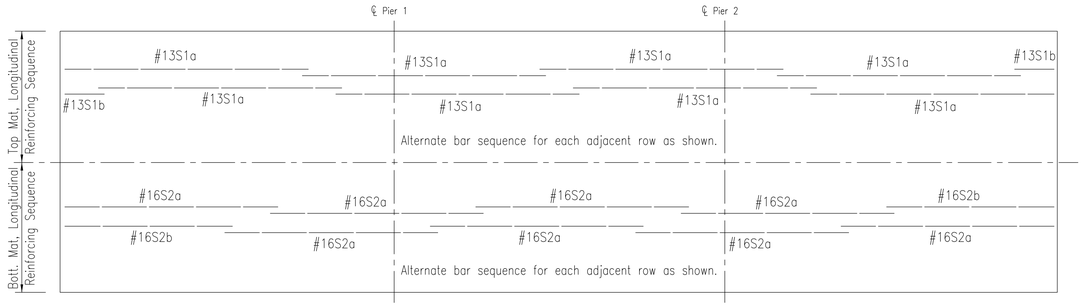
DECK REINFORCING STEEL LAYOUT

North half of Deck shown, South half similar.



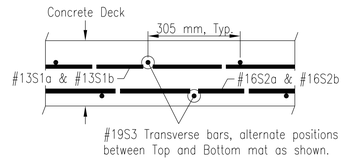
TYPICAL DECK SECTION

Looking Ahead Station



REINFORCING STEEL PLACEMENT DIAGRAM

Curvature of Bridge Deck Not Shown for Clarity
All Longitudinal reinforcing to be aligned with Roadway/Bridge Centerline
All Transverse reinforcing to be parallel to Abutment/Pier Centerline



#19S3 Transverse bars, alternate positions between Top and Bottom mat as shown.

LONGITUDINAL DECK SECTION

Perpendicular to #19S3 Transverse reinforcing.

SPLICE TABLE

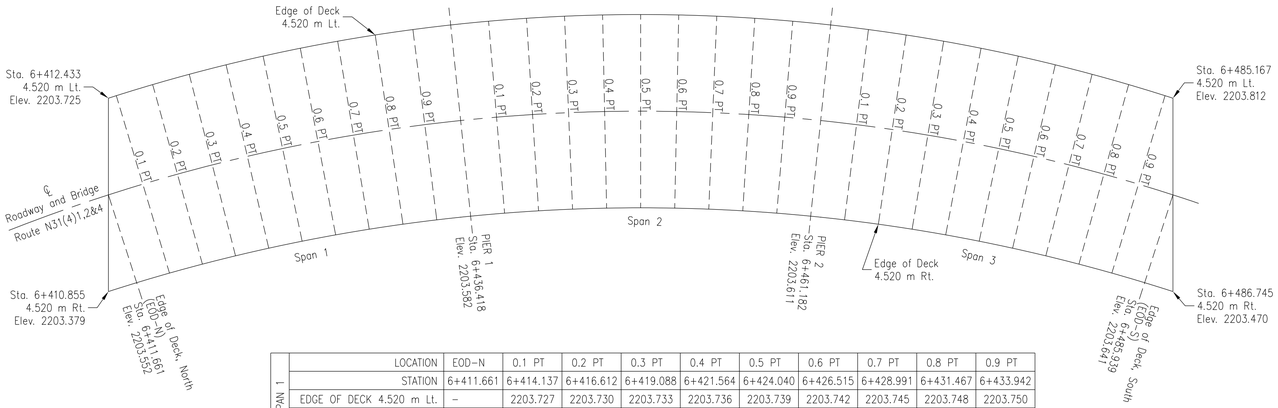
Bar Size	Splice Length
#13	480 mm
#16	600 mm

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

DECK SLAB PLAN AND SECTION REINFORCING

Designed by: NRO-DOT Structural Unit	
Drawn by: cdh, rsh	Date: 08/24/13
Checked by:	Date: --/--/--
File Name: B12_Deck Details	



	LOCATION	EOD-N	0.1 PT	0.2 PT	0.3 PT	0.4 PT	0.5 PT	0.6 PT	0.7 PT	0.8 PT	0.9 PT
SPAN 1	STATION	6+411.661	6+414.137	6+416.612	6+419.088	6+421.564	6+424.040	6+426.515	6+428.991	6+431.467	6+433.942
	EDGE OF DECK 4.520 m Lt.	–	2203.727	2203.730	2203.733	2203.736	2203.739	2203.742	2203.745	2203.748	2203.750
	CENTERLINE	2203.552	2203.555	2203.558	2203.561	2203.564	2203.567	2203.570	2203.573	2203.576	2203.579
	EDGE OF DECK 4.520 m Rt.	2203.380	2203.383	2203.386	2203.389	2203.392	2203.395	2203.398	2203.401	2203.404	2203.407

	LOCATION	PIER 1	0.1 PT	0.2 PT	0.3 PT	0.4 PT	0.5 PT	0.6 PT	0.7 PT	0.8 PT	0.9 PT
SPAN 2	STATION	6+436.418	6+438.894	6+441.371	6+443.847	6+446.324	6+448.800	6+451.276	6+453.753	6+456.229	6+458.706
	EDGE OF DECK 4.520 m Lt.	2203.753	2203.756	2203.759	2203.762	2203.765	2203.768	2203.771	2203.774	2203.777	2203.780
	CENTERLINE	2203.582	2203.585	2203.588	2203.591	2203.594	2203.597	2203.599	2203.602	2203.605	2203.608
	EDGE OF DECK 4.520 m Rt.	2203.410	2203.413	2203.416	2203.419	2203.422	2203.425	2203.428	2203.431	2203.434	2203.437

	LOCATION	PIER 2	0.1 PT	0.2 PT	0.3 PT	0.4 PT	0.5 PT	0.6 PT	0.7 PT	0.8 PT	0.9 PT	EOD-S
SPAN 3	STATION	6+461.182	6+463.658	6+466.133	6+468.609	6+471.085	6+473.561	6+476.036	6+478.512	6+480.988	6+483.463	6+485.939
	EDGE OF DECK 4.520 m Lt.	2203.783	2203.786	2203.789	2203.792	2203.795	2203.798	2203.801	2203.804	2203.807	2203.810	–
	CENTERLINE	2203.611	2203.614	2203.617	2203.620	2203.623	2203.626	2203.629	2203.632	2203.635	2203.638	2203.641
	EDGE OF DECK 4.520 m Rt.	2203.440	2203.443	2203.445	2203.448	2203.451	2203.454	2203.457	2203.460	2203.463	2203.466	2203.469

BRIDGE DECK ELEVATIONS

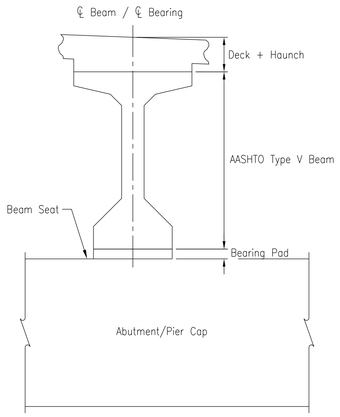
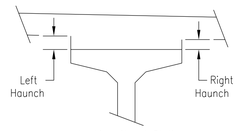


TABLE OF VERTICAL DIMENSIONS AT ℄ BEAM / ℄ BEARING LOCATION

	Abutment 1	Pier 1	Pier 2	Abutment 2
Deck	216 mm	216 mm	216 mm	216 mm
Haunch	95 mm	95 mm	95 mm	95 mm
Beam	1.600 m	1.600 m	1.600 m	1.600 m
Bearing Pad	89 mm	25 mm	25 mm	89 mm
TOTAL	2.000 m	1.936 m	1.936 m	2.000 m

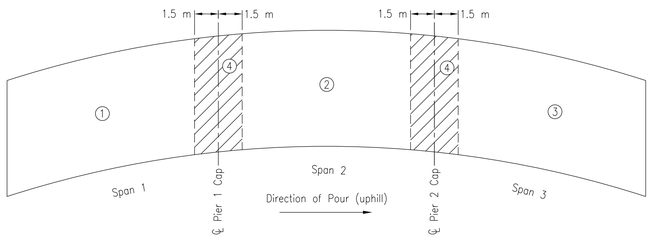


	Left Haunch	Right Haunch
Beam Line #1	58 mm	75 mm
Beam Line #2	116 mm	75 mm
Beam Line #3	116 mm	75 mm
Beam Line #4	116 mm	0 mm

Reference detail at left.

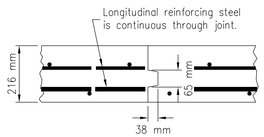
NOTE: Haunch dimensions shown are at ℄ of Bearing at abutments and piers. Haunch dimensions for interior of span shall be determined by the Contractor according to as-built beam camber, calculated dead load deflection and roadway profile grade/cross slope.

BEAM HAUNCH DETAILS



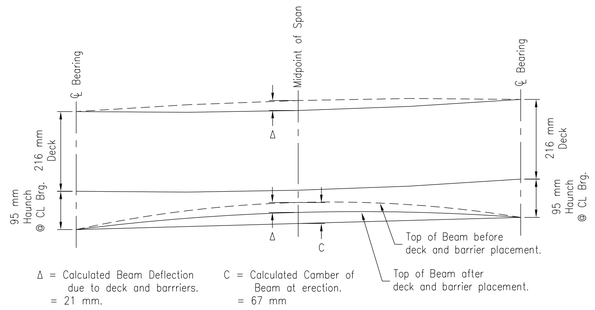
– Cast in Place Concrete Deck closure. To be placed last. To include diaphragms below.

CONCRETE PLACEMENT DIAGRAM



TRANSVERSE DECK CONSTRUCTION JOINT

(TYPICAL, FULL WIDTH OF DECK)



NOTES: 1. Measured beam camber in the field prior to installation of formwork and submit camber measurement to the Navajo Regional Office, Division Transportation for analysis of haunch dimensions for interior of span.

2. Deck screed rails/supports shall be adjusted to match the planned deck elevations plus the anticipated Beam deflection due to deck and barriers.

TOP OF CONCRETE – ABUTMENT/PIER CAP BEAM SEAT ELEVATIONS
(@ ℄ BEARING AND ℄ BEAM – BELOW BEARING PADS)

	SPAN #1		SPAN #2		SPAN #3	
	Abutment 1	Pier 1 Back	Pier 1 Frwd	Pier 2 Back	Pier 2 Frwd	Abutment 2
Beamline #1	2201.691	2201.788	2201.786	2201.815	2201.818	2201.778
Beamline #2	2201.602	2201.697	2201.696	2201.725	2201.728	2201.689
Beamline #3	2201.512	2201.607	2201.607	2201.636	2201.638	2201.601
Beamline #4	2201.424	2201.518	2201.518	2201.547	2201.549	2201.513

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

DECK ELEVATIONS AND DECK PLACEMENT DETAILS

Designed by: NRO-DOT Structural Unit

Drawn by: cdh, rsh Date: 06/03/13

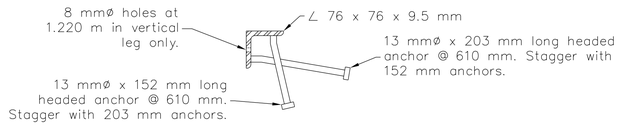
Checked by: Date: --/--/--

File Name: B13_Deck Elevations & Details

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-14 OF 93

GUARD ANGLE NOTES

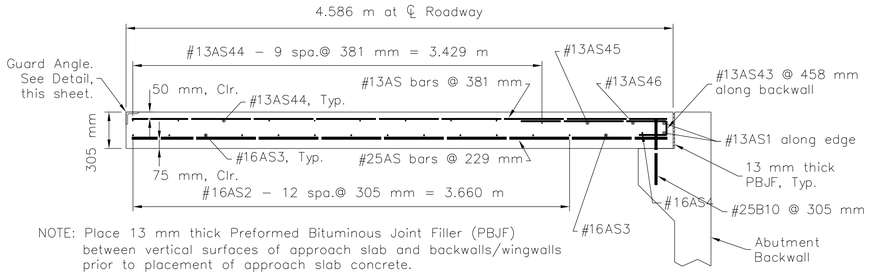
Guard Angle Length = Approach Slab width minus 25 mm at each end.



NOTE: Attached headed anchors to angle with full penetration weld. Guard Angle shall match roadway crown, super-elevation and/or grade.

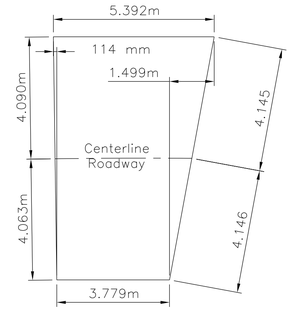
1. Guard Angles shall conform to AASHTO M270, Grade 250 or 345. Headed anchors shall Conform to ASTM A108.
2. Headed Anchors shall be attached to the guard angle by a full penetration end weld.
3. The Guard Angle assembly shall be galvanized after fabrication in accordance with AASHTO M111.
4. The Contractor shall submit full fabrication shop drawings for the Guard Angle assemblies for review. Fabrication of Guard Angle assemblies shall not begin until written approval has been given for the shop drawings.
5. The Guard Angle assemblies shall match the roadway crown, super-elevation and/or grade during installation. Any breaks in crown, super-elevation and/or grade shall be fabricated into the Guard Angle and shall be at the location of the break shown in the plans.
6. The cost of furnishing, fabrication, transportation, installation and all other work involved in the Guard Angles shall be considered incidental to Item 55201-0200, Structural Concrete, Class A(AE).

GUARD ANGLE DETAIL

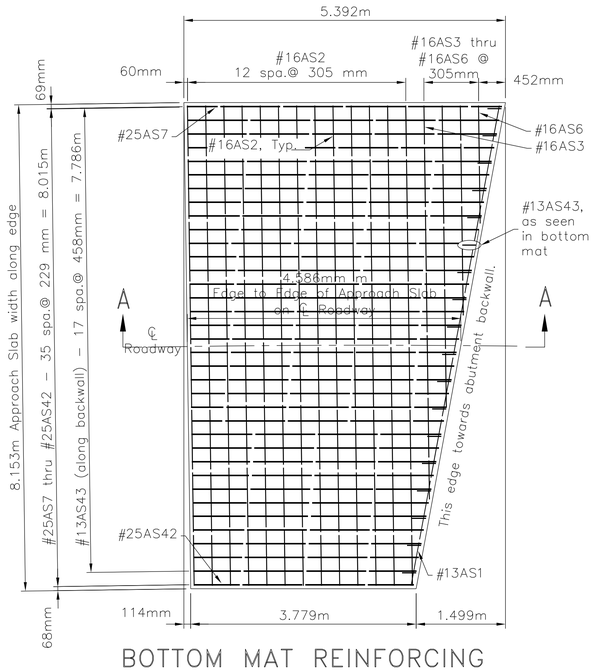


NOTE: Place 13 mm thick Preformed Bituminous Joint Filler (PBJF) between vertical surfaces of approach slab and backwalls/wingwalls prior to placement of approach slab concrete.

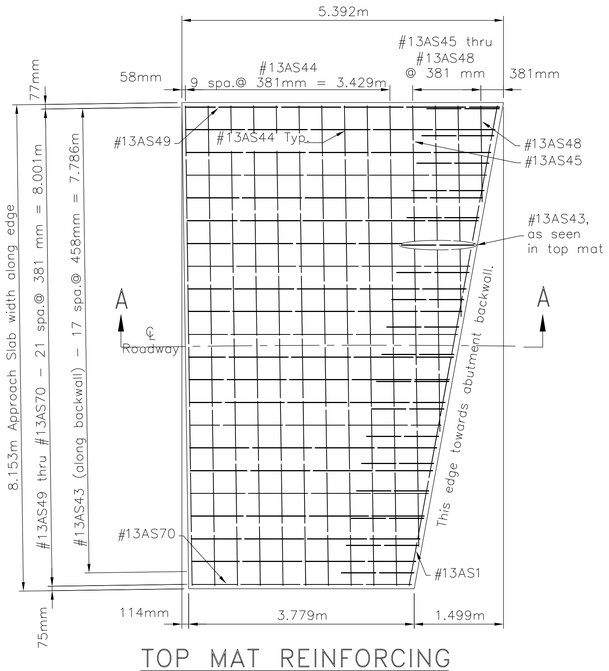
SECTION A-A



APPROACH SLAB DIMENSIONS
ABUTMENT 1 (as shown)
ABUTMENT 2 (opposite hand)



BOTTOM MAT REINFORCING



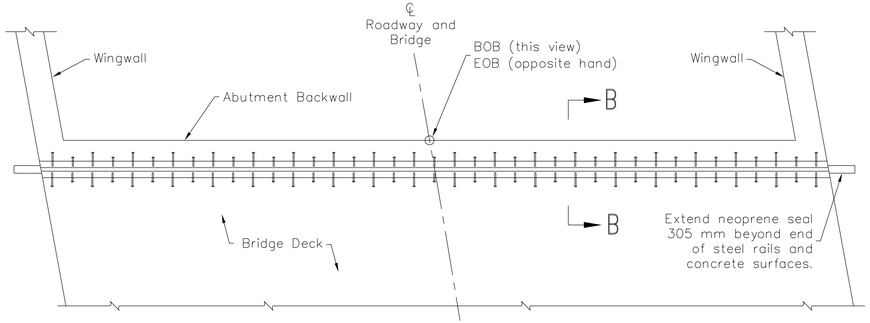
TOP MAT REINFORCING

APPROACH SLAB PLAN VIEW - ABUTMENT 1 (as shown)
APPROACH SLAB PLAN VIEW - ABUTMENT 2 (opposite hand)

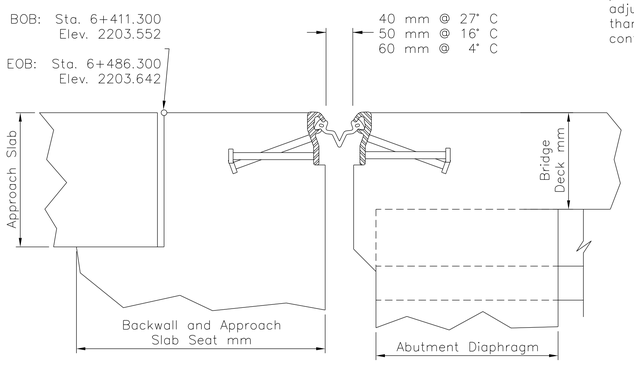
EXPANSION JOINT NOTES

1. Joints shall be one of the following, or an approved equal:
   a. D. S. Brown SSCM2/A2R Expansion Joint (shown).
   b. Watson Bowman Acme Type M SE 400 Expansion Joint.
2. Joints other than those listed above may be submitted for review and approval provided they are similar to that shown in SECTION B-B, and are designed and rated for the specified openings by the manufacturer.
3. The Contractor shall verify all dimensions to insure accurate fit of the expansion joint prior to fabrication.
4. Neoprene seal to be continuous.
5. No welds shall be permitted where steel rails come in contact with neoprene seals.
6. Steel rails shall be fabricated to conform to the roadway crown, super-elevation and/or roadway grade at both abutments. Any breaks in crown, super-elevation and/or grade shall be fabricated into the expansion joint and shall be at the location of the break shown in the plans.
7. Steel rails shall conform to AASHTO M 270, Grade 250 or 345. Headed anchors shall conform to ASTM A108 and shall be electric arc end-welded w/ complete fusion. The entire expansion joint assembly shall be hot dipped galvanized after fabrication in accordance with AASHTO M 111. The neoprene strip seal shall conform to the physical properties prescribed in Table 1 of AASHTO M 220.
8. The Contractor shall submit shop drawings for the joints proposed for this project showing all fabrication details and material specifications in accordance to the Contract specifications. The shop drawings shall be approved prior to the beginning of fabrication of the expansion joints.
9. The Contractor shall adjust the joint opening prior to installation dependent upon the surface temperature of beams.
10. The joints shall be installed in accordance with the manufacturer's recommendations. A manufacturer's representative shall be present during the installation of the expansion joints to assure proper installation. The neoprene seal shall be field installed using the manufacturer's recommended lubricant/adhesive.
11. The cost of furnishing, fabrication, transportation, installation and all other work involved in the expansion joints shall be considered incidental to Item 55201-0200, Structural Concrete, Class A(AE).

Minimum Headed Anchor length = 150 mm
Minimum Headed Anchor size = 13 mmø
Maximum Headed Anchor spacing = 305 mm



EXPANSION JOINT AT ABUTMENT #1 - PLAN (as shown)
EXPANSION JOINT AT ABUTMENT #2 - PLAN (opposite hand)



SECTION B-B

NOTE: Reinforcing steel is not shown to provide clarity. The Contractor may adjust reinforcing steel no more than 50 mm to resolve any conflicts with the expansion joint.

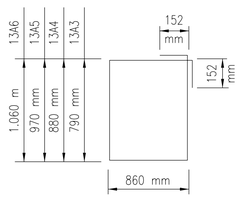
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

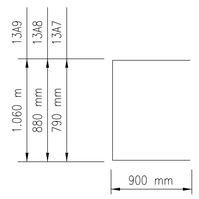
EXPANSION JOINT AND APPROACH SLAB DETAILS

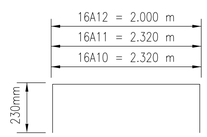
Designed by: cdh	
Drawn by: dc, rsh	Date: 08/23/13
Revised by:	Date:
File Name: B14_Appr Slab & Exp Joint	

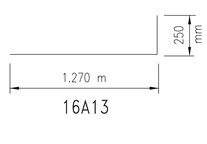
LOCATION	STRAIGHT BARS				BENT BARS				SPACING
	MARK	QTY.	SIZE	LENGTH	MARK	QTY.	SIZE	LENGTH	
ABUTMENT CAP #1 and #2									
Cap, top & bottom, longitudinal	32A1	40	32	9.070 m					As Shown
Cap, sides, longitudinal	13A2	12	13	9.070 m					As Shown
Cap, stirrup pair					13A3	40	13	3.600 m	As Shown
Cap, stirrup pair					13A4	48	13	3.780 m	152 mm
Cap, stirrup pair					13A5	52	13	3.960 m	152 mm
Cap, stirrup pair					13A6	36	13	4.140 m	As Shown
Cap, stirrup pair @ drilled shaft					13A7	16	13	2.590 m	As Shown
Cap, stirrup pair @ drilled shaft					13A8	16	13	2.680 m	As Shown
Cap, stirrup pair @ drilled shaft					13A9	16	13	2.860 m	As Shown
Cap, beam seat step, longitudinal					16A10	16	16	2.780 m	As Shown
Cap, beam seat step, longitudinal					16A11	16	16	2.780 m	As Shown
Cap, beam seat step, longitudinal					16A12	16	16	2.460 m	As Shown
Shear Key, longitudinal					16A13	16	16	1.520 m	As Shown
Shear Key, stirrup					16A14	56	16	1.640 m	152 mm
BACKWALL									
Backwall, top edge bars	*19B1	4	19	9.080 m					as shown
Backwall, horizontal	*13B2	28	13	9.070 m					305 mm
Backwall, vertical pairs	*22B3	264	22	1.900 m					254 mm
Backwall/wingwall corner, Lt. side	*13B4	8	13	3.090 m					as shown
Backwall/Lt. Wingwall corner, fillet					25B5	20	25	1.890 m	203 mm
Backwall/Rt. Wingwall corner, fillet					25B6	18	25	2.050 m	203 mm
Backwall/Lt. wingwall corner					25B7	12	25	2.850 m	as shown
Backwall/Rt. wingwall corner					25B8	12	25	2.850 m	as shown
Backwall/wingwall corner, Rt. side	*13B9	8	13	2.750 m					as shown
Approach slab seat, dowel	25B10	56	25	610 mm					305 mm
Approach slab seat, horizontal	25B11	6	25	9.070 m					305 mm
Approach slab seat, stirrup					16B12	66	16	1.520 m	254 mm
WINGWALLS (4)									
Wingwall, horiz., inside face	25W1	4	25	4.770 m					152 mm
	to	Increments in 290 mm							152 mm
Wingwall, horiz., inside face	25W10	4	25	2.160 m					152 mm
Wingwall, horiz., inside face	25W11	4	25	2.970 m					152 mm
	to	Increments in 290 mm							152 mm
Wingwall, horiz., inside face	25W15	4	25	1.810 m					152 mm
Wingwall, horiz. outside face	*13W16	4	13	4.770 m					305 mm
Wingwall, horiz. outside face	13W17	4	13	4.190 m					305 mm
	to	Increments in 580 mm							305 mm
Wingwall, horiz. outside face	13W20	4	13	2.450 m					305 mm
Wingwall, horiz. outside face	13W21	4	13	2.970 m					305 mm
Wingwall, horiz. outside face	13W22	4	13	2.390 m					305 mm
Wingwall, horiz. outside face	13W23	4	13	1.810 m					305 mm
Rt. WW only, vert., both faces	*13W24	4	13	2.740 m					305 mm
Rt. WW only, vert., both faces	*13W25	4	13	2.610 m					305 mm
	to	Increments in 160 mm							305 mm
Rt. WW only, vert., both faces	*13W38	4	13	530 mm					305 mm
WW, diagonal edge bars	19W39	8	19	4.770 m					As Shown
Wingwall, bottom, extend into cap	19W40	8	19	1.620 m					As Shown
Rt. WW only, vert. abut. cap ends	13W41	8	13	790 mm					305 mm
Wingwall, corbel, longitudinal					*25W42	10	25	5.280 m	As Shown
Lt. WW only, vert., both faces	*13W43	4	13	3.090 m					305 mm
Lt. WW only, vert., both faces	*13W44	4	13	2.960 m					305 mm
	to	Increments in 160 mm							
Lt. WW only, vert., both faces	*13W57	4	13	880 mm					305 mm
	13W58	8	13	1.060 m					305 mm
Wingwall, corbel, stirrups					*16W59	56	16	1.160 m	305 mm
Lt. WW only, extend into abut. cap	25W60	4	25	2.190 m					152 mm
Lt. WW only, extend into abut. cap	13W61	2	13	2.190 m					305 mm

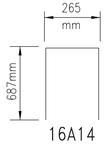
BENDING DIAGRAMS
ALL DIMENSIONS ARE OUT TO OUT

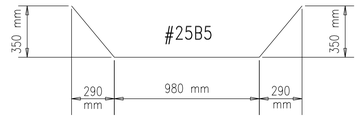


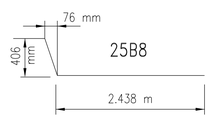


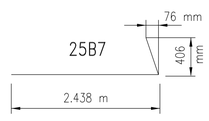


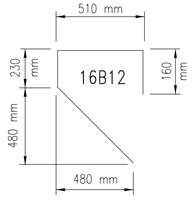


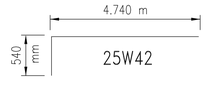


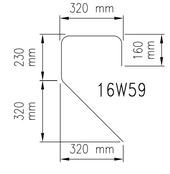








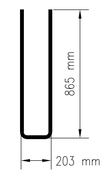




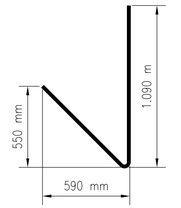
LOCATION	STRAIGHT BARS				BENT BARS				SPACING
	MARK	QTY.	SIZE	LENGTH	MARK	QTY.	SIZE	LENGTH	
ABUTMENT 1 & 2 DIAPHRAGMS									
Horizontal, interior	13DA1	36	13	2.060 m					305 mm
Horizontal, top	13DA2	12	13	1.190 m					305 mm
Beam dowels	25DA3	16	25	1.220 m					As Shown
Stirrups, EPOXY					*13DA4	60	13	1.930 m	305 mm
Diaphragm legs					13DA5	24	13	1.880 m	As Shown
Horizontal left overhang	13DA6	8	13	610 mm					As Shown
Horizontal right overhang	13DA7	8	13	860 mm					As Shown
Stirrup left overhang EPOXY					*13DA8	4	13	2.190 m	As Shown
Stirrup right overhang EPOXY					*13DA9	6	13	2.060 m	As Shown
PIERS 1 & 2									
Longitudinal, bottom	36P1	22	36	8.740 m					145 mm
Longitudinal, sides	16P2	24	16	8.740 m					150 mm
Longitudinal, top					36P3	20	36	9.820 m	As Shown
Stirrup, Elev. D section					16P4	28	16	4.420 m	152 mm
Stirrup, Elev. C section					16P5	48	16	4.600 m	152 mm
Stirrup, Elev. B section					16P6	52	16	4.780 m	152 mm
Stirrup, Elev. A section					16P7	24	16	4.960 m	152 mm
Longitudinal, top of step, Elev. A					13P8	12	13	2.520 m	290 mm
Twin U bars over left column					16P9	12	16	3.600 m	254 mm
Twin U bars over center column					16P10	12	16	3.420 m	254 mm
Twin U bars over right column					16P11	12	16	3.330 m	254 mm
Right end of cap, vertical					16P12	10	16	1.670 m	350 mm
Left end of cap, vertical					16P13	10	16	1.900 m	350 mm
Restrainer dowels in pier cap	36P14	12	36	457 mm					as shown
Vertical, stirrups, shear key					16P15	48	16	1.860 m	as shown
Horizontal, shear key	19P16	12	19	1.170 m					as shown
Longitudinal, top of step, Elev. B					13P17	12	13	4.840 m	290 mm
Longitudinal, top of step, Elev. C					13P18	12	13	3.020 m	290 mm
PIER 1 & 2 DIAPHRAGMS									
Horizontal interior	13DP1	36	13	2.060 m					305 mm
Horizontal bottom	13DP2	24	13	1.680 m					305 mm
Horizontal top	13DP3	12	13	1.520 m					305 mm
Beam dowels	25DP4	48	25	1.220 m					As Shown
Stirrup EPOXY					*13DP5	100	13	2.910 m	305 mm
Horizontal Lt. & Rt. overhang					13DP6	16	13	1.690 m	305 mm
Stirrrup at shearkey					13DP7	60	13	1.680 m	305 mm
Horizontal at shearkey					13DP8	24	13	1.590 m	As Shown
Horizontal thru strands	29DP9	16	29	910 mm					As Shown
Restrainer dowels in diaphragm	36DP10	12	36	457 mm					As Shown
INTERMEDIATE DIAPHRAGMS									
Horizontal	13DI1	108	13	2.060 m					305 mm
Horizontal top	13DI2	36	13	1.190 m					305 mm
Stirrup EPOXY					*13DI3	180	13	1.930 m	305 mm
Diaphragm legs					13DI4	72	13	1.880 m	As Shown
DECK (all Deck reinforcing steel is EPOXY coated)									
Longitudinal, top	*13S1a	124	13	18.290 m					305 mm
Longitudinal, top	*13S1b	31	13	3.000 m					305 mm
Longitudinal, bottom	*16S2a	120	16	16.000 m					305 mm
Longitudinal, bottom	*16S2b	30	16	12.690 m					305 mm
Traverse, top & bottom	*19S3	485	19	8.940 m					305 mm
Moment bar over piers	*19S4	60	19	8.000 m					305 mm
Bridge Railing anchor bar					*16S5	702	16	1.210 m	200 mm

AREA	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-15	93

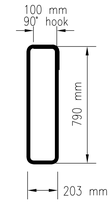
BENDING DIAGRAMS
ALL DIMENSIONS ARE OUT TO OUT



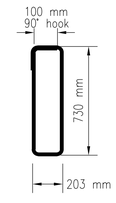
13DA4
13DI3



13DA5
13DI4

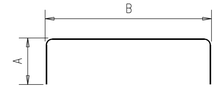


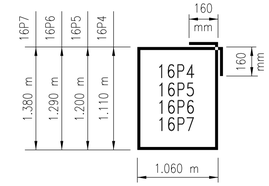
13DA8

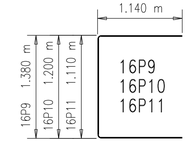


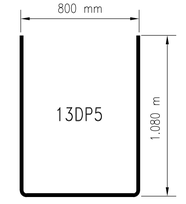
13DA9

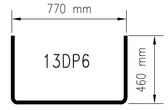
MARK	"A"	"B"
36P3	630 mm	8.740 m
13P8	313 mm	1.950 m
16P12	313 mm	1.100 m
16P13	313 mm	1.340 m
13P17	313 mm	4.280 m
13P18	313 mm	2.450 m

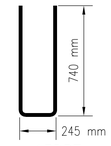


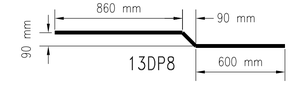


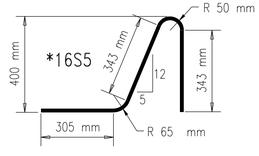












NOTE: * INDICATES REINFORCING STEEL TO BE EPOXY COATED, AS NOTED.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

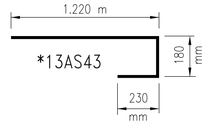
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

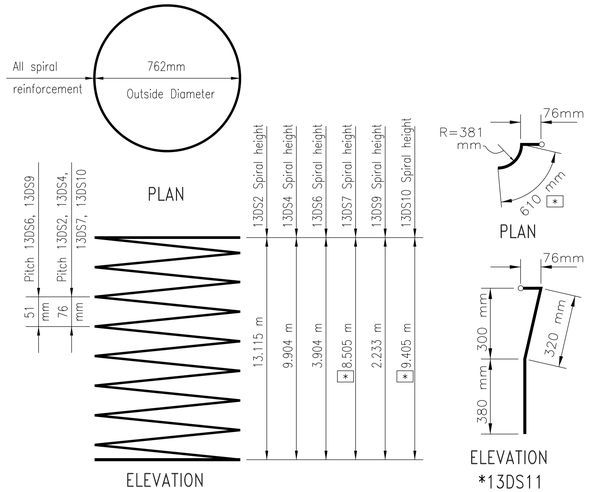
REINFORCING STEEL SCHEDULE – 1 OF 2

Designed by: Structural Unit	
Drawn by: cdh, dc, rsh	Date: 09/14/13
Revised by:	Date:
File Name: B15n16_Reinforcing Schedule	

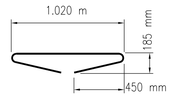
LOCATION	STRAIGHT BARS MARK	QTY.	SIZE	LENGTH	BENT BARS MARK	QTY.	SIZE	LENGTH	SPACING
APPROACH SLABS – Quantities shown for 2 approach slabs									
Edge bars @ backwall	*13AS1	4	13	8.190 m					as shown
Transverse, bottom mat	*16AS2	26	16	8.050 m					305 mm
Transv., bottom mat, tapered side	*16AS3	2	16	6.600 m					305 mm
Transv., bottom mat, tapered side	*16AS4	2	16	5.060 m					305 mm
Transv., bottom mat, tapered side	*16AS5	2	16	3.520 m					305 mm
Transv., bottom mat, tapered side	*16AS6	2	16	1.980 m					305 mm
Longitudinal, bottom mat	*25AS7	2	25	5.280 m					229 mm
	to	Increments of 45 mm							
Longitudinal, bottom mat	*25AS42	2	25	3.690 m					229 mm
Backwall edge bars					*13AS43	36	13	1.640m	458 mm
Transverse, top mat	*13AS44	20	13	8.050 m					381 mm
Transverse, top mat, tapered side	*13AS45	2	13	7.390 m					381 mm
Transverse, top mat, tapered side	*13AS46	2	13	5.470 m					381 mm
Transverse, top mat, tapered side	*13AS47	2	13	3.540 m					381 mm
Transverse, top mat, tapered side	*13AS48	2	13	1.620 m					381 mm
Longitudinal, top mat,	*13AS49	2	13	5.270 m					381 mm
	to	Increments in 75 mm							
Longitudinal, top mat,	*13AS70	2	13	3.690 m					381 mm
+DRILLED SHAFTS, 914 MILLIMETER DIAMETER – Incidental to Item 56501–0400 (Qty's shown for all shafts)									
ABUT #1 DRILLED SHAFTS									
Vertical, Shaft	+36DS1	51	36	13.610 m					As Shown
Drilled Shaft Spiral, 76 mm pitch					13DS2	3	13	421 m	As Shown
ABUT #2 DRILLED SHAFTS									
Vertical, Shaft	+36DS3	51	36	10.400 m					As Shown
Drilled Shaft Spiral, 76 mm pitch					13DS4	3	13	320 m	As Shown
PIER #1 DRILLED SHAFTS									
Vertical, Shaft	+36DS5	51	36	12.800 m					As Shown
Drill Shaft Spiral, 51 mm pitch					13DS6	3	13	191 m	Above CJ
Drill Shaft Spiral, 76 mm pitch					13DS7	3	13	276 m	Below CJ
PIER #2 DRILLED SHAFTS									
Vertical, Shaft	+36DS8	51	36	12.030 m					
Drill Shaft Spiral, 51 mm pitch					13DS9	3	13	113 m	Above CJ
Drill Shaft Spiral, 76 mm pitch					13DS10	3	13	304 m	Below CJ
ALL DRILLED SHAFTS									
Cage Alignment Spacer					*13DS11	528	13	1.400 m	1.830 m
PRESTRESSED GIRDERS [qtys. shown below for one (1) beam only] – To be paid under Item 55301–3300.									
Stirrups in web					*16G1	20	16	3.610 m	As Shown
Enclosure bar, top flange					16G2	20	16	1.990 m	As Shown
Enclosure bars, bottom flange					16G3	40	16	1.360 m	As Shown
Stirrups in web					*13G4	50	13	3.610 m	As Shown
Enclosure bar, top flange					13G5	50	13	1.990 m	As Shown
Enclosure bars, bottom flange					13G6	100	13	1.360 m	As Shown
Horizontal bar, beam ends					13G7	18	13	3.240 m	150 mm
Longitudinal, top flange	13G8	6	13	24.450 m	(minimum lap splice=380 mm)				As Shown
BRIDGE RAIL, CONCRETE, NEW JERSEY SAFETY SHAPE – Quantities below to be paid under Item 55601–0800.									
Longitudinal, sections on deck	*16J1	208	16	5.560 m					as shown
Longitudinal, sections on wingwall	*16J2	32	16	4.790 m					as shown
Stirrups, sections on deck					*16J3	702	16	1.510 m	200 mm
Verticals, sections on wingwall	*16J4	152	16	1.570 m					200 mm
Stirrups, @ Thrie-Beam end					*16J5	32	16	3.320m	as shown

BENDING DIAGRAMS
ALL DIMENSIONS ARE OUT TO OUT

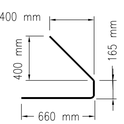




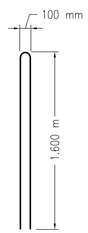
16G1, 13G4



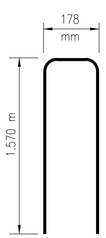
16G2, 13G5



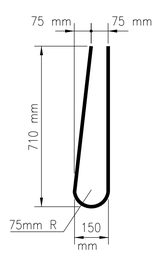
16G3, 13G6



13G7



*16J5



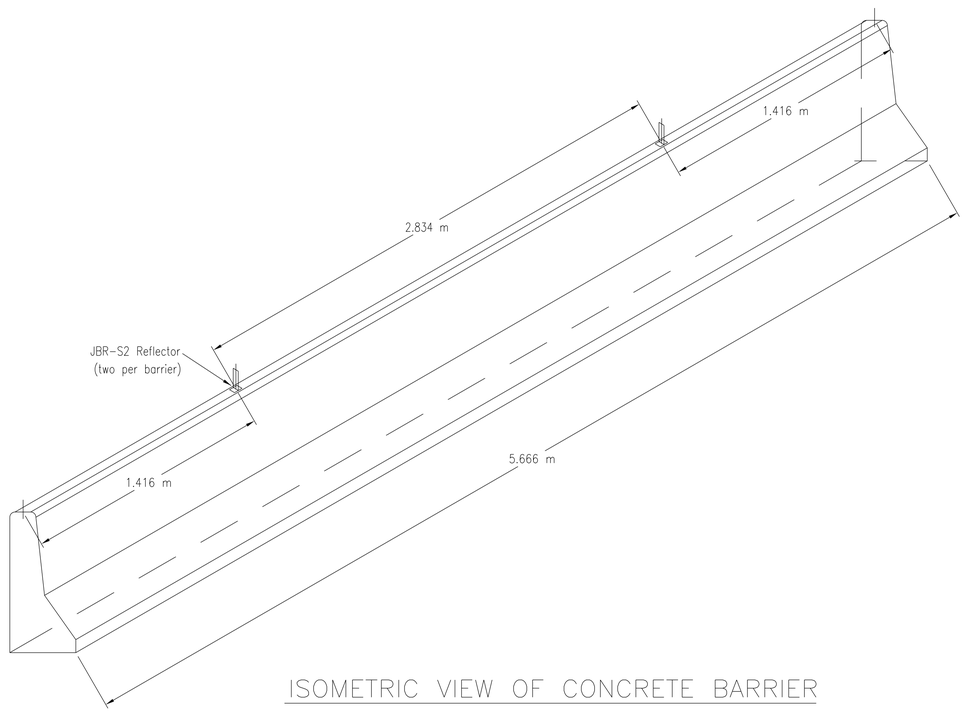
*16J3

AREA	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	NM	Navajo	N31	N31(4)1,2&4	B–16	93

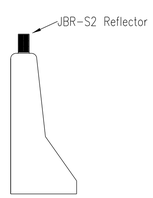
CONCRETE BARRIER REFLECTOR NOTES

1. BARRIER REFLECTORS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE MANUFACTURER REPRENTATIVE WHENEVER THERE IS A QUESTION REGARDING APPLICATION PROCEDURES OR SUBSTRATE CONDITIONS.
2. CONCRETE SURFACE PREPARATION, ADHESIVE, AND METHOD OF APPLICATION SHALL BE AS RECOMMENDED BY THE REFLECTOR MANUFACTURER.
3. THE COLOR OF THE REFLECTIVE SURFACE SHALL MATCH THE COLOR OF THE ADJACENT ROADWAY EDGE LINE.
4. AT THE TIME INSTALLATION, CONTACTING SURFACE SHALL BE DRY AND MOISTURE–FREE.
5. AFTER DELINEATOR INSTALLATION, SURFACES SHOULD STAY DRY WITHOUT RAIN IN THE FORECAST FOR AT LEAST 8 HOURS.
6. ALL LABOR, MATERIALS AND INCIDENTIALS REQUIRED FOR THE FURNISHING, FABRICATING AND INSTALLATION OF BARRIER REFLECTORS SHALL BE INCLUDED IN THE COST OF ITEM 55601–0800.
7. BARRIER REFLECTOR SHALL BE OF THE FOLLOWING MANUFACTURER OR APPROVED EQUAL

   US REFLECTOR TYPE JBR–S2, AASHTO APPROVED HIGH POWER HIGHWAY REFLECTORS.



ISOMETRIC VIEW OF CONCRETE BARRIER



END VIEW OF CONCRETE BARRIER

+ – REVISED
12/06/2013

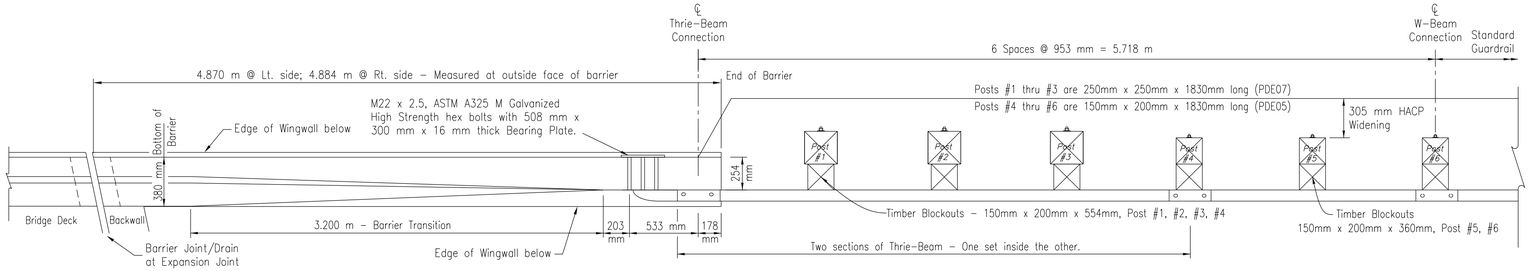
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

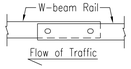
REINFORCING STEEL SCHEDULE – 2 OF 2
CONCRETE BARRIER REFLECTOR DETAILS

Designed by: Structural Unit	
Drawn by: cdh, dc, rsh	Date: 12/06/13
Revised by: rsh,cdh	Date: 12/06/2013
File Name: B15n16_Reinforcing Schedule	

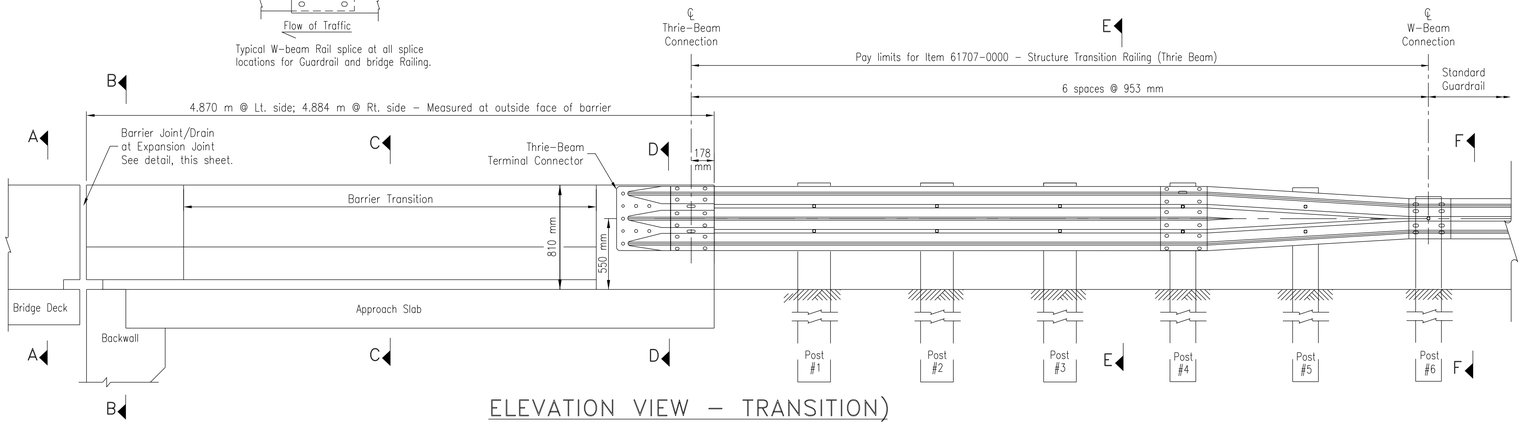
AREA	STATE	RESERVATION	ROUTE	PROJECT	SHEET
Navajo	NM	Navajo	N31	N31(4)1,2&4	B-17 OF 93



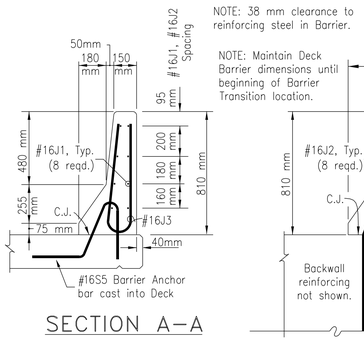
PLAN VIEW – (TRANSITION)



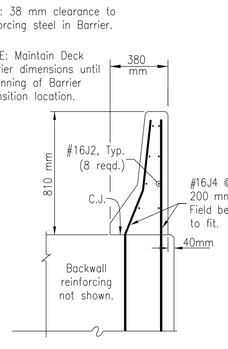
Typical W-beam Rail splice at all splice locations for Guardrail and bridge Railing.



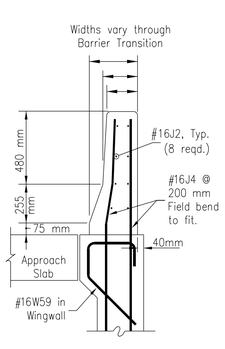
ELEVATION VIEW – TRANSITION)



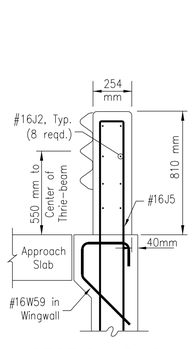
SECTION A–A



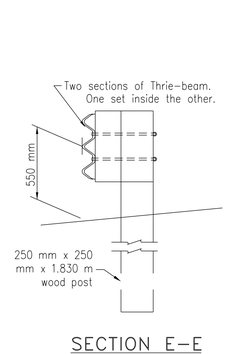
SECTION B–B



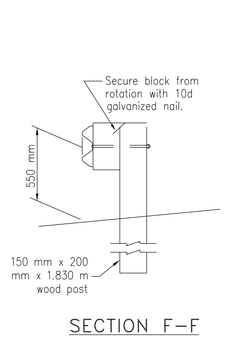
SECTION C–C



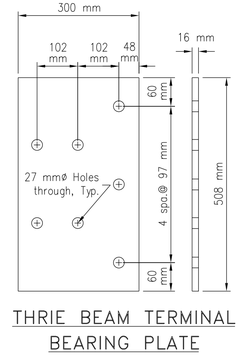
SECTION D–D



SECTION E–E



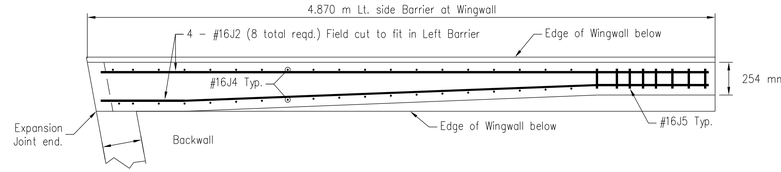
SECTION F–F



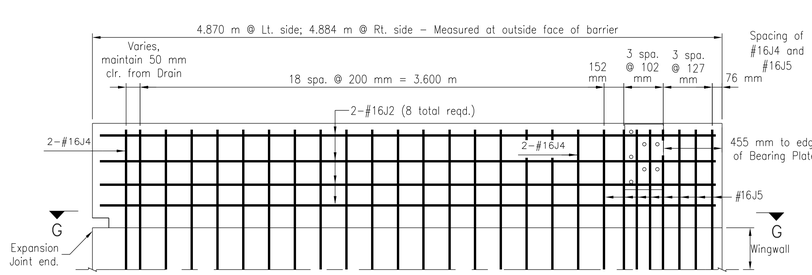
THRIE BEAM TERMINAL BEARING PLATE

TRANSITION NOTES

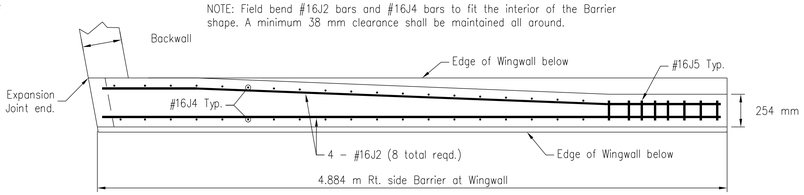
1. Standard barrier hardware has been used to develop this guardrail transition. Standard guardrail elements are as detailed in "A Guide to Standarized Highway Barrier Rail Hardware", AASHTO-AGC-ARTBA Joint Cooperative Committee and modified standard elements as detailed on this sheet.
2. All W-Beams, Thrie-Beams, Terminal Connectors, Bearing Plates and other pieces shall be galvanized in accordance with AASHTO M 111. The furnishing, fabricating and installing of these items shall be considered incidental to Item 61707-0000.
3. All high strength bolts, carriage, lag bolts and other attachment hardware shall be galvanized in accordance with AASHTO M 232. The furnishing, fabricating and installing these items shall be considered incidental to Item 61707-0000.
4. W-Beam and Thrie-Beam shall conform to AASHTO M 180, Class A, Type 2. Terminal Connectors shall conform to AASHTO M 180, Class B, Type 2.
5. Bearing Plates shall conform to AASHTO M 270, Grade 250. Bearing Plates shall be galvanized.
6. Wood blocks and posts shall be rough sawn lumber or surfaced on four sides (S4S) having a minimum bending strength of 8.27 MPa (1,200 psi). All posts shall be treated in accordance with AASHTO M 133.
7. Concrete for the Bridge Railing shall be in accordance with Item 55201-0200, Structural Concrete. Reinforcing steel for the Bridge Railing shall be in accordance with Item 55401-2000, Reinforcing Steel, Epoxy Coated. All attachments to concrete shall be considered incidental to Item 61707-0000. Chamfer all corners of concrete barrier 19 mm unless otherwise noted.
8. The Thrie-Beam Terminal Connector attachment to the Bridge Railing requires seven (7) closely spaced 27 mmø holes through the Bridge Railing. Holes shall be formed in the concrete during concrete placement. Drilling of holes may be allowed under the condition that all concrete spalls resulting from drilling are repaired with an approved epoxy resin patching material to the satisfaction of the AOTR/COR.
9. Asphaltic Concrete widening for the installation of the Thrie-Beam to W-Beam transiton shall be considered incidental to Item 61707-0000. The Contractor shall be required to backfill and compact hot asphaltic concrete mixture around the guardrail posts to the satisfaction of the AOTR/COR. All embankment materials shall be compacted to 95% maximum density.
10. Certificates of compliance shall be required for all guardrail, wood post materials and hardware prior to installation.
11. No punching, drilling or cutting of any elements shall be permitted after galvanizing.



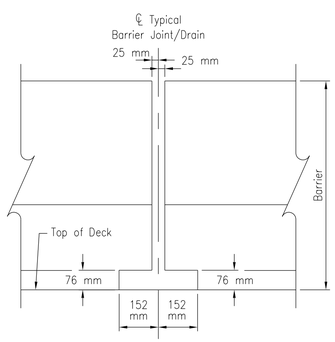
SECTION G–G – LEFT SIDE BARRIER @ WINGWALL
(ABUTMENT 2 SHOWN – ABUTMENT 1 OPPOSITE HAND)



ELEVATION VIEW – TYPICAL BARRIER @ WINGWALL

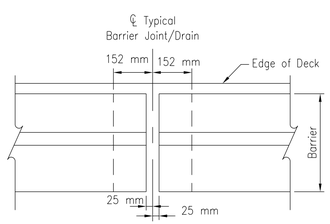


SECTION G–G – RIGHT SIDE BARRIER @ WINGWALL
(ABUTMENT 2 SHOWN – ABUTMENT 1 OPPOSITE HAND)



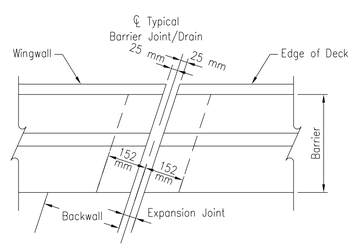
ELEVATION VIEW

TYPICAL BARRIER JOINT/DRAIN DETAIL



PLAN VIEW

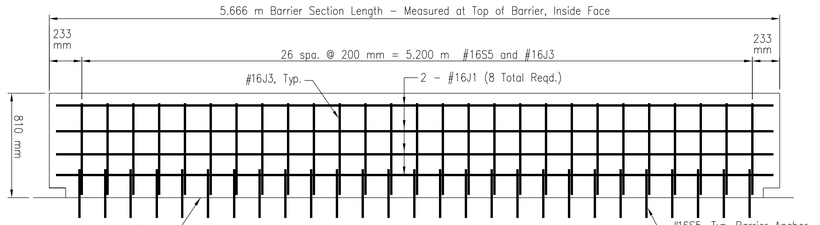
TYPICAL BARRIER JOINT/DRAIN DETAIL



PLAN VIEW

NOTE: ELEVATION VIEW similar to TYPICAL BARRIER JOINT/DRAIN DETAIL on this sheet.

BARRIER JOINT/DRAIN DETAIL AT EXPANSION JOINT



REINFORCING STEEL LAYOUT

13 BARRIER SECTIONS REQUIRED EACH SIDE OF DECK (26 TOTAL)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

CONCRETE BARRIER/GUARDRAIL TRANSITIONS

Designed by: BOR – Structural Unit	
Drawn by: rsh, dc	Date: 08/23/13
Revised by:	Date:
File Name: B17_Conc Barrier & Tran...	