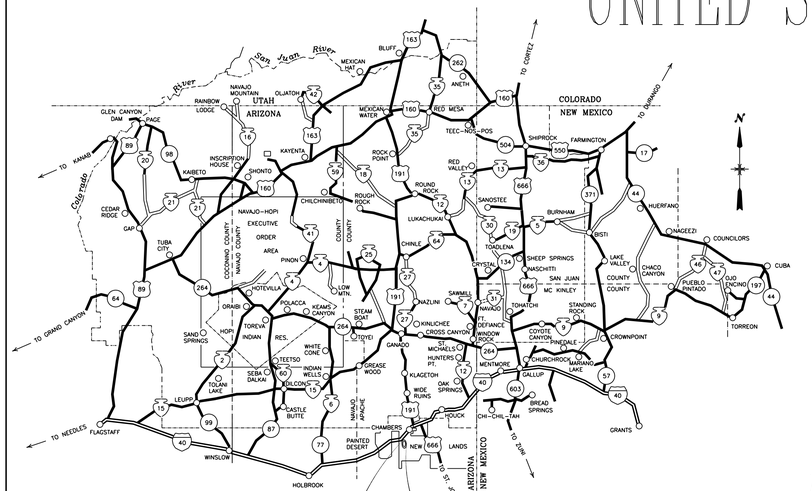
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGION
ROUTE

CONSTRUCTION PLANS APPROVED
DATE: 01/17/2014

N2007

APPROVED CONSTRUCTION PLANS
DATE: 07/10/2018
By Harold J Riley-PE at 7:38 am, May 31, 2018

RIO PUERCO WASH
BRIDGE AND APPROACH ROADWAY



NAVAJO RESERVATION MAP
N.T.S.

DESIGN DATA

Design Speed	50 mph
Maximum Curvature	4°
Maximum Gradient	6%
Minimum Passing Sight Distance	1835.93 Ft.
Minimum Stopping Sight Distance	425.00 Ft.
Average Daily Traffic 2015	327 vpd
Future ADT (2035)	868 vpd
R.O.W. Width	See Table

N2007 RIGHT-OF-WAY TABLE

STATION TO STATION			Width (Lt.) Ft.	Width (Lt.) Ft.
0+68.94	to	19+58.69	50.00	
19+60.09	to	28+93.53	75.00	
28+93.53	to	57+82.74	100.00	
0+68.94	to	19+53.05		50.00
19+47.42	to	31+46.09		150.00
31+53.63	to	57+82.74		50.00

LENGTH OF PROJECT

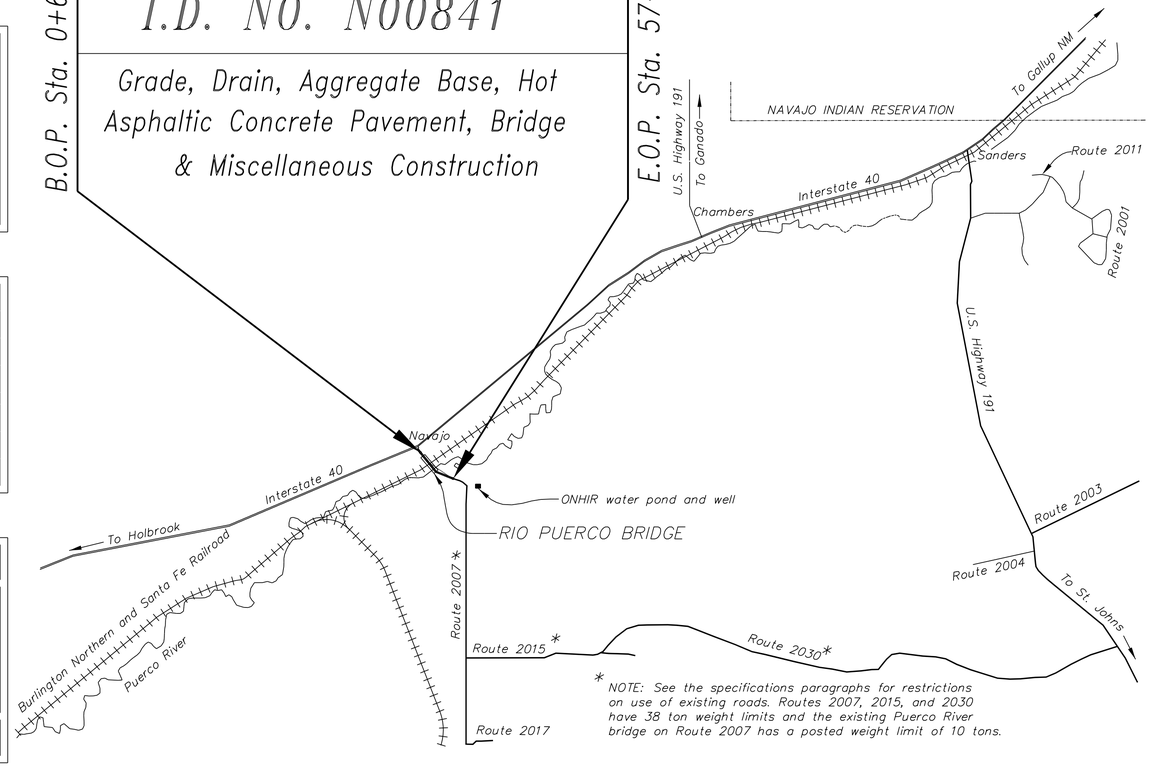
STATION TO STATION	FEET	MILES
B.O.P. Station 0+69.88		
B.O.B. Station 24+83.00	2413.12	0.4570
E.O.B. Station 30+07.50	524.50	0.0993
E.O.P. Station 57+82.74	2775.24	0.5256
TOTAL	5712.86	1.0819

B.O.P. Sta. 0+69.88

PROJ.N2007(1-1)1,2&4
I.D. NO. N00841

Grade, Drain, Aggregate Base, Hot Asphaltic Concrete Pavement, Bridge & Miscellaneous Construction

E.O.P. Sta. 57+82.74



* NOTE: See the specifications paragraphs for restrictions on use of existing roads. Routes 2007, 2015, and 2030 have 38 ton weight limits and the existing Puerco River bridge on Route 2007 has a posted weight limit of 10 tons.

INDEX TO SHEETS

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4	ESTIMATED QUANTITIES
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11-12	FRONTAGE ROAD, PLAN & PROFILE AND DETOUR DETAILS
13	GABION LAYOUT DETAILS
14	DITCH CHANNEL PLAN & PROFILE SHEET
15	TEMPORARY TRAFFIC CONTROL
16	PERM. ROADSIDE, T.O. DETAIL & PAVEMENT MARKINGS
17	STANDARD GUARDRAIL DETAILS
18a, 18b & 18c	STANDARD GUARDRAIL BARRIER SKT-350 END TREATMENT
19	STRUCTURE QUANTITIES
20	PERMANENT SIGNING DETAIL
21	LAP SPLICE U-CHANNEL BREAKAWAY SYSTEM
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24-25	PRECAST CONCRETE CATTLEGUARD DETAILS
26	STANDARD PIPE INSTALLATION AND DITCH DETAILS
27	PLACED RIPRAP DOWN DRAIN DETAIL
28	STANDARD FENCING DETAIL w/ TYPE I & II GATE
29	STANDARD CHAINLINK FENCE DETAIL
30	STANDARD MILE POST DETAIL
31	SIGNALS AND TURNOUT W/ CONCRETE PADS DETAILS
32	MISCELLANEOUS DETAILS
33	PIPE CROSS-SECTION
34-37	CROSS-SECTION FROM STA. 5+20 TO STA. 7+55
38-39	18' TYPE III LOCKABLE GATE & WATERLINE DETAILS
B1-B25	BRIDGE DESIGN PLANS & QUANTITIES
Mod-1 to Mod-14	CONSTRUCTION MODIFICATION DETAILS

LEGEND

STATE LINE
RESERVATION LINE
COUNTY LINE
TOWNSHIP or RANGE LINE
SECTION LINE
NATIONAL FOREST LINE — SHADING 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
DELINEATION — ONE WAY / TWO WAY
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
DIKE or DITCH BLOCK
RIP-RAP
RAILROAD TRACK
GAS LINE — G
IRRIGATION LINE — IRR
WELL
DWELLING
SCHOOL
CHURCH
WINDMILL
RIGHT-OF-WAY MONUMENT — PLANNED / EXISTING

INDIAN SERVICE | COUNTY | STATE | FEDERAL

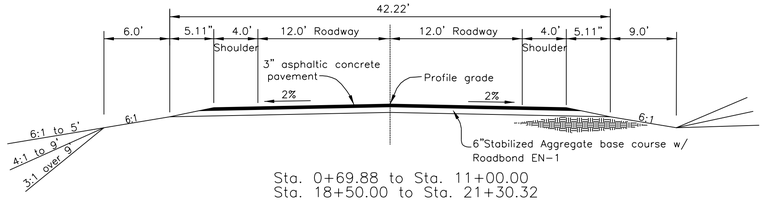
PAVED | GRADED | UNIMPROVED

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

RECOMMENDED APPROVAL:		APPROVAL	
AGENCY ROAD ENGINEER	08/28/2012 DATE		
REGIONAL DIVISION MANAGER	08/28/2012 DATE		
PLANNING & DESIGN BRANCH CHIEF	08/28/2012 DATE	Sharon A. Pinto, REGIONAL DIRECTOR	08/28/2012 DATE

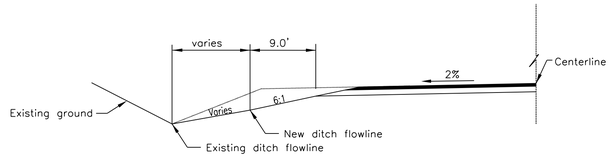
AREA	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	2	63

TYPICAL ROAD SECTIONS

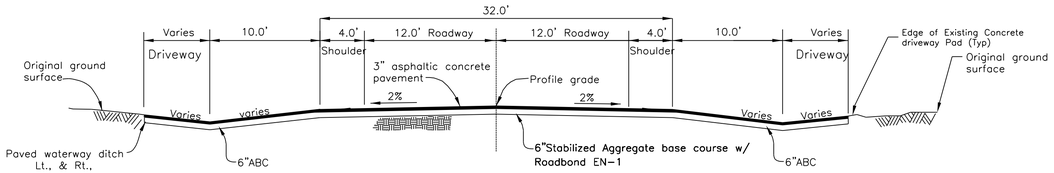


Sta. 0+69.88 to Sta. 11+00.00
Sta. 18+50.00 to Sta. 21+30.32
Sta. 33+60.18 to Sta. 57+82.74

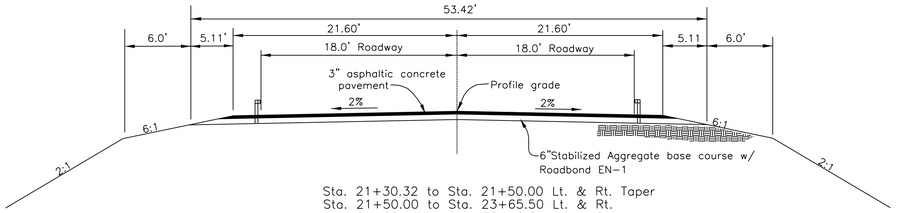
SEE SHEET 11&13 FOR FRONTAGE ROAD TYPICAL CROSS SECTION.



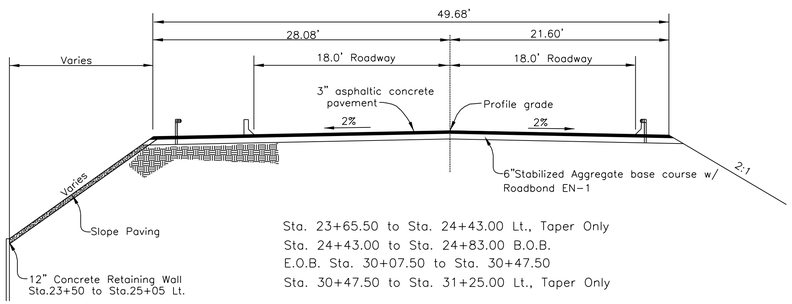
Sta. 53+50 to Sta. 58+40 Lt. – Grade to drain from new ditch flowline to existing ditch flowline.



Sta. 11+00 to Sta. 19+75.00 Rt.
Sta. 11+00 to Sta. 19+75.00 Lt.
SPECIAL PAVED DITCHES



Sta. 21+30.32 to Sta. 21+50.00 Lt. & Rt. Taper
Sta. 21+50.00 to Sta. 23+65.50 Lt. & Rt.
Sta. 31+25.00 to Sta. 33+40.50 Lt. & Rt.
Sta. 33+40.50 to Sta. 33+60.18 Taper



Sta. 23+65.50 to Sta. 24+43.00 Lt., Taper Only
Sta. 24+43.00 to Sta. 24+83.00 B.O.B.
E.O.B. Sta. 30+07.50 to Sta. 30+47.50
Sta. 30+47.50 to Sta. 31+25.00 Lt., Taper Only

REVISED 06/02/2017

SEQUENCING NOTES:

1–The Contractor shall be required to break up all of the existing asphaltic concrete pavement structure in accordance with Section 204.09(b) of FP–03, including all existing paved turnouts. The Contractor has the option to utilized cold milling machine or other construction method to break up the existing pavement structure.

2–After processing the existing pavement, the contractor shall build up the subgrade with the material along with additional borrow with moisture and density control per Section 204 of FP–03.

3–At all new and reconstructed turnouts, and mainline, the contractor shall furnish and place 6" of new aggregate base course material on the finished and approved subgrade. The new placed ABC shall be treated with Roadbond EN–1.

4–The contractor shall then place 3" (2–1.5" lifts) of hot asphalt concrete pavement on the mainline, and all turnouts.

5–The Contractor shall provide for a safe and relatively dust free driving surface throughout the reconstruction process for all school, general traveling public, and local traffic use day and night. The contractor's traffic control and construction sequencing plan shall include these requirements and be submitted for review and approval prior to any ground disturbing activities taking place.

SPECIAL PAVED DITCH NOTES STA 11+00 to 19+75:

1–Constructed the paved ditches as shown through residential area on right and left.
2–The paved ditch structural section shall match the roadway section (3 inches of asphalt over 6 inches of ABC) for the entire width and length of the ditch. The ABC course to extend 6 inches beyond all free asphalt edges.
3–The paved ditch inslope shall be variable starting at the roadway shoulder with variable backslope TAPER TO BE INSTALLED up to the edge of each concrete driveway pad.
4–At driveways the paved backslope shall be extended as needed to the right of way line or to the edge of PCC driveways per note 3 using the ABC and asphlat thickness shown on sheet 16 of 64 except for the the driveway at sta. 12+30 Rt. to 13+66 shall be the ABC and asphalt thickness of the main roadway.
5–The backslope grade shall be adjusted to fit each existing driveway as directed by the COR/AOTR without any turnout radius.
6–At roadway turnout at sta.14+50 Lt., carry paved ditch around the radius to the right of way line on the north side of the turnout. On the south side of turnout restart the paved ditch at the right of way line and grade to drain to sta. 19+75 left turnout drainage structure as directed by the COR/AOTR.
7. Install paved driveway lt at sta. 16+25.
8. Stations 0+00, 3+40 Lt, 11+71 Rt. and 14+50 Lt. shall be built with radious per sheet 16 of 64.
9. The turnouts near 17+25 Lt. adjust the backslope distance beyond the 10 feet to provide for a flatter driveway approach as directed by the COR/AOTR.

TURNOUT LOCATIONS

STATION	LOC.	SIZE	TYPE	REMARKS
3+40	Lt.	40' x 34'	A	Reconstruct existing T.O. to match existing concrete at R/W line. Remove existing 24" pipe and replace w/new pipe & end sections.
8+27	Rt.	14' x 34'	A	Reconstruct existing T.O.–No cattleguard w/type I gate and pipe.
11+41	Lt.	16' x 34'	A	Reconstruct existing T.O.–No cattleguard or pipe.
11+71	Rt.	16' x 34'	A	Reconstruct existing T.O.–No cattleguard or pipe.
12+30	Rt.	24' x 34'	A	Reconstruct existing T.O.–No cattleguard or Pipe.
12+65	Lt.	16' x 34'	A	Reconstruct existing T.O.–No cattleguard or Pipe.
13+66	Rt.	24' x 34'	A	Reconstruct existing T.O.–to match existing PCC driveway for new Business.
14+40	Rt.	24' x 34'	A	Reconstruct existing T.O.–to match existing PCC driveway.
14+50	Lt.	24' x 34'	A	Reconstruct existing T.O.–to newlands office.
15+16	Rt.	16' x 34'	A	Reconstruct existing T.O.–to match existing PCC driveway.
15+85	Rt.	16' x 34'	A	Reconstruct existing T.O.–to match existing PCC driveway.
15+85	Lt.	16' x 34'	A	Reconstruct existing T.O.–No cattleguard or pipe.
16+55	Rt.	16' x 34'	A	Reconstruct existing T.O.–to match existing PCC driveway.
17+25	Rt.	16' x 34'	A	Reconstruct existing T.O.–to match existing PCC driveway.
17+94	Rt.	16' x 34'	A	Reconstruct existing T.O.–to match existing PCC driveway.
19+75	Rt.	24' x 34'	A	Reconstruct existing T.O.–Paved 50' from C/L and install new cspc
19+75	Lt.	24' x 34'	A	Reconstruct existing T.O.–@ 113 ° skew–relocate 3–unit cattleguard 180' Lt of C/L on old 66 Route, pass the proposed BNSF Service Road Intersection. Pave Turnout to new cattleguard location match existing service road and turnout @ 100'.

SPECIAL ROADWAY TYPICAL AND SPECIAL DITCH LOCATION

Station To Station	Roadway Width to Hinge Lt.	Roadway Width to Hinge Rt.	Remarks
6+60.00 To 11+00.00	16.00 ft.	16.00 ft.	Special Ditch Grade
10+90.00 To 11+00.00	16.00 ft.	16.00 ft.	Special Ditch Grade
11+00.00 To 17+00.00	---	16.00 ft.	Special Paved Ditch, Rt.
11+00.00 To 17+00.00	16.00 ft.	---	Special Paved Ditch, Lt.
20+30.32 To 21+50.00	Varies	Varies	19.68 ft. Taper Lt. & Rt.
21+50.00 To 23+65.50	21.60 ft.	21.60 ft.	Guardrail Location:
23+65.50 To 24+43.00	21.60 ft.	21.60 ft.	77.50 ft. of Taper with Guardrail, Left Side.
24+43.00 To 24+83.00	27.08 ft.	21.60 ft.	1:11/2 at Fill Slope Location, Lt.
24+83.00 To 30+07.50	---	---	Bridge Location.
30+07.50 To 30+47.50	27.08 ft.	21.60 ft.	2:1 at Fill Slope Location, Lt. & Rt.
30+47.50 To 31+25.00	27.08 ft.	21.60 ft.	77.50 ft. of Taper with Guardrail, Left Side.
31+25.00 To 33+40.50	21.60 ft.	21.60 ft.	Guardrail Location,
33+40.50 To 33+60.18	---	---	19.68 ft. Taper Lt. and Rt.

BASIS ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	GRADE	UNITS	APPLICATION	FRONTAGE ROAD
30101–2000	Untreated Aggregate Base Course	"D"	140 lbs/ft^3	6" Mainline, – 4" Turnout	6" Service Road BNSF
30413–1000	Aggregate Stabilization with Roadbond	EN–1			
40201–0500	Hot Asphalt Concrete Pavement Class "B"	"B"	150 lbs/ft^3	3" Mainline, – 2" Turnout	2" Service Road BNSF
40502–0800	Asphalt Cement	PG58–28	0.9806 L/kg	6% by Total Weight HACP	
41101–5000	Asphalt Prime Coat	PEP	2.53 gal/ton	0.30 gal/sq. yd. top of ABC	

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

TYPICAL CROSS SECTION

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 06/02/2017	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.2_Typical Sections Sheet.dgn	

J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

AREA	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	3	63

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 ENGLISH UNITS), 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. THE CONTRACTOR SHALL ALSO SUBMIT A COPY OF HIS TRAFFIC CONTROL PLAN, RELATED TO I-40 FRONTAGE ROAD AND RAILROAD CROSSING, TO THE ARIZONA DEPARTMENT AND TRANSPORTATION (DIANA ARMIJO (928)524-5455), AND BURLINGTON NORTHERN & SANTA FE (BNSF) (2)-WEEKS PRIOR TO START OF CONSTRUCTION.

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.

6. THE BIDDER SHALL 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 AOTR/COR, 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 CIRCUMSTANCE 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, (OR AS DIRECTED BY COR/AOTR) NOT TO EXCEED THE RIGHT-OF-ENTRY 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 REQUIRED AT THE DRAINAGE PIPE REPLACEMENT LOCATIONS, ACCESS ROAD TO RAILROAD TRACKS & RIO PUERCO RIVER, ANYWHERE WHERE THERE IS GROUND DISTRUBINC ACTIVITIES, AND MATERAILS STOCKPILES. THE CONTRACTOR IS REQUIRED TO SUBMIT COURTESY COPY OF THE APPROVED SWPPP TO THE ARIZONA DEPARTMENT ENVIRONMENTAL QUALITY (ADEQ) OFFICE (602) 771-4245.NICOLE CORONADO @ nm1@azdeq.gov

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 14.0' WIDE TURNOUTS; PLACE AGGREGATE AND HOT ASPHALTIC CONCRETE FOR TURNOUTS WIDER THAN 14.0' 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 THE AOTR/COR) SHALL BE INCIDENTAL TO BID ITEM 20102-0000. 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 12-INCH THE SCARIFIED SURFACE SHALL BE LEFT ROUGH, WITH 4-INCH TO 12-INCH 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 INCIDENTAL WORK UNDER BID ITEM 20304-1000. PERMANENT SEEDING AND STRAW MULCHING SHALL BE APPLIED TO ALL AREAS WITHIN THE CONSTRUCTION LIMITS. SEEDING AND MULCHING TO BE PAID UNDER ITEM 62510-1000.

13. STRUCTURAL EXCAVATION AND BEDDING/BACKFILL OF ALL DRAINAGE STRUCTURES 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 DITCH BLOCKS, AND/OR PLACED ALONG ROADWAY SHOULDERS AS EMBANKMENT IN AREAS ADJACENT TO THE REMOVAL 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 DITCH BLOCKS, DIKES AND DITCHES SHALL BE CONSTRUCTED AS SHOWN ON THESE PLANS AND/OR ADDED AT LOCATIONS DESIGNATED BY THE COR/AOTR. ALL DITCH BLOCKS, DIKES AND 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.

15. IMMEDIATELY PRIOR TO PLACING EMBANKMENT, AGGREGATE BASE AND/OR RECYCLED MATERIAL, THE TOP 6-INCH OF THE ORIGINAL GROUND, OR FINISHED SUBGRADE (INCLUDING TURNOUTS) SHALL BE CHECKED FOR COMPACTION AND GRADE. IF COMPACTION DOES NOT MEET THE MINIMUM SPECIFIED COMPACTION AND TOLERANCE REQUIREMENTS, THE ORIGINAL 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 (INCLUDING BASECOURSE) BE PLACED ON FROZEN, MUDDY OR UNSTABLE NATURAL GROUND OR SUBGRADE.

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 AND EMBANKMENT MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 20401-0000 AND 20403-0000.

17. 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 ARIZONA BLUE STAKES AT 1-800-782-5348, AND NAVAJO TRIBAL UTILITY AUTHORITY (NTUA) AT (928)-729-5 721, 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.

18. THE CONTRACTOR SHALL REMOVE, CLEAN, AND STOCKPILE ALL SALVAGEABLE EXISTING CULVERTS, CATTLE GUARDS AND FENCING MATERIALS, ETC. AS CALLED FOR ON THESE PLANS AND SECTIONS 203 AND 607. ALL SALVAGEABLE MATERIALS, EXCEPT THE BNSF AND COUNTY PROPERTY, SHALL BE STOCKPILED IN A DESIGNATED LOCATION FOR COMMUNITY USE. AOTR SHALL COORDINATE THIS WITH BNSF AND COUNTY PROPERTY REMOVED AS PART OF THIS PROJECT SHALL BE OFFERED TO THE COUNTY AND BNSF. IF THEY ACCEPT, THE MATERIAL SHALL BE HAUL AND STOCKPILED INSIDE THE RAILROAD'S PROPERTY LINE FOR BNSF PICK UP. ANY MATERIALS DETERMINED TO BE UNUSEABLE BY THE COR/AOTR SHALL BE DISPOSED OF BY THE CONTRACTOR IN 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.

19. 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.

20. THE CONTRACTOR SHALL SAW CUT (FULL DEPTH) THE EXISTING ASPHALT PAVEMENT (INCLUDING TURNOUTS)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.

21. 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.

22. 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.

23. THE CONTRACTOR SHALL REMOVE BIA ROUTE N2007 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 NEW LANDS MAINTENANCE YARD. SIGNS NEEDED FOR SAFETY/INFORMATION SHALL BE TEMPORARILY RESET AS DIRECTED BY THE COR/AOTR. ALL COUNTY ROUTE SIGNS SHALL BE REMOVED AND STOCKPILED, AND NOTIFY THE MAINTENANCE DEPARTMENT AT (928)-688-2928 FOR MATERIAL PICK UP. THIS WORK SHALL BE CONSIDERED AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.

24. 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.

25. AT MAJOR DRAINAGE STRUCTURES AND LIVESTOCK PASS LOCATIONS THAT SPECIFY REPLACING OR INSTALLING WING FENCES, THE CONTRACTOR SHALL TIE WING FENCES TO THE EXISTING STRUCTURES IN ACCORDANCE WITH THE DETAILS ON SHEET 30 OF 63. 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 28 OF 63. ANY EXISTING CATTLE PASS CLOSURES ARE TO BE REMOVED. THIS WORK TO BE INCIDENTAL TO BID ITEM 61921-1000, AND NO ADDITIONAL PAYMENT SHALL BE MADE.

26. ALL RIGHT-OF-WAY REFERENCE MARKERS SHALL BE LABELED IN THE ENGLISH UNITS OF MEASURE. ALL EXISTING AND NEW BRASS CAPS SHALL BE STAMPED WITH BOTH ALIGNMENT STATIONING AND ELEVATIONS IN ENGLISH, 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. 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.

27. DUE TO NARROW RIGHT-OF-WAY WIDTHS, THE COMPLETE TURNOUT RADIUS CAN NOT BE CONSTRUCTED AT NUMEROUS TURNOUTS. AT THESE LOCATIONS THE CONTRACTOR SHALL CONSTRUCT THE PLANNED RADIUS, BUT END THE RADIUS AT THE RIGHT-OF-WAY LIMIT. THE ACTUAL TURNOUT WIDTH (AT THE RIGHT-OF-WAY LINE) WILL BE WIDER THAN THE WIDTH GIVEN ON THE PLANS.

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

29. ROADWAY ENDAREA AND PIPE CROSS SECTION DRAWINGS WILL BE PROVIDED IN EITHER HARD COPY OR ELECTRONIC FORMAT UPON WRITTEN REQUEST FROM THE CONTRACTOR THRU CO/AO.

30. ANY EXISTING MAIL BOXES, ADVERTISING BILLBOARDS, OR HOUSE ADDRESS SIGNS LOCATED ALONG THE ROADWAY PRISM SHALL BE REMOVED AND RE-INSTALLED OUTSIDE OF THE RIGHT-OF-WAY LIMIT OR AS DIRECTED BY THE COR/AOTR. THE CONTRACTOR SHALL NOTIFY THE US-POSTAL SERVICE AND ATTEMPT TO CONTACT ALL AFFECTED RESIDENTS TEN (10) WORKING DAYS PRIOR TO RESETTING MAIL BOX (ES). THIS WORK SHALL BE INCIDENTAL TO BID ITEM 20304-1000.

31. 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.

32. 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 ITEM 61901-1000, 62101-0000, AND 62102-0000, AND NO ADDITIONAL PAYMENT WILL BE MADE.

33. IT IS EXPECTED A REVISED/FINAL RIGHTS-OF-WAY GRANT OF EASEMENT BE DEVELOPED DURING THE CONSTRUCTION OF THE N2007 PROJECT. THE CONTRACTOR SHALL NOT SURVEY FOR OR INSTALL R.O.W. MONUMENTS AND MARKERS OR FENCINGS UNTIL EXPRESSLY APPROVED BY THE NRDOT DIVISION MANAGER. RIGHT-OF-WAY FENCING CAN BE PLACED AT ALL ARCHAEOLOGICAL SITES IF SPECIFIED ON THE PLANS.

REVISED: 10-15-2016

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

GENERAL NOTES

DRAWN BY: Peterson.Yazzie	DATE: 7/16/2011
DESIGNED BY: NRDOT	DATE: 7/16/2011
REVISED: 8/15/2016	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.3_General Notes_ 012813.dgn	

J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	4	63

ROADWAY AND BRIDGE ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	Frontage/Access Rd.	RIO PUERCO Bridge	UNIT
10901-0000	Miscellaneous and Extra Work Under Section 109.02(m)	All Req'd.	All Req'd.	All Req'd.	L.S.
15101-0000	Mobilization	All Req'd.	All Req'd.	All Req'd.	L.S.
15201-0000	Construction Survey and Staking	All Req'd.	All Req'd.	All Req'd.	L.S.
15301-0020	Contractor Quality Control	14,000.00	2,000.00	12,000.00	Man-hr.
15708-1000	Temporary Erosion Control	All Req'd.	All Req'd.	All Req'd.	L.S.
15714-0000	Temporary Straw Mulching	17.40	5.00	12.40	Ac.
20102-0000	Clearing and Grubbing	All Req'd.	All Req'd.	All Req'd.	L.S.
20304-1000	Removal of Structures and Obstructions	All Req'd.	All Req'd.	All Req'd.	L.S.
20401-0000	Roadway Excavation	6,587.00	2,506.00	4,281.00	C.Y.
20403-0000	Borrow Excavation	114,178.00	196.00	113,982.00	C.Y.
20410-2000	Furrow Ditches and Ditch Blocks	500.00	0.00	0.00	L.F.
20425-2000	Channel Reshaping, 3ft. wide bottom	369.00	369.00	0.00	L.F.
20601-0000	Development of Water Supply	4.85	0.03	4.82	M-Gal.
25101-2000	Placed Riprap Class 2	66.00	0.00	66.00	C.Y.
25112-3000	Articulated Concrete Block Revetment	2,846.00	0.00	2,846.00	S.Y.
25302-1000	Gabions, Galvanized Coated, Class 2	721.00	0.00	721.00	C.Y.
30101-2000	Aggregate Base Course, Grade D,	8,795.00	594.00	8,201.00	Ton
30413-1000	Roadbond EN-1 , - 152 mm depth	21,431.00	0.00	21,431.00	S.Y.
40201-0500	Hot Asphalt Concrete Pavement, Class B, Grade B	4,163.00	190.40	3,972.60	Ton
40502-0800	Asphalt Cement Grade PG 58-28	250.00	11.50	238.50	Ton
41101-5000	Prime Coat Grade (PEP)	32.50	2.00	30.50	Ton
55201-0200	Structural Concrete, Class A(AE)	1,888.00	0.00	1,888.00	C.Y.
55301-2000	Precast Prestressed Conc. Bulb Tee Grider 72", 130'-5" long	12	0	12	Ea.
55301-2010	Precast Prestressed Conc. Bulb Tee Grider 72", 129'-4" long	12	0	12	Ea.
55401-1000	Reinforcing Steel, Grade 60	186,034.00	0.00	186,034.00	Lb.
55401-2000	Reinforcing Steel, Epoxy Coated, Grade 60	236,909.00	0.00	236,909.00	Lb.
56501-0600	Drilled Shafts, 4'-0" diameter	507.00	0.00	507.00	L.F.
56501-0800	Drilled Shafts, 5'-0" diameter	409.00	0.00	409.00	L.F.
60201-0810	24" Corrugated Steel Pipe Culvert	178.00	0.00	178.00	L.F.
60201-0910	36" Corrugated Steel Pipe Culvert	212.00	0.00	212.00	L.F.
60202-0510	28" Span x 20" Rise, CSPA	142.00	142.00	0.00	L.F.
60202-0610	35" Span x 24" Rise, CSPA	70.00	0.00	70.00	L.F.
60210-0810	End Section for 24" CSPC	5	0	5	Ea.
60210-1010	End Section for 36" CSPC	2	0	2	Ea.
60211-0910	End Section for 28" Span, 20" Rise CSPA	6	6	0	Ea.
60211-1010	End Section for 35" Span, 24" Rise CSPA	1	0	1	Ea.
60701-1000	Removing, Cleaning, Stockpiling Salvageable Culverts	448.00	0.00	448.00	L.F.
60801-0500	Paved Waterway, Type S	1,514.00	1,514.00	0.00	S.F.
61701-1250	Guardrail System: SGR04b, Type PDE02 w/ SKT-350 End Treatment	1,178.00	0.00	1,178.00	L.F.
61707-0000	Structural Transition Railing (Thrie Beam)	75.00	0.00	75.00	L.F.
61711-5000	Impact Attenuator, QUADGUARD	2	0	2	Ea.
61801-1000	Concrete Barrier	40	0	40	L.F.
61901-1000	Fence, 5 Strand Barbed Wire	5,900.00	0.00	5,900.00	L.F.
61901-1800	Fence, Chain Link, 5' high Pedestrain Fence	552.00	0.00	552.00	L.F.
61901-2100	Fence, Chain Link, 7' high w/2-24' Swinging Gates	150.00	150.00	0.00	L.F.
61901-3400	Temporary Safety Fence, Plastic, HDPE-Type	200.00	0.00	200.00	L.F.
61902-0010	16' Turnout No Gate	9	0	0	Ea.
61902-0020	24' Turnout No Gate	7	0	0	Ea.
61902-1300	14' Turnout w/Type 1 Gate Only	2	0	0	Ea.
61902-1600	Gate Type III, 20ft wide	1	0	0	Ea.
61903-0710	18 ft Turnout w/Type IIIA Lockable Closure Gate (see sht 38)	1	1	0	Ea.
61903-0810	40 ft. wide Turnout, No Gate	1	0	1	Ea.
61921-0000	Remove and reset fence	675.00	67.00	608.00	L.F.
62101-0000	Right-of-Way Monument	21	0	21	Ea.
62102-0000	Reference Marker	21	0	21	Ea.
62510-1000	Seeding, Dry Method	8.50	0.50	8.00	Ac.
62901-1100	Erosion Control Matting, Type IV	2,723.00	0.00	2,723.00	S.Y.
63302-0003	Sign Installation, 1 Post and Hardware: 2.75 lb/ft.	38.00	0.00	38.00	S.F.
63302-0010	Sign Installation, 2 Posts and Hardware: 2.00 lb/ft.	41.65	0.00	41.65	S.F.
63308-2000	Object Markers, Glass Fiber, Type 2	6	0	6	Ea.
63308-3000	Object Markers, Type 3, 1- post & Hardware:	4	0	4	Ea.
63309-0010	Delineators, Glass Fiber, Type "1a"	10	0	10	Ea.
63309-0020	Delineators, Glass Fiber, Type "1b"	5	0	5	Ea.
63318-1000	Mile Markers, 1 Post and Hardware; 2.00 lb/ft.	4	0	4	Ea.
63401-1510	Pavement Markings, Type "M", Solid Yellow	2,906.00	522.62	0.00	L.F.
63401-1520	Pavement Markings, Type "M", Solid White	9,650.00	811.24	0.00	L.F.
63401-1610	Pavement Markings, Type "M", Broken Yellow	6,661.00	0.00	0.00	L.F.
63501-0000	Temporary Traffic Control	All Req'd.	All Req'd.	0	L.S.
63502-3000	Temporary Traffic Control, Raised Pavement Markers, Yellow	700	0	700	Ea.
63509-1000	Flaggers	8,000.00	200.00	7,800.00	Man-hr.

Description:	Location:	Offset:	New aggregate base course (ton)	Aggregate stabilization with Roadbond	HACP (ton)	Asphalt Cement PG58-28 (ton)	Asphalt Prime Coat (ton)	Remark:
0+69.88 - 21+30.32	mainline	centerline	2,814.20	8,149.00	1,309.00	78.50	9.70	regular roadway section.
21+30.32 - 21+50.00	mainline	centerline	30.80	90.00	14.60	0.90	0.10	tapered guardrail section.
21+50.00 - 23+65.50	mainline	centerline	379.30	1,122.00	182.40	10.90	1.30	constant guardrail section.
23+65.50 - 24+43.00	mainline	centerline	132.30	411.00	68.60	4.10	0.50	tapered guardrail section on left side.
24+43.00 - 24+83.00	mainline	centerline	72.90	227.00	37.90	2.30	0.30	constant guardrail section to Beginning of Bridge.
30+07.50 - 30+47.50	mainline	centerline	72.90	227.00	37.90	2.30	0.30	Ending of Bridge to constant guardrail section.
30+47.50 - 31+25.00	mainline	centerline	132.30	411.00	68.60	4.10	0.50	tapered guardrail section on left side.
31+25.00 - 33+40.50	mainline	centerline	379.30	1,122.00	182.40	10.90	1.30	constant guardrail section.
33+40.50 - 33+60.18	mainline	centerline	30.80	90.00	14.60	0.90	0.10	tapered guardrail section.
33+60.18 - 57+82.74	mainline	centerline	3,308.80	9,582.00	1,539.10	92.30	11.40	regular roadway section.
turnout	3+40	left	64.00	0.00	39.00	2.37	0.36	40 ft wide x 34 ft driveway to business.
turnout with type 1 gate	8+27	right	32.33	0.00	19.17	1.15	0.18	14 ft wide x 34 ft turnout.
turnout	11+41	left	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	11+71	right	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	12+30	right	42.91	0.00	26.28	1.58	0.24	24 ft wide x 34 ft turnout.
turnout	12+65	left	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	13+34	right	42.91	0.00	26.28	1.58	0.24	24 ft wide x 34 ft turnout.
turnout	14+40	right	42.91	0.00	26.28	1.58	0.24	24 ft wide x 34 ft turnout.
turnout	14+50	left	42.91	0.00	26.28	1.58	0.24	24 ft wide x 34 ft turnout.
turnout	15+16	right	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	15+85	right	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	15+85	left	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	16+55	right	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	17+25	left	42.91	0.00	26.28	1.58	0.24	24 ft wide x 34 ft turnout.
turnout	17+25	right	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	17+94	right	32.33	0.00	19.17	1.15	0.18	16 ft wide x 34 ft turnout.
turnout	19+75	right	42.91	0.00	26.28	1.58	0.24	24 ft wide x 34 ft turnout to old HWY666
turnout	19+75	left	42.91	0.00	26.28	1.58	0.24	24 ft wide x 34 ft turnout to BNSF service road.
turnout with type 2 gate.	37+00	right	42.91	0.00	26.28	1.58	0.24	24 ft wide x 34 ft turnout with 3-unit cattleguard.
		subtotal:	8,084.18	21,431.00	3,896.04	233.71	29.58	
0+17.38 - 5+75.00	Frontage	centerline	444.60	0.00	143.90	8.60	1.60	Frontage and Access Road
5+75.00 - 8+32.00	Access	centerline	150.60	0.00	46.90	2.80	0.50	Frontage and Access Road
turnout	1+35.00	left	42.91	0.00	26.28	1.58	0.24	24 ft wide x 80 ft
turnout with type 1 gate	4+80.00	left	32.33	0.00	19.17	1.15	0.18	14 ft wide x 10 ft
turnout	5+30.00	left	20.00	0.00	15.00	1.00	0.18	24 ft wide x 10 ft to BNSF service building.
turnout	6+35.62	left	20.00	0.00	15.00	1.00	0.18	24 ft wide x 20 ft to BNSF track.
		subtotal:	710.44	0.00	266.25	16.13	2.88	
		grand total:	8,794.62	21,431.00	4,162.29	249.84	32.46	

ITEM 61903-1210 - 4 UNIT CATTLEGUARD NO GATE

STATION	LOCATION	DESCRIPTION
19+25.0	C/L	Install new 4 unit cattle guard
57+82.7	C/L	E.O.P. Install new 4 unit cattle guard

ITEM 20304-1000 - REMOVAL OF STRUCTURE & OBSTRUCTIONS

STATION	LOCATION	REMARKS
3+55.00	Left.	Remove and salvage metal post & wing fences at T.O. Set fence material out side R/W line.
8+27.00	Right	Remove existing cattleguard and foundation
19+25.00	Centerline	Remove existing 4-unit cattleguard & tie-in fencing back to R/W lines.
20+40.71	3.76 Rt.	Remove existing sign
20+30.00 to 24+90.00	Left	Remove meandering 465' barbed wire fence
23+80.00 to 24+90.00	Left	Remove 110' temporary chainlink fence segments
25+05.00	Right	Remove ±60' of BNSF barbed wire fencing
25+95.00	Right	Remove ±100' of BNSF barbed wire fencing
26+50.00 to 30+00.00	Left	Remove existing bridge SEE NOTE #15 on SHEET B-1
31+60.00	Rt. & Lt.	Remove ±400' of BNSF property barbed wire fencing
24+15.00	Left	Remove 2'x3' Steel Metal Grate & 2-14"x ±160' pipe
DETOUR - FRONTAGE ROAD		
5+35.00	Left.	Remove 10'x12' concrete slab at West Entrance of Service Building off Frontage Road
25+40±	Left	Relocate existing drainage pipes 18' Left under new Detour Road.

ITEM 60701-1000 - REMOVING, CLEANING, STOCKPILING SALVAGEABLE CSPC

STATION	LOCATION	SIZE	REMARKS
3+55.00	Turnout Left	1-24" x 68'	To be removed/salvage
6+60.00	C/L	1-24" x 70'	To be removed/salvage
8+27.00	Turnout-Rt.	1-18" x 50'	To be removed/salvage
24+15.00	10'+Lt.	2-14" x 160'	Concrete inlet and under ground drainage
31+75.00	300' Lt./exst'g road	2-24" x 30'	Removed & salvage
34+50.00	130' Rt./exst'g road	1-24" x 30'	To be removed/salvage
47+40.00	150' Lt./exst'g road	1-24" x 50'	To be removed/salvage
50+30.00	C/L	1-24" x 80'	To be removed/salvage
		TOTAL: 448 Feet	To be removed/salvage

ITEM 61902-1300 - 14' TURNOUT w/TYPE 1 GATE

STATION	LOCATION	DESCRIPTION
8+27.00	Rt.	Reconstruct 14' Turnout
MAINTENANCE ROAD - 14' Turnout w/Type 1 Gate		
4+80.00	Lt.	Frontage Road

ITEM 61901-1000 - BARBED WIRE FENCING

STATION TO STATION	LOCATION	REMARKS
19+25 - 20+10	Lt.	100' Tie to Cattleguard
20+30-21+52	Lt.	120' Install to Cattleguard & tie to Guardrail
31+60.00	Lt. & Rt.	400' BNSF property fence
31+60-58+00	Lt. & Rt.	5,280 L.F. R/W fence
	TOTAL:	5,900 L.F.

ITEM 20401-0000 - EARTHWORK QUANTITIES

STATION - STATION	CUT (yd^3)	FILL (yd^3)	BORROW (yd^3)	WASTE (yd^3)
0+69.88 to 21+60.15	4,281.25	4,281.25	0	0
21+60.15 to 24+83.0	0	32,790.48	0	0
**** EXCEPTION - BRIDGE ****				
30+07.50 to 57+82.7	1,585.74	73,105.05	71,519.32	0
Sub-total:	5,866.99	110,176.78	104,309.80	0
**** MAINTENANCE/DETOUR ROAD ****				
0+17.38 to 01+32.5	41.16	41.15	0	0
01+32.52 to 8+32	678.48	154.97	0	523.50
Sub-total:	719.63	196.13	0	523.50
TOTAL:	6,586.63	110,372.91	104,309.80	0

* 20% Shrinkage Factor applied

61701-5000; GUARDRAIL SYSTEM, SGR-04b, TYPE PDE WITH STK 350 TERMINAL SECTION

STATION TO STATION			LOCATION	LENGTH (ft)	Remarks
21+50.00	To	24+44.583	Right	294.58	Includes STK 350, Connect to guardrail transition railing
21+50.00	To	24+44.583	Left	294.58	Includes STK 350, Tapered guardrail
30+45.917	To	33+40.50	Right	294.58	Includes STK 350, Straight section guardrail
30+45.917	To	33+40.50	Left	294.58	Includes STK 350, Tapered guardrail
			TOTAL:	1,178.33	

ITEM 61902-0010 - 16' TURNOUT NO GATE -9 REQ'D.

STATION	LOCATION	DESCRIPTION
11+41.00	Lt.	Reconstruct 16' turnout
11+71.00	Rt.	Reconstruct 16' turnout
12+65.00	Lt.	Reconstruct 16' turnout
15+16.00	Rt.	Reconstruct 16' turnout to match existing concrete driveway
15+85.00	Lt.	Reconstruct 16' Turnout
15+85.00	Rt.	Reconstruct 16' turnout to match existing concrete driveway
16+55.00	Rt.	Reconstruct 16' turnout to match existing concrete driveway
17+25.00	Rt.	Reconstruct 16' turnout to match existing concrete driveway
17+94.00	Rt.	Reconstruct 16' turnout to match existing concrete driveway

ITEM 61903-1100 - 24' TURNOUT w/3 UNIT CATTLEGUARD & TYPE II GATE

STATION	LOCATION	DESCRIPTION
37+00.00	Rt.	Construct 24' turnout w/3 unit cattleguard & Type II Gate

ITEM 61903-0810 - 40' Turnout w/No Gate

STATION	LOCATION	DESCRIPTION
3+40.00	Lt.	Construct 40' turnout w/No Gate

ITEM 61921-0000 - REMOVE AND RESET FENCE @ 675 L.F.

STATION TO STATION	LOCATION	REMARKS
20+50 to 23+75	Lt.	Remove/reset 325' barbed wire fence for BNSF service road
26+65.00	Lt. & Rt.	Remove 350' existing barbed wire fence, as necessary for construction activities. Reset fence under new bridge & across the removed bridge location. Tie reset fence onto existing fence.

ITEM 61901-2100 - CHAIN LINK FENCE w/2-12' SWINGING GATE

STATION TO STATION	LOCATION	DESCRIPTION
23+40.00 to 24+90.00	Left	150' Install new chain link fence 2-12' swinging gates
	TOTAL:	299 L.F.

ITEM 62901-1100 - EROSION CONTROL MATTING, TYPE IV

STATION	LOCATION	HEIGHT	LENGTH	2:1Factor	QUANTITY (S.Y.)
21+30 to 23+50	Lt.	17.18 Avg.	220	0.7071	296.86
21+30 to 24+68	Rt.	23.09 Avg.	338	0.7071	613.17
30+15 to 33+60	Lt.	33.46 Avg.	344.77	0.7071	906.35
21+30 to 24+68	Rt.	33.46 Avg.	344.77	0.7071	906.35
				TOTAL:	2,722.73 S.Y.

ITEM 61902-0020 - 24' TURNOUT NO GATE - 7 REQ'D.

STATION	LOCATION	DESCRIPTION
12+30.00	Rt.	Reconstruct 24' turnout
13+66.00	Rt.	Reconstrurt 24' turnout to match existing concrete driveway
14+40.00	Rt.	Reconstruct 24' turnout to match existing concrete driveway
14+50.00	Lt.	Reconstruct 24' turnout to New Lands Office
17+25.00	Lt.	Reconstruct 24' turnout
19+75.00	Rt.	Reconstruct 24' turnout
19+75.00	Lt.	Reconstruct 24' turnout @ 113 degree skew
MAINTENANCE ROAD - 24' TURNOUT NO GATE		
1+35.00*	Lt.	Reconstruct 24' turnout to Old Hwy. 66
5+30.00*	Lt.	Reconstruct 24' turnout to BNSF Service Building
6+35.62*	Lt.	Reconstruct 24' turnout to existing bridge

*Reconstruct maint./detour road turnouts with gravel only

REVISED ON 8/16/2016

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

ESTIMATED QUANTITIES

DRAWN BY: Peterson.Yazzie DATE: 1/28/2013
DESIGNED BY: NRDOT DATE: 1/28/2013
REVISED: 8/16/2016 BY: Gerald.Hood
ANNOTATION SCALE: Full Size 1=1
FILENAME: Sht.4_Est. Quantities.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	5	63

Sta. 0+50 Lt. Existing stop sign to be protected in place.

Sta. 0+80 to Sta. 3+80 Lt. Existing fence on Right-of-Way line protect in place.

Sta. 3+40 Lt. Reconstruct 40' wide turnout @ 90° skew with 50' radius. Remove steel posts and wing fences. CMP replace w/new pipe and end sections.

Sta. 3+68, Existing waterline crossing centerline.

Sta. 3+98, 40' Lt. existing 6" PVC riser (C.O.).

Sta. 6+60, Existing 30" CMP to be remove and replace.

Sta. 6+60 to Sta. 11+00 Lt. Construct special ditch grade as needed to drain from Special Paved Ditch to culvert.

Sta. 8+20, Lt., Obliterate existing turnout.

Sta. 10+90 to Sta. 11+00 Lt. & Rt. Warp 6:1 pavement edge taper to 20:1 to match Special Paved Ditch.

Sta. 0+80 to Sta. 13+50 50' Rt. Existing fence on Right-of-Way line. Protect in place.

Sta. 3+74.71 Existing overhead powerline crossing @ 110° centerline.

Sta. 3+90, Existing buried telephone line crossing centerline.

Sta. 8+27, Rt. Existing turnout reconstruct new 14' Wide Type I gate. Remove existing cattleguard, foundation and existing 18" ø x 50' CSPC. No cattleguard.

Sta. 8+50 to Sta. 11+00 Rt. Construct special ditch grade as needed to drain from Special Paved Ditch to turnout and around the turnout radius to the Right-of-Way line

Sta. 9+43.45 Existing powerline crossing centerline.

Sta. 10+96.26 Existing powerline crossing centerline.

Sta. 0+00.00 Route N2007
℄ I-40 Frontage Road

B.O.P. Station 0+69.88
Existing 5-Units Cattleguard to be Protected in Place

POB Sta0+00.000

Sta0+70.300

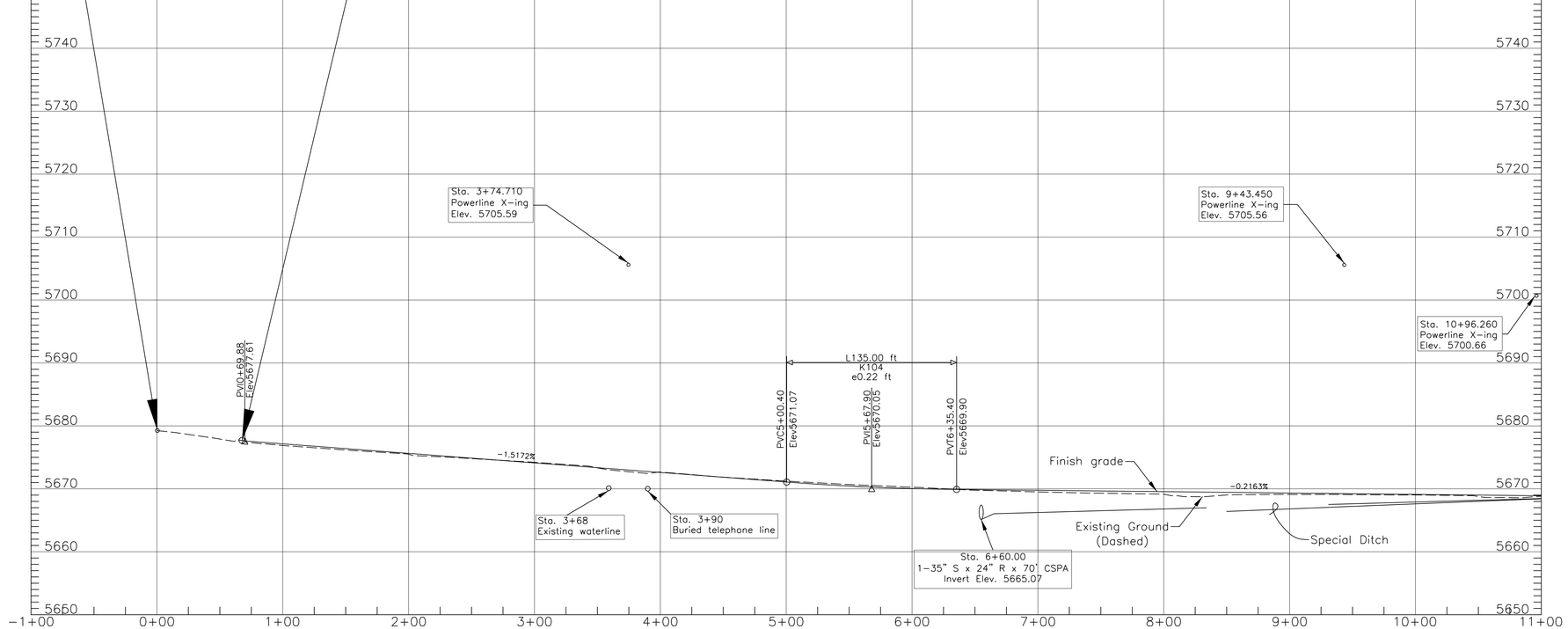
ML Sta 11+00.000 EOP

SCALE
0 50 100 150 200

DELINEATORS		OBJECT MARKER	RIGHT OF-WAY MONUMENTS
Type "1a"	Type "1b"	Type 2	
2	0	2	2

DRAINAGE STRUCTURES

Station	Structure	Skew No.	D.A. (ac.)	Remarks
3+55.00	1-24" x 68' CSPC	90°	N/A	Under T.O.-Lt.,
6+60.00	1-35" S x 24" R x 70' CSPA	90°	N/A	Remove/Salvaged Existing 30" CSPC



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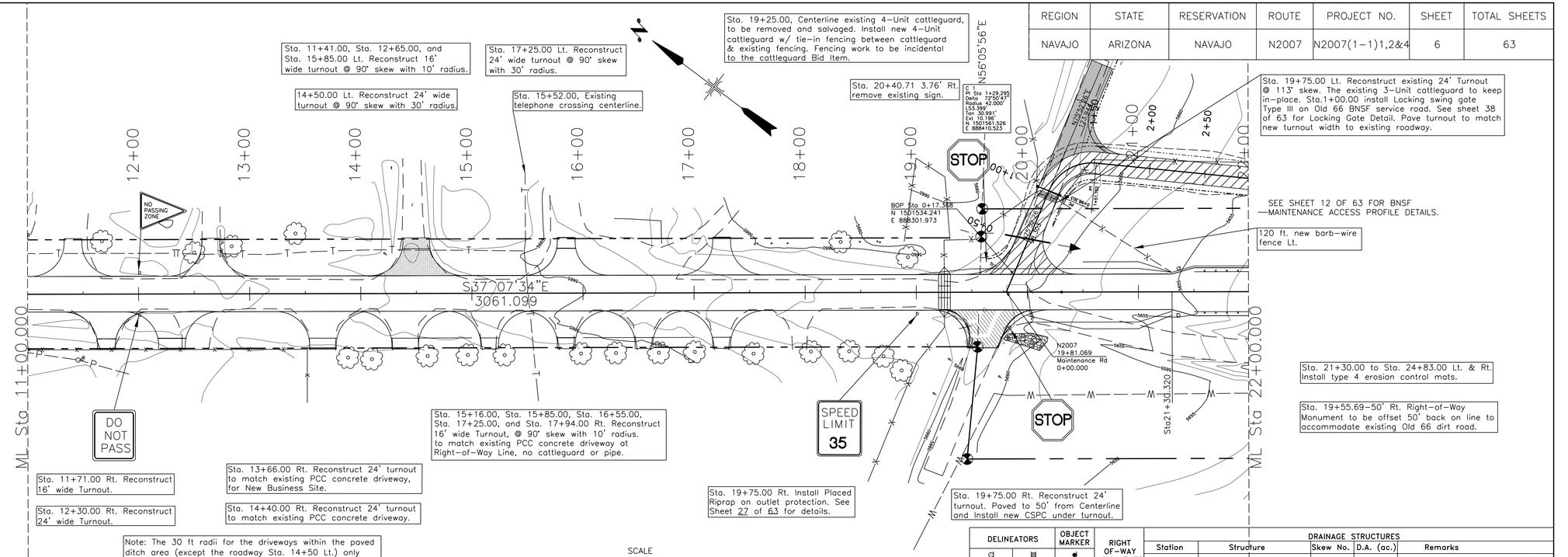
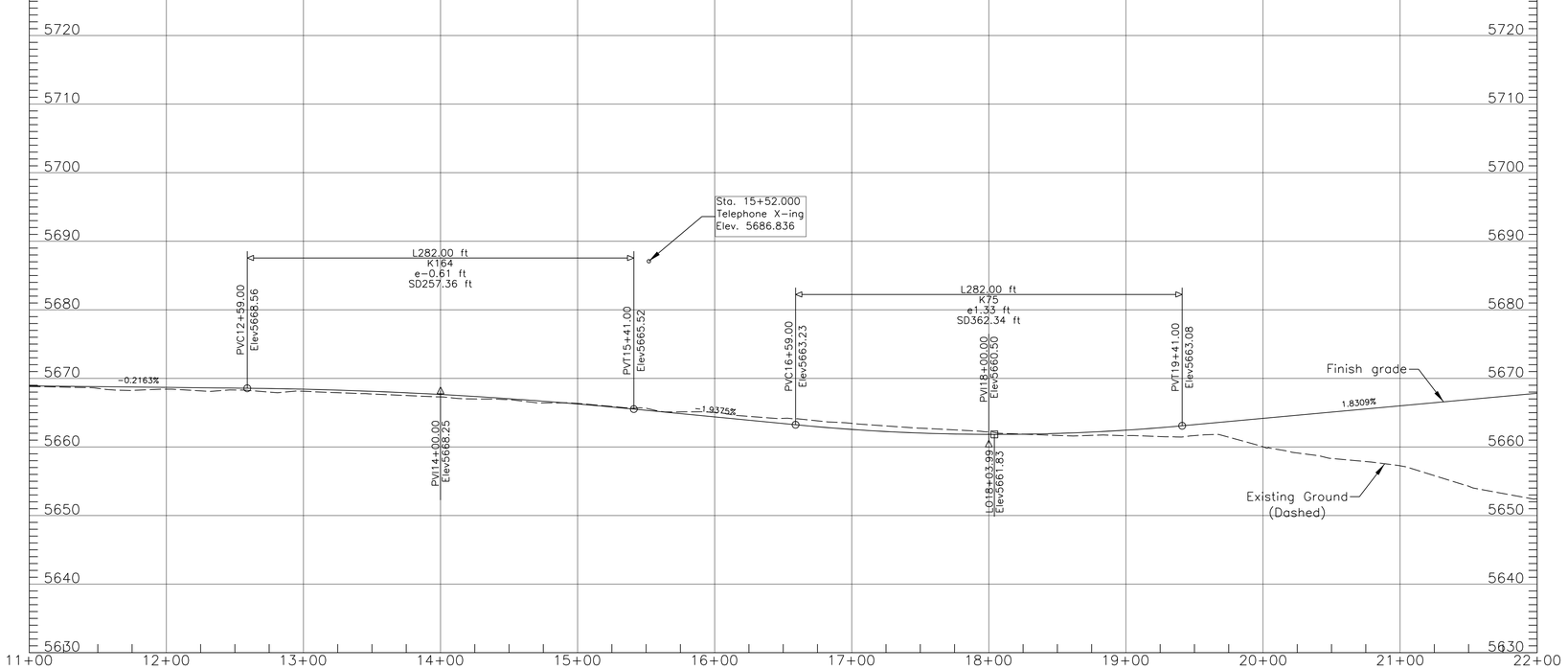
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	6	63



DELINEATORS		OBJECT MARKER	RIGHT OF-WAY MONUMENTS
Type "1a"	Type "1b"	Type 2	
2	0	0	4

DRAINAGE STRUCTURES				
Station	Structure	Skew No.	D.A. (ac.)	Remarks
19+75.00 Rt.	1-24" x 40' CSPC	N/A	N/A	Install CSPC under the turnout with Riprap.
0+50.00 Lt.	1-28" x 20" x 50' CSPA	N/A	2.000	Install new pipe under Turnout to Service Building Road



Revised
12/12/2013

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	7	63

Sta. 20+50.00 to Sta. 25+50.00 Lt. See Sheet 11 of 63 for BNSF fencing modifications.

Sta. 21+30.00 slope paving Lt. & Rt. and from E.O.B. to Sta. 33+60.00 Lt. & Rt. install type 4 erosion control mats.

Sta. 23+50.00 Lt. Building w/utilities to be relocated by others.

Sta. 25+65.00 Lt. Existing railroad crossing with concrete vehicle panels and automatic signals/arms. See Sheet 31 for additional information.

Sta. 26+50.00 to Sta. 30+00.00 Lt. The existing bridge, piers, abutments, approach guardrail, attached waterline, wing tie-fences, and all related structures shall be removed by the Contractor. See bridge General Notes on Sheet B-1 for additional information.

Sta. 31+75.00, 275' Lt. remove and salvage the 2 existing 24" CSPC. Regrade channels thur the obliterated roads as directed by the COTR.

See Sheet 12c of 63 for alignment Change on maintenance road.

Sta. 34+10.00 Centerline buried telephone line.

Sta. 34+50.00, 130' Rt. Remove and salvage the existing 24" CSPC.

Sta. 24+68.00 Rt. Extend existing barbed wire fence and connect to slope paving cut off wall. See Sheet B29 for details.

Sta. 24+15.00, 10 ft. Lt. Existing 2'x3' steel grate with 2-14"x 160' pipe underground to be removed.

Sta. 25+05.00 Rt. Remove ±60' of existing fence.

Sta. 25+95.00 Rt. Remove ±100' of existing fence.

Sta. 26+65.00 Lt. & Rt. Existing borbed wire fence. Remove as necessary for construction activities. Replace fence under new bridge, across location of removed bridge and continue to tie-in with existing fence.

Sta. 31+60.00 Lt., Centerline install new fencing to post behind guardrail at BNSF property line. No cattleguard required.

Sta. 31+60.00 Lt. & Rt. Existing BNSF property barbed wire fence. Remove from ±101' Lt. & ±150' Rt. to the CL of the new road. Replace fencing on BNSF property line from the inner ROW mounment out ±150' Rt. to the new outter ROW mounment and tie in to existing BNSF fence.

DELINEATORS		OBJECT MARKER	RIGHT OF-WAY MONUMENTS
Type "1a"	Type "1b"	Type 2	
0	2	0	11

BNSF FRONTAGE ROAD DRAINAGE STRUCTURES

STATION	STRUCTURE	SKEW	D.A. (Ha)	REMARKS
5+05.00	1- 28" x 20" x 46' CSPA (Left)	00.0	2.000	Install new pipe under turnout to Service Building Road
5+90.00	1- 28" x 20" x 46' CSPA (Left)	00.0	2.000	Install new pipe beneath existing Service road

Revised 8/15/2016

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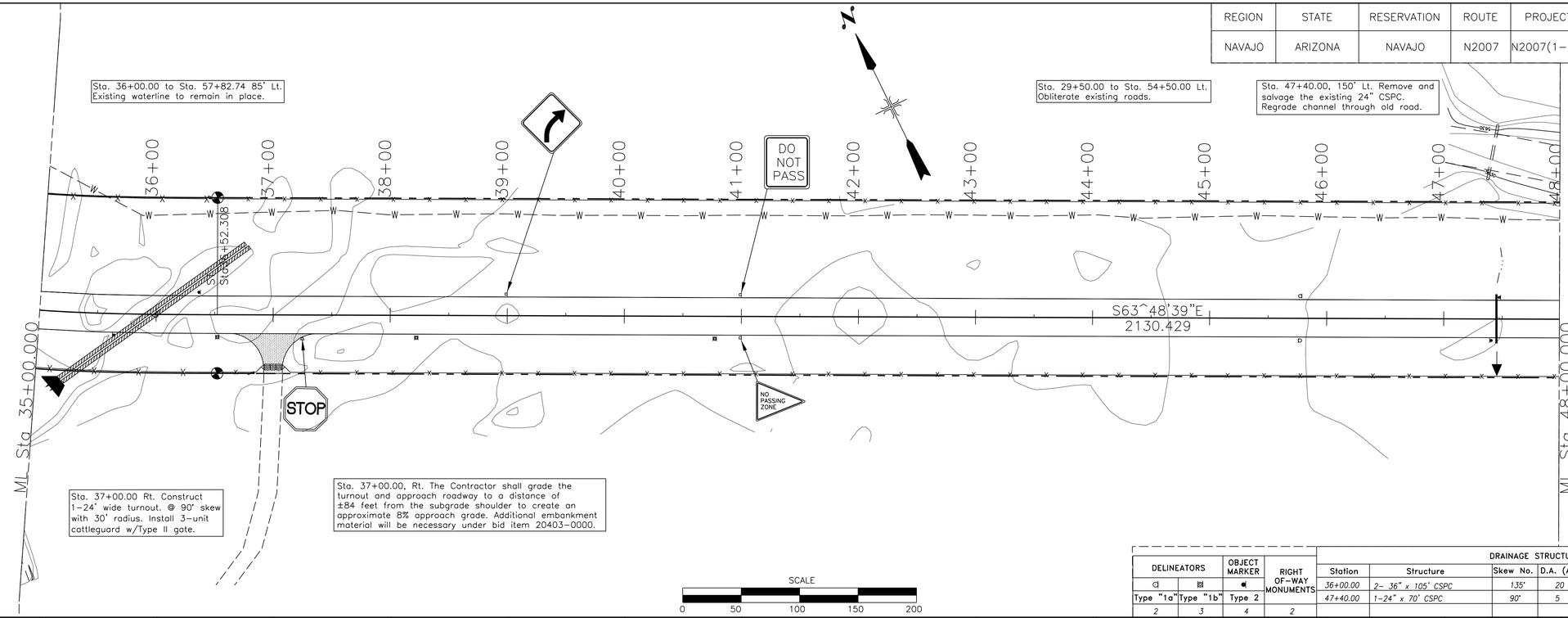
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	8	63

REVISED:8/16/16

Sta. 36+00.00 to Sta. 57+82.74 85' Lt.
Existing waterline to remain in place.

Sta. 29+50.00 to Sta. 54+50.00 Lt.
Obliterate existing roads.

Sta. 47+40.00, 150' Lt. Remove and salvage the existing 24" CSPC. Regrade channel through old road.



Sta. 37+00.00 Rt. Construct 1–24' wide turnout. @ 90° skew with 30' radius. Install 3–unit cattleguard w/Type II gate.

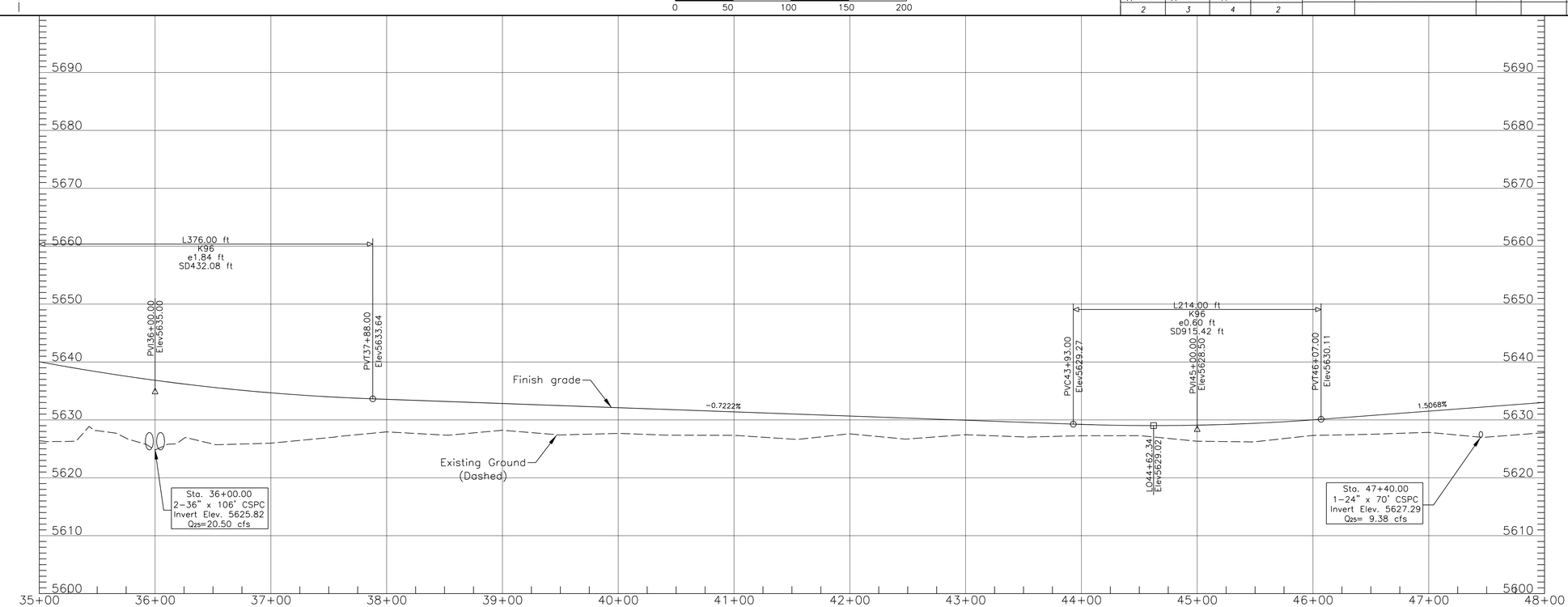
Sta. 37+00.00, Rt. The Contractor shall grade the turnout and approach roadway to a distance of ±84 feet from the subgrade shoulder to create an approximate 8% approach grade. Additional embankment material will be necessary under bid item 20403–0000.

SCALE
0 50 100 150 200

DELINEATORS		OBJECT MARKER	RIGHT OF-WAY MONUMENTS
Type "1a"	Type "1b"	Type 2	
2	3	4	2

DRAINAGE STRUCTURES

Station	Structure	Skew No.	D.A. (Ac.)	Remarks
36+00.00	2– 36" x 105' CSPC	135°	20	with Riprap at outlet
47+40.00	1–24" x 70' CSPC	90°	5	Relief pipe, Reshape drainage



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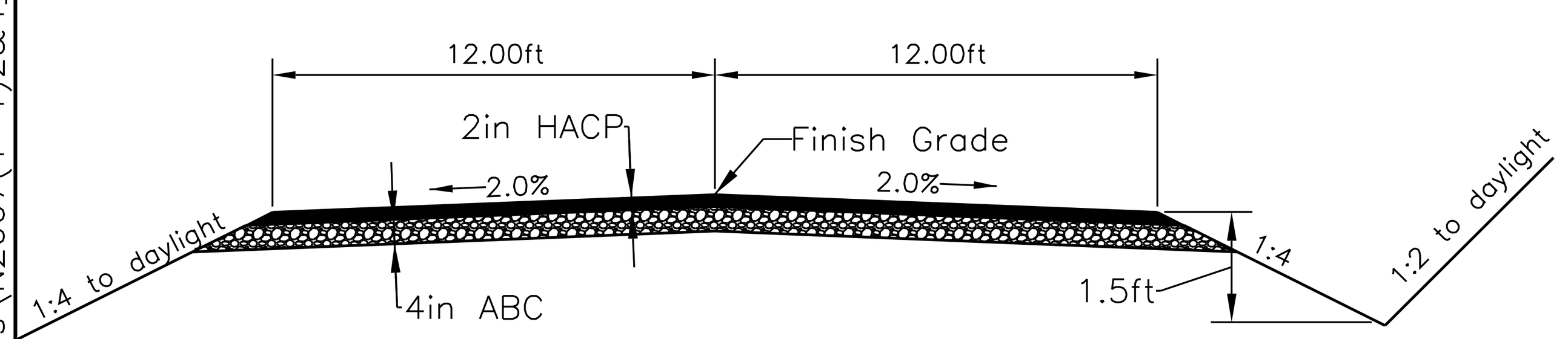
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	8a	63

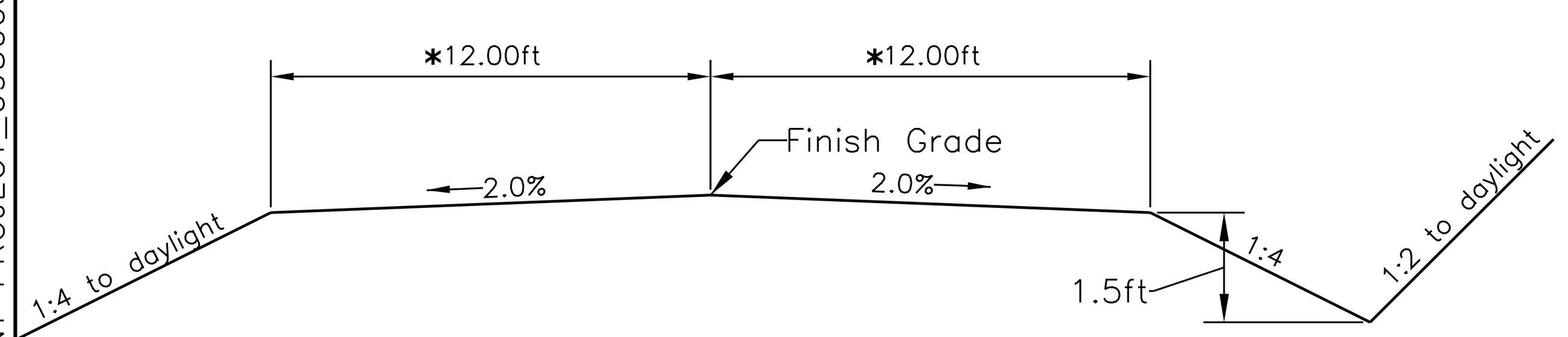
EARTHWORK FOR STA 37+100.00 TURNOUT

Station to Station			Cut (cy)	Fill (cy)	Waste (cy)	Borrow (cy)
0+50.00	to	3+97.77	90.64	480.96	0.00	390.32
		Total	90.64	480.96	0.00	390.32

20% Shrinkage Applied

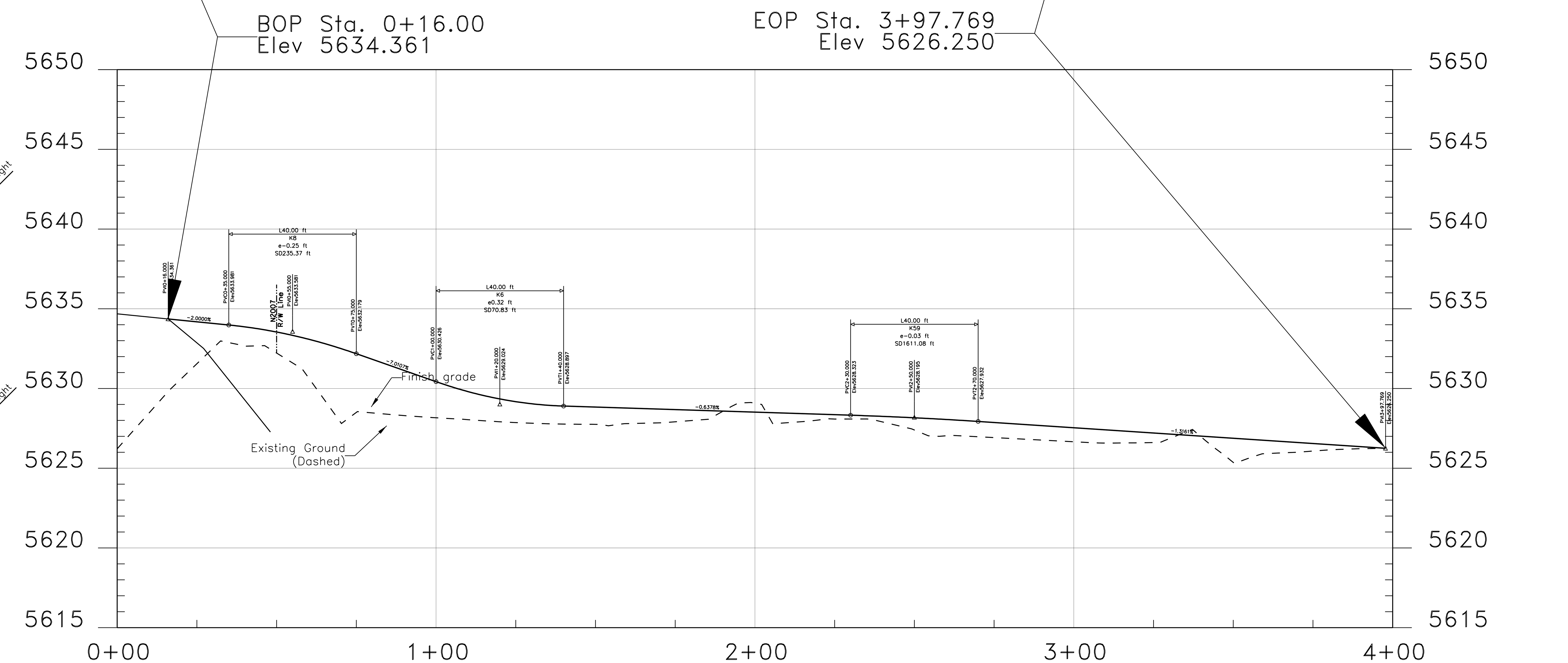


TYPICAL CROSS SECTION
Sta. 0+16.00 to 0+50.00



TYPICAL CROSS SECTION
Sta. 0+50.00 to 3+97.567

*Note: Sta. 0+350.00 to 3+97.537
Taper Roadway Width From
12ft to 9ft Left & Right.



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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	9	63

Sta. 50+30.00 Lt. Remove the existing 24" CSPC and fill excavation.

Sta. 53+50.00 to Sta. 58+40.00 Lt. Grade area from standard ditch flow line location to existing roadway ditch, to drain to the existing ditch. See Sheet 2 for typical section detail.

SPEED LIMIT 35

SPEED LIMIT 45

ML Sta 48+00.000

49+00 50+00 51+00 52+00 53+00 54+00 55+00 56+00 57+00 57+83 58+00 59+00

Sta. 57+82.74 E.O.P. Centerline
Install new 4-unit Cattleguard.
Fence shall be tied to new cattleguard.

Sta. 55+33.87 Existing overhead powerline crossing centerline.

CP 3
X=891675.019
Y=1499292.733
Z=5648.789

CP 4
X=891746.962
Y=1499007.058
Z=5648.549

SCALE
0 50 100 150 200

EOP. Sta.57+82.74
END OF PAVEMENT

DELINEATORS		OBJECT MARKER	RIGHT OF-WAY MONUMENTS
Type "1a"	Type "1b"	Type 2	
4	0	0	2

Sta. 57+82.74 to Sta. 58+40.00 Lt. & Rt. Taper new roadway template to existing 28 ft. wide asphalt roadway. Sawcut Existing Pavement, Grade and shape ditch line tie in as needed for drainage.

Sta. 55+33.870
Powerline X-ing
Elev. 5669.450

L150.00 ft
K204
e-0.14 ft
SD349.98 ft

PVC54+25.00
Elev5642.44

PVI55+75.00
Elev5644.15

PVI55+00.00
Elev5643.57

1.5068%

0.7717%

Finish grade

Existing Ground
(Dashed)

5700 5690 5680 5670 5660 5650 5640 5630 5620 5610

48+00 49+00 50+00 51+00 52+00 53+00 54+00 55+00 56+00 57+00 57+83 58+00 59+00

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	10	63

N2007 HORIZONTAL ALIGNMENT TABLE REPORT *

Point Type	Station	Direction	Style:	Northing	Easting	Radius	Length	Delta / Theta	Rotation Direction
POB	00+00.000		Tangent	1,503,109.49	887,089.42				
TS	30+61.099	S37°07'34"E	Tangent	1,500,668.85	888,937.01				
TS	30+61.099	S37°07'34"E	Clothoid	1,500,668.85	888,937.01				
SPI	32+01.220		Clothoid	1,500,557.13	889,021.59		210.00	7°21'00"	Left
SC	32+71.099		Clothoid	1,500,507.11	889,070.71				
SC	32+71.099		Arc	1,500,507.11	889,070.71				
PI	33+57.017		Arc	1,500,445.80	889,130.90	818.51	171.21	11°59'05"	Left
CC			Arc	1,501,080.57	889,654.75				
CS	34+42.308	S63°48'39"E	Arc	1,500,398.33	889,202.52				
CS	34+42.308		Clothoid	1,500,398.33	889,202.52				
SPI	35+12.418		Clothoid	1,500,359.59	889,260.95		210.00	7°21'00"	Left
ST	36+52.308		Clothoid	1,500,297.75	889,386.69				
ST	36+52.308	S63°48'39"E	Tangent	1,500,297.75	889,386.69				
POE	57+82.737		Tangent	1,499,357.52	891,298.41				

* SPC-NAD83-AZ-E
CSF: 1.0003293134 (0.9996708050) INTERNATIONAL SURVEY FOOT

N2007 FRONTAGE ROAD ALIGNMENT *

DESCRIPT	STATION	DIRECTION	NORTHING (ft)	EASTING(ft)
POB	0+00.000	N 75°52'26" E	1,501,529.971	888,285.138
PC	0+98.303	N 75°52'26" E	1,501,553.962	888,380.469
PI	1+29.295	S 31°16'47" E	1,501,561.526	888,410.523
PT	1+51.702	S 31°16'47" E	1,501,535.039	888,426.614
PC	5+96.511	S 31°16'47" E	1,501,154.886	888,657.566
PI	6+25.054	S 55°52'03" W	1,501,130.493	888,672.385
PT	6+42.141	S 55°52'03" W	1,501,114.478	888,648.760
POE	9+13.599	S 55°52'03" W	1,500,962.160	888,424.063

N2007 CONTROL POINTS *

N2007 NEW REVISE CONTROL (SHIFT) INT-FEET LOCAL COORDINATES 12-09-2016

POINT	NORTH	EAST	ELEVATION	CODE
NBASE	1501393.340	888214.030	5655.770	SCP4
NMARTY	1502113.520	889430.090	5664.460	MARTY
NPCP1	1503017.520	887096.070	5676.610	PCP1
NPCP2	1501011.640	888367.970	5634.790	PCP2
NPCP3	1501074.530	888810.330	5631.410	PCP3
NPCP4	1500865.100	889103.230	5628.660	PCP4
NPCP5	1500596.140	888842.100	5629.570	PCP5
NPCP6	1499006.640	891747.900	5648.770	PCP6
DNU NPI	1500430.000	889117.870	5627.280	DNU PI 3+360.70
NSCP1	1502554.100	887572.440	5668.230	SCP1
NSCP2	1502171.670	887741.100	5669.120	SCP2
NSCP3	1501597.570	888282.070	5660.550	SCP3
DNU NSCP	1501285.480	888337.330	5653.900	DNU SCP4
NSCP5	1500201.780	889430.020	5628.270	SCP5
NSCP6	1500097.980	890028.060	5627.890	SCP6
NSCP7	1499681.690	890491.600	5629.300	SCP7
NSCP8	1499514.790	891136.100	5646.660	SCP8
NSCP9	1499192.120	891504.630	5648.850	SCP9

** UTILITY CROSSING INFORMATION

STATION	DESCRIPTION	LOCATION	DEPTH	HEIGHT	SKEW	OWNER	REMARKS
1+10.00	Power pole with anchor	50' Left	–	–	–	Navajo Tribal Utility Authority	To Remain in Place
3+68.00	Water Line	CL	3 ft.	–	90°	Navajo Tribal Utility Authority	To Remain in place
3+74.71	Power Line	CL	–	20 ft.	110°	Navajo Tribal Utility Authority	To Remain in Place
3+90.00	Telephone Line	CL	–	–	–	Unknown	To Remain in Place
3+95.00	Power pole	47' Left	–	–	–	Navajo Tribal Utility Authority	To Remain in Place
3+98.00	6-inch PVC Riser	40' Left	–	–	–	Navajo Tribal Utility Authority	To Remain in Place
9+43.45	Power Line	CL	–	20 ft.	90°	Navajo Tribal Utility Authority	To Remain in Place
10+96.26	Power Line	CL	–	20 ft.	90°	Navajo Tribal Utility Authority	To Remain in Place
15+52.00	Telephone Line	CL	–	–	–	Casing may be required	To be relocate by owner
25+00 to 32+00	Water line	Lt. & Rt.	Varies	–	–	Navajo Tribal Utility Authority	To be relocate by owner
25+20.00	Signal control panel and battery box	30', left	–	–	–	BNSF	To Remain In Place
33+40 – 34+40	Buried Telephone Line	Lt. & Rt.	–	–	60°	Table Top Telephone Co.	To Remain In Place
35+50 to 57+83	Water Line	85' Left	3 ft.	–	–	Navajo Tribal Utility Authority	To Remain In Place
55+31.00	Power Line	CL	–	20 ft.	100°	Navajo Tribal Utility Authority	To Remain In Place

** Remarks related to work by owners is work to be required by B.I.A. for Construction of Roadway and Structures. Actual work required / performed by utility owner(s) may vary.

REVISED ON
01/10/2017

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

ALIGNMENTENT TABLE AND CONTROL POINTS AND UTILITY CROSSING

DRAWN BY: Peterson.Yazzie DATE: 5/3/2010
DESIGNED BY: NRDOT DATE: 5/3/2010
REVISED: 01/10/2017 BY: Peterson.Yazzie
ANNOTATION SCALE: 1:10
FILENAME: Sht.10_Alignment Table.dgn

J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	11	63

BNSF FRONTAGE ROAD

DRAINAGE STRUCTURES

STATION	STRUCTURE	SKEW No.	D.A. (Ha.)	REMARKS
0+50.00	1- 28" x 20" x 50' CSPA (Left)	00.0	2.000	Install new pipe under turnout to Service Building Road
5+05.00	1- 28" x 20" x 46' CSPA (Left)	00.0	2.000	Install new pipe under turnout to Service Building Road
5+90.00	1- 28" x 20" x 46' CSPA (Left)	00.0	2.000	Install new pipe under turnout to existing Service road

60801-0500 PAVED WATERWAY, TYPE 5

STATION to STATION	LENGTH(ft)	WIDTH(ft)	VOLUME(sf)
5+90 -8+32	242	3.5	847
		TOTAL:	847

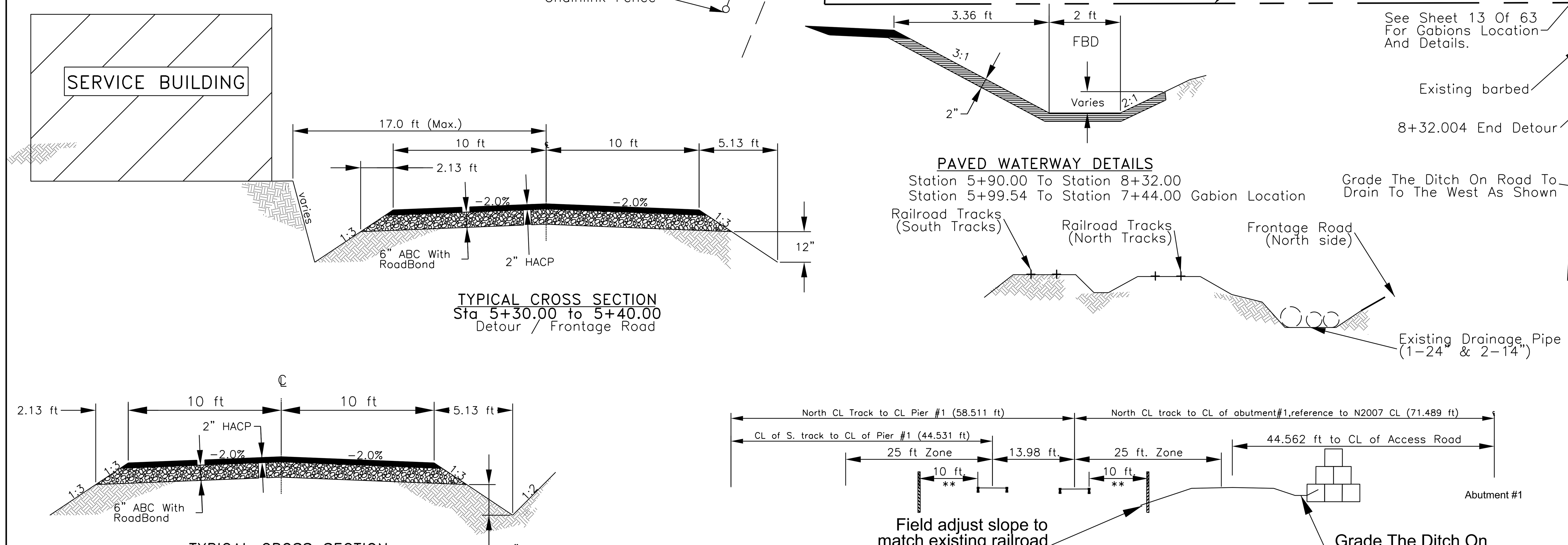
*Sta. 23+30 To *Sta. 24+90 Lt, Remove *270' Of Existing Chain Link Fence Including 2 Swing Gates. Reset Fencing/Gates As Temporary Chain Fencing At Location Shown. Construct Temporary Steel Posts Installations As Directed By COR/AOTR To Provide Security And Working Gates For BNSF.

P L A N

NOTES
1. BEFORE CONSTRUCTING THE DETOUR/FRONTAGE ROAD AND RETAINING WALL, THE CONTRACTOR SHALL RELOCATE THE CHAINLINK BOUNDARY FENCE AS SHOWN AND AS DIRECTED BY AOTR/COR. THE CONTRACTOR SHALL REMOVE AND SALVAGE THE EXISTING CHAINLINK FENCE AND GATE FROM THE WEST END OF THE YARD AND CONSTRUCT THE CHAINLINK FENCE AND GATE ADJACENT TO THE SERVICE BUILDING AS SHOWN. SEE PLAN VIEW NOTE.

2. ANY EXISTING RAILROAD COMMUNICATION LINES AND POLES THAT ARE AFFECTED BY CONSTRUCTION WILL BE REMOVED AND RELOCATED BY THE BNSF RAILWAY COMPANY.

3. ADDITIONAL FENCES FOR PROTECTION OF RAILROAD PROPERTY AND SAFETY BARRIERS FOR PROTECTION OF PUBLIC TRAFFIC SHALL BE ERECTED AS DIRECTED BY THE COR/AOTR.



TYPICAL CROSS SECTION
Sta 5+30.00 to 5+40.00
Detour / Frontage Road

TYPICAL CROSS SECTION
Sta 0+17.368 to 5+60.000
Note: Sta 5+60.00 to 5+90.00 Roodway Width Transition
Detour / Frontage Road

Note: The Contractor Shall Provide Drainage Ditches As Directed By COR/AOTR To Protect Railroad Property From Damage Caused By Surface Water Runoff.

**HDPE Temporary Protection Fence Can be placed 10 ft. from the center of the outer rail in accordance with BNSF "Foul of Track" Zone requirements where flaggers may not be required. The Contractor must request to BNSF for the "Foul of Track" Zone requirements to be allowed.

TYPICAL CROSS SECTION
Sta 6+81.33
Note: Sta 5+60.00 to 5+90.00 Roadway Width Transition Frontage Road Under The Bridge

REVISED ON 8/15/2016

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

FRONTAGE AND DETOUR BYPASS ROAD DETAILS

sgfhdfnh

DRAWN BY: DESIGN2	DATE: 2/24/05
DESIGNED BY: B.O.R.	DATE: 2/24/05
REVISED: 08/15/2016	FILENAME: Maint-detour.dgn
BY: DESIGN2	SCALE: NTS

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	12	63

C 1
PI Sta 1+29.295
Delta 72°50'47"
Radius 42.000'
L53.399'
Tan 30.991'
Ext 10.196'
N 1501561.526
E 888410.523

C 2
PI Sta 6+25.054
Delta 87°08'50"
Radius 30.000'
L45.630'
Tan 28.542'
Ext 11.408'
N 1501130.493
E 888672.385

Offset -200.00' Lt.
N 1501661.8133
E 888436.1508

Maintance Road
BOP Sta 0+17.382
N 1501534.213
E 888301.994

N2007
19+81.069
Maintenance Rd
0+00.000
N 1501529.971
E 888285.138

Scale: 1" = 50'

Temporary Construction Easement (200 ft Rt.)

Temporary Construction Easement

BNSF R/W LINE 100' Lt.

BNSF R/W LINE 100. Rt.

14' Turnout

Contractors will place permanent concrete jersey barriers across the existing bridge approach on North side Sta 26+50 Lt. see sheet 16 of 63 for detail.

Existing Railroad Crossing Signal Gate

Existing Bridge

Approved Right-Of-Way Line (50 ft Lt.)

Approved Right-Of-Way Line (75 ft Rt.)

Proposed 20' Turnout

Proposed Retaining Wall

N2007 Centerline

S37°07'34"E
3061.099'

Existing 2'x3' grate with 2-14"x160' pipe

Existing Railroad Crossing Signal Gate

7+00
N2007
25+29.770
Maintenance Rd
6+81.334
N 1501092.486
E 888616.318

Proposed Gabion Wall

Bridge Abutment Sta 24+83.00

Approved Right-Of-Way Line (150 ft Lt.)

1104.467 ft
S37°07'34"E

Maintenance Road
EOP Sta 8+32.004
N 1501007.944
E 888491.603

POE 9+13.599

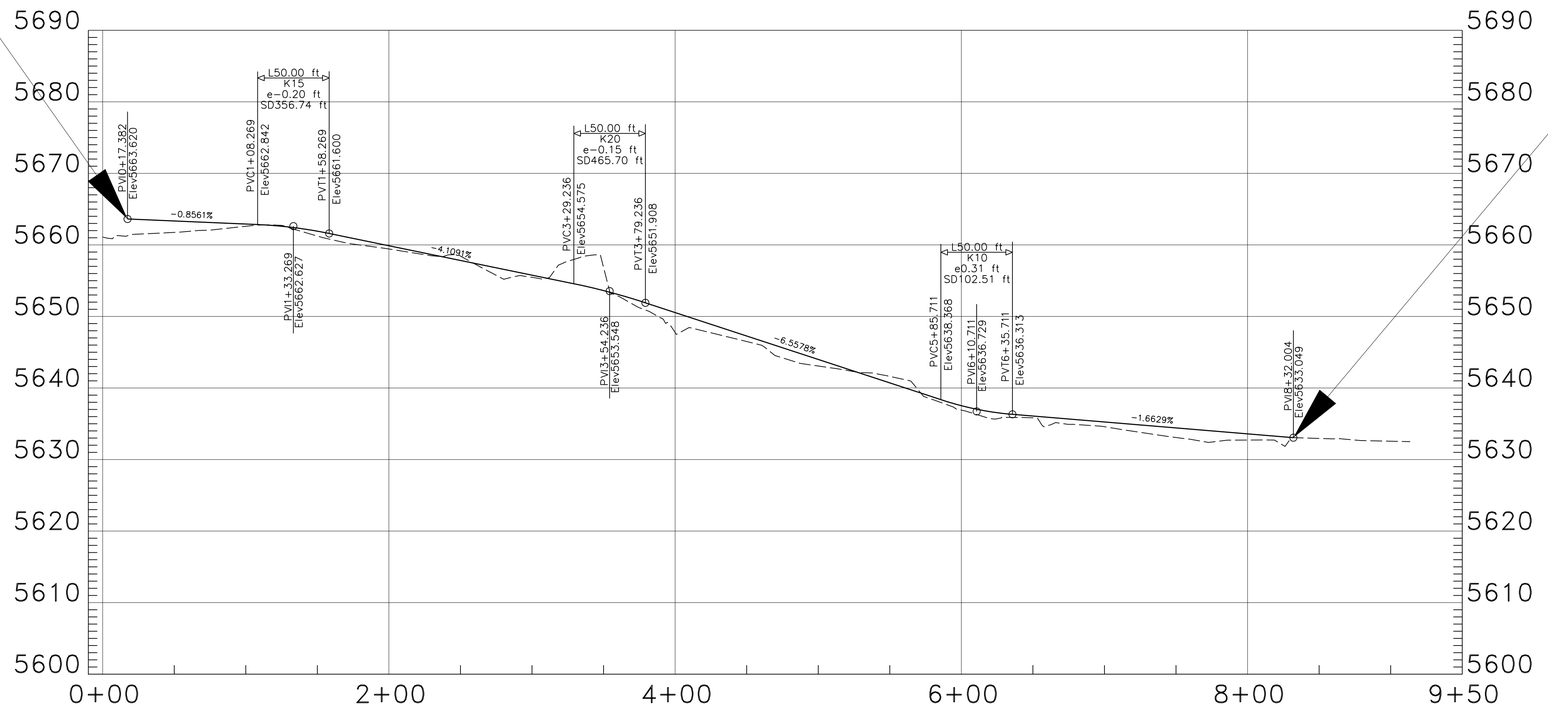
C1
Delta = 72°50'47" Rt.
Deg. = 136°25'07"
R = 42.000 (ft)
L = 53.399 (ft)
T = 30.991 (ft)
e = 10.196 (ft)

C2
Delta = 87°08'50" Rt.
Deg. = 190°59'09"
R = 30.000 (ft)
L = 45.630 (ft)
T = 28.542 (ft)
e = 11.408 (ft)

NOTE: CONTOUR LINES REFLECT POST-CONSTRUCTION

B.O.P.
STA.0+17.38
[FRONTAGE ROAD]

E.O.P.
STA.8+32.00
[FRONTAGE ROAD]



LEGEND

- Existing Railroad X-ing Signal Gate
- Existing Waterline Valve
- Existing Traffic Signs
- Concrete Pad At Railroad X-ing
- Waterline
- Fence
- Existing Road
- Right-Of-Way Line
- Temporay Construction Easement
- Proposed Roadway CL
- Railroad Tracks
- Existing Ditch Bottom
- Existing Guardrail
- Telephone Line
- Existing Concrete Pipe With Headwalls
- Flow or Drainage Line

Revised: 8/08/2017
See sheets 12A thru C
for revised design data

Y:\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Final Plans 02-28-18\Sht 12_N2007(1-1)Maint. Rd. Plan-Profile rev081716.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1)1,2&4	12A	65

BNSF YARD EARTHWORK

Remarks	CUT (cu/yd)	Fill (cu/yd)	Borrow (cu/yd)	Waste (cu/yd)**
BNSF Yard	1,445.00	0.00		1,445.00
Minus 3" Gravel	−155.00			
3' x variable base Dike	0.00	449.00	449.00	
Total	1,290.00	449.00		841.00

15% Shrinkage factor applied to fill
** NOTE: Access waste shall be used for widening the N2007 Mainline Embankment

HORIZONTAL ELEMENT TABLE

CURVE TABLE

Name	Radius	Arc Length	Chord Length	Tangent Length	Middle Ordinate	External Distance	Chord Direction
C1	75	85.207	80.698	47.866	11.779	13.973	N 88°43'58" W
C2	75	38.741	38.312	19.813	2.488	2.573	N 41°23'17" W

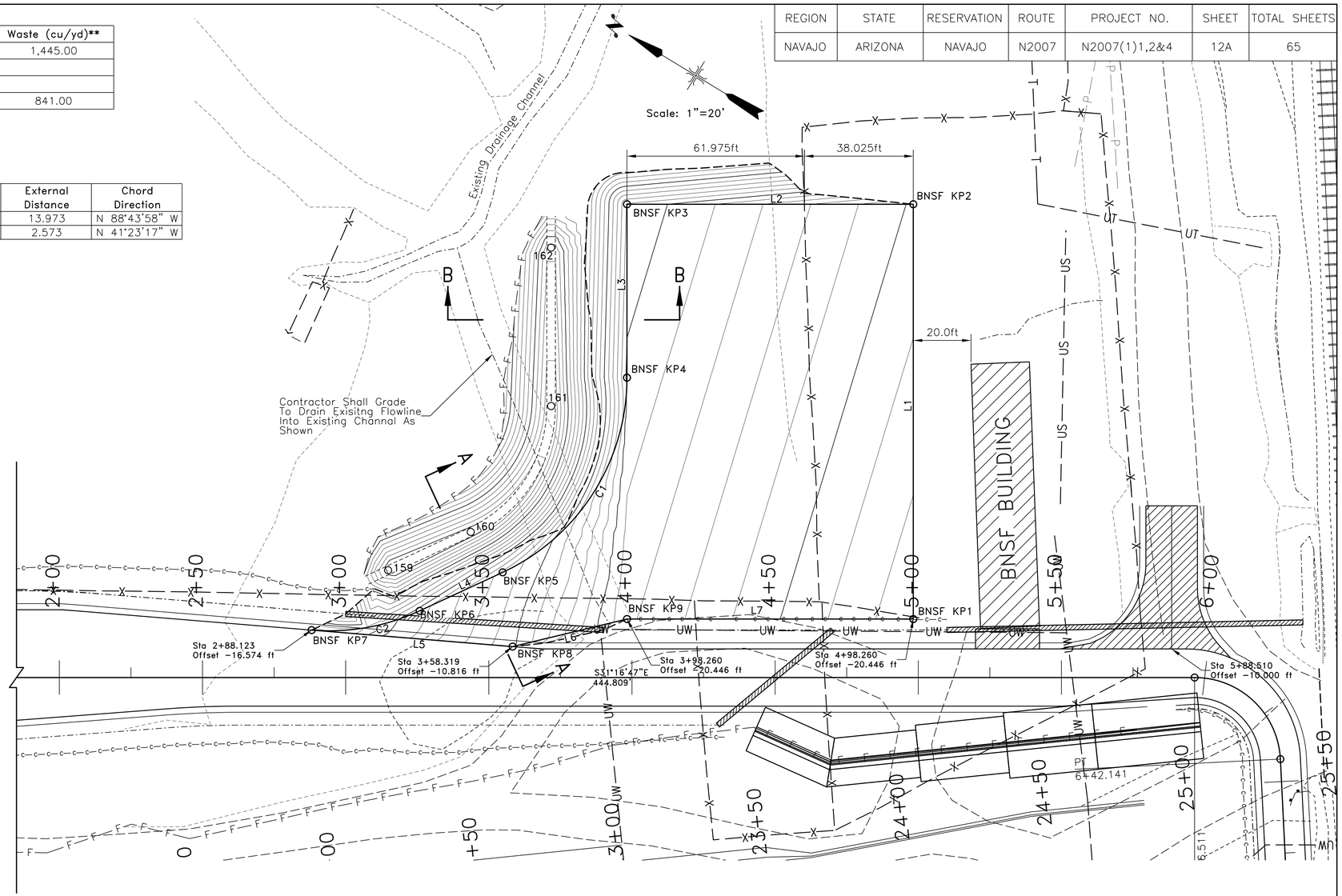
LINE TABLE

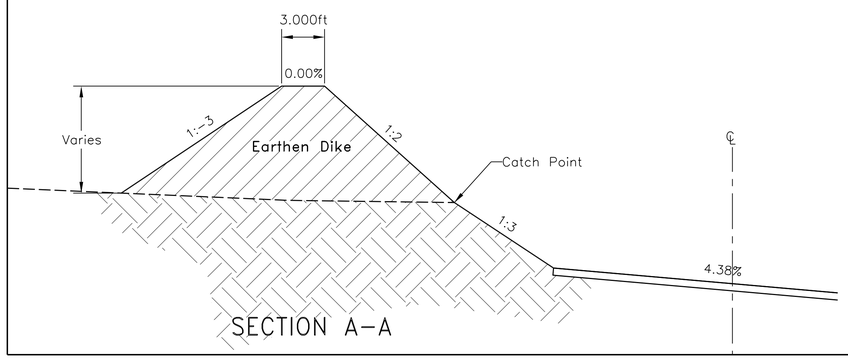
Name	Length	Direction
L1	144.947	N 58°43'13" E
L2	100	N 31°16'47" W
L3	60.602	S 58°43'13" W
L4	31.98	N 56°11'10" W
L5	70.432	S 26°35'23" E
L6	41.086	S 56°11'10" E
L7	100	S 31°16'47" E

POINT TABLE

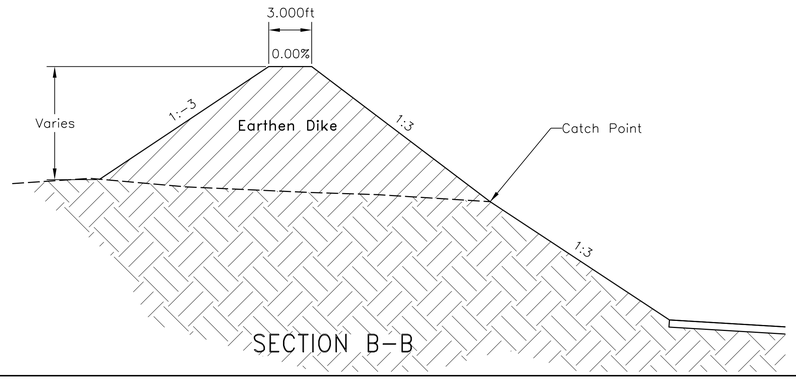
Point	Northing	Easting	Elevation
BNSF KP1	1,501,249.472	888,624.026	5,643.606
BNSF KP2	1,501,324.730	888,747.904	5,644.926
BNSF KP3	1,501,410.195	888,695.983	5,647.925
BNSF KP4	1,501,378.729	888,644.190	5,647.373
BNSF KP5	1,501,380.514	888,563.511	5,650.860
BNSF KP6	1,501,398.310	888,536.941	5,652.169
BNSF KP7	1,501,427.054	888,511.611	5,653.754
BNSF KP8	1,501,364.071	888,543.136	5,650.100
BNSF KP9	1,501,334.936	888,572.105	5,646.606
159 (Top of Dike)	1,501,415.085	888,543.344	5,657.609
160 (Top of Dike)	1,501,397.379	888,569.778	5,657.551
161 (Top of Dike)	1,501,396.225	888,621.950	5,656.730
162 (Top of Dike)	1,501,424.979	888,669.279	5,655.650

SEE SHEET 12B FOR GENERAL NOTES





SECTION A–A



SECTION B–B

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

N2007 BNSF ACCESS ROAD & YARD DESIGN LAYOUT & GRADING PLAN

DRAWN BY: NRDOT	DATE: 7/31/2017
DESIGNED BY: NRDOT	DATE: 7/31/2017
REVISED: 8/21/2017	BY: Leroy.Toledo
Sht 12A N2007 BNSF Yard.dgn	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1)1,2&4	Mod-8	14

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. THE CONSTRUCTION OF THE BNSF YARD WIDDENING SHALL BE IN ACCORDANCE WITH THE N2007(1-1) CONTRACT A16V00510 DOCUMENTS AND THESE DETAILS AND THE APPROPRIATE UNIT BID PRICES.
3. THE DESIGN FEATURES INCLUDING HORIZONTAL AND VERTICAL ALIGNMENTS, TYPICAL SECTIONS, AND OTHER DESIGN DETAILS SHOWN SHALL NOT BE ALTERED OR MODIFIED IN ANY WAY DURING CONSTRUCTION WITHOUT THE EXPRESSED, WRITTEN DIRECTION AND WRITTEN APPROVAL OF THE AWARDING OFFICIAL, 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 15 FEET FROM THE LOCATIONS SHOWN ON THE PLANS WITHOUT THE WRITTEN APPROVAL OF THE AWARDING OFFICIAL AND BNSF.
4. IT IS ASSUMED THAT BNSF WILL REMOVE ALL MATERIALS, STRUCTURES, AND EQUIPMENT (NOT ALREADY CALLED FOR IN THE ORIGINAL DESIGN PLANS) OUT OF THE WAY OF THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND EXPENSE FOR DISPOSAL OF THE CONTRACTORS CONSTRUCTION DEBRIS IN ACCORDANCE WITH SECTIONS 107 AND 203 OF THE FP-03 AS WELL AS ACQUIRING ANY AND ALL PERMIT REQUIREMENTS. THIS WORK SHALL BE AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.
5. THE CONTRACTOR IS REQUIRED TO SUBMIT A REVISED PIPE LIST TO THE NRDOT PLANNING & DESIGN BRANCH CHIEF THROUGH THE CONTRACTING OFFICIAL, BASED ON THE FIELD STAKING IN ACCORDANCE WITH SECTION 152 OF THE CONTRACT SUPPLEMENTAL SPECIFICATIONS. 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 CIRCUMSTANCE SHALL ANY DRAINAGE STRUCTURE(S) BE INSTALLED BELOW THE NATURAL FLOW LINE OF THE WASH, CHANNEL, ARROYO, OR DITCH LINE.
6. NO WORK SHALL BE PERFORMED OR GROUND DISTURBED OUTSIDE OF THE DESIGNATED CONSTRUCTION LIMITS IN ACCORDANCE WITH SECTION 107.02 OF THE FP-03 WITHOUT WRITTEN APPROVAL BY THE BIA, AWARDING OFFICIAL AND BNSF, UNLESS SPECIFICALLY NOTED/LABLED ON THE PLANS AS "CONSTRUCTION WORK ZONE". UNLESS NOTED OTHERWISE, THE CONSTRUCTION LIMITS ARE THE EARTHWORK CUT / FILL LIMITS PLUS 3 METERS, NOT TO EXCEED THE R.O.W. LIMITS OF BNSF OR GOVERNMENT. WORK LIMITS AT DRAINAGE STRUCTURES, R.O.W. MARKERS, ETC, WILL BE APPROVED BY THE AWARDING OFFICIAL,BNSF, AND THE NRDOT THROUGH THE AOTR.
7. THE QUANTITIES SHOWN ARE ESTIMATES ONLY. ACTUAL PAY QUANTITIES WILL BE DETERMINED IN THE FIELD FOR AUTHORIZED CHANGES THAT AFFECT THE QUANTITIES. PAYMENT SHALL BE PER THE A16V00510 CONTRACT DOCUMENTS.
8. ALL TURNOUTS/DRIVEWAYS, AS CALLED FOR ON THESE PLANS, SHALL EITHER BE. CONSTRUCTED, REBUILT, RESHAPED AND/OR REMOVED UP TO THE RIGHT-OF-WAY LIMITS UNLESS SHOWN OTHERWISE IN THE PLANS. REQUIRED GRADING, SHAPING, AND EARTH COMPACTION OUTSIDE OF THE RIGHT-OF-WAY TO CONNECT NEW TURNOUTS TO THE EXISTING ROADWAY/DRIVEWAY/YARD (AS SHOWN ON THE PLANS OR AS DIRECTED BY THE AOTR) SHALL BE INCIDENTAL TO BID ITEMS SHOWN.
9. STRUCTURAL EXCAVATION AND BEDDING/BACKFILL OF ALL DRAINAGE STRUCTURES SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE STRUCTURES. BEDDING AND BACKFILL MATERIAL SHALL MEET ALL REQUIREMENTS OF FP-14, SECTIONS 209 AND 704. APPROVED EXCESS EXCAVATION MATERIAL MAY BE USED TO REBUILD TURNOUTS, AND EARTHEN DITCH BLOCKS, AND/OR PLACED ALONG ROADWAY SHOULDERS AS EMBANKMENT IN AREAS ADJACENT TO THE REMOVAL AND AS DIRECTED BY THE AOTR.
10. ALL DIKES AND DRAINAGE DITCHES SHALL BE STAKED AND GRADED TO DRAIN TO THE RIGHT-OF-WAY LIMITS OR AS SHOWN ON THESE PLANS. THIS WORK SHALL BE INCIDENTAL TO BID ITEMS UNDER SECTIONS 204, 602, 603, AND 607.
11. THIS BNSF YARD LAYOUT WAS DONE AS AN INKIND SERVICE TO BNSF. THEREFORE, THE GOVENMENT DOES NOT ASSUME RESPONSIBILITY OR LIABILTY FOR THE OUTCOME OF THE DESIGNS OR THE MODIFICATION WORK IN CARRYING OUT THESE REVISIONS TO THE BNSF YARD AND ACCESS ROAD. BNSF ASSUMES ALL RESPONSIBILITY, ALONG WITH ANY CURRENT AND FUTURE MAINTENANCE FOR THE YARD WIDDENING AND ACCESS ROAD TO THE BNSF YARD AND RAILROAD TRACKS. THIS INCLUDES ANY ENVIRONMENTAL AND ARCHAEOLOGICAL DISCOVERIES WHILE CARRYING OUT SUCH WORK ON BNSF PROPERTY.

MAINTENANCE ACCESS ROAD EARTHWORK

Sta. to Sta.	CUT (cu/yd)	Fill (cu/yd)	Borrow (cu/yd)	Waste (cu/yd)**
0+18.00 to 1+21.39	49.00	49.00	0.00	0.00
1+21.39 to 8+32.00	1,596.00	34.00	0.00	1,562.00
Total	1,645.00	83.00	0.00	1,562.00

20% Shrinkage factor applied to fill

** NOTE: Access waste shall be used for N2007 Mainline Embankment.

BNSF Revised Access & Yard RFP

BID ITEM	DESCRIPTION	QUANTITY	UNTS	UNIT PRICE	TOTAL PRICE	REMARKS
20401-1000	Roadway excavation BNSF yard	1290	CY	$Contract Price	$Contract Price	grading the existing yard to the north 62 Feet from existing fence at contract price
20410-3000	Earthen Dike with 3ft top and variable base & height	163	ft	$	$	The excavation material from the yard will be used to build the dike above the yard widdening
30100-3500	Gravel, 3" thick, 1/2 minus size	95	Ton	$	$	gravel for yard widening
60202-6000	21" x 15" CSPA	84	ft	$	$	replaces the 28x20 CSPA under turnout to access road
60201-0800	24" CSPC	78	ft	$Contract Price	$Contract Price	this pipe replaces the one called for in the plan at a new length & station of 19+64 Rt at contract price
60202-6001	21" x 15" CSPA	90	ft	$	$	new pipe added under the BNSF access road sta 3+45 lt new turnout to yard
60202-6002	21" x 15" CSPA	52	ft	$	$	new pipe added under the BNSF access road sta 4+50 Cl
60202-6003	21" x 15" CSPA	124	ft	$	$	new pipe added under the BNSF access turnout to building and existing road alond RR tracks sta 5+72 Lt
15201-1000	Additional survey staking for yard work	LS	All Req'd			additional survey work for yard
61903-0800	25 foot type III Locking Closure Gate	1	Each	$	$	this gate will replace the 18 foot gate as shown in the design plans and bid schedule
	Note: earthwork will be paid for under the contract bid items for such work					
	draiange structures as called for in the contract shall be at the unit price given					
				Total Cost	$	

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

N2007 BNSF ACCESS ROAD & YARD GENERAL NOTES

DRAWN BY: NRDOT	DATE: 8/1/2017
DESIGNED BY: NRDOT	DATE: 8/1/2017
REVISED: 8/21/2017	BY: Leroy.Toledo
Sht 12B N2007 BNSF Yard.dgn	

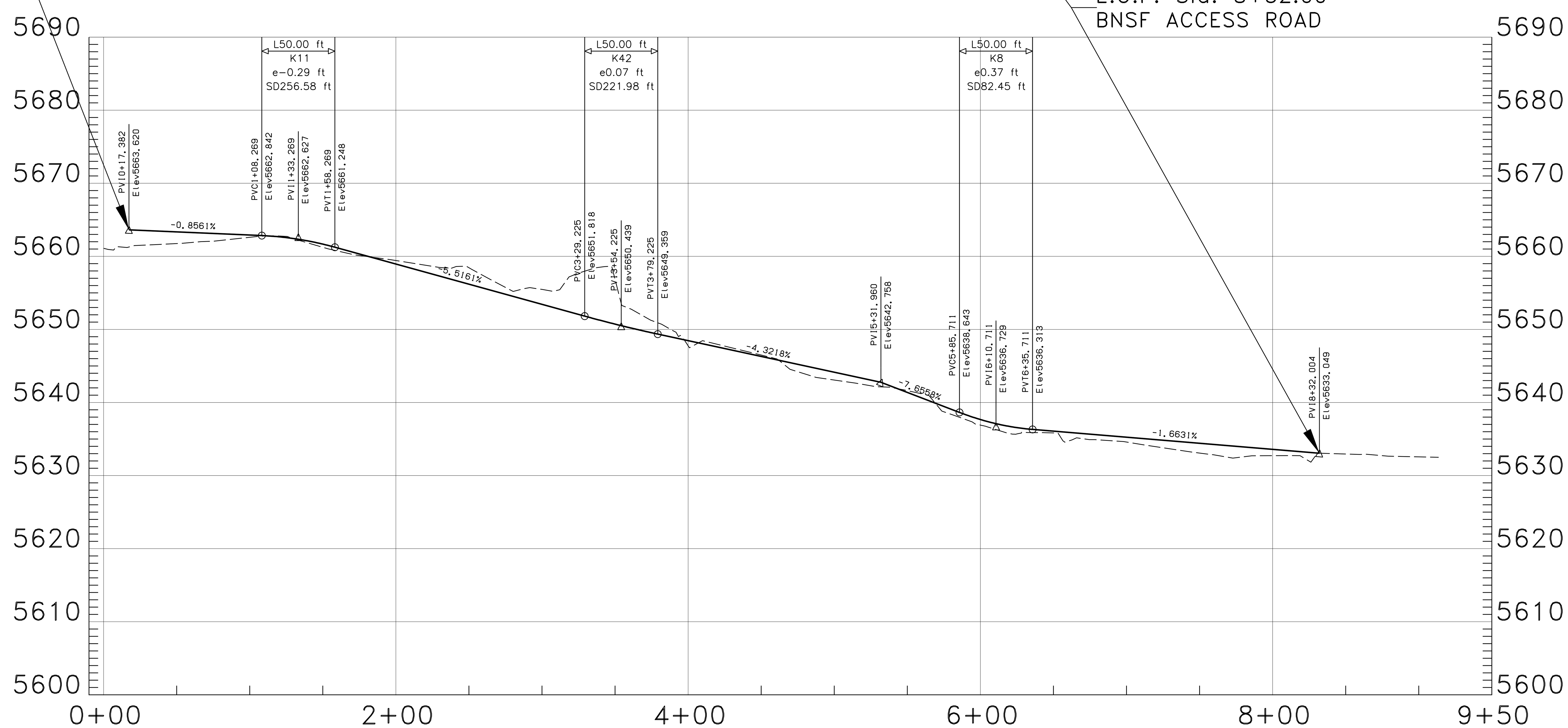
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	Mod-5	14

Existing Chainlink Fence On The North Side Of The Yard Shall Be Removed And Reinstalled At The New North Yard BoundaryLine Tieing Into The Existing Chainlink Fence On The East Yard Boundary Line As IncidentalWork Under Bid Item 20410-3000.
C1 Delta 72°50'47" Radius 42.000' T 30.991' L 53.399' Ext 10.196' N 1501561.526 E 888410.523
Constractor Shall Grade These Turnouts For A Smooth Transition Into The Existing Access. This Work Shall Be Incidental To The Earthwork Bid Items Shown In The Contract.
Constractor Shall Remove & Salvage Existing Cattleguard
Sta. 0+90.00, Intall 25' Type 3 Steel Locking Gate
Top of Proposed Dike
Existing Chainlink Fence
Existing Barbed Wire Fence New Location
Existing Barbed Wire Fence To Be Relocated As Shown
BNSF Access Road CL
C2 Delta 87°08'50" Radius 30.000' T 28.542' L 45.630' Ext 11.408' N 1501130.493 E 888672.385
Existing Bridge
Approved Right-Of-Way Line (75 ft Rt.)
Contractors will place permanent concrete jersey barriers across the existing bridge approach on North side Sta 26+50 Lt, see sheet 16 of 63 for detail.
Approved Right-Of-Way Line (50 ft Lt.)
Remove & Salvage Existing 24" CSPC
N2007 Centerline
Proposed Retaining Wall
Existing 2-14"x160' pipe with 2'x3' grate at Inlet.
Proposed Gabion Wall
Existing Railroad Crossing Signal Gate
N2007 25+29.770 Maintenance Rd 6+81.334 N 1501092.486 E 888616.318
Proposed 20' Turnout
Approved Right-Of-Way Line (150 ft Lt.)
Scale: 1" = 50'
B.O.P. Sta. 0+17.38 BNSF ACCESS ROAD
NOTE: CONTOUR LINES REFLECT POST-CONSTRUCTION

DRAINAGE STRUCTURE TABLE

MARKED	STATION	STRUCTURE	Skew	REMARKS
CSPC 1	19+64.00 Rt. (N2007)	1-24" x 78' CSPA	Normal to Turnout CL	Witn End Section at Inlet Only
CSPA 1	19+72.85 (N2007)	1-21" S x 15" R x 84' CSPA	65.0	Witn End Section at Inlet Only
CSPA 2	3+45.00 Lt. (Maintenance Access Rd)	1-21" S x 15" R x 90' CSPA	Inline with ditch bottom	Witn End Section at Inlet Only
CSPA 3	4+50.00 (Maintenance Access Rd)	1-21" S x 15" R x 52' CSPA	140.0	Witn End Section at Inlet Only
CSPA 4	5+72.00 Lt. (Maintenance Access Rd)	1-21" S x 15" R x 124' CSPA	Inline with ditch bottom	Witn End Section at Inlet Only

E.O.P. Sta. 8+32.00 BNSF ACCESS ROAD



LEGEND

- Existing Railroad X-ing Signal Gate
- Existing Waterline Valve
- Existing Traffic Signs
- Concrete Pad At Railroad X-ing
- Waterline
- Fence
- Existing Road
- Right-Of-Way Line
- Temporay Construction Easement
- Proposed Roadway CL
- Railroad Tracks
- Existing Ditch Bottom
- Existing Guardrail
- Telephone Line
- Existing Concrete Pipe With Headwalls
- Flow or Drainage Line

Revised 09-27-2017

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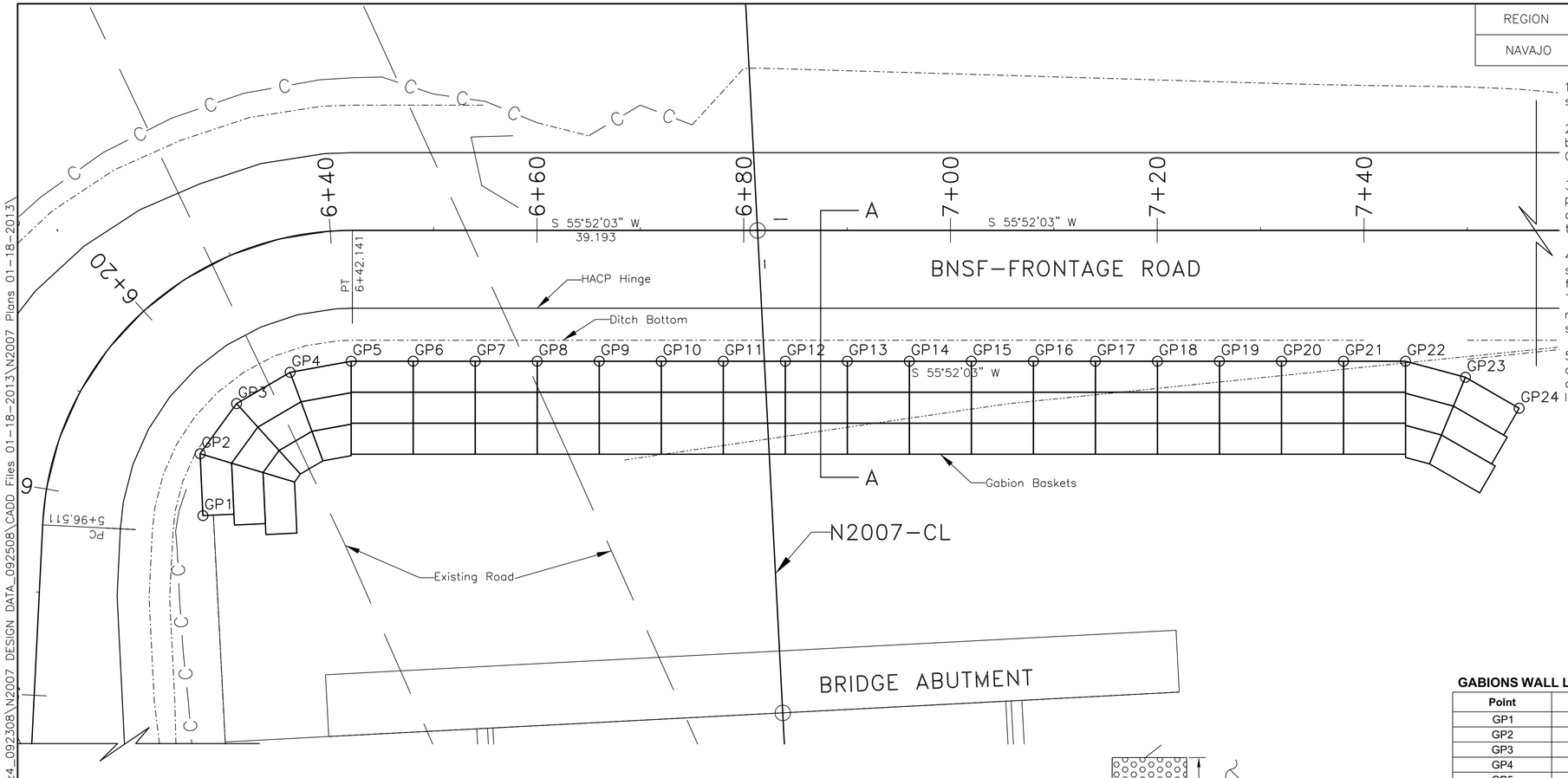
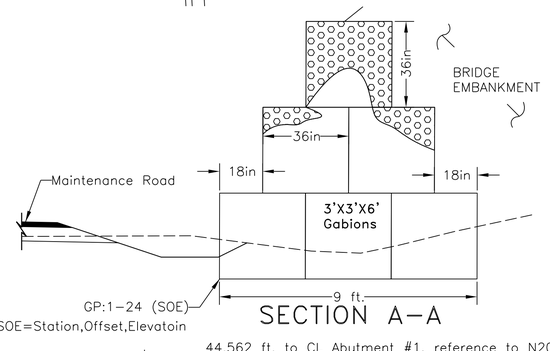
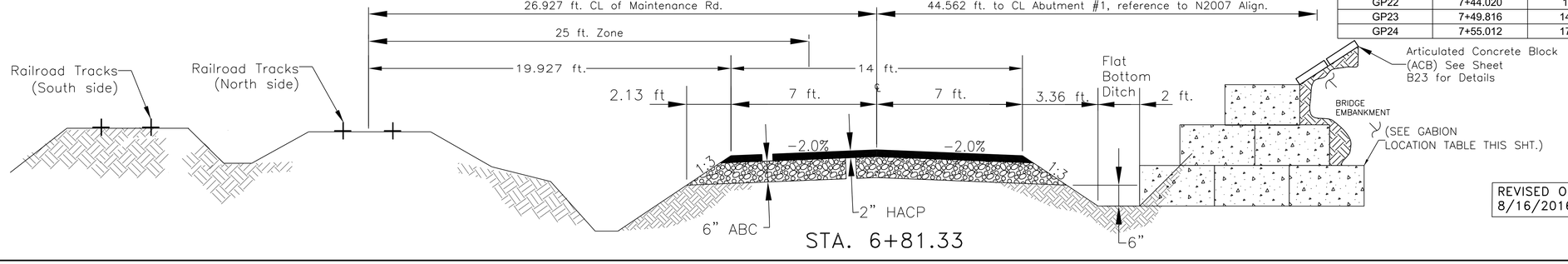
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2,4	13	63







NOTES

1. Frontage Road with retaining wall must be constructed to finish subgrade to use as detour, before bridge approach work can proceed.

2. Any existing railroad communication lines and poles that are affected by construction will be removed and relocated by the BNSF Railway Company.

3. Additional temporary safety fences (Orange HDPE plastic fence) for protection of railroad traffic and public traffic shall be erected as directed by the COR/AOTR 25' left and right of centerline of railroad tracks under new bridge full length.

4. After the detour road is no longer required, the detour road shall be scarified graded and compacted as specified to construct the railroad frontage road to the plan and profile grades. shown on sheet 12 of 63. The frontage road shall be 2" of asphaltic concrete over 6" of ABC material, finish asphalt top width to be 20' wide. Shoulder and ditch slopes to match detour road typical.

5. The Contractor shall coordinate with the BNSF railway, the relocation of the existing at-grade railroad crossing for the detour road. This coordination shall include, but not necessary be limited to the items listed in the following notes.

   a. The BNSF Railway shall remove and relocate the existing concrete vehicle panels, the existing flashing lights and arms, and all controls to establish the detour road. See Sheet 31 of 63 for relocation details.

   b. The Contractor shall survey and stake out the centerline of the detour road crossing, extend the existing N2007 roadway CMP to cross the detour road, place asphalt or cold mix around and between the concrete panels to anchor in place and grade the detour road as needed to access the new crossing.

   c. The BNSF Railway estimates N2007 will need to be closed for one(1) 8 hour day in order to relocate the at-grade crossing. The Contractor shall provide all necessary traffic control and advance notification of the public for the closing and detour.

   d. After the detour is no longer required, the contractor shall remove the approaches to the crossing as directed by the COR/AOTR in conjunction with the BNSF Railway.

GABIONS WALL LAYOUT TABLE

Point	Frontage Rd.	Offset (ft.)	Northing	Easting	Elevation
GP1	5+99.935	15.347	1,501,145.442	888,645.234	5633.132
GP2	6+10.539	13.048	1,501,140.636	888,648.826	5633.132
GP3	6+21.069	12.658	1,501,134.640	888,648.627	5633.132
GP4	6+31.500	12.655	1,501,129.227	888,646.039	5633.132
GP5	6+41.932	12.66	1,501,125.025	888,641.756	5633.132
GP6	6+48.020	12.66	1,501,121.658	888,636.790	5633.132
GP7	6+54.020	12.66	1,501,118.291	888,631.823	5633.132
GP8	6+60.020	12.66	1,501,114.925	888,626.857	5633.132
GP9	6+66.020	12.66	1,501,111.558	888,621.890	5633.132
GP10	6+72.020	12.66	1,501,108.191	888,616.924	5633.132
GP11	6+78.020	12.66	1,501,104.825	888,611.957	5633.132
GP12	6+84.020	12.66	1,501,101.458	888,606.991	5633.132
GP13	6+90.020	12.66	1,501,098.091	888,602.025	5633.132
GP14	6+96.020	12.66	1,501,094.725	888,597.058	5633.132
GP15	7+02.020	12.66	1,501,091.358	888,592.092	5633.132
GP16	7+08.020	12.66	1,501,087.991	888,587.125	5633.132
GP17	7+14.020	12.66	1,501,084.625	888,582.159	5633.132
GP18	7+20.020	12.66	1,501,081.258	888,577.192	5633.132
GP19	7+26.020	12.66	1,501,077.891	888,572.226	5633.132
GP20	7+32.020	12.66	1,501,074.525	888,567.259	5633.132
GP21	7+38.020	12.66	1,501,071.158	888,562.293	5633.132
GP22	7+44.020	12.66	1,501,067.792	888,557.326	5633.132
GP23	7+49.816	14.213	1,501,065.825	888,551.658	5633.132
GP24	7+55.012	17.213	1,501,065.393	888,545.674	5633.132

REVISED ON 8/16/2016

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

GABION LOCATION DETAILS

DRAWN BY:	B.O.R.	DATE:	06/13/11
DESIGNED BY:	Design 2	DATE:	06/03/11
REVISED:	8/16/16	FILENAME:	Gabion Details
BY:	B.O.R.	SCALE:	1:10 (Horiz. & Vert.)

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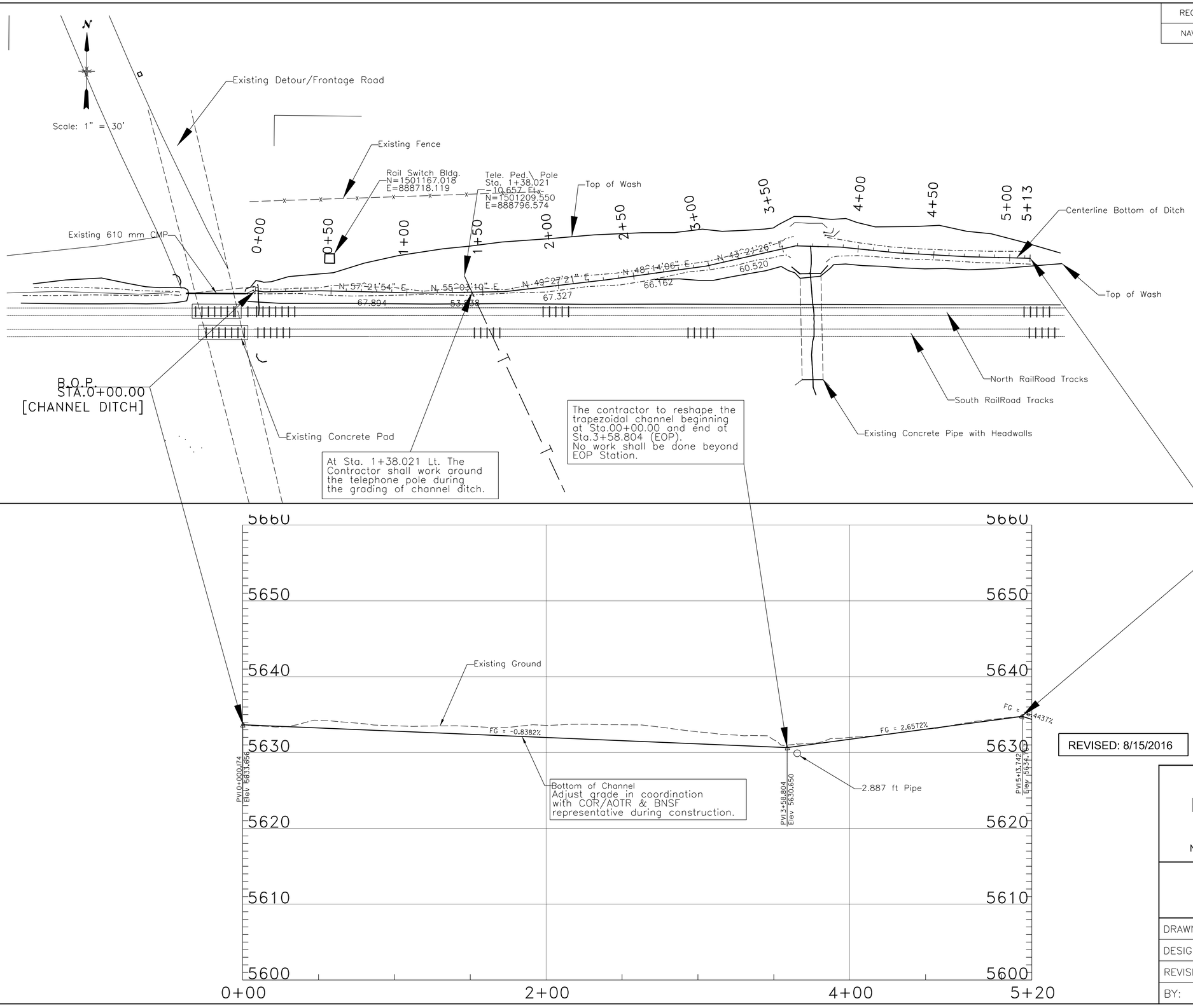
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	14	63

Alignment Name: BNSFN.CHANNELALIGNMENT
Alignment Description: BNSF N. DRAINAGE CHANNEL
Alignment Datum: SPC-AZ83- E

	Station	Northing	Easting
Element: Linear			
POB 500	0+000.000	1501124.670	888687.554
PI 44	0+05.737	1501127.178	888692.714
Tangential Direction:	N 64°04'37"E		
Tangential Length:	5.737		
Element: Linear			
PI 44	0+05.737	1501127.178	888692.714
PI 45	0+43.063	1501148.559	888723.309
Tangential Direction:	N 55°03'10"E		
Tangential Length:	37.326		
Element: Linear			
PI 45	0+43.063	1501148.559	888723.309
PI 46	1+10.957	1501185.174	888780.484
Tangential Direction:	N 57°21'54"E		
Tangential Length:	67.894		
Element: Linear			
PI 46	1+10.957	1501185.174	888780.484
PI 47	1+64.795	1501216.013	888824.614
Tangential Direction:	N 55°03'10"E		
Tangential Length:	53.838		
Element: Linear			
PI 47	1+64.795	1501216.013	888824.614
PI 48	2+32.122	1501259.778	888875.777
Tangential Direction:	N 49°27'21"E		
Tangential Length:	67.327		
Element: Linear			
PI 48	2+32.122	1501259.778	888875.777
PI 49	2+98.284	1501303.847	888925.125
Tangential Direction:	N 48°14'06"E		
Tangential Length:	66.162		
Element: Linear			
PI 49	2+98.284	1501303.847	888925.125
PI 50	3+58.804	1501347.850	888966.675
Tangential Direction:	N 43°21'26"E		
Tangential Length:	60.52		
Element: Linear			
PI 50	3+58.804	1501347.850	888966.675
PI 51	3+88.404	1501363.654	888991.703
Tangential Direction:	N 57°43'46"E		
Tangential Length:	29.6		
Element: Linear			
PI 51	3+88.404	1501363.654	888991.703
PI 52	4+25.713	1501381.262	889024.596
Tangential Direction:	N 61°50'25"E		
Tangential Length:	37.309		
Element: Linear			
PI 52	4+25.713	1501381.262	889024.596
PI 53	4+71.979	1501404.866	889064.387
Tangential Direction:	N 59°19'22"E		
Tangential Length:	46.266		
Element: Linear			
PI 53	4+71.979	1501404.866	889064.387
POE 54	5+13.472	1501427.144	889099.392
Tangential Direction:	N 57°31'37"E		
Tangential Length:	41.493		



REVISED: 8/15/2016

LEGEND

- Existing Railroad X-ing Signal Gate
- Concrete Pad At Railroad X-ing
- Fence
- Existing Road
- Proposed Roadway CL
- Railroad Tracks
- Existing Ditch Bottom
- Existing Concrete Pipe With Headwalls

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

DITCH CHANNEL PLAN AND PROFILE SHEET

DRAWN BY:	NRODOT	DATE:	5/17/13
DESIGNED BY:	NRODOT	DATE:	5/17/13
REVISED:	8/15/16	FILENAME:	PLPDITCH_CHANNEL
BY:	B.O.R.	SCALE:	NTS

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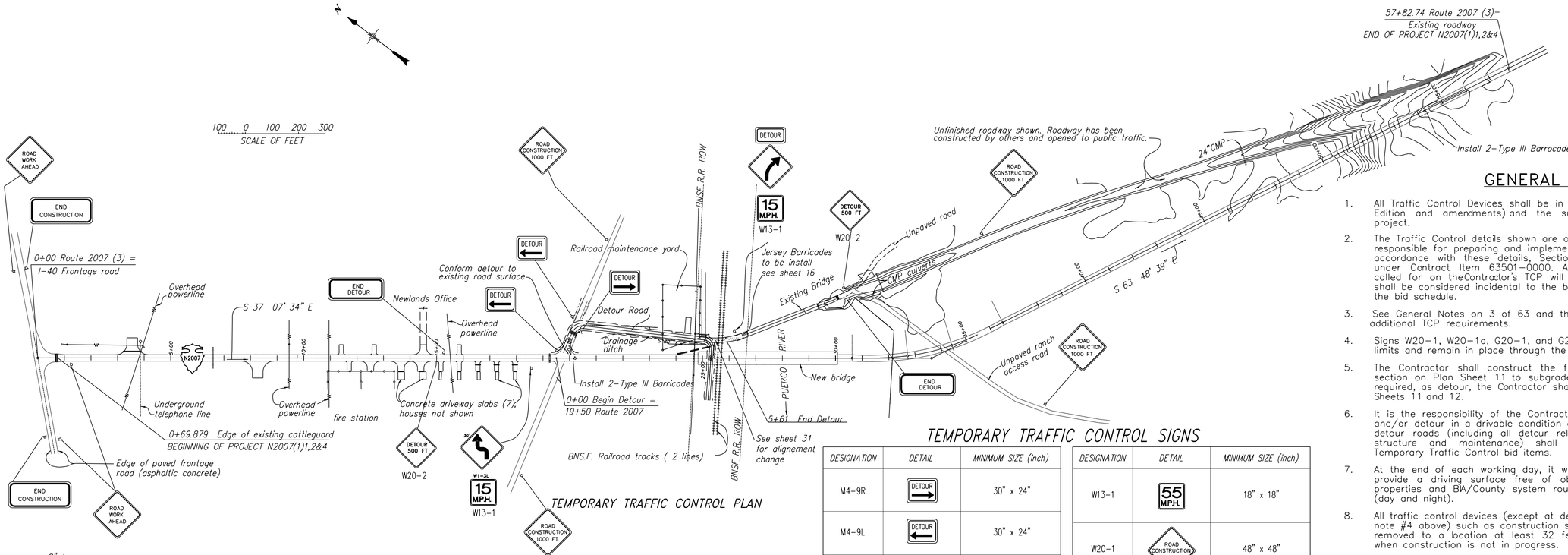
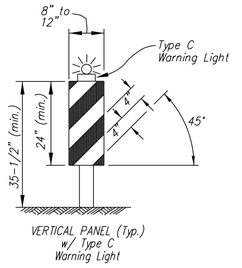
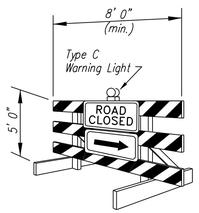
AREA	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	15	63



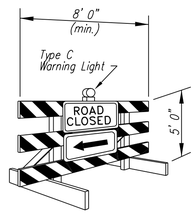
TEMPORARY TRAFFIC CONTROL PLAN



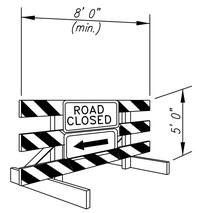
VERTICAL PANEL (Typ.) w/ Type C Warning Light



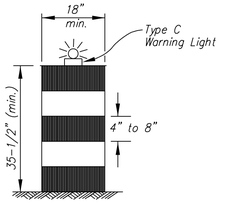
TYPE III BARRICADE w/ R11-2, W1-6 (right) and Type C Warning Light



TYPE III BARRICADE w/ R11-2, W1-6 (left) and Type C Warning Light



TYPE III BARRICADE

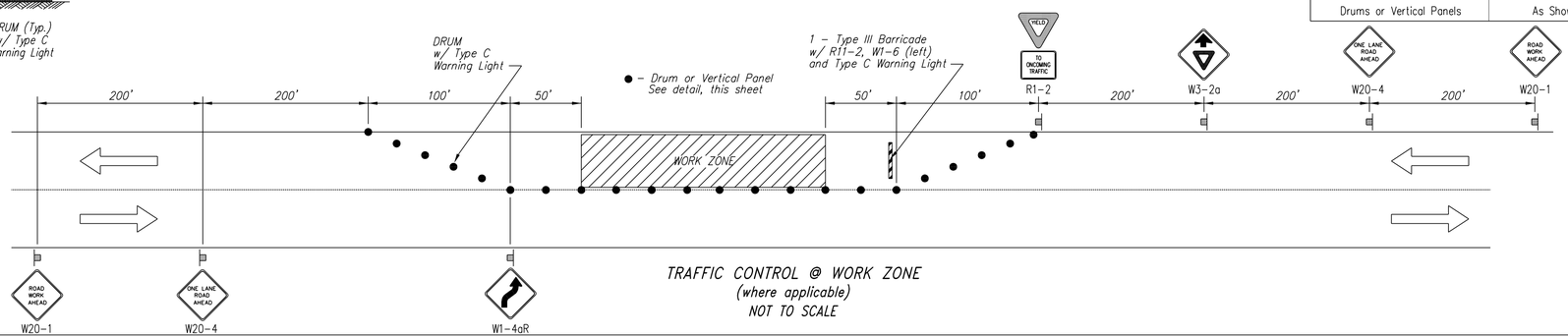


DRUM (Typ.) w/ Type C Warning Light

TEMPORARY TRAFFIC CONTROL SIGNS

DESIGNATION	DETAIL	MINIMUM SIZE (inch)
M4-9R	DETOUR	30" x 24"
M4-9L	DETOUR	30" x 24"
R1-2	YIELD / TO ONCOMING TRAFFIC	36" x 36" x 36"
SUPPLEMENTAL PLATE	TO ONCOMING TRAFFIC	30" x 24"
G20-2	END CONSTRUCTION	60" x 24"
Type III Barricade w/ R11-2, W1-6 (right) and Type C Warning Light		As Shown
Type III Barricade w/ R11-2, W1-6 (left) and Type C Warning Light		As Shown
Type III Barricade		As Shown
Drums or Vertical Panels		As Shown

DESIGNATION	DETAIL	MINIMUM SIZE (inch)
W13-1	55 MPH	18" x 18"
W20-1	ROAD CONSTRUCTION 1000 FT	48" x 48"
W20-1	ROAD WORK AHEAD	48" x 48"
W20-4	ONE LANE ROAD AHEAD	48" x 48"
W1-1L		30" x 30"
W1-3L	30° W1-3L	30" x 30"
W1-3R	30° W1-3R	30" x 30"
W3-2a		36" x 36"
Drums or Vertical Panels		As Shown



TRAFFIC CONTROL @ WORK ZONE (where applicable) NOT TO SCALE

GENERAL NOTES

1. All Traffic Control Devices shall be in accordance with the MUTCD (Latest Edition and amendments) and the supplemental specifications 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 of FP-03, and the MUTCD under Contract Item 63501-0000. 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.
3. See General Notes on 3 of 63 and the supplemental specifications for additional TCP requirements.
4. Signs W20-1, W20-1a, G20-1, and G20-2a shall be placed at the project limits and remain in place through the duration of the project.
5. The Contractor shall construct the frontage/detour road to the typical section on Plan Sheet 11 to subgrade only. After the road is no longer required, as detour, the Contractor shall complete the construction as Plan Sheets 11 and 12.
6. It is the responsibility of the Contractor to maintain the existing roadway and/or detour in a drivable condition during construction. The cost of any detour roads (including all detour related earthwork, temporary drainage structure and maintenance) shall be considered incidental to the Temporary Traffic Control bid items.
7. At the end of each working day, it will bethe Contractor responsibility to provide a driving surface free of obstructions. Access to all adjoining properties and BIA/County system routes shall bemaintained at all times (day and night).
8. All traffic control devices (except at detour road locations and as noted in note #4 above) such as construction signs, drums, barricades,etc., shall be removed to a location at least 32 feet from the edge of the shoulder when construction is not in progress.
9. 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 pilot cars and traffic control shall be considered incidental obligations of the Contractor.
10. The Contractor has the option to either use drums or vertical panels, but shall not use a combination of both. No traffic cones are allowed.
11. At locations where new road construction intersects existing roadways and at tie-ins with existing roads at the endof the new construction "Special traffic control" procedures shall be included as needed in the Contractor's TCP. These include,but are not necessarily limited to the following: Type III barricades with "Road Closed/ detour sign", flaggers, drums, etc.
12. The Traffic Control on this project shall be coordinated with the project construction schedule. The Contractor's TCP shall reflect this coordination.
13. The Contractor may install temporary HDPE plastic fence 15 feet out from the outside rail of the railroad tracks so that all work, equipment, and materials are kept outside these limits. This fence installation shall be paid for under bit item 61901-3400. This may reduce the need for railroad flaggers.

UNITED STATES
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TEMPORARY TRAFFIC CONTROL

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 05/20/2013	BY: Gerald.Hood
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.15_Traffic Control Details.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	16	63

PERMANENT ROADSIDE SIGNS

STATION	LOC.	SIZE DETAIL NO.	DESCRIPTION	SIGN PANEL SIZE INCH	AREA OF SIGN ft²	NO. Of POSTS	POST WEIGHT lb/ft	TOTAL PANELS
19+68.00 19+86.00	Lt. Rt.	R1-1 R1-1	STOP	30" x 30"	6.25	2 2	2.00	2
1+00.00 19+00.00 56+00.00	Rt. Rt. Lt.	R2-1(35)	SPEED LIMIT 35	24" x 30"	5.0	1 1 1	2.75	3
56+00.00	Rt.	R2-1(45)	SPEED LIMIT 45	24" x 30"	5.0	1	2.75	1
2+00.00	Rt.	M-1	2007	18" x 24"	3.0	1	2.75	1
39+00.00	Lt.	W1-2R		30" x 30"	6.25	2	2.00	1
5+00.00 12+00.00 41+00.00	Lt. Rt. Lt.	M-1	DO NOT PASS	24" x 30"	5.0	1 1 1	2.75	3
5+00.00 12+00.00 41+00.00	Rt. Lt. Rt.	R4-1	NO PARKING ZONE	48" x 48" x 36"	5.55	2 2 2	2.00	3
2+00.00	Lt.	W3-1a		30" x 30"	6.25	2	2.00	1
63302-0003 Sign Installation, 1 Post & Hardware: 2.75 lbs/ft.____ 38.00 sq.ft.								
63302-0010 Sign Installation, 2 Post & Hardware: 2.00 lbs/ft.____ 41.65 sq.ft.								

63401-1610 PAVEMENT MARKINGS: SOLID YELLOW

STATION TO STATION			LOCATION	DECRIPTION	LENGTH (Ft.)
0+69.879	To	5+00.00	Center-Right	Solid Yellow	430.12
0+69.879	To	5+00.00	CenterL-Left	Solid Yellow	430.12
12+00.00	To	41+00.00	Center-Right	Solid Yellow	2,900.00
12+00.00	To	41+00.00	Center-Left	Solid Yellow	2,900.00
				TOTAL:	6,660.24

63401-1520 PAVEMENT MARKINGS: SOLID WHITE

STATION TO STATION			LOCATION	DECRIPTION	LENGTH (Ft.)
0+69.879	To	57+82.74	Right	Solid White	5,712.86
Minus (1) 14' T.O. @ 68'					-68.00
Minus (6) 16' T.O. @ 70'					-420.00
Minus (5) 24' T.O. @ 118'					-590.00
				SUB-TOTAL:	4,634.86
0+69.879	To	57+82.74	Left	Solid White	5,712.86
Minus (1) 40' T.O. @ 134'					-134.00
Minus (3) 16' T.O. @ 70'					-210.00
Minus (3) 24' T.O. @ 118'					-354.00
				SUB-TOTAL:	5,014.86
				GRAND-TOTAL:	9,649.72

63401-1510 PAVEMENT MARKINGS: BROKEN YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH (ft)
5+00.00	To	12+00.00	Center	Broken Yellow	700.00
41+00.00	To	57+82.74	Center	Broken Yellow	1,682.74
				TOTAL:	2,382.74

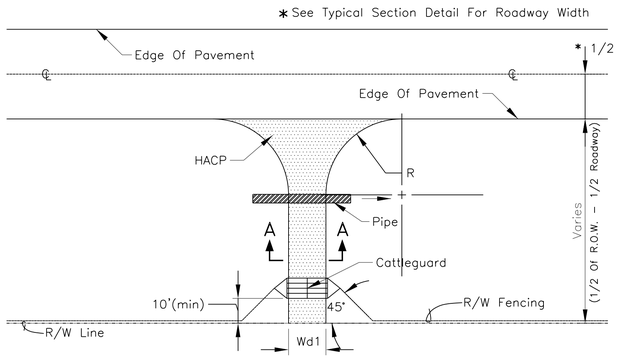
MAINTENANCE/DETOUR ROAD

63401-1510 PAVEMENT MARKINGS: SOLID YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH (ft)
0+17.38	To	5+40.00	Center	Solid Yellow	522.62
				TOTAL:	522.62

63502-3000 TTC, RAISED PAVEMENT MARKINGS:

63502-3000 TTC, RAISED PAVEMENT MARKERS @ 700 TOTAL



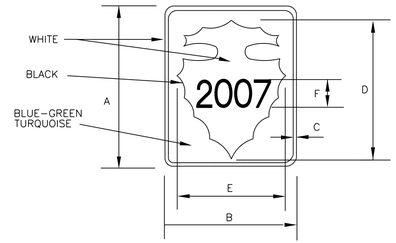
TYPICAL TYPE "A" TURNOUT

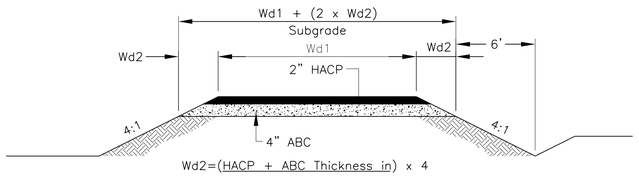
Special width turnouts at Sta.3+55 Lt. and Sta.13+34 Rt., to be constructed similar, Radii to be 30'.

TYPE "A" TURNOUT

Wd1	Cattleguard	R *
14'	2-Unit	30'
16'	3-Unit	30'
24'	4-Unit	50'
30'	5-Unit	50'
30'	6-Unit	50'

* Radius 10', for housing street/ driveway approaches.

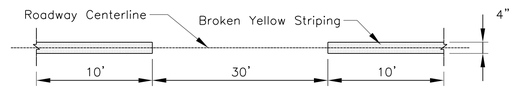




SECTION A-A

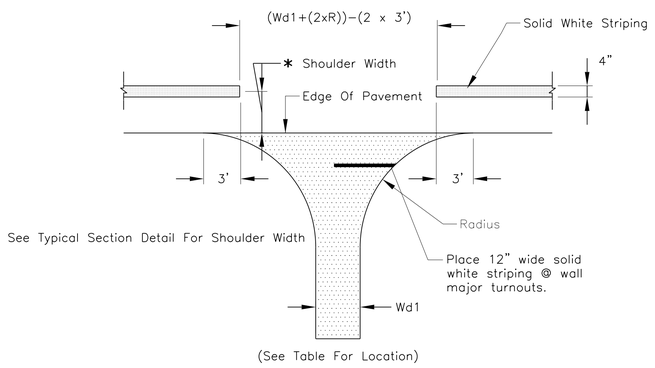
Modify turnout shoulder/ditch grading to fit existing drainage and ground conditions, if directed by the C.O.R./AOTR

SIGN	DIMENSION inches					F = NUMERALS				
	A	B	C	D	E	DIGITS IN ROUTE	1	2	3	4
MIN.	24"	18"	1/2"	19-1/2"	13-1/2"	SIZE	14 1/2"	12"	9"	8"



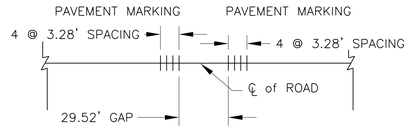
TYPICAL PAVEMENT MARKING "BROKEN YELLOW"
(See Table For Location)

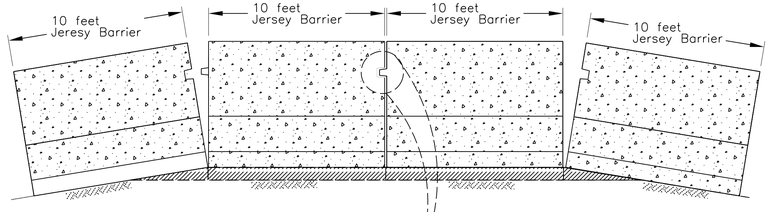
STOP SIGN and STOP BAR location			Y (m)=	
Radius of turnout (ft)	X (ft)	y' (ft)	y' + LO (ft)	Length of Stop Line
10.00	5.00	5.00	7.00	1/2 Roadway width + Y
20.00	10.00	10.00	8.50	1/2 Roadway width + Y
30.00	15.00	15.00	10.00	1/2 Roadway width + Y
40.00	20.00	20.00	11.00	1/2 Roadway width + Y
50.00	25.00	25.00	12.50	1/2 Roadway width + Y



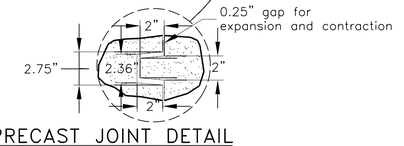
(See Table For Location)

ITEM 63502-3000 TEMP. TRAFFIC CONTROL
RAISED PAVEMENT MARKER, YELLOW





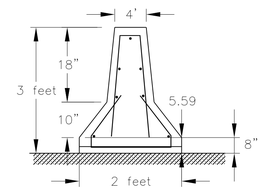
STA. 26+50.00 ± PRECAST CONCRETE JERSEY BARRIER ON FRONTAGE ROADWAY ON EXISTING BRIDGE APPROACH



PRECAST JOINT DETAIL

(a). The Precast Jersey Barrier shall be install on the North side of the existing bridge approach as shown and location determined by AOTR.

(b). The Precast Jersey Barrier construction shall meet the requirements of Safety-Shape Barrier (SGM11a-b) in the AASHTO-AGC-ARTBA Joint Committee Task Force 13 Report.



SIDE VIEW

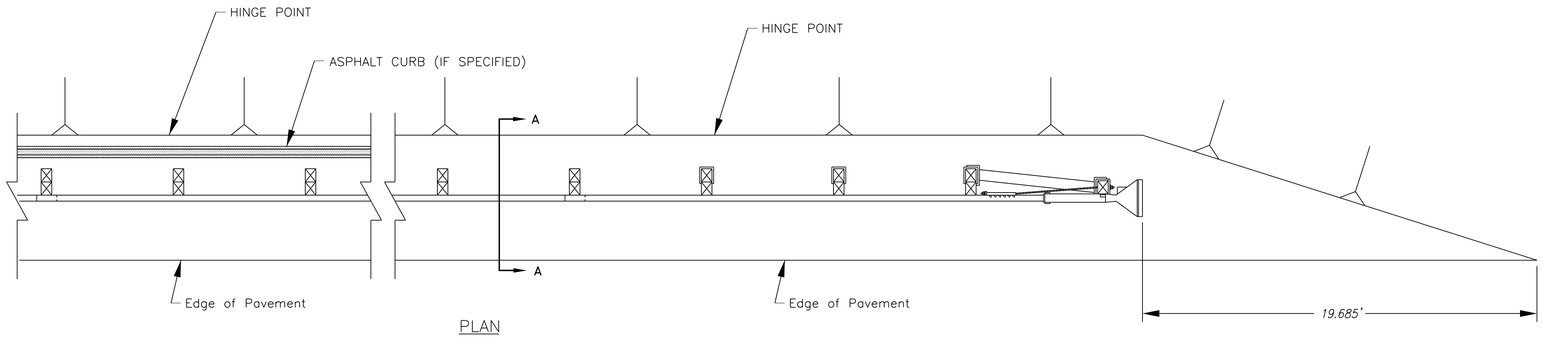
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PERMANENT PAVEMENT MARKINGS ROADSIDE SIGNS & TURNOUT DETAIL

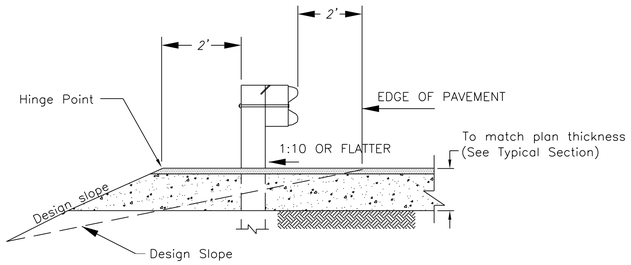
DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 6/4/2013	BY: Gerald.Hood
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.16_PermSign & T.O Details.dgn	

J:\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\CADD Files

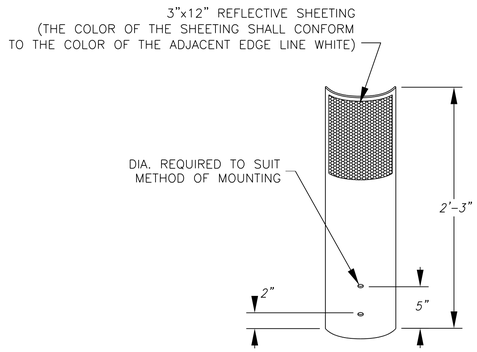
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	17	63



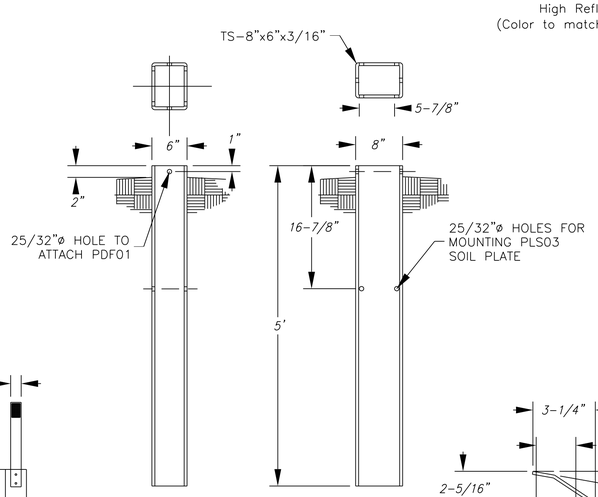
PLAN



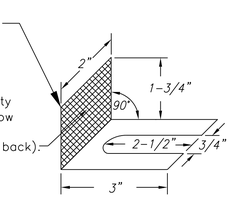
SECTION A-A
Without Asphalt Curb



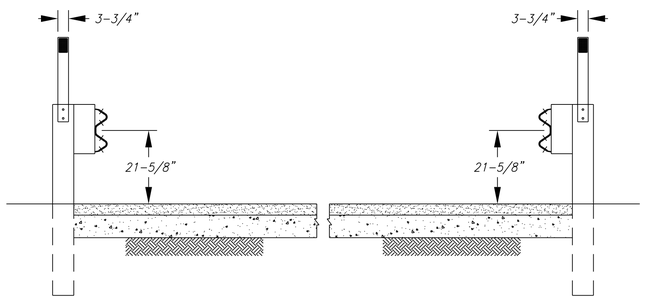
DELINEATOR DETAIL



FOUNDATION TUBE

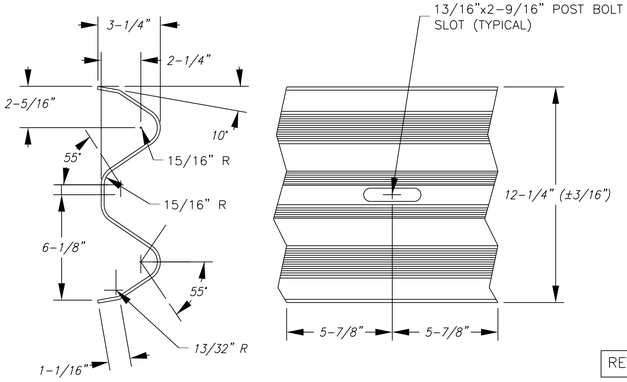


REFLECTOR TAB DETAIL
(Install on every fourth post,
starting on post #2)



The delineator shall be placed at 18'-9" spacing, around the outside of horizontal curve, or where the guardrail conflicts with Type "1a" delineator located on tangent segment of roadway.

GUARDRAIL MOUNTED DELINEATOR



SECTION THRU GUARDRAIL ELEMENT

REVISED: 8/16/2016

GENERAL NOTES

1. ALL W-BEAMS, THRIE-BEAMS, END TREATMENT, AND TERMINAL CONNECTORS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M-180, CLASS A, TYPE-II SPECIFICATION. ALL HARDWARE SHALL CONFORM TO ASTM A-325, AND BE GALVANIZED IN ACCORDANCE WITH ASTM A-153.

2. ALL STRUCTURAL STEEL ITEMS SHALL CONFORM TO AASHTO M183/ ASTM A36, AND BE GALVANIZED IN ACCORDANCE WITH AASHTO M111 SPECIFICATION.

3. WIRE ROPE, FITTINGS, AND ASSEMBLIES OF HARDWARE SHALL CONFORM TO AASHTO M-30, TYPE-2 SPECIFICATION AND A CLASS B ZINC COATING.

4. WOOD POSTS AND BLOCKS SHALL BE ROUGH SAWN LUMBER OR TYPE S4S HAVING MINIMUM BENDING STRENGTH OF 8.27 MPa (SINGLE MEMBER) AND MEETING AASHTO M-168. ALL POSTS AND BLOCK SHALL BE TREATED IN ACCORDANCE WITH AASHTO M-133 SPECIFICATION.

5. ALL EMBANKMENT AND AGGREGATE BASE MATERIAL SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY.

6. THE EMBANKMENT MATERIAL AND PLACING THEREOF SHALL BE INCIDENTAL TO EARTHWORK ITEMS AND NO DIRECT PAYMENT SHALL BE MADE.

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

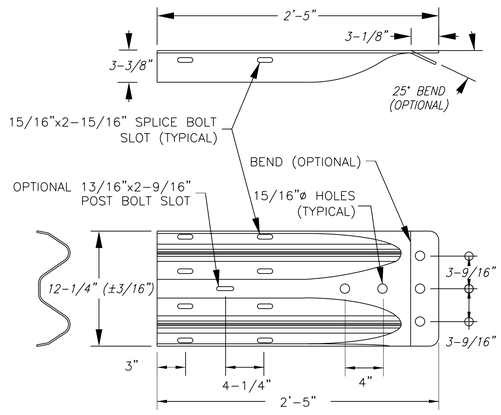
8. THE COST OF THE SKT-350 ASSEMBLY AND PLACING THEREOF SHALL BE CONSIDERED INCIDENTAL TO ITEM 61701-1250, WHICH INCLUDES BREAKAWAY POSTS, STEEL FOUNDATION TUBE, AND HARDWARE.

9. PLACEMENT OF HOT ASPHALTIC CONCRETE AND AGGREGATE BASE MATERIAL FOR GUARDRAIL WIDENING SHALL BE INCLUDED WITH ITEMS 30101-2000 AND 40201-0500.

10. FURNISHING AND PLACEMENT OF REFLECTIVE SHEETING AND TABS SHALL BE CONSIDERED INCIDENTAL TO ITEM 61701-1250 AND NO DIRECT PAYMENT SHALL BE MADE.

11. ALL RELATED PATENT RIGHTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AS PER SECTION 107.01 OF THE FP-03

12. GUARDRAIL POSTS TO BE INSTALLED PER SECTION 617.03 WITH THE PROPER HOLE TOLERANCE OF 9/16". FAILURE OF THE CONTRACTOR TO INSTALL THE GUARDRAIL POST INCORRECTLY SHALL RESULT IN THE GUARDRAIL BEING REJECTED AND RE-INSTALLED AT THE CONTRACTOR'S ENTIRE EXPENSE.



TERMINAL CONNECTOR

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD GUARDRAIL DETAIL SKT-350 PLUS

DRAWN BY: Gerald.Hood	DATE: 5/6/2009
DESIGNED BY: NRDOT	DATE: 5/6/2009
REVISED: 8/16/2016	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.17_Guardrail ET Plus2.dgn	

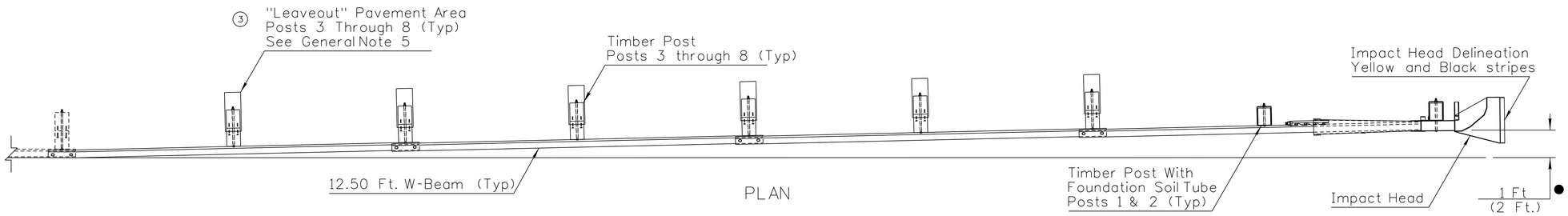
J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
NAVAJO	AZ	NAVAJO	N2007	N2007(1-1)1,2&4	18a	63

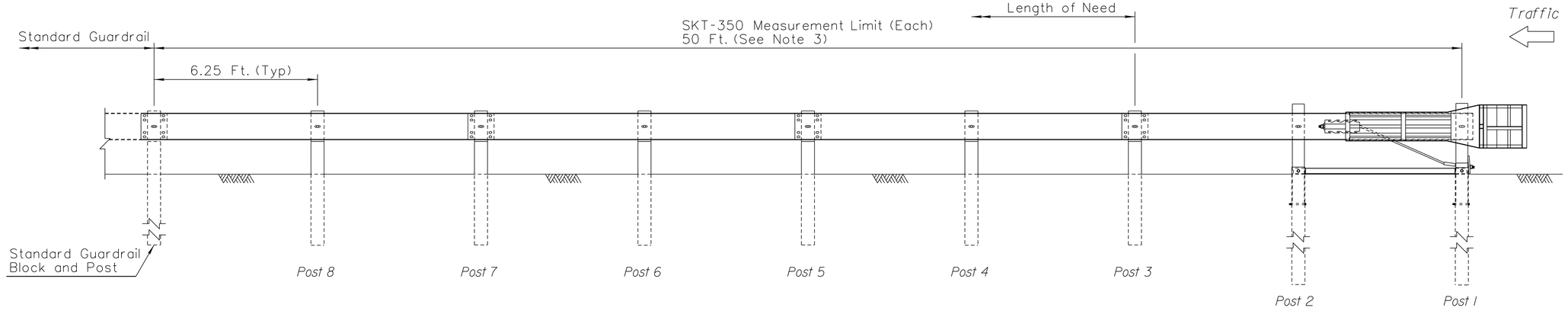
- FOR ELEVATIONS ABOVE 4002 (Ft.), USE THE VALUES IN PARENTHESES

GENERAL NOTES

1. This detail is for roadway layout only.
2. The SKT-350 shall be installed in accordance with the manufacturer's specifications and current approved drawings including all details, hardware, hardware quantities, and other information as shown in these plans.
3. The 50 Ft. W-Beam length shall consist of four 12.50 Ft. sections, the end section being a proprietary split rail.
4. See specifications and other drawings and details in these plans.
5. (3) "Leaveouts" in asphaltic concrete shall be provided in the AC pavement around the guardrail posts at the locations and dimensions specified on the Road Systems Inc. approved drawing (SKT-350 Sht 3 of 3) shown in these plans. "Leaveout" material shall consist of a 1-sack grout mix or other non-cohesive material as approved by the NRDOT Materials Unit.



PLAN



ELEVATION

REVISED ON
4/21/2015

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

GUARDRAIL END TREATMENT
SKT-350 LAYOUT; SHEET 1 of 3

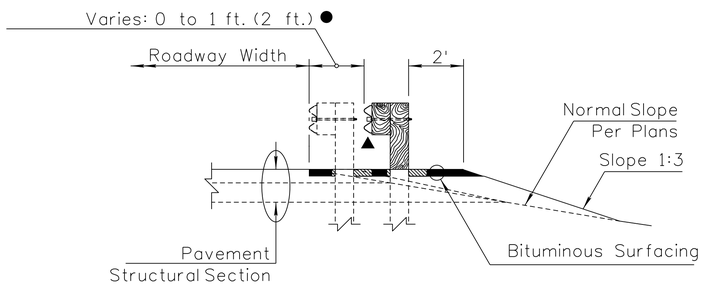
Designed by: BIA NRO-DOT Structural Unit	
Drawn by: - - -	Date: 2/13/2015
Revised by: - - -	Date: - - -
File Name: SKT-350 Sht 1 of 3_2015-02-13	

L:\LIBRARY\SKT-350\update\SHT 1 of 2_2015-01-08.dgn

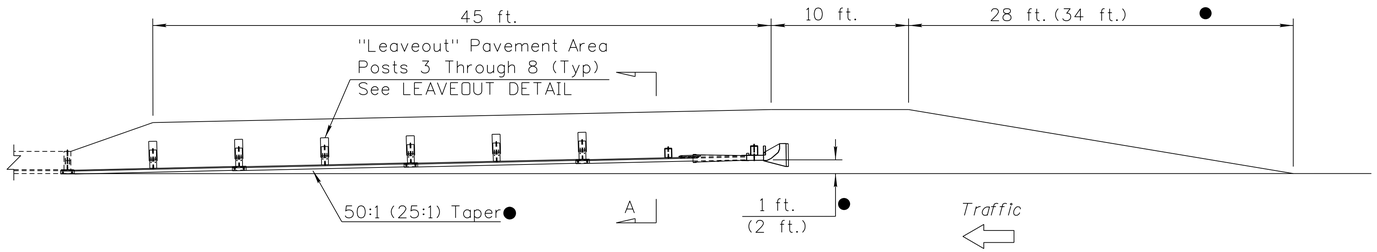
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
NAVAJO	AZ	NAVAJO	N2007	N2007(1-1)1,2&4	18b	63

● FOR ELEVATIONS ABOVE 4002 (Ft.), USE THE VALUES IN PARENTHESES

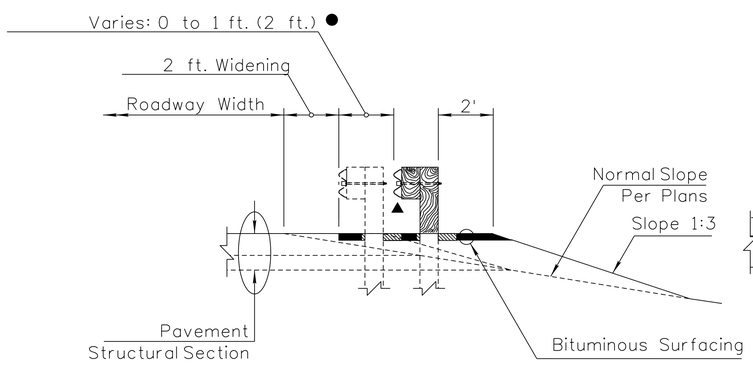
▲ Top of Rail
to Roadway Surface
= 28"



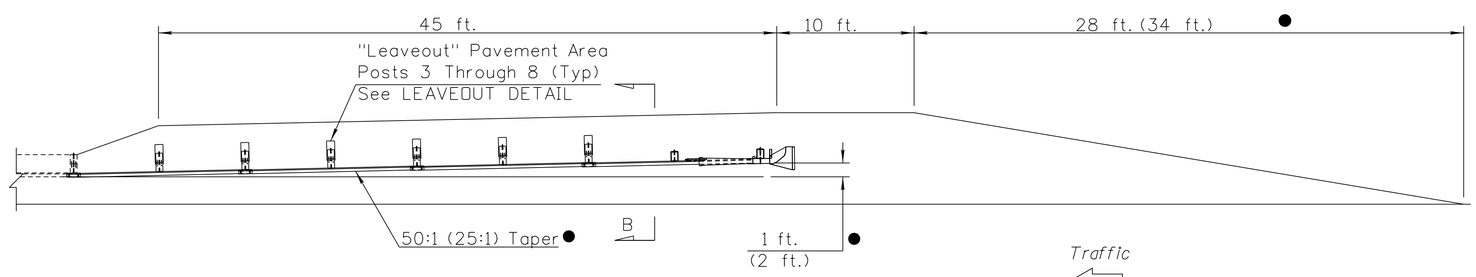
TYPE A SECTION



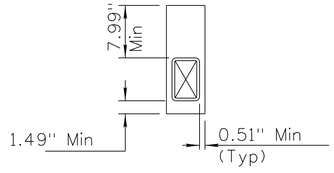
TYPE A GUARDRAIL INSTALLATION
(FACE OF RAIL AT EDGE OF PAVEMENT)



TYPE B SECTION



TYPE B GUARDRAIL INSTALLATION
(FACE OF RAIL OFFSET 2 ft. FROM NORMAL EDGE OF PAVEMENT)



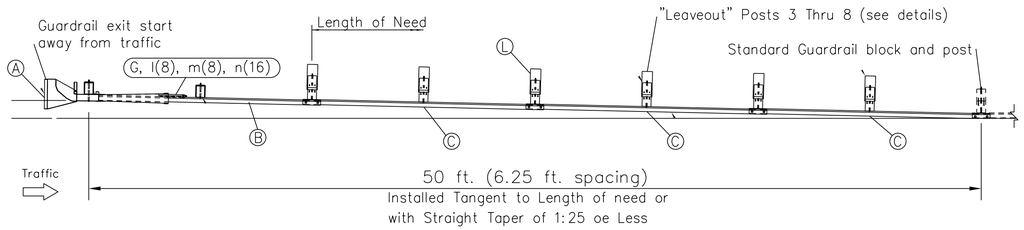
LEAVEOUT DETAIL

REVISED ON
4/21/2015

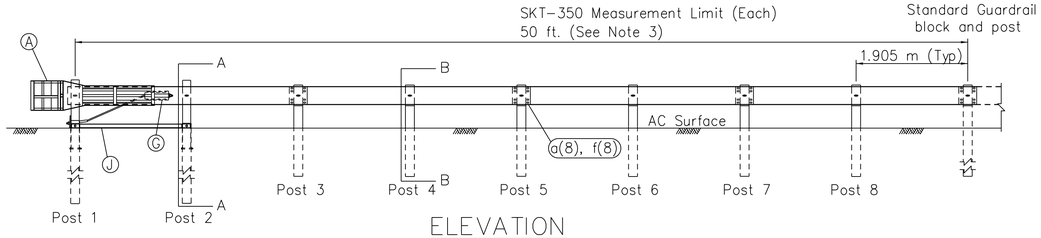
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

GUARDRAIL END TREATMENT
SKT-350 LAYOUT; SHEET 2 of 3

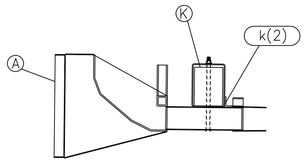
Designed by: BIA NRO-DOT Structural Unit	
Drawn by: - - -	Date: 2/13/15
Revised by: - - -	Date: - - -
File Name: SKT-350 Sht 2 OF 3_2015-02-13	

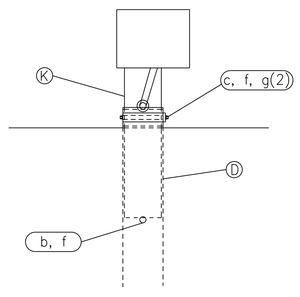


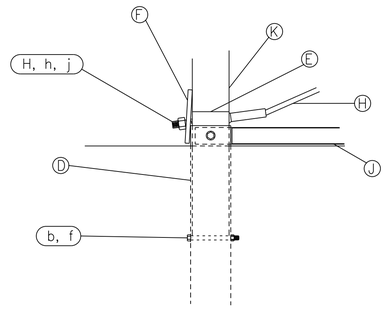
PLAN

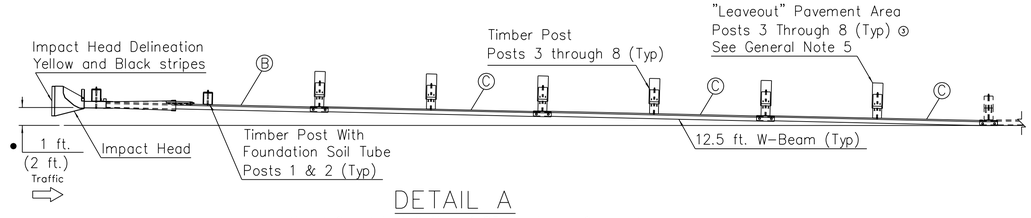


ELEVATION









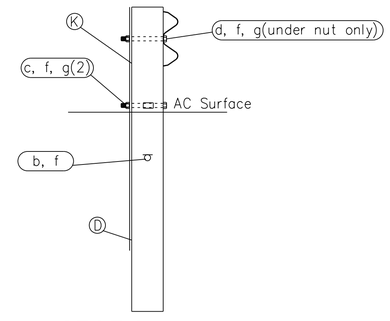
DETAIL A

optional flared installation, 1:25 maximum flare rate

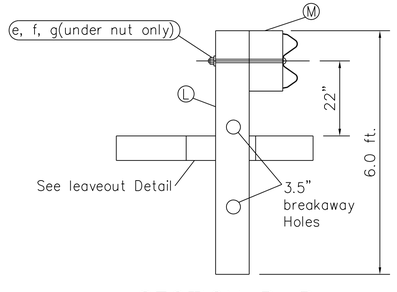
APPROVED AS NCHRP 350 T3 TERMINAL

GENERAL NOTES

1. Breakaway posts are required with the Sequential Kinking Terminal.
2. All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
3. The SKT can be flared at a rate of 1:25 to prevent the impact head from encroaching on the shoulder. The flare is not required and may be decreased or eliminated fot specific installations.
4. The soil tubes shall not protrude more than 4" above ground (measured along a 4.92 ft. chord). Site grading may be necessary to meet this requirement.
5. The soil tubes may be driven with an approved driving head. Soil tubes should not be driven with the post in the tube. If the tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent settlement.
6. When rock is encountered during excavation, a 1 ft. Dia. post hole, 20" into rock may be used if approved by the engineer. Granular material will be placed in the bottom of the hole approx. 2.51" deep to provide drainage. The soil tubes will be field cut to length, placed in the hole and backfilled with adequately compacted material excavated from the hole.
7. The breakaway cable assembly must be taut. A locking device, (vice-grips or channel-lock pliers) should be used to prevent the cable from twisting when tightening nuts.
8. A special site evaluation should bee considered prior to using the SKT where there is less than 25 ft. between the outlet side of the SKT and any adjacent driving lane.
9. The wood blockouts should be "toe-nailed" to the wood posts to prevent them from turning when the wood shrinks.
10. Guardrail splice shall be overlapped in the direction of adjacent traffic.
11. Bill of materials and some of the details herein were provided by Road Systems Inc.



SECTION A-A

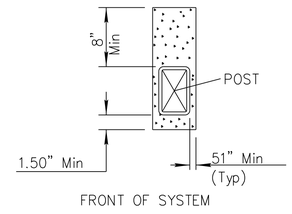


SECTION B-B

typical at Post 3 thru 8

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
NAVAJO	AZ	NAVAJO	N2007	N2007(1-1)1,2&4	18c	63

Code	QTY.	BILL OF MATERIALS	ITEM#
A	1	IMPACT HEAD	S3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 GA., 12.5 ft.	FS1303
C	3	W-BEAM GUARDRAIL, 12 ga., 12.5 ft RAIL ELEMENTS	G1203
D	2	FOUNDATION SOIL TUBE, 6" x 8" x 6'	E731
E	1	PIPE SLEEVE	E740
F	1	BEARING PLATE, 8" x 8" x 0.63"	E750
G	1	CABLE ANCHOR BOX	S760
H	1	BCT CABLE ANCHOR ASSEMBLY	E770
J	1	GROUND STRUT	E780
K	2	5.51" x 7.51" x 3.75' WOOD POSTS	P650
L	6	6" x 8" x 6' WOOD CRT POST	P671
M	6	6" x 8" x 14" TIMBER BLOCKOUT	P675
		HARDWARE	
a	32	0.63" Dia. x 1.25" SPLICE BOLT	B580122
b	2	0.63" Dia. x 7.52" HEX BOLT	B580754
c	2	0.63" Dia. x 10" HEX BOLT	B581004
d	1	0.63" Dia. x 7.52" H.G.R. BOLT (post 2 only)	B581002
e	6	0.63" Dia. x 18" H.G.R. BOLT (posts 3-8)	B581802
f	43	0.63" Dia. H.G.R. NUT	N050
g	11	H.G.R. WASHER	W050
h	2	0.98" ANCHOR CABLE HEX NUT	N100
j	2	0.98" ANCHOR CABLE WASHER	W100
k	2	0.37" X 3" LAG SCREW	E350
l	8	CABLE ANCHOR BOX SHOULDER BOLTS	SB58A
m	8	0.50" A325 STRUCTURAL NUTS	N055A
n	16	1.06" OD x 0.55" ID A325 STR. WASHER	W050A



LEAVEOUT DETAIL

Leaveout Requirement:

For posts 3 through 8, leaveouts in the asphaitic concrete pavement, as shown in Section B-B and LEAVEOUT DETAIL, around guardrail posts shall be provided where asphalt thickness exceeds 1.53" nominal (2" max) and where the asplait extends more than 18" behind the posts. The leaveout shall be used at the post locations indicated and the leaveout material to place in the void shall consist of a 1-sack grout mix or other non-cohesive material as approved by the NRDOT Materials Unit.

REVISED ON 4/21/15

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

GUARDRAIL END TREATMENT SKT-350 LAYOUT; SHEET 3 of 3

Designed by: BIA NRO-DOT Structural Unit	
Drawn by: dc	Date: 2/13/2015
Revised by: - - -	Date: - - -
File Name: SKT-350 Sht 3 of 3_2015-02-13	

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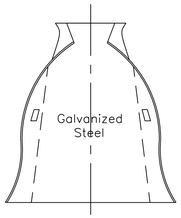
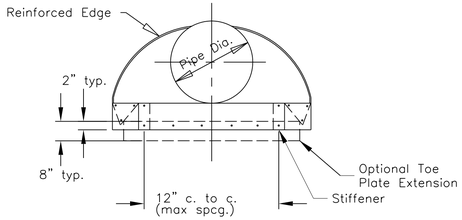
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	19	63

ESTIMATED STRUCTURE QUANTITIES

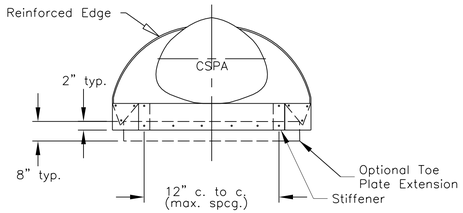
STATION	LOCATION	STRUCTURE DESCRIPTION	SKEW NO.	c.y.	ft.	ft.	ft.	ft.	Ea.	Ea.	Ea.	Ea.
		ITEM NO.		25101-2000	60201-0810	60201-0910	60202-0510	60202-0610	60210-0810	60210-1010	60211-0910	60211-1010
				Placed Riprap, Class 2	24" CSPC-16 Gauge 2 2/3" x 1/2" Corrugation	36" CSPC-16 Gauge 2 2/3" x 1/2" Corrugation	28" Span x 20" Rise CSPA-16 Gauge 2 2/3" x 1/2" Corrugation	35" Span x 24" Rise CSPA-16 Gauge 2 2/3" x 1/2" Corrugation	End Section For 24" CSPC-16 Gauge	End Section For 36" CSPC-16 Gauge	End Section For 28" Span x 20" Rise CSPA 16 Gauge	End Section For 35" Span x 24" Rise CSPA 16 Gauge
3+55.00	Lt.	1-24"ø x 68' CSPC (Under Turnout Lt.)			68'				2			
6+60.00	℄	1-35" Span x 24" Rise x 70' CSPA With End Section	90°					70'				1
19+75.00	Rt.	1-24" x 40' CSPC (Under Turnout Rt.)		5.62	40'				2			
36+00.00	℄	2-36" x 106' CSPC	135°	33.22		212'				2		
47+40.00	℄	1-24" x 70' CSPC	90°		70'				1			
		Sub-total :		38.84	178'	212'	0	70'	5	2	0	1
MAINTENANCE ROAD RIGHT TURNOUT TO EXISTING BRIDGE												
0+50.00	℄	1-28" Span x 20" Rise x 50' CSPA With End Section	90°				50'				2	
5+05.00	Lt.	1-28" Span x 20" Rise x 46' CSPA With End Section	90°				46'				2	
5+90.00	Lt.	1-28" Span x 20" Rise x 46' CSPA With End Section	90°				46'				2	
370 ft	--	Trapezoidal Channel Lining with Class-2 Rip Rap		27.0								
		Sub-total :		0	0	0	142'	0	0	0	0	0
		GRAND TOTAL :		66.0	178'	212'	142'	70'	5	2	6	1



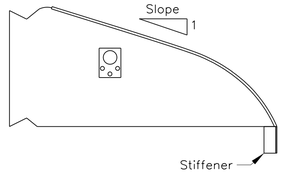
PLAN



ELEVATION



ELEVATION



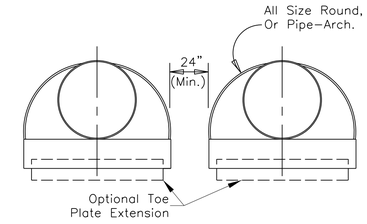
TYPICAL CROSS SECTION

DIMENSIONS:

A, B, F, H, & L See Table 2.39, 2.40, And 2.41 In "Handbook Of Steel Drainage & Highway Construction Projects" Latest Editions.

GENERAL NOTES

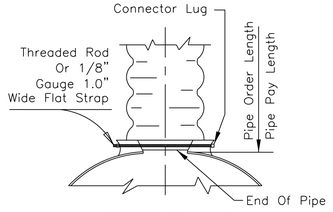
1. FOR MULTIPLE INSTALLATION OF ALL TYPES, A MINIMUM OF A 24" SPACING MEASURED ALONG THE HORIZONTAL BETWEEN FLARED END SECTIONS AT THEIR WIDEST CROSS SECTION SHALL BE USED.
2. ALL THREE (3) PIECE BODIES TO HAVE 0.109" THICKNESS SIDES AND 0.138" THICKNESS CENTER PANELS. WIDTH OF CENTER PANELS TO BE GREATER THAN 20% OF THE PIPE PERIPHERY. MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED BY 0.375" ø GALVANIZED RIVETS OR BOLTS.
3. END SECTIONS FOR STEEL PIPE-ARCHES: FOR THE 77" x 52" AND 83" x 57" SIZES, REINFORCED EDGE TO BE SUPPLEMENTED BY 2" x 0.25" GALVANIZED ANGLES. THE ANGLES TO BE ATTACHED BY 0.375" DIA. GALVANIZED NUTS AND BOLTS. ANGLE REINFORCEMENT WILL BE PLACED UNDER THE CENTER PANEL SEAMS.
4. END SECTIONS FOR STEEL CIRCULAR PIPES: FOR 60" ø THRU 84" ø SIZES, REINFORCED EDGE TO BE SUPPLEMENTED WITH GALVANIZED STIFFENER ANGLES. THE ANGLES WILL BE 2" x 2" x 0.25" FOR 60" ø THRU 72" ø, AND 2.52" x 2.52" x 25" FOR 78"ø AND 84" ø. THE ANGLES TO BE ATTACHED BY 0.375" ø 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 24" ø ROUND PIPE AND 28" x 20" CSPA.
7. TYPE NO. 2 STEEL END SECTION, CONNECT END SECTION WITH THREADED ROD WITH ROD HOLDER FOR 30" ø AND 36" ø ROUND PIPE AND 17" x 13" THRU 57" x 38" CSPA.
8. TYPE NO. 3 STEEL END SECTION, THE CONNECTION INCLUDES 12" OF THE PIPE LENGTH AS A CONNECTOR SECTION FOR PIPE ARCH SIZES 64" x 43" THRU 84" x 57" AND ROUND PIPE SIZES 42" ø THRU 84" ø. 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 0.374 ø GALVANIZED RIVETS OR BOLTS APPROXIMATELY 6" 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 0.374" ø GALVANIZED STEEL RIVETS OR BOLTS SPACED AT APPROXIMATELY 6" 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.
11. ALL CUT ENDS OF PIPE MUST BE CLEANED AND EITHER REGALVANIZED OR PAINTED AT THE FABRICATION PLANT USING GALVANIZED-ZINC PAINT PER THE MANUFACTURES RECOMENDATIONS WITH MATERIAL CERTIFICATIONS SUBMITTED.



MULTIPLE INSTALLATION SPACING

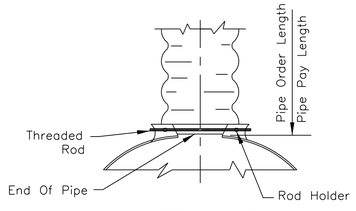
NOTE: At Roadway Culverts Place End Sections On Inlet End Only. At Driveway Culverts Place End Sections On Both Ends.

REVISED ON 12/12/2013



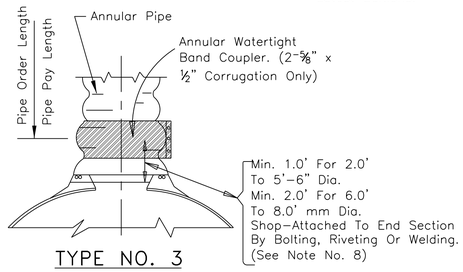
TYPE NO. 1

For 1.0' Thru 2.0' CSPC & 3'-⅜" x 1'-8" CSPA (See Note No. 6)

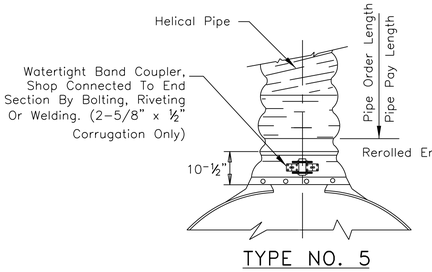


TYPE NO. 2

For 2'-6" & 3.0' CSP And 1'-5" x 1'-1" thru 4'-9" x 3'-2" CSPA Only (See Note No. 7)



TYPE NO. 3



TYPE NO. 5

(SEE NOTE NO. 6)

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

STRUCTURE QUANTITIES

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 1/28/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.19_Drainage Str. Quantity.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	20	63

CHART TO DETERMINE SINGLE POST SIZE

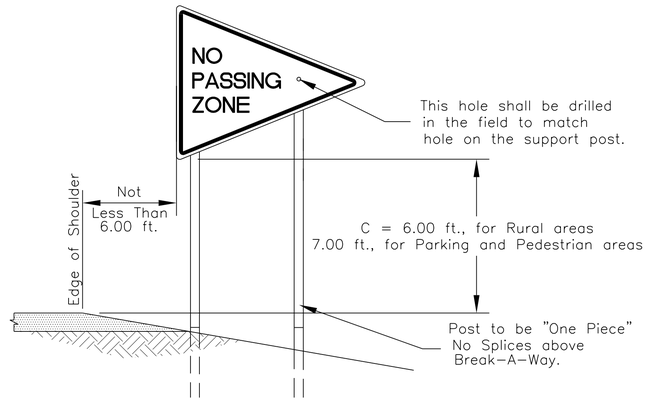
POST SIZE	K FACTOR (B x A)	B DIMENSION (Feet) 5	6	7	8	9	10	11	12	13	14	15	16	
2.00 lb/ft	DOES NOT APPLY	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.7	3.4	3.2	2.9	2.8	
2.25 lb/ft		5.1	5.1	5.1	5.1	5.1	5.1	4.6	4.2	3.9	3.6	3.4	3.2	
2.75 lb/ft		6.7	6.7	6.7	6.7	6.7	6.7	6.0	5.5	5.1	4.7	4.4	4.1	A(ft ^{2})
3.00 lb/ft		7.3	7.3	7.3	7.3	7.3	7.3	7.3	6.7	6.2	5.6	5.1	5.0	SIGN AREA
4.00 lb/ft		9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	8.6	8.0	7.5	7.0	

CHART TO DETERMINE DOUBLE POST SIZE

POST SIZE	K FACTOR (B x A)	B DIMENSION (Feet) 5	6	7	8	9	10	11	12	13	14	15	16	
2.00 lb/ft	97.00	19.4	16.1	13.8	12.1	10.8	9.7	8.8	8.1	7.5	6.9	6.5	6.1	
2.25 lb/ft	109.00	21.9	18.2	15.6	13.7	12.2	10.9	9.9	9.1	8.4	7.8	7.3	6.8	
2.75 lb/ft	142.00	28.4	23.7	20.3	17.8	15.8	14.2	12.9	11.8	10.9	10.1	9.5	8.9	A(ft ^{2})
3.00 lb/ft	174.00	34.8	29.0	24.9	21.8	19.3	17.4	15.8	14.5	13.4	12.4	11.6	10.9	SIGN AREA
4.00 lb/ft	241.00	48.2	40.2	34.4	30.1	26.8	24.1	21.9	20.1	18.5	17.2	16.1	15.1	

CHART TO DETERMINE THREE POST SIZE

POST SIZE	K FACTOR (B x A)	B DIMENSION (Feet) 5	6	7	8	9	10	11	12	13	14	15	16	
2.00 lb/ft	145.00	29.0	24.2	20.7	18.1	16.1	14.5	13.2	12.1	11.2	10.4	9.7	9.1	
2.25 lb/ft	164.00	32.8	27.3	23.4	20.5	18.2	16.4	14.9	13.7	12.6	11.7	10.9	10.3	
2.75 lb/ft	213.00	42.6	35.5	30.4	26.6	23.6	21.3	19.3	17.7	16.3	15.2	14.2	13.3	A(ft ^{2})
3.00 lb/ft	261.00	52.2	43.5	37.3	32.6	29.0	26.1	23.7	21.7	20.0	18.6	17.4	16.3	SIGN AREA
4.00 lb/ft	361.00	72.2	60.1	51.5	45.1	40.1	36.1	32.8	30.0	27.7	25.8	24.0	22.5	



TYPICAL ROADSIDE SIGN LOCATION

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 exceed of 30" x 30" size shall be install with a minimum of two (2) steel posts.

illustration of posts/weight determination:

REQUIRED: Determine Post Requirement
For a 5.00 ft. wide x 4.00 ft. high traffic Sign.
Located On A Rural Highway.

GIVEN: W=5.00 ft.
D=4.00 ft.
C = 6.00 ft, for Rural areas

SOLUTION: 1) B= C+(D/2)
B = 6.00 ft. + (4 ft/2)
B = 8.00 ft.

2) A = W X D
A = 5.00 ft. x 4.00 ft)
A = 20 ft.^{2}

3) K factor = A X B
K = 20 x 8
K = 160

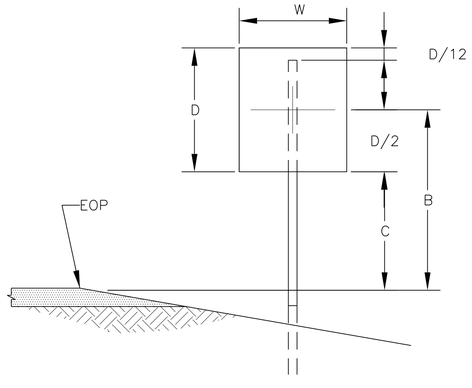
4. Begin with single post chart for column of B=8.00 ft. and continue down until area of sign equal or exceed 20 sq./ft. or down the K factor column until the value equaals or exceeds 160. Both the Area and K factor exceed the single post chart so go to the double post chart.

Select two (2) Posts of 3.00 lb/ft.
Yields a factor of 174
Which Is Optimum.

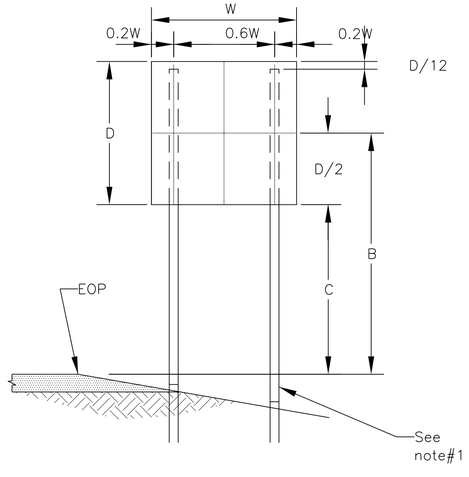
EXAMPLE: 160 ➡

K factor	Post weight	B=8
142	2.75 lb/ft	17.8
174	3.00 lb/ft	21.8
241	4.00 lb/ft	30.1

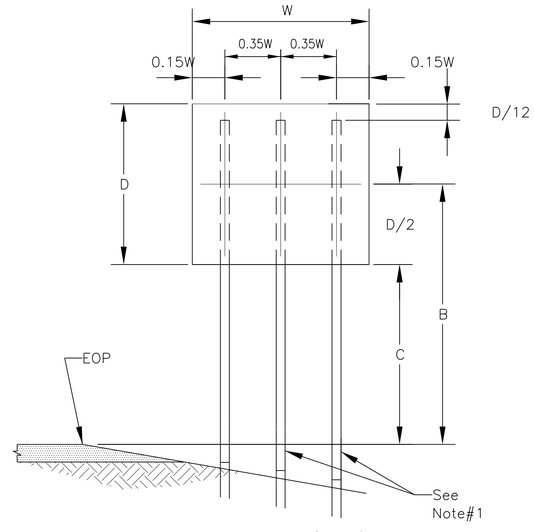
➡ 20



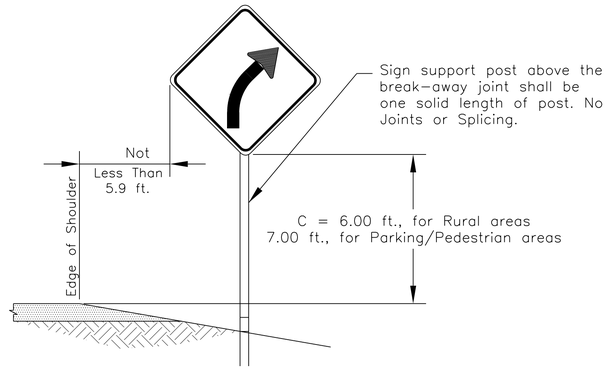
SINGLE POST SIZE (typ.)



DOUBLE POST SIZE (typ.)



THREE POST SIZE (typ.)



TYPICAL ROADSIDE SIGN LOCATION

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

PERMANENT SIGNING DETAIL

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.20 Perm Sign Std Details1.dgn	

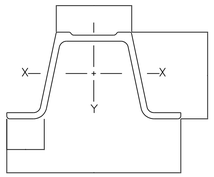
J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	21	63

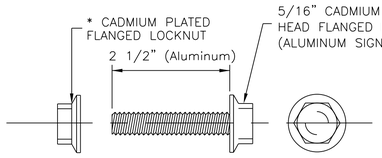
RIB-BAK U-CHANNEL SIGN SUPPORTS

WEIGHT *lb/ft	DIMENSIONS (inches)				AREA	X-X AXIS		Y-Y AXIS	
	A	B	C	D	in^2	in^4	in^3	in^4	in^3
2.0	1.462	3.062	1.278	.669	.556	.155	.195	.422	.276
2.5	1.516	3.062	1.278	.669	.701	.208	.249	.550	.359
2.75	1.536	3.062	1.278	.669	.756	.228	.270	.598	.391
3.0	1.881	3.500	1.336	.834	.840	.376	.340	.837	.478
4.0	1.968	3.500	1.336	.834	1.112	.540	.467	1.147	.655

* ±5%

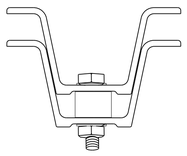


RIB-BAK U-CHANNEL

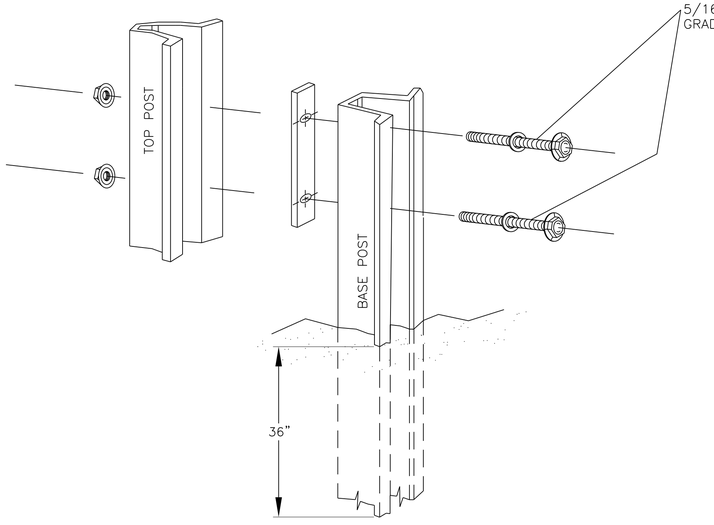


BOLTS AND LOCKNUT – SIGN ATTACHMENT

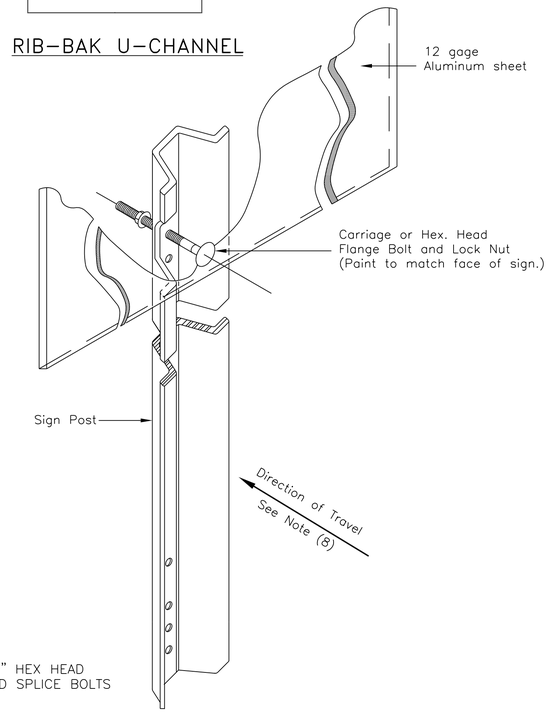
* FLANGED LOCKNUT REQUIRED FOR CARRIAGE AND HEX.



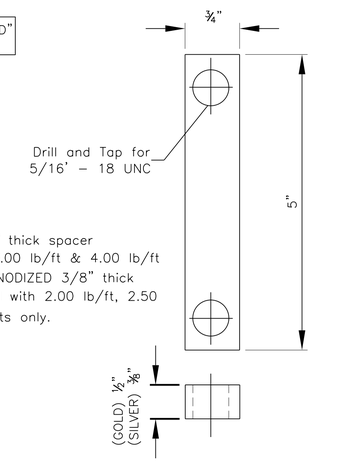
LAP SPLICE – TOP VIEW



LAP SPLICE CONNECTION DETAIL



NOTE: ALL BOLTS TO BE "BURRED" TO PREVENT LOOSENING



NOTE: The GOLD ANODIZED 1/2" thick spacer bar is to be used with 3.00 lb/ft & 4.00 lb/ft posts only. The SILVER ANODIZED 3/8" thick spacer bar is to be used with 2.00 lb/ft, 2.50 lb/ft, and 2.75 lb/ft posts only.

LAP SPLICE SPACER BAR

GENERAL NOTES

1. 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 OF THE STEEL SHALL BE 550 MPa (MINIMUM) TENSILE SHALL BE 689.47 MPa (MINIMUM).
2. POSTS SHALL BE A UNIFORM, MODIFIED, FLANGED CHANNEL SECTION OF THE RIB-BAK DESIGN. WEIGHT OF THE POSTS SHALL BE AS SPECIFIED BY THE USER, ±5% BEFORE PUNCHING. THE POSTS SHALL BE PUNCHED WITH WITH CONTINUOUS 3/8" HOLES ON 1" CENTERS FOR THE ENTIRE LENGTH OF THE POST.
3. THE POSTS SHALL BE MACHINE STRAIGHTENED TO HAVE A SMOOTH UNIFORM FINISH, FREE FROM DEFECTS AFFECTING THEIR STRENGTH, DURABILITY, OR APPEARANCE. ALL HOLES AND ROUGH EDGES SHALL BE FREE FROM BURRS. THE PERMISSIBLE TOLERANCE FOR STRAIGHTNESS SHALL BE WITHIN 1/4" IN 5 FEET
4. POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 123. BOLTS, NUTS, WASHERS AND SPACER SHALL BE CADMIUM PLATED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 165 OR ZINC PLATED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM B 633.
5. SPLICE HARDWARE SHALL CONSIST OF TWO FULLY THREADED, 5/16" x 1 1/2" GRADE 9 PLATED, HEX HEAD BOLTS, WITH FLAT WASHERS, AND SELF LOCKING HEX NUTS PER POST. IN ADDITION, ONE 3/4" x 5" PLATED SPACER BAR SHALL BE USED, PER POST, TO STIFFEN THE SPLICE CONNECTION. EACH SPACER BAR SHALL BE DRILLED AND TAPPED WITH 5/16"-18 UNC THREADS. THE SPACER SHALL BE FABRICATED FROM HOT ROLLED CARBON STEEL BARS CONFORMING TO ASTM A 36 OR M 1020. BOLTS SHALL BE RED IN COLOR, WITH THE HEAD MARKING "M180".
6. BOLTS AND LOCK NUT HARDWARE FOR SIGN ATTACHMENT SHALL BE HEX HEAD FLANGE TYPE, SIZE SHALL BE 5/16"-18 UNC.
7. AN APPROVED ALTERNATE BREAKAWAY POST ASSEMBLY MAY BE SUBMITTED TO THE C.O.R. FOR REVIEW AND APPROVAL.
8. SUPPLEMENTAL SIGNS ON THE OPPOSITE SIDE OF ROAD SHALL HAVE THE POST REVERSED SO THAT RIB-BAK IS FACING AWAY FROM THE OPPOSING TRAFFIC.
9. THE POST SHALL BE COATED WITH A BAKED ON GREEN ALKYD RESIN, PAINT, PAINTED WITH A POLYESTER POWDER OR GALVANIZED PER NOTE 4 ABOVE. POWDER COATING SHALL CONFORM TO AASHTO M 284-08.

INSTALLATION PROCEDURE

STEP 1:
DRIVE BASE POST TO WITHIN APPROXIMATELY ONE FEET 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 4" 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 2" 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.

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

LAP SPLICE U-CHANNEL BREAKAWAY SYSTEM

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.21 Perm Sign Std Details2.dgn	

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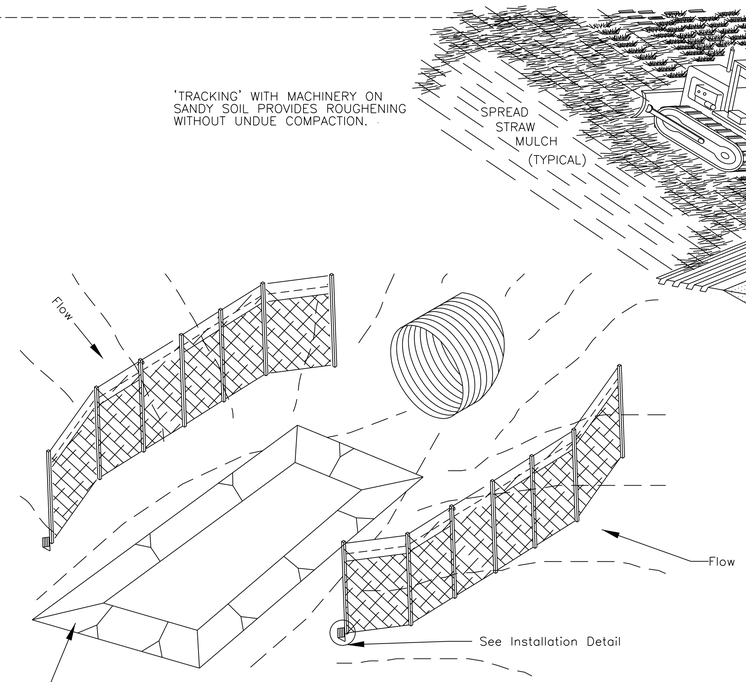
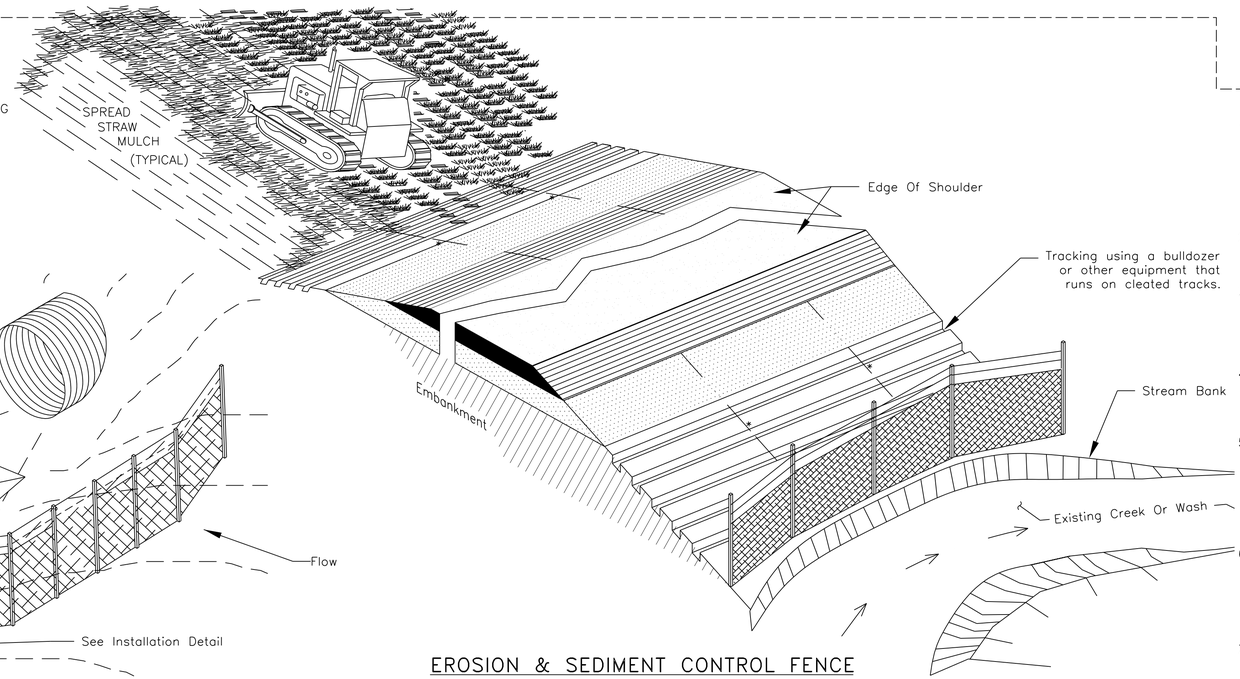
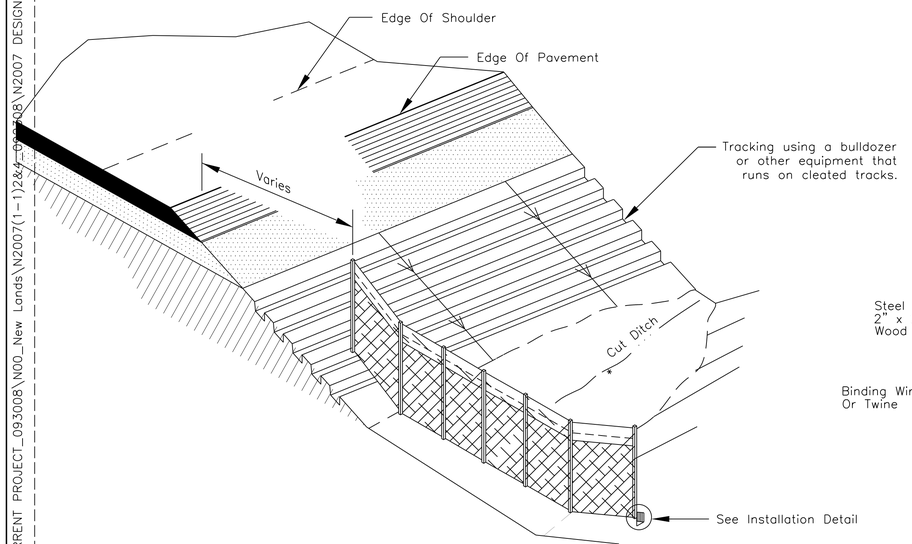
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	22	63



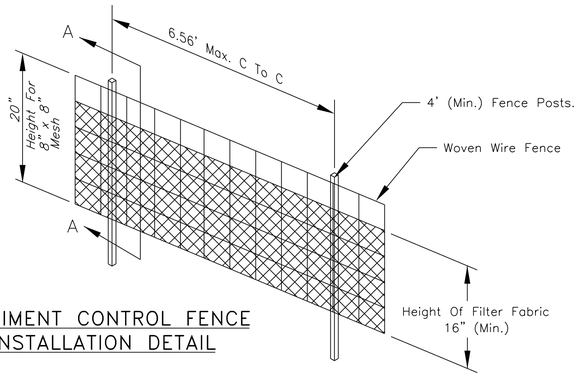
EROSION & SEDIMENT CONTROL FENCE
AT DRAINAGE STRUCTURE



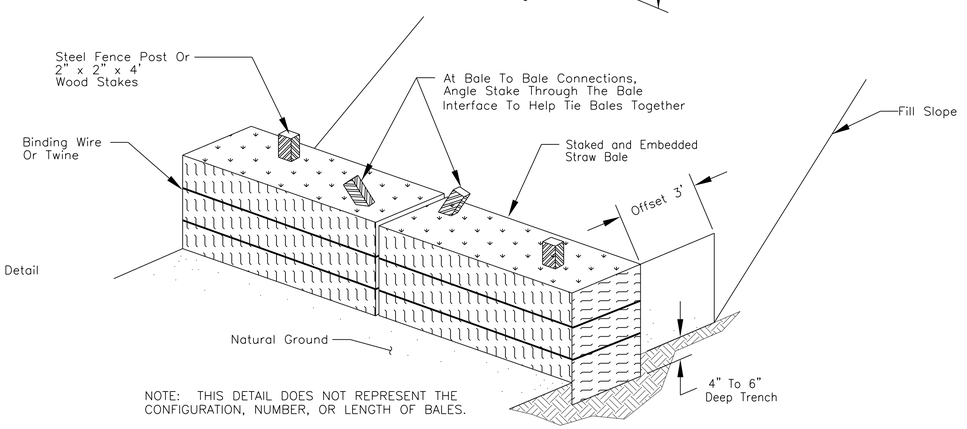
EROSION & SEDIMENT CONTROL FENCE
ALONG EDGE OF STREAM BANK (TOE OF SLOPE)



EROSION & SEDIMENT CONTROL FENCE
IN MINOR SWALES OR CUT DITCHES
(APPROX 197' SPACING FOR FABRIC)



SEDIMENT CONTROL FENCE
INSTALLATION DETAIL

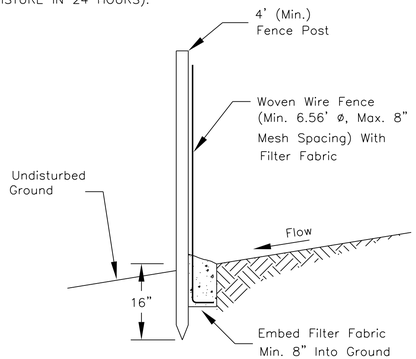


NOTE: THIS DETAIL DOES NOT REPRESENT THE CONFIGURATION, NUMBER, OR LENGTH OF BALES.

TYPICAL STRAW BALE STAKING
AND TRENCHING DETAIL

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 CALENDAR 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 36" SEDIMENT CONTROL FABRIC CLOTH WITH BURIED-TOE, AND STEEL POSTS (TEE OR U TYPE) SPACED AT 6.56' WITH 3/32" 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 24" 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 SECTION OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 6" AND FOLDED. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "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 6.56' 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 3' TO 6' DOWNHILL FROM THE TOE OF THE 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 2" x 2" x 4' 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 15708-1000.
8. SEDIMENT/SILT FENCING SHALL BE PLACED AT ALL LOCATIONS WHERE EMBANKMENTS HAVE SLOPE DISTANCES OF 100' OR GREATER. THE SEDIMENT FENCING WILL BE PLACED AT THE TOE OF SLOPES OFFSET 3-6 FEET.
9. THE CONTRACTOR SHALL INSPECT AND MAINTAIN ALL SWPPP MEASURES WEEKLY AND AFTER EACH SIGNIFICANT STORM EVENT (I.E. 1" OF MOISTURE IN 24 HOURS).



SECTION A-A

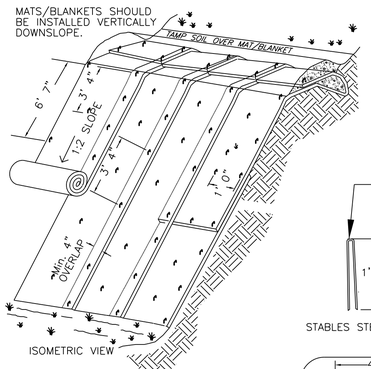
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STORMWATER POLLUTION & EROSION SEDIMENT CONTROL DETAILS

DRAWN BY: Gerald.Hood	DATE: 5/6/2009
DESIGNED BY: NRDOT	DATE: 5/6/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.22 Erosion Control Details1.dgn	

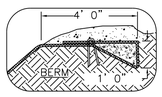
J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092508\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	23	63



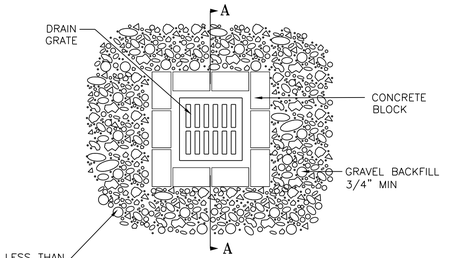
TYPICAL SLOPE SOIL STABLIZATION

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.

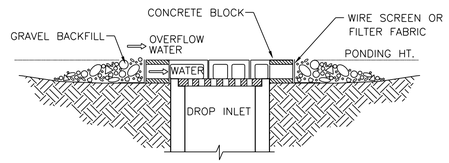


NOT TO SCALE

EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION



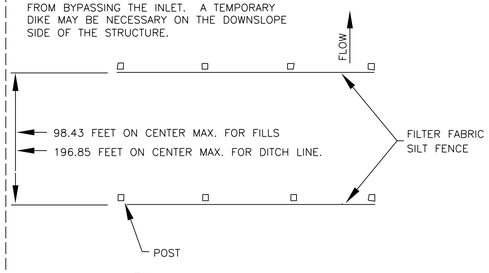
PLAN VIEW



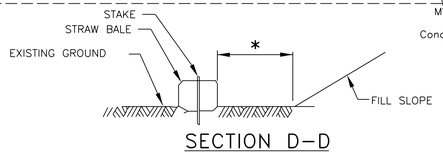
SECTION A – A

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.

BLOCK AND GRAVEL DROP INLET SEDIMENT BARRIER

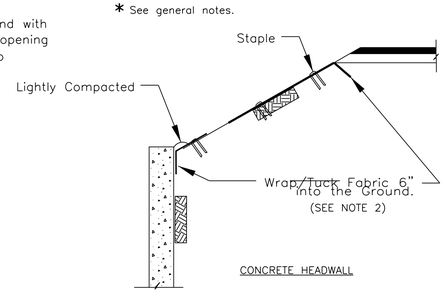


PLAN
SILT FENCE EROSION CHECK

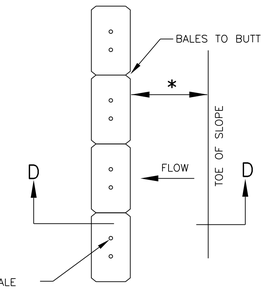


SECTION D–D

* See general notes.

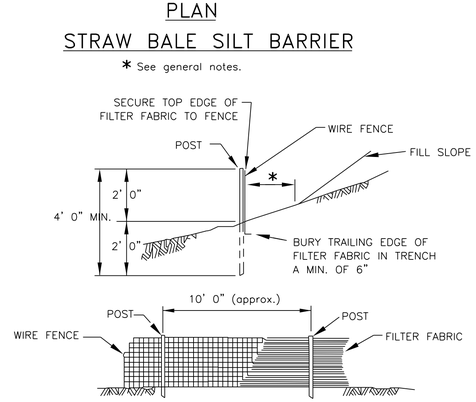


CONCRETE HEADWALL



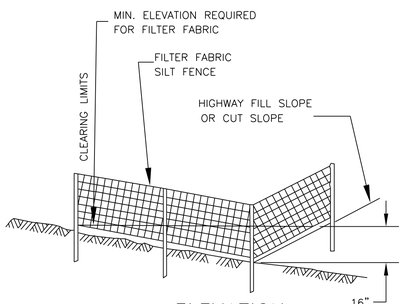
PLAN
STRAW BALE SILT BARRIER

* See general notes.

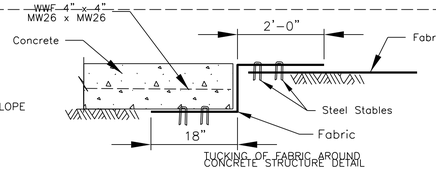


FILTER FABRIC SILT FENCE

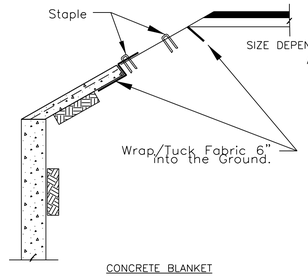
* See general notes.



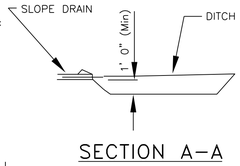
ELEVATION



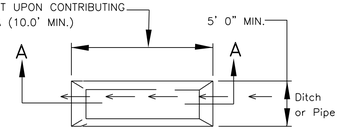
TUCKING OF FABRIC AROUND CONCRETE STRUCTURE DETAIL



CONCRETE BLANKET



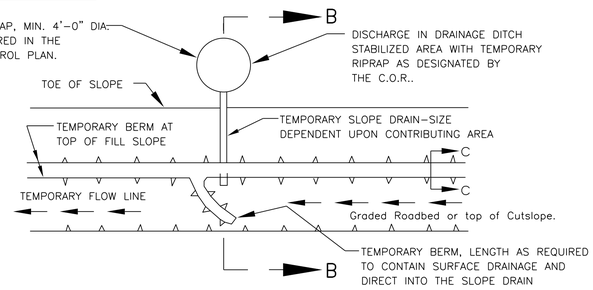
SECTION A–A



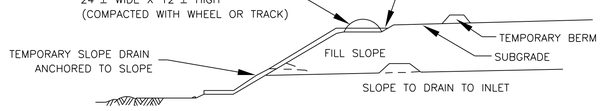
SEDIMENT TRAP

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

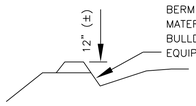
TEMPORARY CLASS I RIPRAP, MIN. 4'–0" DIA. AND 9" THICK, AS REQUIRED IN THE APPROVED EROSION CONTROL PLAN.



PLAN VIEW

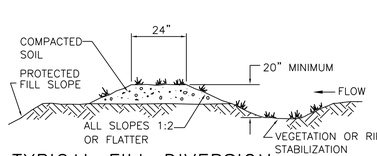


SECTION B–B



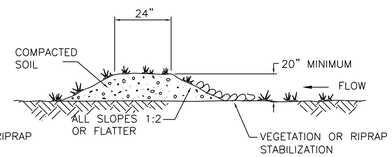
SECTION C–C

Temporary Slope Drain, Berm. (for fill and cutslopes)
[NOTE: Temporary berms may also be constructed of straw bales set 4"to 6" into ground.]



TYPICAL FILL DIVERSION

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 STABILIZED 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.



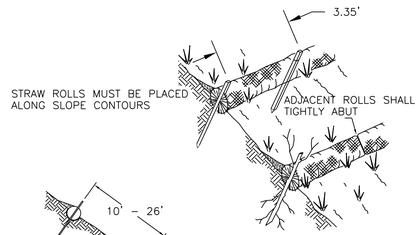
TYPICAL TEMPORARY DIVERSION DIKE

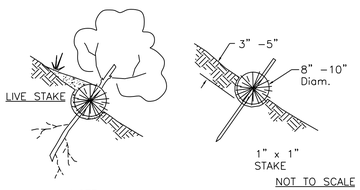
(FOR TOP OF CUT BACK SLOPES.)

TEMPORARY DIVERSION DIKE

GENERAL NOTES

1. SEE SHEET 22 OF 63 FOR ADDITIONAL NOTES AND DETAILS.
2. THE CONTRACTOR SHALL INSTALL GEOTEXTILE FABRIC, TYPE IV, AROUND CONCRETE STRUCTURE, AS FOLLOWS:
   a) Constructure finish grading around structure to be placed.
   b) Cut trenches for footing of slab.
   c) Install 4' of Geotextile Fabric anchored on floor and top, along the cut face of trench 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 SEDIMENT 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 WHEN THE PERMANENT EROSION CONTROL MEASURES ARE SATISFACTORILY ESTABLISHED. DRAINAGE DITCHES, AND CHANNELS ARE LINED AND STABILIZED, IN ACCORDANCE WITH SECTION 157 OF FP–03.





NOT TO SCALE

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

STRAW ROLLS

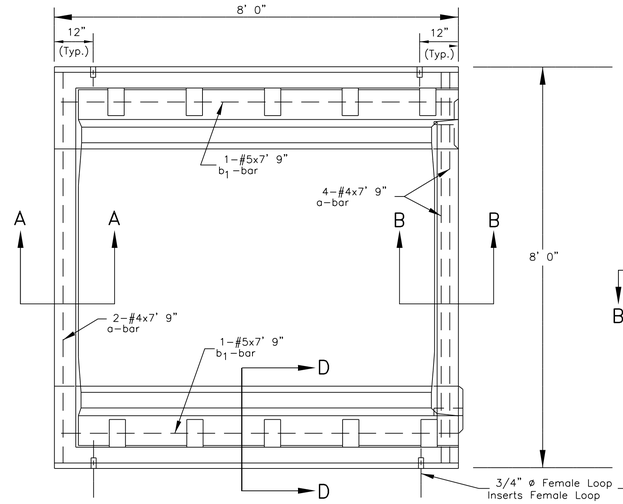
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SEDIMENT CONTROL DETAILS
EROSION/SEDIMENT CONTROL DETAIL

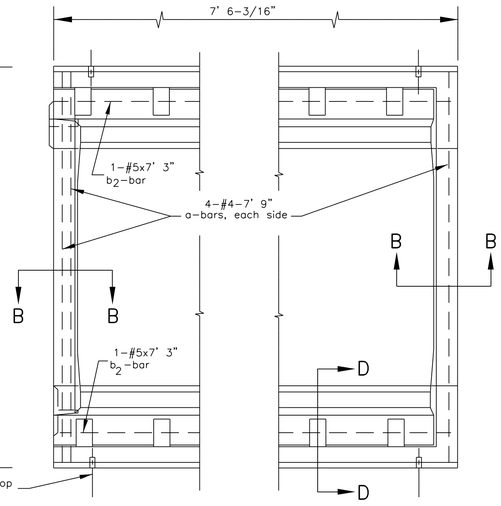
DRAWN BY: Gerald.Hood	DATE: 5/6/2009
DESIGNED BY: NRDOT	DATE: 5/6/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.23_Erosion Control Details2.dgn	

J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

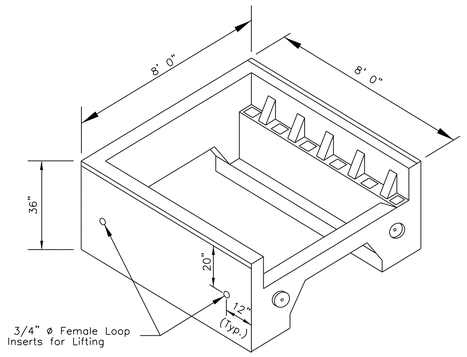
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	24	62



PLAN – END UNIT



PLAN – INTERMEDIATE UNIT



ISOMETERIC VIEW – END UNIT

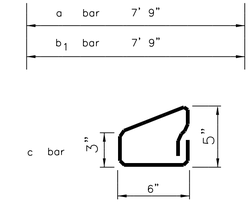
GENERAL NOTE:

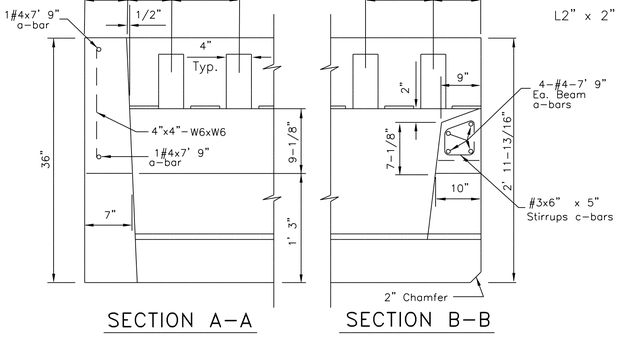
1. Precast concrete shall attain 28-day compressive strength of 4,000 psi (minimum) in accordance with AASHTO T22 (ASTM C-39). The concrete shall be Class A(AE) conforming to Section 552 of FP-03.
2. Reinforcing steel shall conform to ASTM A615, Grade 420. All structural steel shall conform to AASHTO 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 M 111 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, he/her 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, 2004.

   Design Loads: HS20 and Design Tandem with 33% impact.

REINFORCING STEEL SCHEDULE

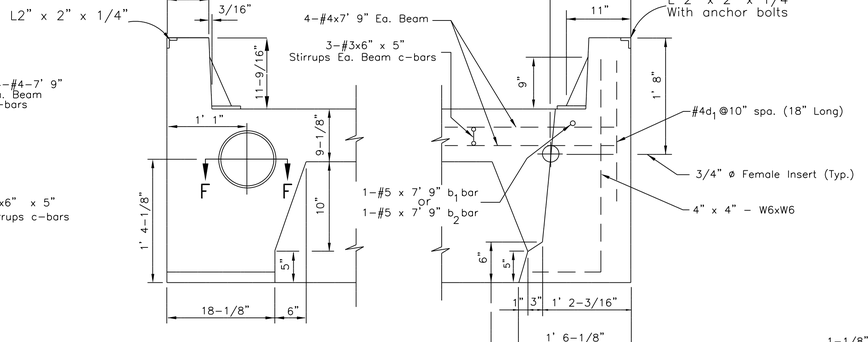
STRAIGHT BARS				BENT BARS				BENDING DIAGRAMS
MARK	NO.	SIZE	LENGTH	MARK	NO.	SIZE	LENGTH	ALL DIMENSIONS ARE OUT TO OUT
END UNIT								
a	6	4	7' 9"					
b_1	2	5	7' 9"					
c					3	3	2' 0"	
D_1	20	4	1' 6"					
INTERMEDIATE UNIT								
a	8	4	7' 9"					
b_2	2	5	7' 3"					
c					6	3	2' 0"	
D_1	18	4	1' 6"					





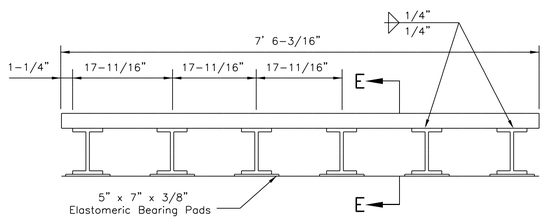
SECTION A–A

SECTION B–B

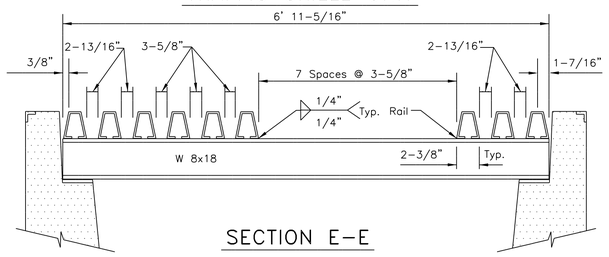


KEY LOCATION

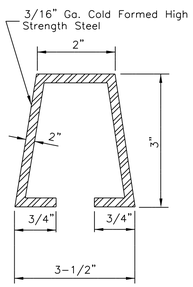
SECTION D–D



TRAFFIC GRILLE UNIT

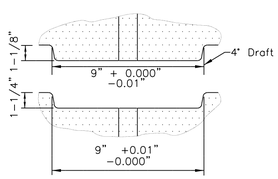


SECTION E–E

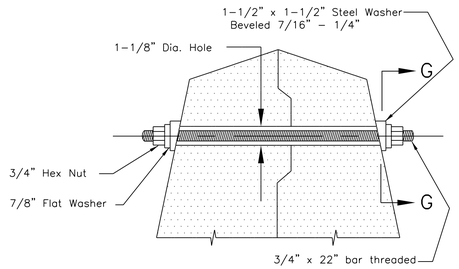


STEEL CROSSBAR SECTION

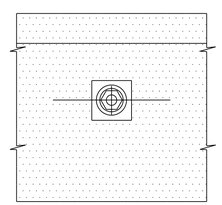
15 Req'd for 1 Grid



SECTION F–F



TIE BOLT DETAIL



SECTION G–G

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRECAST CONCRETE CATTLEGUARD DETAILS

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.24_Precast Cattleguard Std.dgn	

J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

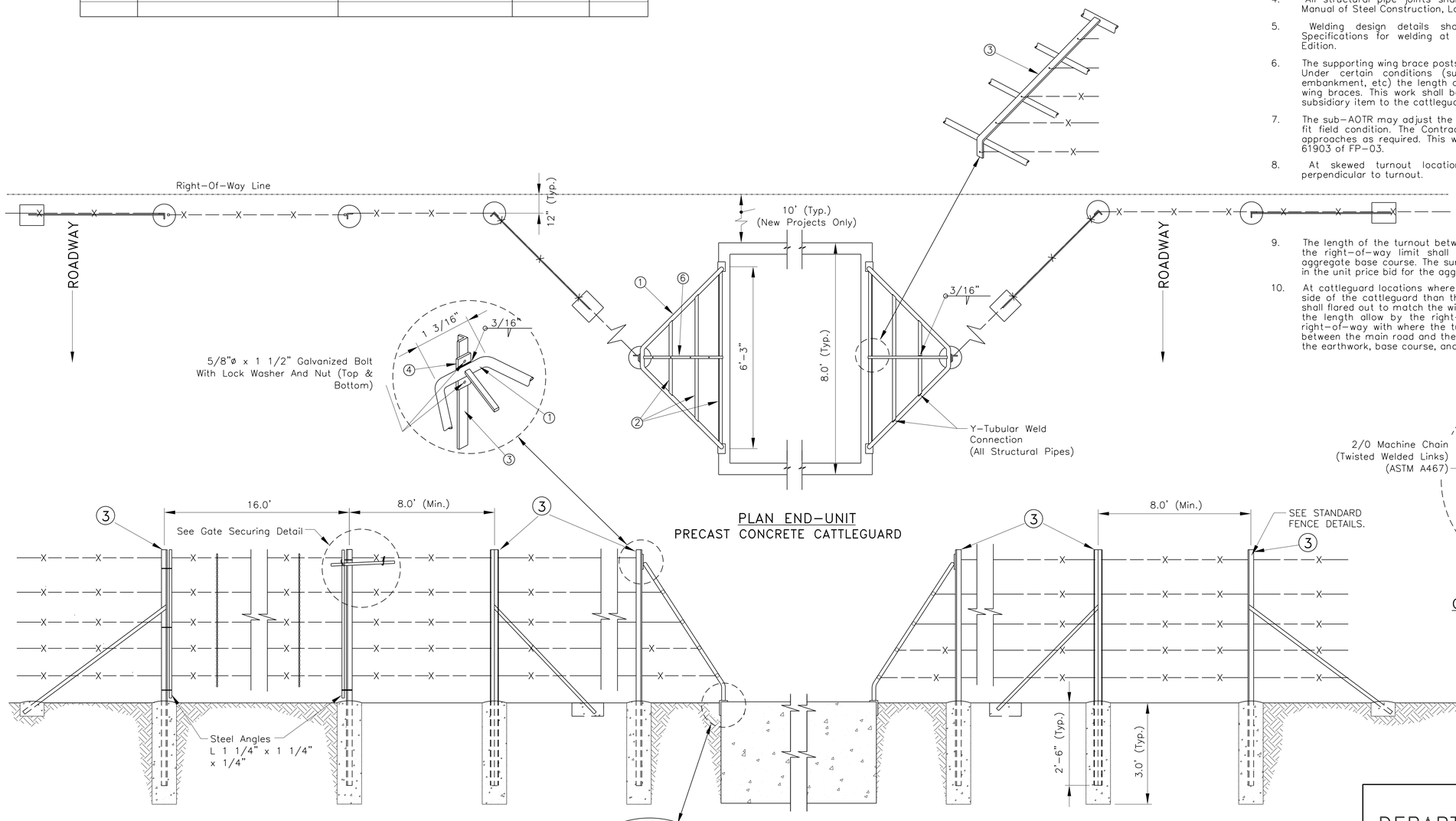
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	25	63

ESTIMATED MATERIAL LIST

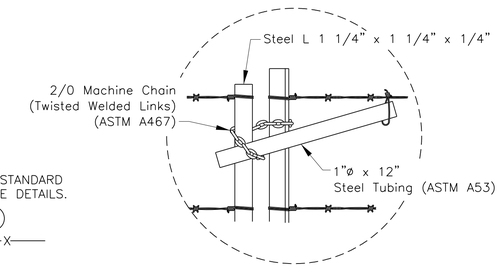
PART NO.	MATERIAL	SIZE AND THICKNESS	LENGTH	QUANTITY
1	Structural Steel Pipe	2 1/2" ø Nominal	14'-2"	2
2	Structural Steel Pipe	1 1/4" ø Nominal	13'-9"	2
3	Steel Angle (See Note 4 & 6)	L 2 1/2" x 2 1/2" x 3/8"	7' 6-3/16"	2
4	Steel Plate	3 1/2" x 3/8"	7"	2
5	Steel Angle	L 6" x 3 1/2" x 3/8"	3 1/2"	4
6	Bar	1" x 1/4"	5' 6-1/8"	2
	Bolts, Nuts and Washers	As Shown		

GENERAL NOTES

1. Structural pipe shall conform to ASTM A53-93a, Grade B. All other structural steel shall conform to ASTM-A36.
2. Bolts, nuts, and washers shall be galvanized in accordance with AASHTO M111 (ASTM A123).
3. All wing brace structural steel and pipe 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.
4. All structural pipe joints shall be fabricated in accordance with AISC Manual of Steel Construction, Latest Edition.
5. Welding design details shall conform to the AASHTO Standard Specifications for welding at Structural Steel Highway Bridges, Latest Edition.
6. The supporting wing brace posts length (part 3) shall be 7'-6" (minimum). 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 item 61903. Gate shall be subsidiary item to the cattleguard item(s).
7. The sub-AOTR may adjust the finished cattleguard elevation as needed to fit field condition. The Contractor shall re-grade the adjoining turnout approaches as required. This work shall be considered incidental to Item 61903 of FP-03.
8. At skewed turnout locations, the cattleguard shall be installed perpendicular to turnout.
9. The length of the turnout between the back edge of the cattleguard and the right-of-way limit shall be surfaced with a 4-inch thickness of aggregate base course. The surfacing material and work shall be included in the unit price bid for the aggregate item shown in the bid schedule.
10. At cattleguard locations where the design roadway 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 with where the turnout radius cannot be completely install between the main road and the cattleguard. This work shall be paid under the earthwork, base course, and paving items included in the bid schedule.



PLAN END-UNIT
PRECAST CONCRETE CATTLEGUARD



GATE SECURING DETAIL

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

CATTLEGUARD WING-BRACE DETAILS

DRAWN BY: Gerald.Hood	DATE: 5/6/2009
DESIGNED BY: NRDOT	DATE: 5/6/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.25_C-GuardWingBraceDetails.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N007	N2007(1-1)1,2&4	26	63

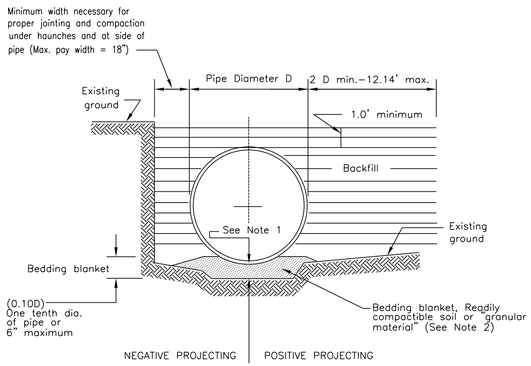


FIG. A. CLASS C BEDDING

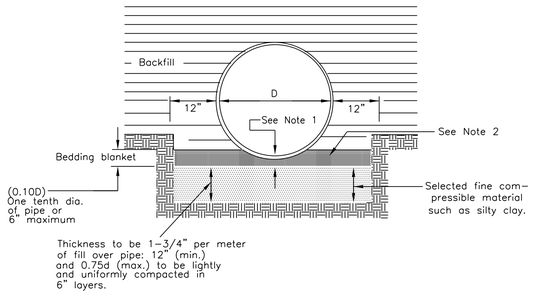


FIG. B ROCK BEDDING

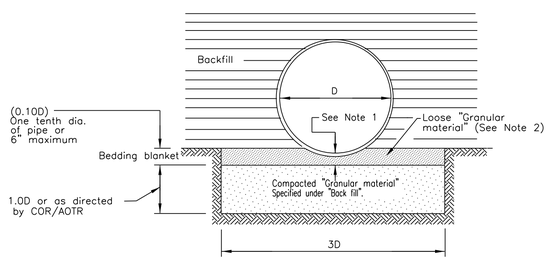
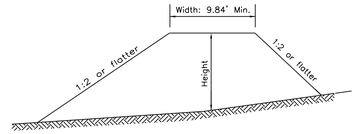
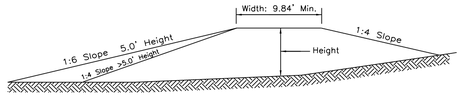


FIG. C. FOUNDATION STABILIZATION BEDDING

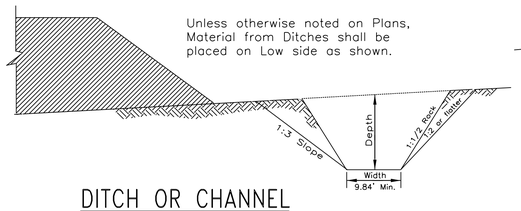


TYPE "A" DIKE



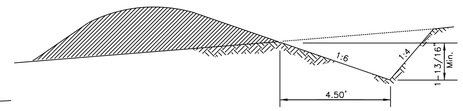
TYPE "B" DIKE

NOTE: When necessary the slope may be flattened to 1:6 with bit. mix or soil cement protection as called for on plans.



DITCH OR CHANNEL

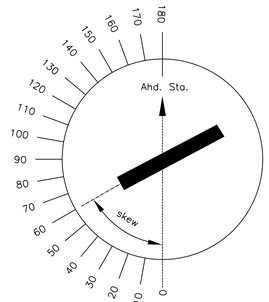
Note: DIMENSIONS OF DITCHES AND DIKES as shown on plans are respectively width, depth or height and length.



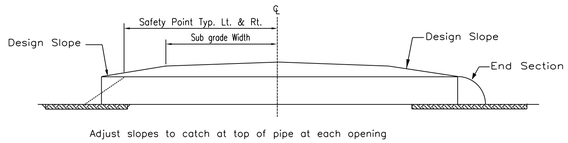
FURROW DITCH

1. To be paid for by linear measure.
2. Furrow ditch sections as shown above or an approved equivalent may be built as directed by the C.O.R./AOTR

DITCH BLOCK DETAILS

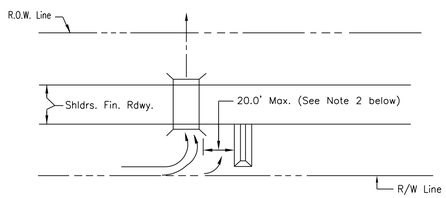


STRUCTURE SKEW DIAGRAM



Adjust slopes to catch at top of pipe at each opening

TYPICAL PIPE INSTALLATION



TYPICAL DITCH BLOCK INSTALLATION AT STRUCTURE

1. Ditch Block at structures to be so placed that they create a water cushion. Elevation top of Ditch Block shall be 6" above elevation of top of pipe unless otherwise shown.
2. Ditch Block 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 20.0'.

GENERAL NOTES

1. PLACE LOOSE BEDDING ROUGHLY SHAPED TO BOTTOM OF PIPE, THEN COMPACTED UNDER HAUNCHES AFTER PIPE PLACEMENT.
2. SEE SECTION 204, 209, 602, AND 704 OF FP-2003, 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 STRUCTURES SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE FABRICATOR'S RECOMMENDATION.
5. BACKFILL MATERIAL SHALL BE PLACED 12-INCH (MIN.) TO 40-INCH (MAX.) PIPE DIAMETER WIDTH ON THE SIDES AND 12-INCH OVER THE PIPE. BACKFILL MATERIAL BEYOND THESE LIMITS SHALL BE REGULAR EARTHWORK EMBANKMENT MATERIAL. THE BACKFILL MATERIAL SHALL BE APPROVED BY THE AOTR/COR 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 24-INCH BETWEEN END SECTIONS UNLESS OTHERWISE DIRECTED BY THE AOTR/COR OR AS SHOWN ON THE PLANS.
9. ALL PIPES SHALL BE PROTECTED BY A COVER OF NOT LESS THAN 36-INCH OF EMBANKMENT ABOVE PIPE BEFORE ANY HEAVY EQUIPMENT IS ALLOWED TO PASS OVER THE STRUCTURE(S) DURING CONSTRUCTION.
10. ALL DRAINAGE STRUCTURES 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(S) BE PLACED BELOW THE ORIGINAL GROUND ELEVATIONS. THIS WORK 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 AOTR/COR. THIS WORK SHALL BE INCIDENTAL TO BID ITEMS UNDER SECTIONS 602, 603, AND 607.
12. ALL CULVERTS UNDER TURNOUTS AND DRIVEWAYS SHALL BE PLACED AT THE PROPOSED DITCH FLOWLINE. THE CONTRACTOR SHALL BE REQUIRED TO FIELD ADJUST THE PROFILE GRADES OVER PIPE AS DIRECTED BY THE AOTR/COR TO PROVIDE FOR THE MINIMUM COVER.
13. TYPE "B" DIKE SHALL BE USED ON THIS PROJECT UNLESS OTHERWISE NOTED ON THE PLANS. EMBANKMENT MATERIAL NEEDED TO BUILD EARTHEN DIKES SHALL BE CONSIDERED INCIDENTAL TO ITEM 20443-2000.
14. IF DIRECTED BY THE AOTR/COR TO BETTER FIT FIELD CONDITIONS, TO MORE SMOOTHLY DIRECT THE FLOW INTO THE PIPE AND/OR LESSEN THE WATER'S IMPACT ON THE FACE OF THE DITCH BLOCKS, THE DITCH BLOCK TO BE CURVED. THIS WORK TO BE INCIDENTAL TO BID ITEM 20443-2000.

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

STANDARD PIPE INSTALLATION AND DITCH DETAILS

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.26_Std.DrainageStruct.Insta.Details.dgn	

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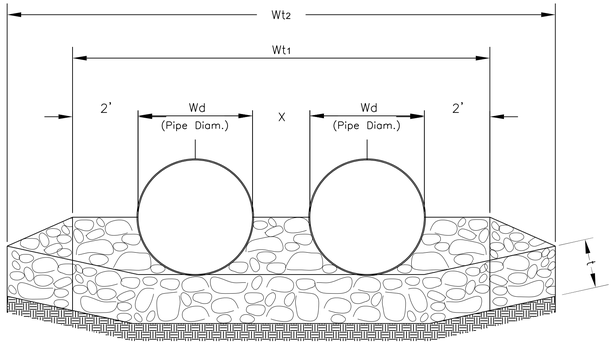
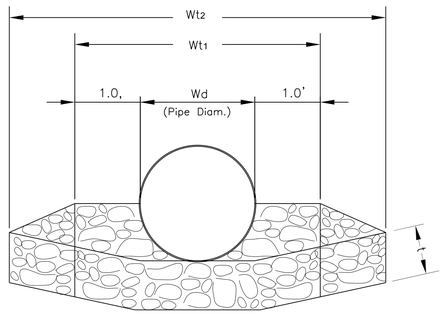
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	27	63



SECTION A–A – DOUBLE BARREL

Distance Between Pipe's
X = 72" For 24" ø CSPC
X = 82" For 30" ø CSPC
X = 93" For 36" ø CSPC



SECTION A–A – SINGLE BARREL

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. 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 THE OBLIGATIONS OF THE CONTRACTOR.

3. EXCAVATION FOR RIPRAP BELOW FLOW LINE AS SHOWN SHALL BE CONSIDERED INCIDENTAL TO ITEM 25101-2000.

4. STONE SIZE SHALL CONFORM TO FP-03, TABLE 705-1, CLASS 2.

5. FILTER FABRIC TYPE IV-B SHALL BE INSTALLED UNDER ALL RIP RAP AND SHALL CONFORM TO SECTION 251, FP-03, AND SHALL BE CONSIDERED INCIDENTAL TO ITEM 25101-2000.

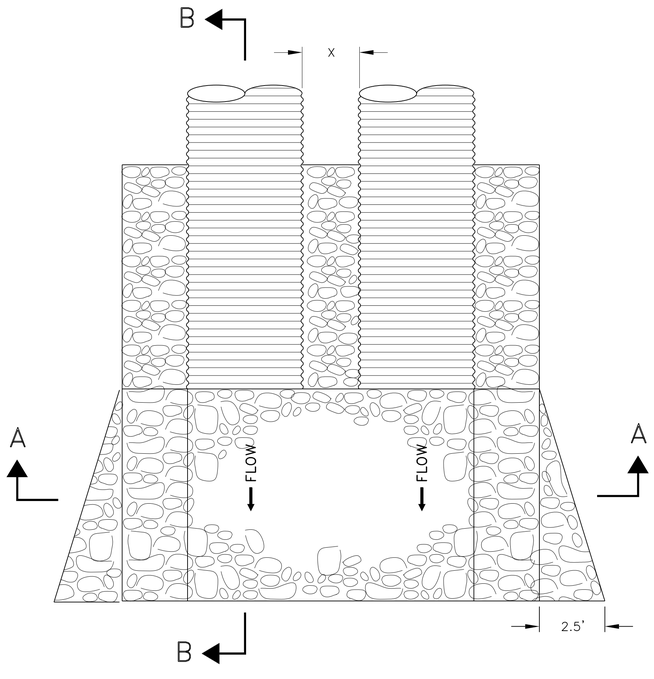
6. THE TOP OF THE RIPRAP SHALL BE INSTALLED TO MATCH THE EXISTING OR FINISHED GROUND ELEVATIONS.

7. FILTER FABRIC SHALL BE TUCKED OR EMBEDDED 16" INTO EMBANKMENT ALONG ALL EDGES AS SHOWN. FILTER FABRIC IS NOT REQUIRED UNDER GROUTED RIPRAP.

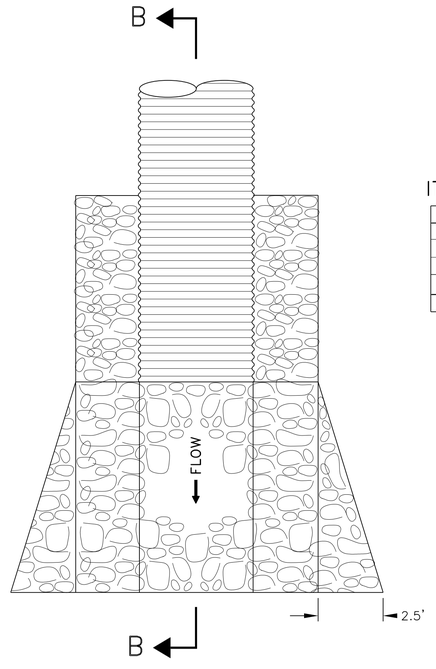
8. RIPRAP DOWN DRAIN SHALL BE CARRIED DOWN SLOPE TO INTERSECTION OF FILL SLOPE AND EXTENDED UNTIL A 2% OR LESS GRADE IS ACHIEVED BEFORE TERMINATION.

9. FOR GROUTED RIPRAP, FILL ALL ROCK VOIDS WITH GROUT AS FP-03 SECTION 251. LEAVE 0.5 TO .25 OF THE RIP RAP SURFACE ROCK EXPOSED.

10. THE QUANTITIES SHOWN ARE ONLY AN ESTIMATE. ACTUAL QUANTITIES SHALL BE DETERMINED IN THE FIELD. THE PROJECT MANAGER, AOTR/COR, AND CONTRACTOR SHALL REVIEW ALL ROCK CUT AREAS AFTER THE CONSTRUCTION OF DITCHES, DOWN DRAINS, AND RIPRAP BASINS HAVE BEEN "ROUGH IN". IF IN THE OPINION OF THE AOTR/COR, THAT THE ROCK CUT IS STABLE, THE AOTR/COR MAY ELECT TO DELETE SECTIONS OF THE RIP RAP PROTECTION.



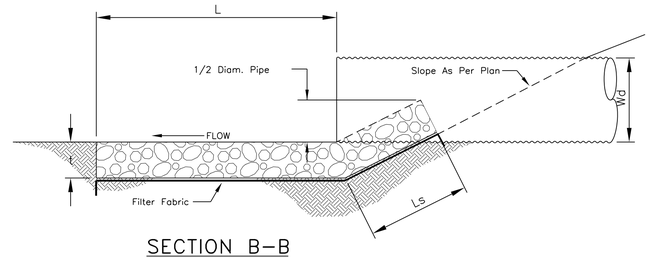
PLAN – DOUBLE BARREL



PLAN – SINGLE BARREL

ITEM 25101-2000 ESTIMATED QUANTITIES: PLACED RIPRAP, CLASS 2

STATION	STRUCTURE	LOCATION	Wd (FT.)	Wt. (FT.)	Wt.(FT.)	t(Inch)	L(Ft.)	VOLUME (cu yd)
19+75.00	1-24" @ 90	Outlet	2.0'	4.0	9.0	18	10.0	5.62
36+00.00	2-36" @ 135	Outlet	3.0	17.75	22.75	18	7.87	33.22
						TOTAL		38.84



SECTION B–B

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

PLACE RIPRAP DROWN DRAIN DETAIL

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.27_Riprap_DowndrainDetails.dgn	

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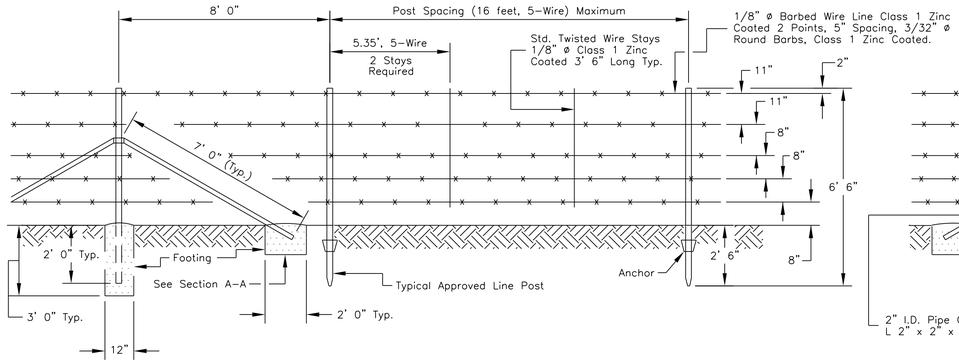
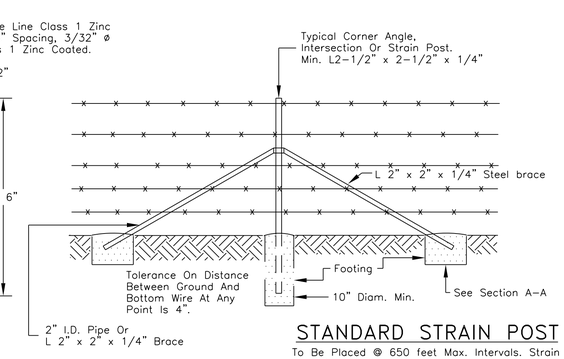
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	28	63

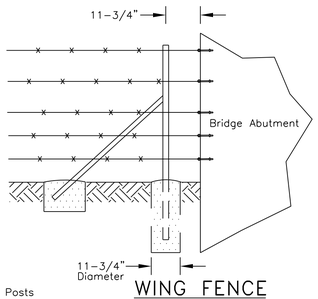


STANDARD 5 LINE GALVANIZED BARBED WIRE PANEL



STANDARD STRAIN POST

To Be Placed @ 650 feet 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.

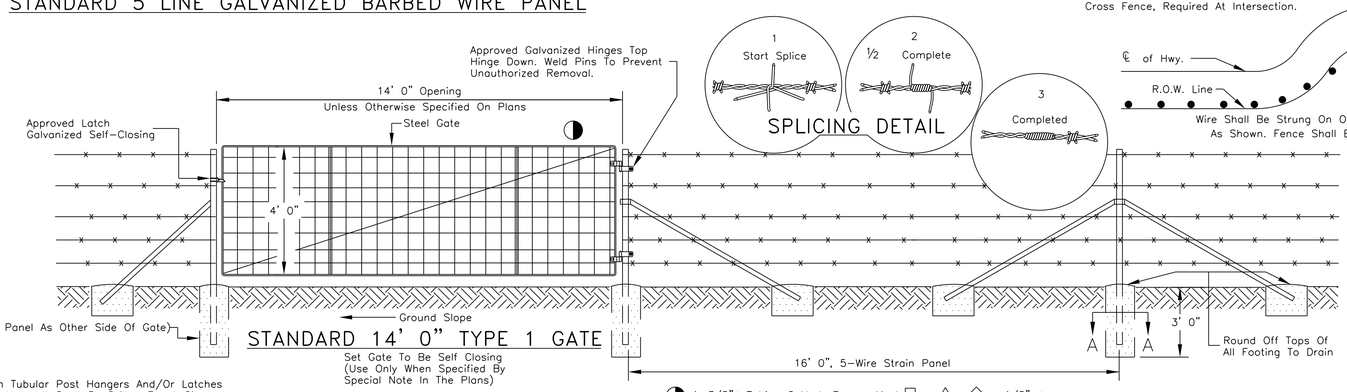


WING FENCE

Detail at Bridge Abutment

GENERAL NOTES

1. CORNER, GATE, INTERMEDIATE BRACE POSTS AND LINE POSTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M 281-88. METAL POST AND BRACES SHALL BE FABRICATED FROM RAIL, BILLETS, OR COMMERCIAL GRADE STEEL CONFORMING WITH THE REQUIREMENT OF ASTM A 702.
2. LINE POSTS SHALL BE FABRICATED IN ACCORDANCE WITH AASHTO M 281, SECTION 7.1.2 WHICH INCLUDES THE ANCHOR PLATES.
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 61901-1000.
4. TIE WIRE, WIRE FASTENERS OR WIRE CLIPS FOR FASTENING BARBED & WOVEN FABRIC FENCING TO THE STEEL POSTS SHALL BE 1/8" (Diam.) 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 61901-1000.
5. CONCRETE FOR ANCHORS, POST HOLES, ETC. SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3.6 KSI IN 28 DAYS AND SHALL CONFORM TO SECTION 601 OF THE FP-03. FURNISHING AND PLACEMENT OF CONCRETE SHALL BE INCLUDED WITH ITEM 61901-1000.
6. TWO SPLICES ON THE SAME LINE BETWEEN THE STRAIN POST ASSEMBLIES SHALL NOT BE PERMITTED. NO SPLICES SHALL BE PLACED CLOSER THAN 100 FEET OF ANY POST ASSEMBLIES.
7. CONNECT ALL R.O.W. FENCING TO CATTLEGUARDS, CULVERTS (GREATER THAN 48" Diam.), CONCRETE STRUCTURES, AND BRIDGES AS SHOWN ON THESE PLANS AND/OR AS DIRECTED BY THE C.O.R/AOTR.
8. 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.
9. ALL DRILLING INTO ROCK MATERIAL, ETC. SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING AND NO ADDITIONAL PAYMENT SHALL BE MADE.
10. THE CONTRACTOR SHALL BE REQUIRED TO INSTALL SAG WEIGHTS WHERE VERTICAL CLEARANCE BETWEEN THE BOTTOM WIRE AND NATURAL GROUND IS 2 FEET OR GREATER. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING.
11. GATE CLOSURE DEVICE SHALL BE STEEL PIPE, NPS ¾" (1" ø) 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 24 INCH OR GREATER. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING.

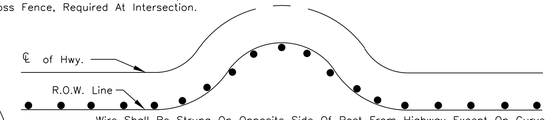


STANDARD 14' 0" TYPE 1 GATE

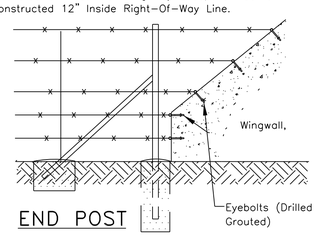
Set Gate To Be Self Closing (Use Only When Specified By Special Note In The Plans)

NOTE: When Tubular Post Hangers And/Or Latches Are Used, It Shall Be Drilled For A Single 1-1/8" ø Min. Drive Pin To Prevent Rotation Of The Hangers And/Or Latches.

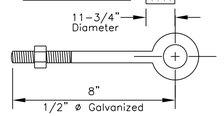
SPLICING DETAIL



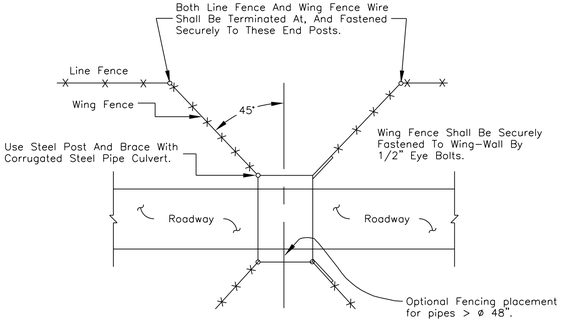
Wire Shall Be Strung On Opposite Side Of Post From Highway Except On Curve As Shown. Fence Shall Be Constructed 12" Inside Right-Of-Way Line.



END POST

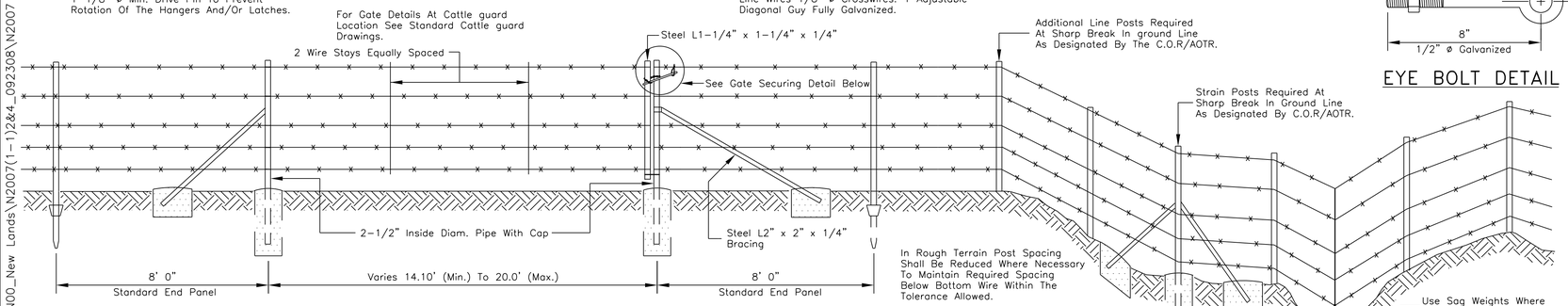


EYE BOLT DETAIL



WING FENCE DETAIL

This Detail Shall Be Used Where Stock Passes Or Large Drainage Structures > 48" ø Are Called For On Plans Unless Otherwise Directed By The C.O.R/AOTR.

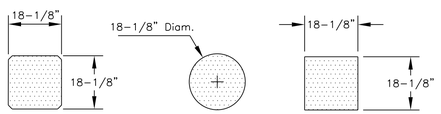


STANDARD TYPE-2 GATE

Use At Locations Noted On Plans

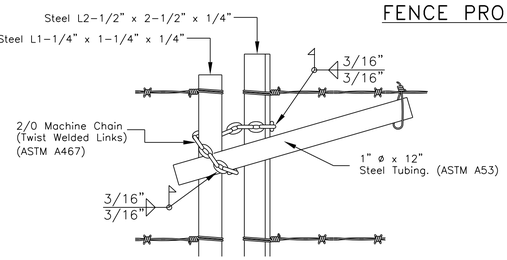
FENCE PROFILE IN ROUGH TERRAIN

TYPICAL STEEL POST SECTION

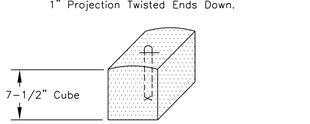


SECTION A-A

(Alternates)



GATE SECURING DETAIL



CONCRETE SAG WEIGHT DETAIL

Min. Weight Of Concrete Sag Shall Be 35.3 lb.

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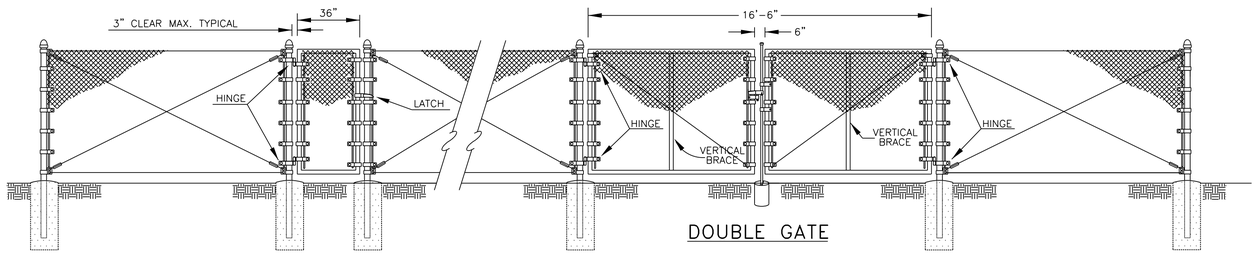
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD FENCING DETAIL w/TYPE I & II GATE

DRAWN BY: Gerald.Hood	DATE: 5/6/2009
DESIGNED BY: NRDOT	DATE: 5/6/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.28_Fencing Std Details.dgn	

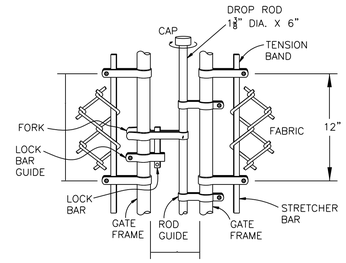
J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

AREA	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	29	63

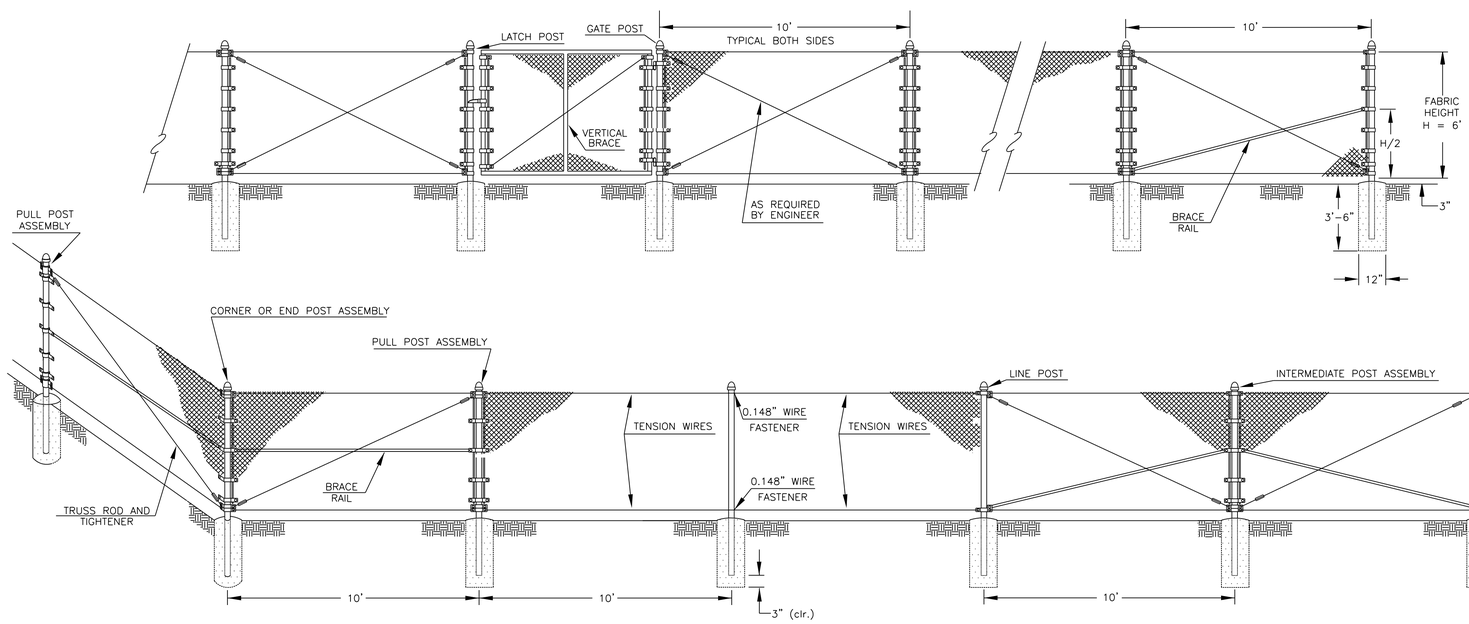


WALK GATE

DOUBLE GATE



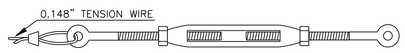
TYPICAL DROP ROD ASSEMBLY



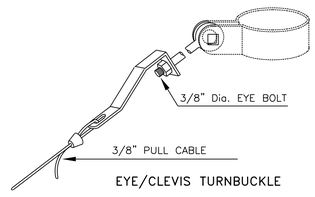
TYPICAL CHAIN LINK FENCE INSTALLATION

GENERAL NOTES

1. POSTS SHALL BE ROUND PIPE, H-SECTION OR ROLL FORMED AND SHALL CONFORM TO THE NOMINAL DIMENSIONAL REQUIREMENTS SHOWN ON THE PLANS. IN ADDITION, THE MATERIAL OF WHICH POST ARE FABRICATED SHALL HAVE A NOMINAL THICKNESS, BEFORE GALVANIZING, OF NOT LESS THAN 0.111 INCH.
2. CHAIN LINK FABRIC SHALL BE EITHER ZINC-COATED OR ALUMINUM-COATED STEEL WIRE FENCE FABRIC. ZINC-COATED STEEL FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A392, CLASS 1 COATING. ALUMINUM-COATED STEEL FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A491, WITH A MINIMUM WEIGHT OF COATING OF 0.40 OUNCE PER SQUARE FOOT OF WIRE SURFACE AREA. FABRIC SHALL BE 11 GAUGE FOR ALL FENCE FABRIC 60 INCHES OR LESS IN HEIGHT AND SHALL BE 9 GAUGE FOR FABRICS GREATER THAN 60 INCHES IN HEIGHT.
3. TENSION WIRES SHALL BE 7 GAUGE (0.177 INCH DIAMETER) COIL SPRING STEEL WIRE WITH A MINIMUM TENSILE STRENGTH OF 75,000 PSI, AND SHALL BE ZINC-COATED OR ALUMINUM-COATED.
4. TRUSS RODS SHALL BE 3/8-INCH DIAMETER ADJUSTABLE RODS. TRUSS TIGHTENERS SHALL HAVE A STRAP THICKNESS OF NOT LESS THAN 1/4-INCH.
5. STRETCHER BARS SHALL BE 3/16-INCH BY 3/4-INCH STEEL FLAT BARS. STRETCHER BAR BANDS SHALL BE 1/8-INCH BY 1-INCH PREFORMED STEEL BANDS.
6. BOTTOM TENSION WIRE SHALL BE 5-INCHES FROM TOP OF CROWN ON CONCRETE FOOTINGS.
7. INTERMEDIATE POST ASSEMBLIES SHALL BE SPACED AT 500 FOOT INTERVALS OR MIDWAY BETWEEN PULL POSTS WHEN THE DISTANCE BETWEEN SUCH POSTS IS LESS THAN 1,000 FEET AND MORE THAN 500 FEET.
8. CHAIN LINK FENCE POST DIAMETERS SHALL BE , AS FOLLOWS:
   a) 1.66" O.D. TOP & BRACE RAILS AND GATE FRAMES TO 6' WIDTH.
   b) 1.90" O.D. FOR LINE POSTS AND GATE FRAMES TO 13' WIDTH.
   c) 2.875" O.D. FOR END POSTS, CORNER POSTS AND GATE POSTS FOR SINGLE GATE OPENINGS TO 6' WIDTHS.
   d) 4.00" O.D. FOR GATE POSTS FOR SINGLE GATE OPENINGS TO 13' WIDTH AND DOUBLE GATE OPENINGS.
9. NEW DOUBLE GATE ASSEMBLIES SHALL INCLUDE ALL MATERIALS AND LABOR BETWEEN AND INCLUDING THE OUTER GATE POSTS. WHEN NEW GATE ASSEMBLIES ARE A PART OF EXISTING FENCE RELOCATION, THE RESET (EXISTING) MATERIAL SHALL STOP AT AND CONNECT TO THE OUTER GATE POSTS. IF THE ADJOINING FENCE IS EQUIPPED WITH A BARBED WIRE TOP, INSTALL A MATCHING BARBED WIRE TOP ON THE GATE ASSEMBLY FROM OUTER GATE POST TO OUTER GATE POST INCLUDING THE GATE LEAFS. ON THE GATE LEAFS, INSTALL BARBED WIRE SUPPORTS AT BOTH GATE ENDS AND AT EACH VERTICAL BRACE. FENCING BETWEEN GATE ENDS SHALL INCLUDE TOP AND/OR BOTTOM TENSION WIRES OR TOP RAIL AS NEEDED TO MATCH ADJOINING FENCINGS.



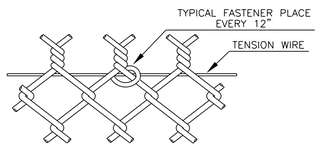
3/8" EYE & EYE/TURNBUCKLE



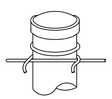
TYPICAL TENSION DEVICES

TYPICAL POST DIMENSIONS- TYPE 1

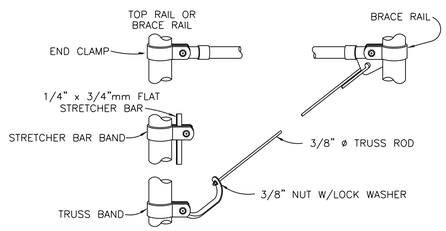
	CORNER, END, INTERMEDIATE, GATE, LATCH AND PULL POSTS.					LINE POSTS				
FABRIC HEIGHT	LENGTH	POST HOLE, DIA. x DEPTH	ROUND (I.D.)	ROLL FORMED L-shape	ROLL FORMED U-shape	LENGTH	POST HOLE, DIA. x DEPTH	ROUND (I.D.)	H - SECTION	ROLL FORMED "U"
36"	6'-0"	10" x 3'-0"	2.00"	3.50" x 3.50"	2.00" x 1.75"	5'-6"	10" x 2'-6"	1.50"	1.875" x 1.625"	2.00" x 1.75"
48"	7'-0"	10" x 3'-0"	2.00"	3.50" x 3.50"	2.00" x 1.75"	6'-6"	10" x 2'-6"	1.50"	1.875" x 1.625"	2.00" x 1.75"
60"	8'-0"	10" x 3'-0"	2.00"	3.50" x 3.50"	2.00" x 1.75"	7'-6"	10" x 2'-6"	1.50"	1.875" x 1.625"	2.00" x 1.75"
72"	9'-0"	10" x 3'-0"	2.00"	3.50" x 3.50"	2.00" x 1.75"	8'-6"	10" x 2'-6"	1.50"	1.875" x 1.625"	2.00" x 1.75"
> 72"	H + 3'-0"	12" x 3'-0"	2.50"	3.50" x 3.50"	2.50" x 2.50"	H + 2'-6"	12" x 2'-6"	2.00"	2.25" x 2.00"	2.00" x 1.75"



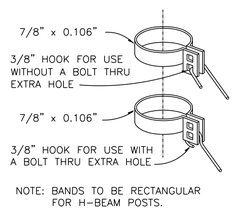
FABRIC & TENSION WIRE DETAIL
(TOP AND BOTTOM)



0.148" WIRE FASTENER
(TOP AND BOTTOM OF POST)

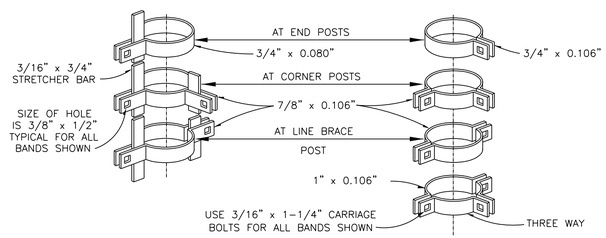


GATE DETAIL



NOTE: BANDS TO BE RECTANGULAR FOR H-BEAM POSTS.

BRACE & TRUSS BANDS



TENSION BANDS

BRACE BANDS

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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CHAIN LINK FENCE DETAILS

DRAWN BY: Gerald.Hood	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 2/1/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.29_chain_link_fence.dgn	

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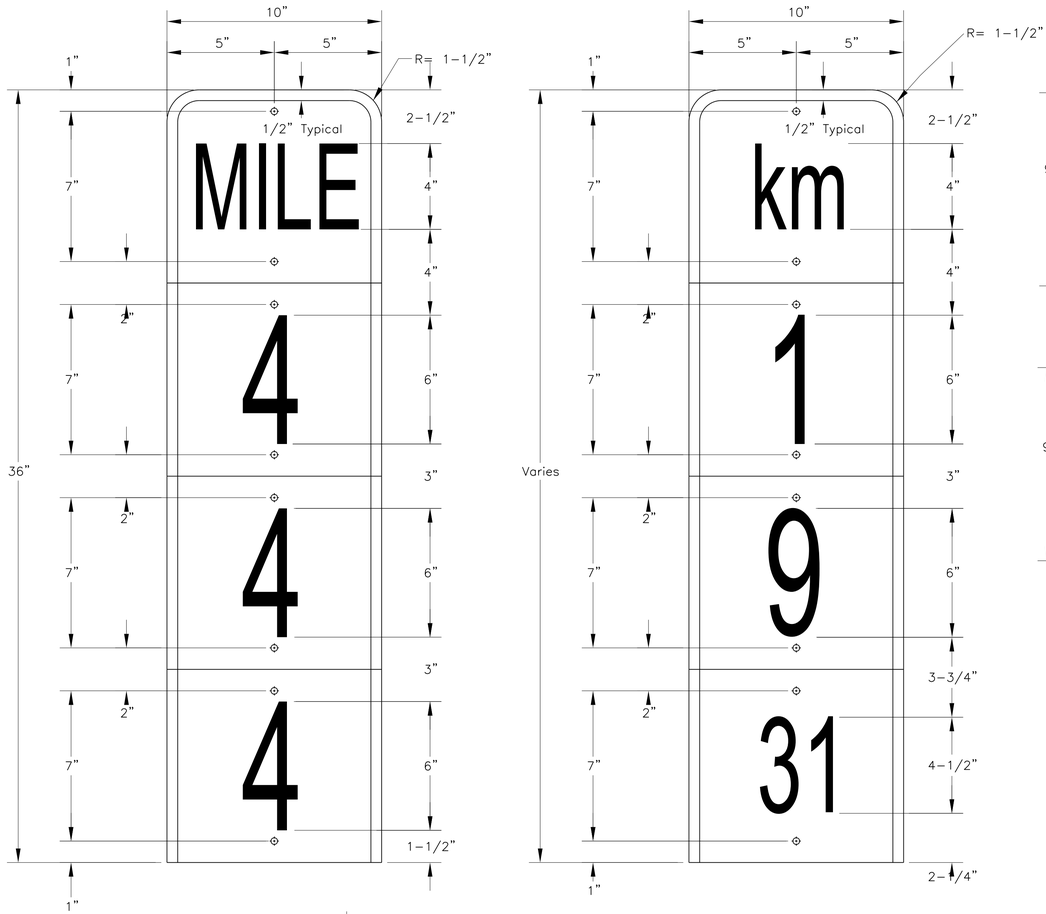
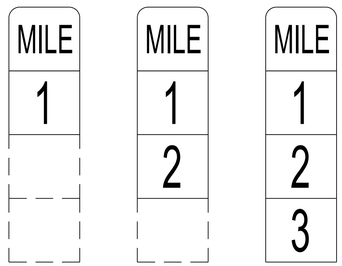
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	30	63

GENERAL NOTES

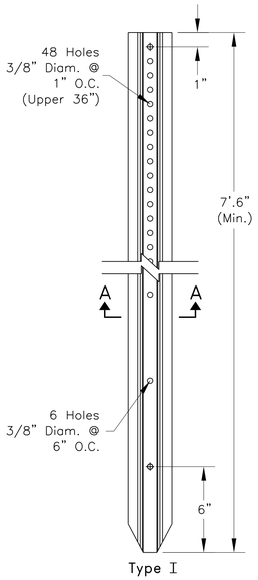
1. THE MILEPOSTS SHALL BE PLACED ON BOTH SIDE OF THE ROADWAY WITH ENGLISH UNITS PANEL ON APPROACHING TRAFFIC AND METRIC UNITS PANEL ON OPPOSING TRAFFIC.
2. MILEPOST PLATES SHALL BE FABRICATED FROM 16 GAGE 3003 H14, 5052-H38 OR 6061-T6 ALUMINUM SHEET.
3. ALL SURFACES TO BE COVERED WITH REFLECTIVE SHEETING SHALL BE PREPARED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE SHEETING MANUFACTURER.
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 A.S.T.M.-A570 GRADE 30,36 OR 40 AND SHALL NOT WEIGH LESS THAN 2 LB/FT THEY SHALL BE GALVANIZED TO CONFORM TO A.S.T.M.-A123.
7. THE OFFSET DISTANCE SHALL BE 12 INCHES BEHIND THE CUT DITCH ON THE BACK SLOPE BUT NOT MORE THAN 20 FEET FROM THE EDGE OF THE PAVEMENT. IN FILL SECTION THE OFFSET SHALL BE AT THE HINGE POINT (OR AT THE EDGE OF CLEAR RECOVERY ZONE). OFFSET DISTANCE MAY HAVE TO VARY TO FIT EXISTING CROSS SECTION. AT GUARDRAIL LOCATIONS, THE MILE POST SIGNS SHALL LINE UP WITH THE GUARDRAIL POSTS.
8. POST LENGTH SHALL BE DETERMINED IN FIELD BASED ON FINISH GROUND ELEVATION WITH RESPECT TO EDGE OF PAVEMENT ELEVATION.
9. EACH MILE POST INCLUDES 2 SIGNS, ONE POST, AND HARDWARE INSTALLED AND ACCEPTED.



TYPICAL MILEPOST DETAIL



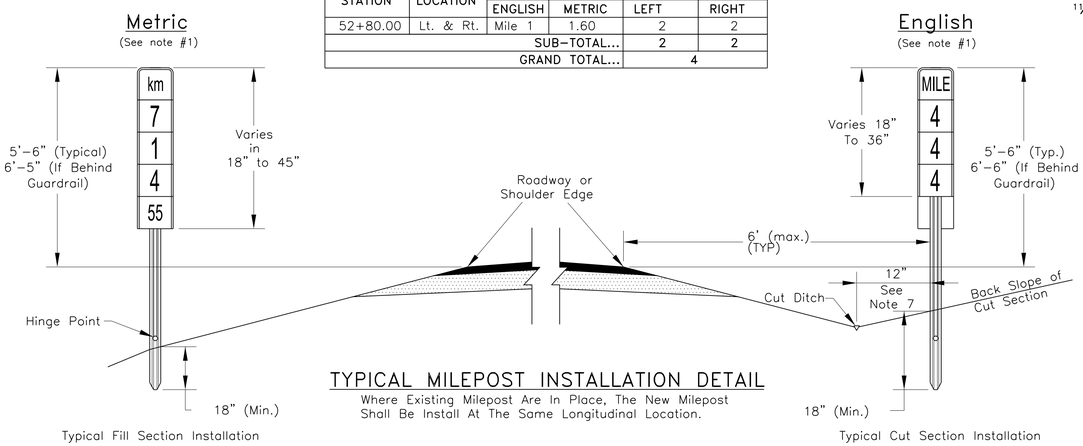
STANDARD NUMERAL POSITION



GALVANIZED STEEL POSTS

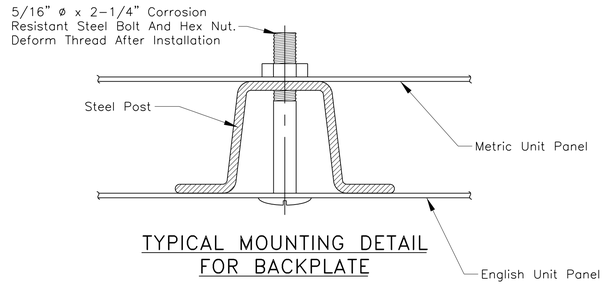
ITEM 63318-1000: MILEPOST,
1-POST & HARDWARE; 2 lb/ft

STATION	LOCATION	DESCRIPTION		QUANTITY (Ea.)	
		ENGLISH	METRIC	LEFT	RIGHT
52+80.00	Lt. & Rt.	Mile 1	1.60	2	2
			SUB-TOTAL...	2	2
			GRAND TOTAL...	4	

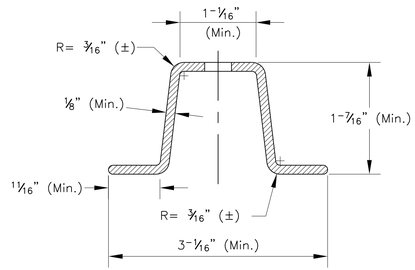


TYPICAL MILEPOST INSTALLATION DETAIL

Where Existing Milepost Are In Place, The New Milepost Shall Be Install At The Same Longitudinal Location.



TYPICAL MOUNTING DETAIL FOR BACKPLATE



SECTION A-A

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

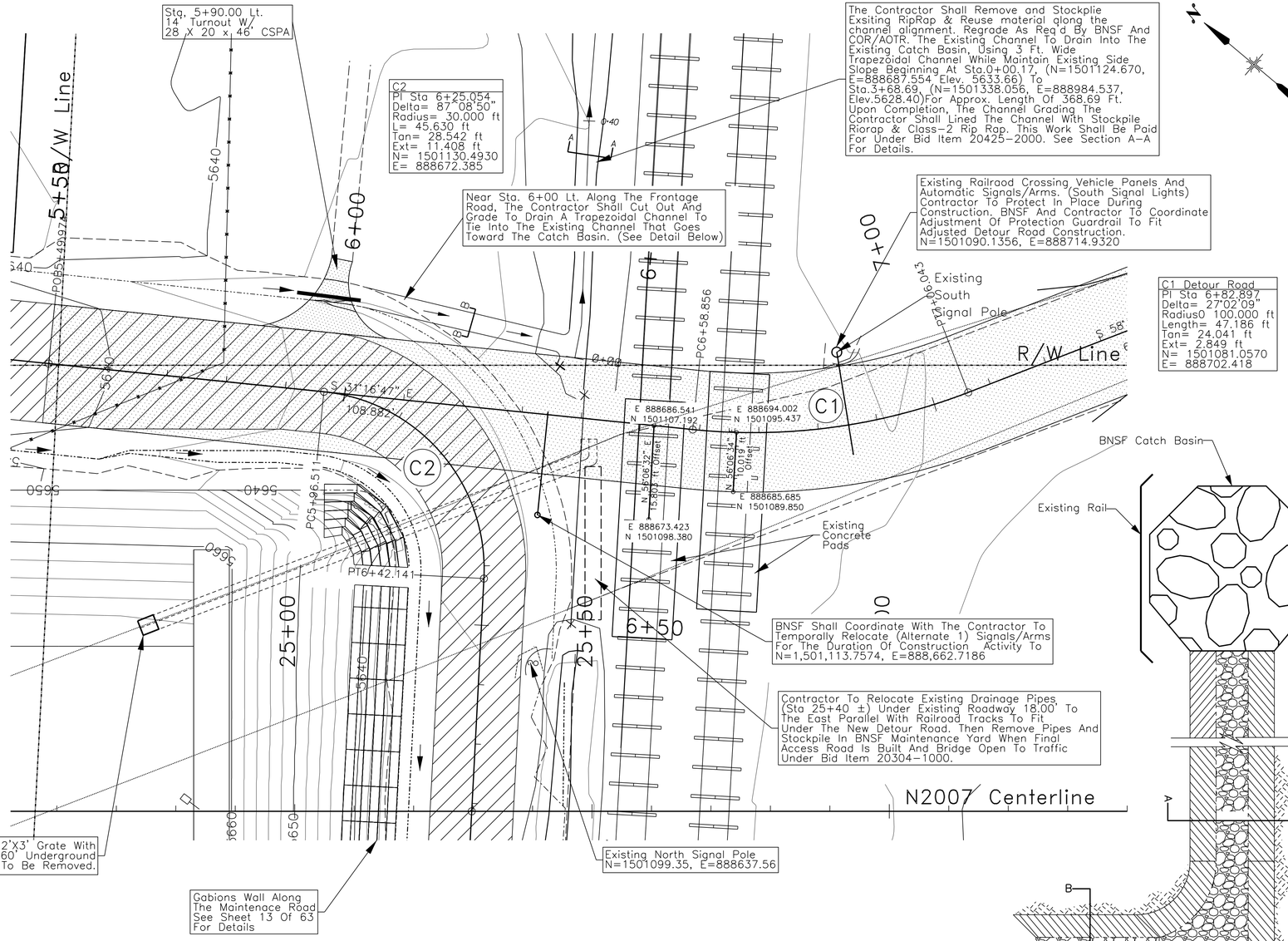
STANDARD MILE POST DETAIL

DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.30_MilepostDetails.dgn	

J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	31	63

SEE SHEET 13 of 63 FOR NOTES.

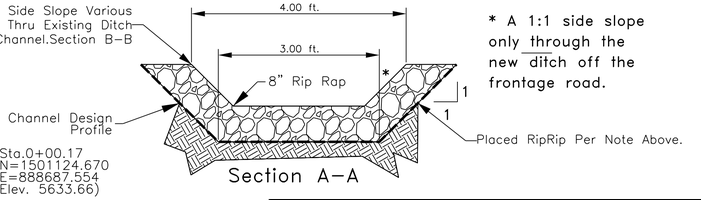


SOUTH POLE SIGNAL LIGHTS

POINT NO.	NORTHING	EASTING	CODE	ELEVATION
1133	1,501,090.704	888,711.711	RRGR ST	5634.836
1135	1,501,087.897	888,715.190	RRGR	5634.192
1137	1,501,090.069	888,719.693	RRGR	5634.023

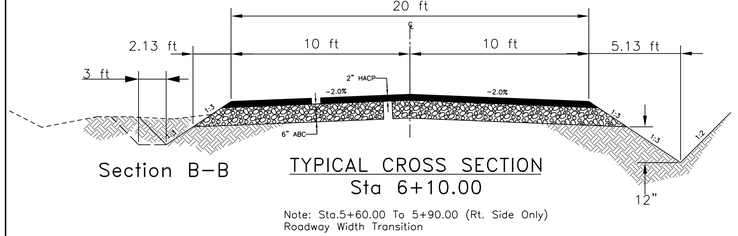
NORTH POLE SIGNAL LIGHTS

POINT NO.	NORTHING	EASTING	CODE	ELEVATION
1138	1,501,100.182	888,644.241	RRGR ST	5635.458
1140	1,501,104.089	888,641.037	RRGR	5635.645
1142	1,501,103.082	888,636.768	RRGR	5634.623



* A 1:1 side slope only through the new ditch off the frontage road.

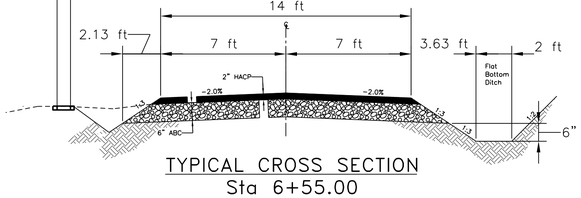
Section A-A



Section B-B

TYPICAL CROSS SECTION
Sta 6+10.00

Note: Sta.5+60.00 To 5+90.00 (Rt. Side Only)
Roadway Width Transition



TYPICAL CROSS SECTION
Sta 6+55.00

Note: Sta.5+60.00 To 5+90.00
Roadway Width Transition

Legend

Temporary Detour Road

Access Road

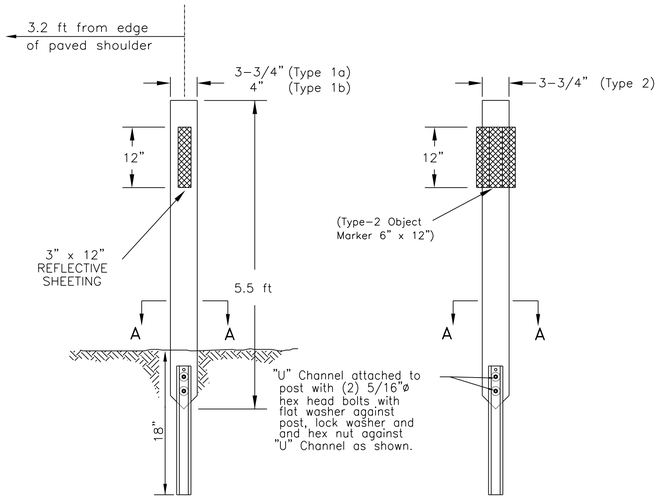
REVISED:
8/17/2016

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

SIGNAL & TURNOUT WITH CONCRETE PADS DETAILS

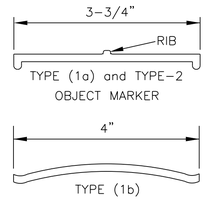
DRAWN BY:	DESIGN2	DATE:	2/20/10
DESIGNED BY:	B.O.R.	DATE:	2/24/05
REVISED: 08/17/2016		FILENAME:	Signal & T.O..dgn
BY:	DESIGN2	SCALE:	NTS

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	32	63



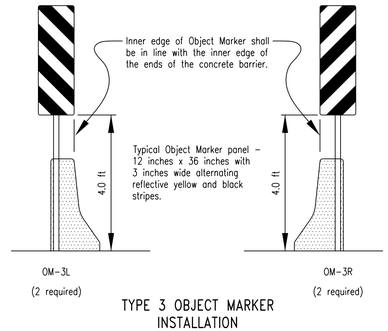
DELINEATOR
(FLEXIBLE TYPE)

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



Glass Fiber Type

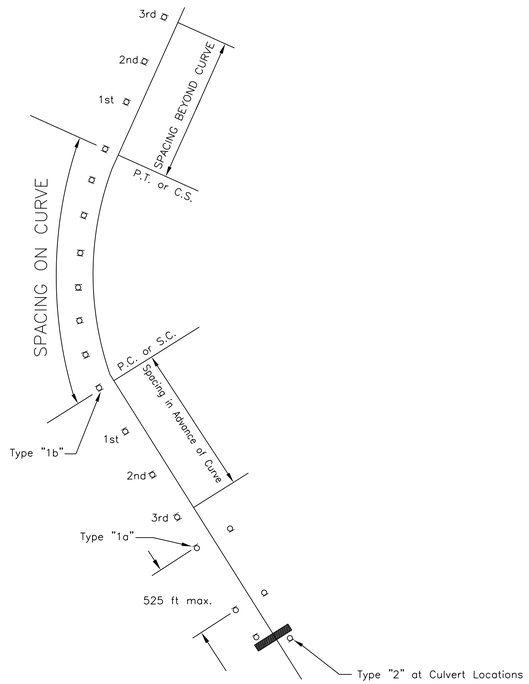
SECTION A-A



TYPE 3 OBJECT MARKER
INSTALLATION

GENERAL NOTES

1. THE CONTRACTOR HAS THE OPTION TO EITHER USE GLASS FIBER OR ENGINEERED PLASTIC TYPE FOR DELINEATOR AND/OR TYPE II OBJECT MARKER. THE CONTRACTOR SHALL NOT USE A COMBINATION OF BOTH, STEEL "U" CHANNEL SHALL BE ATTACHED TO THE DELINEATOR, AND SHALL BE INCLUDED IN CONTRACT ITEM 63309-0010 AND 63309-0020.
2. TYPE "B" DIKE SHALL BE USED ON THIS PROJECT UNLESS OTHERWISE NOTED. EMBANKMENT MATERIAL NEEDED TO BUILD EARTHEN DIKE SHALL BE CONSIDERED INCIDENTAL TO ITEM 20410-2000, FURROW DITCHES, DITCH BLOCKS AND DIKES.



Typical spacing on tangent = 525 ft

Radius of Curve (feet)	Approximate Spacing (S) on Curve (feet)	Spacing on Advance of or Beyond a Curve (feet)		
		A (2S)	B (3S)	C (6S)
50	20	40	60	120
115	25	50	75	150
180	35	70	105	210
250	40	80	120	240
300	50	100	150	300
400	55	110	165	330
500	65	130	195	390
600	70	140	210	420
700	75	150	225	450
800	80	160	240	480
900	85	170	255	510
1000	90	180	270	540
1100	97	194	292	583
1200	102	203	305	610
1300	106	212	318	636
1400	110	220	331	661
1500	114	228	343	685
1600	118	236	354	709
1700	122	244	366	731
1800	125	251	376	753
1900	129	258	387	774
2000	132	265	397	795
2500	148	297	445	891
3000	163	326	489	978
3500	176	352	529	1057
4000	189	377	566	1131
4500	200	400	600	1201
5000	211	422	633	1266
5500	221	443	664	1329
6000	231	463	694	1388
6500	241	482	723	1446
7000	250	500	750	1501
7500	259	518	777	1554

S= 3.0 * sq. rt.(R-50).
Spacing for specific radii may be interpolated from table.
The spacing on curves should not exceed 300 feet.
Shaded areas denotes to use 300 feet spacings.
Delineators should be spaced 200 to 530 feet apart on mainline tangent sections.
NOTE: When uniform spacing is interrupted by such features as culverts, signs, driveways, intersections, delineators which would ordinarily be located within the features may be relocated in either direction for a distance not exceeding one quarter of the uniform spacing. Delineators still falling within such features may be eliminated.

63309-0010 Delineators, Type "1a"
63309-0020 Delineators, Type "1b"

STATION	LOCATION	DESCRIPTION	Each
1+36.06	Lt & Rt.	DL_1A	2
21+36.07	Lt & Rt.	DL_1A	2
45+77.31	Lt & Rt.	DL_1A	2
50+77.31	Lt & Rt.	DL_1A	2
55+77.31	Lt & Rt.	DL_1A	2
TOTAL			10
STATION	LOCATION	DESCRIPTION	
33+98.93	Rt.	DL_1B	1
34+83.39	Rt.	DL_1B	1
36+52.31	Rt.	DL_1B	1
38+22.31	Rt.	DL_1B	1
40+77.31	Rt.	DL_1B	1
		TOTAL...	5

ITEM 63308-2000 FLEXIBLE
TYPE 2 OBJECT MARKER

STATION	LOCATION	QTY.
6+60	Lt. & Rt.	2
36+00	Lt. & Rt.	2
47+40	Lt. & Rt.	2
	TOTAL...	6

ITEM 63308-3000 TYPE 3
OBJECT MARKER

STATION	LOCATION	QTY.
24+68.00	Rt.	1 (OM-3R)
24+68.00	Lt.	1 (OM-3L)
33+43.77	Rt.	1 (OM-3R)
33+43.77	Lt.	1 (OM-3L)
	TOTAL...	4

NOTE:
Included with Bridge Quantities on Sheet B-1

62101-0000 R/W MONUMENTS
62102-0000 Reference Markers

STATION	REQUIRED	LOCATION	REMARK
0+68.940	1	Left	
0+68.940	1	Right	
19+56.340	2	Left	
19+56.340	2	Right	
28+94.000	2	Left	
28+94.000	1	Right	
30+61.099	1	Left	
30+61.099	1	Right	
31+58.000	2	Right	
32+71.099	1	Left	
32+71.099	1	Right	
34+42.308	1	Left	
34+42.308	1	Right	
36+52.308	1	Left	
36+52.308	1	Right	
57+82.737	1	Left	
57+82.737	1	Right	
TOTAL... 21			

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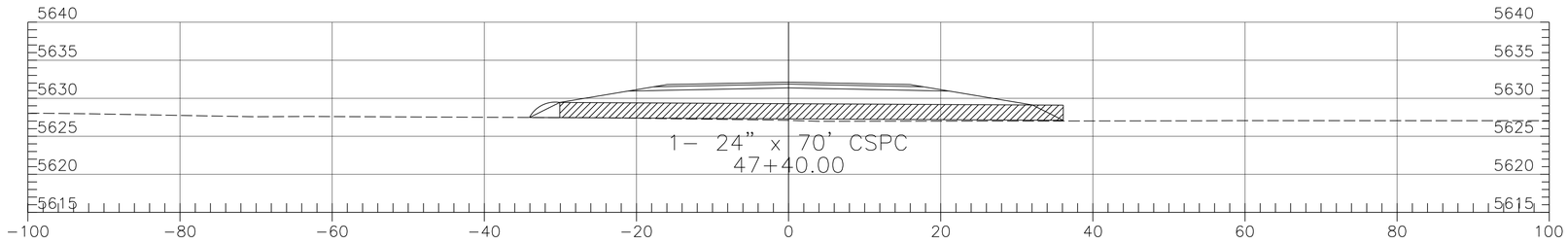
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

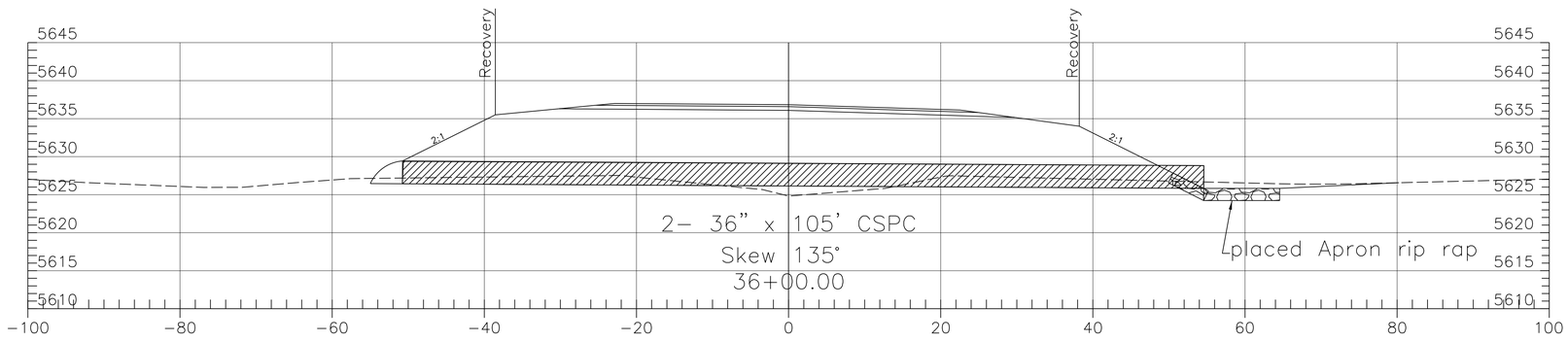
MISCELLANEOUS DETAILS

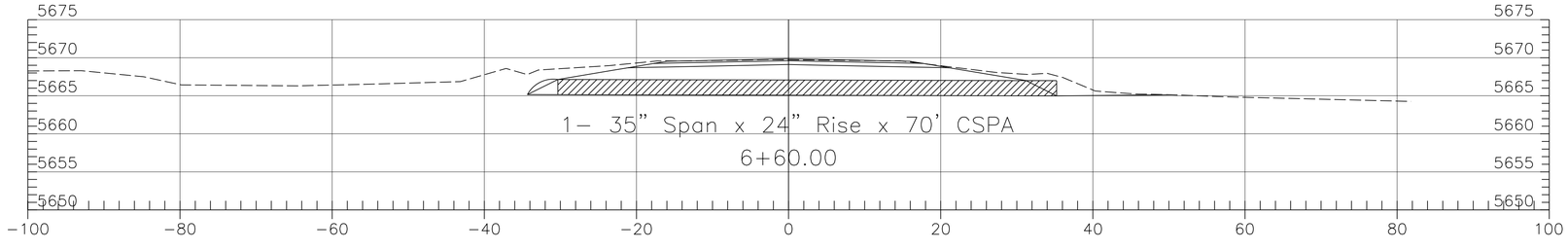
DRAWN BY: Gerald.Hood	DATE: 5/7/2009
DESIGNED BY: NRDOT	DATE: 5/7/2009
REVISED: 1/25/2013	BY: Peterson.Yazzie
ANNOTATION SCALE: Full Size 1=1	
FILENAME: Sht.32_Deliniators&Misc.Details.dgn	

J:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(2)1,2&4	33	63







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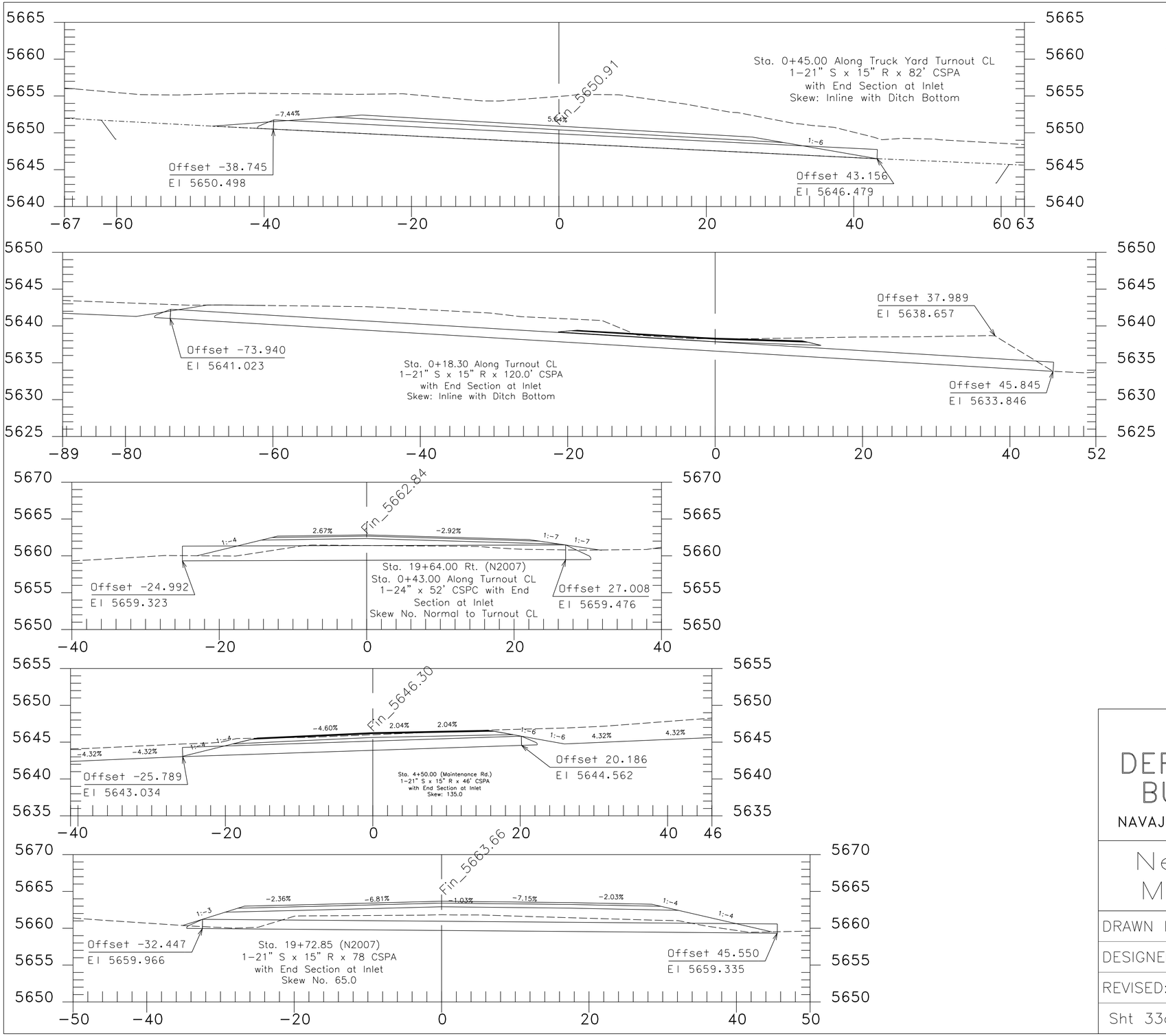
PIPE CROSS SECTIONS

DRAWN BY: B.O.R.	DATE: 07/29/05
DESIGNED BY: Design 2	DATE: 07/29/05
REVISED: 07/16/11	FILENAME:Pipe X–SEC.dwg
BY: B.O.R.	SCALE:1:10 (Horiz. & Vert.)

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
Navajo	Arizona	Navajo	N2007	N2007(1-1)1,2&4	33a	63



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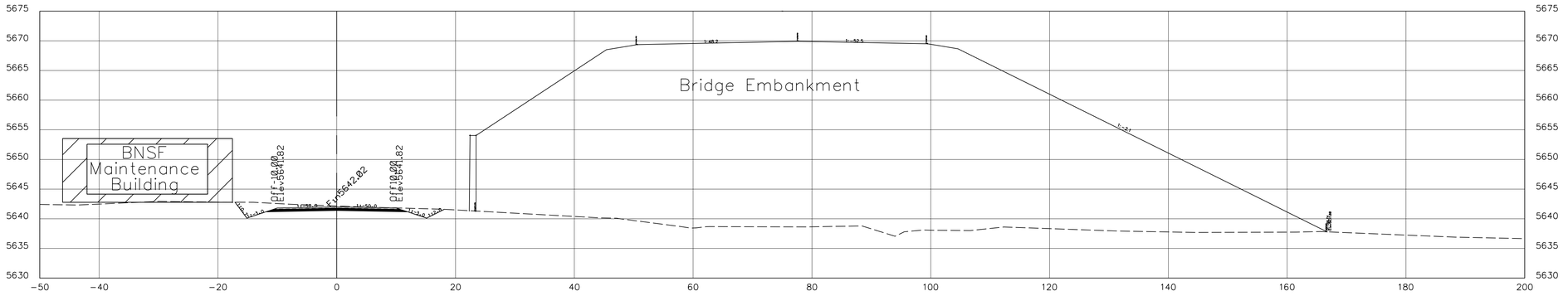
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

New Pipe Cross Sections Mainline & BNSF Access

DRAWN BY: NRDOT	DATE: 8/01/2017
DESIGNED BY: HRiley	DATE: 08/01/2017
REVISED: 03/16/2018	BY: Leroy.Toledo

Sht 33a_N2007(1-1) Mainline with BNSF Acc Pipe Xsection 2018.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2,4	34	63



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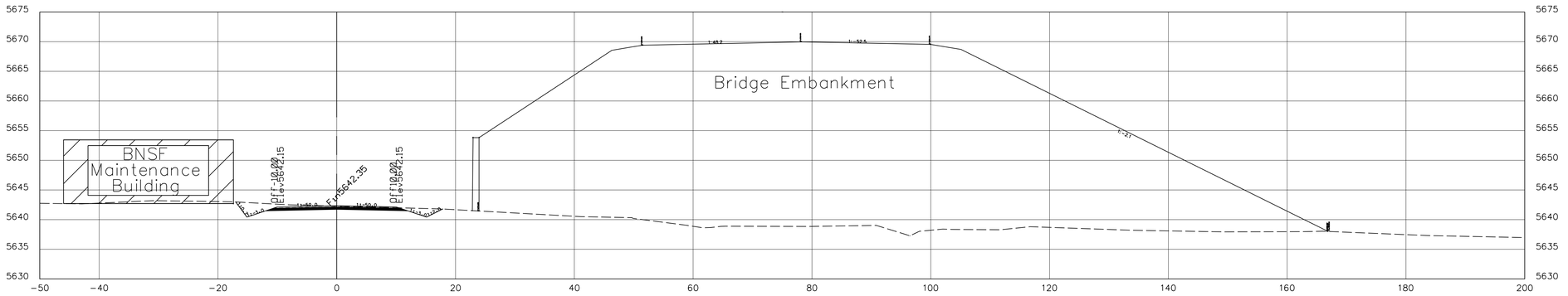

5+25.00

5+20.00

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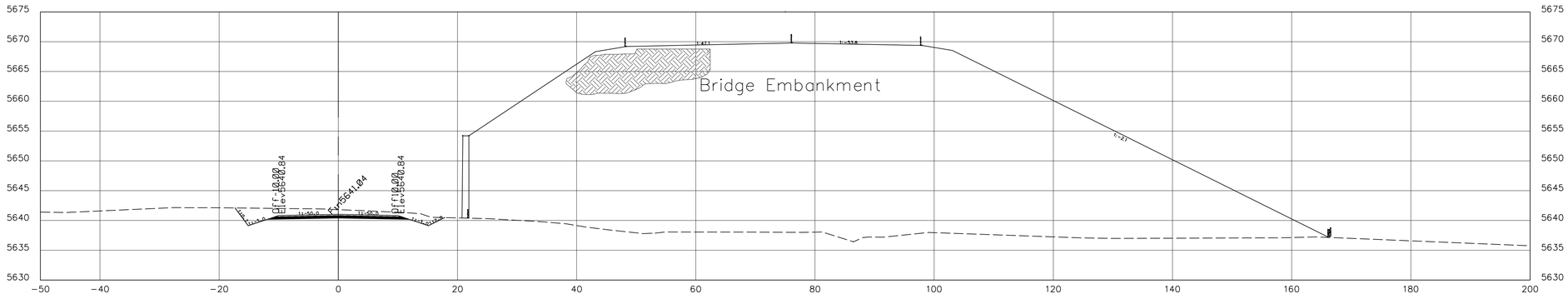
FRONTAGE & DETOUR RD SECTIONS

DRAWN BY: B.O.R.	DATE: 06/03/11	
DESIGNED BY: Design 2	DATE: 06/03/11	
REVISED: 07/11	FILENAME: Pipe.dwg.	
BY: B.O.R.	SCALE:1:10 (Horiz. & Vert.)	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2,4	35	63



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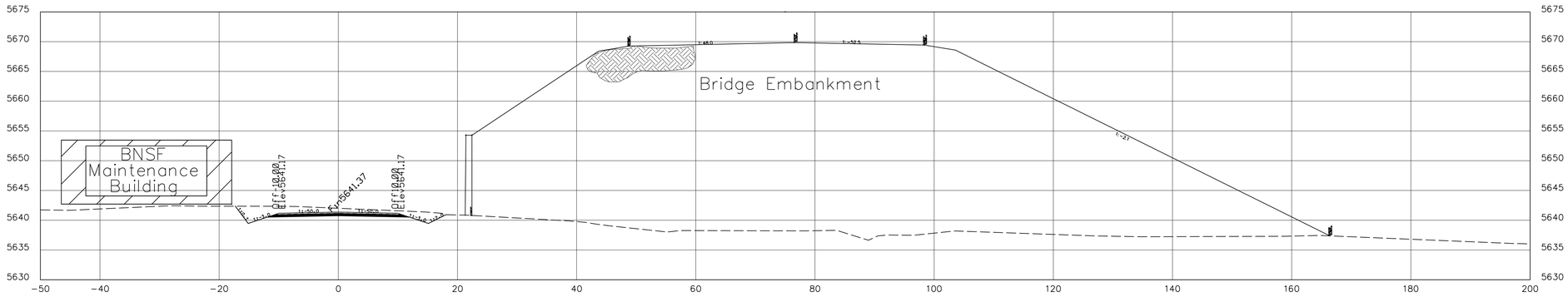

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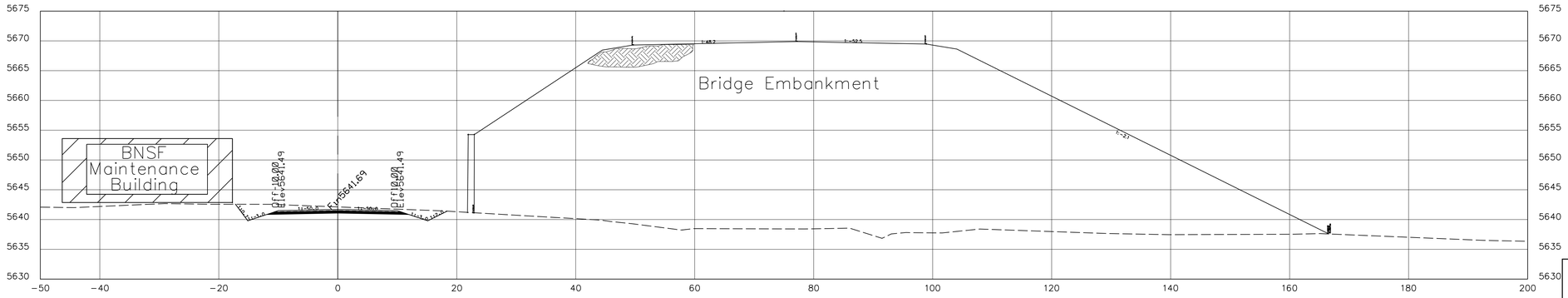

5+35.00

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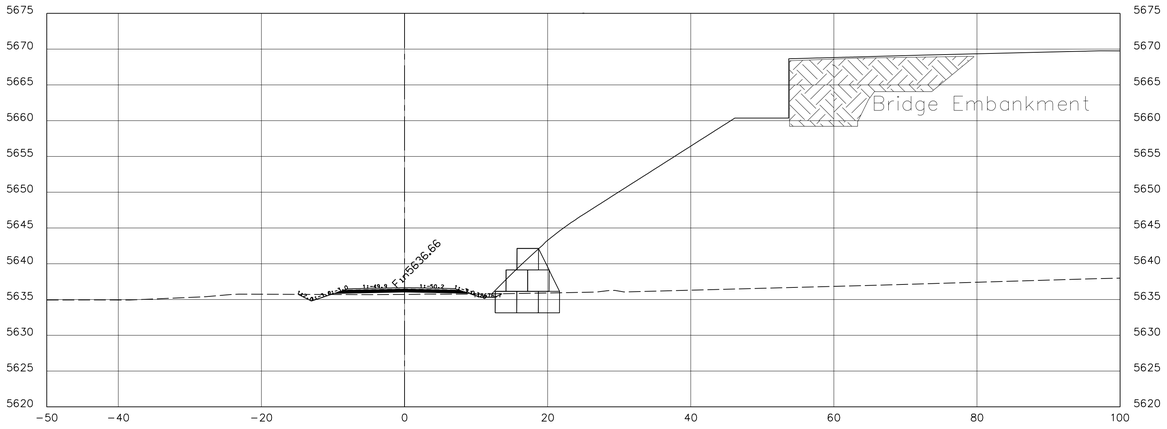
FRONTAGE & DETOUR RD SECTIONS

DRAWN BY:	B.O.R.	DATE:	06/03/11
DESIGNED BY:	Design 2	DATE:	06/03/11
REVISED:	07/11	FILENAME:	Pipe.dwg.
BY:	B.O.R.	SCALE:1:10 (Horiz. & Vert.)	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2,4	36	63



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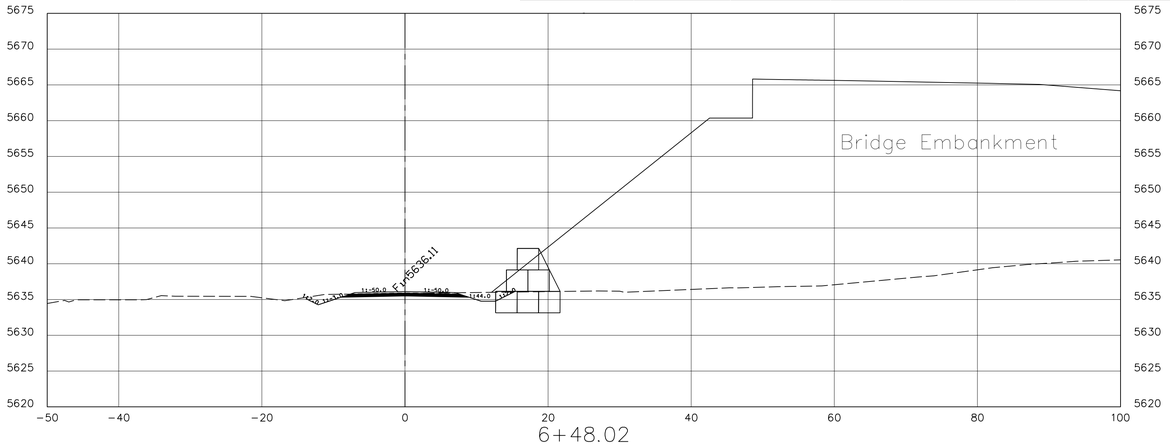
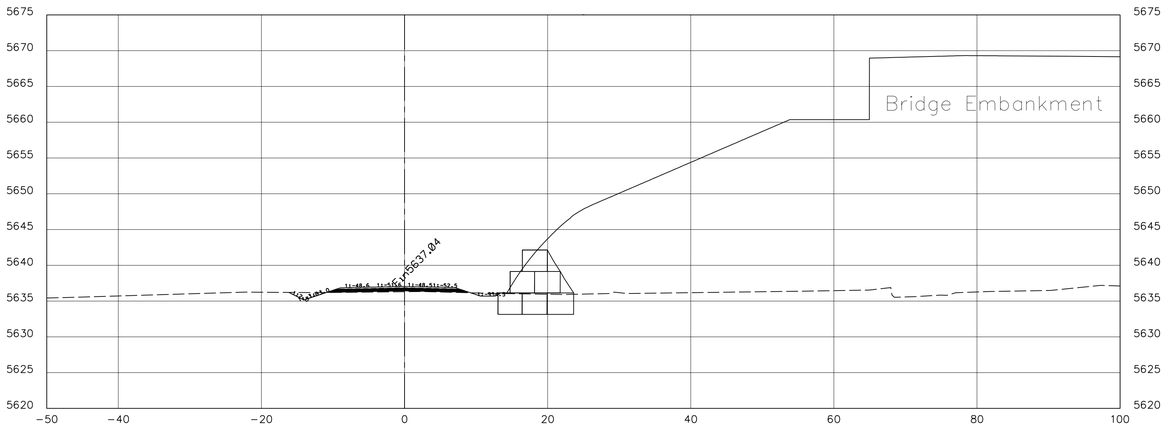


6+48.02



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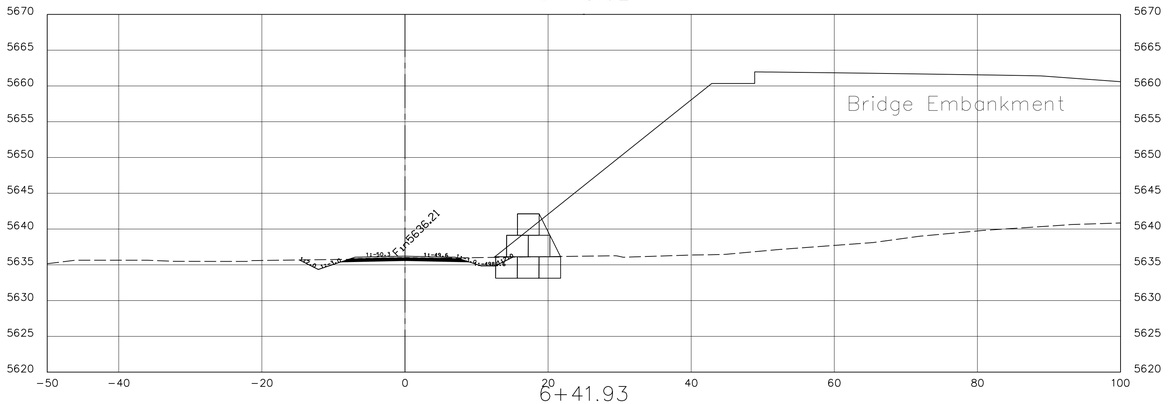
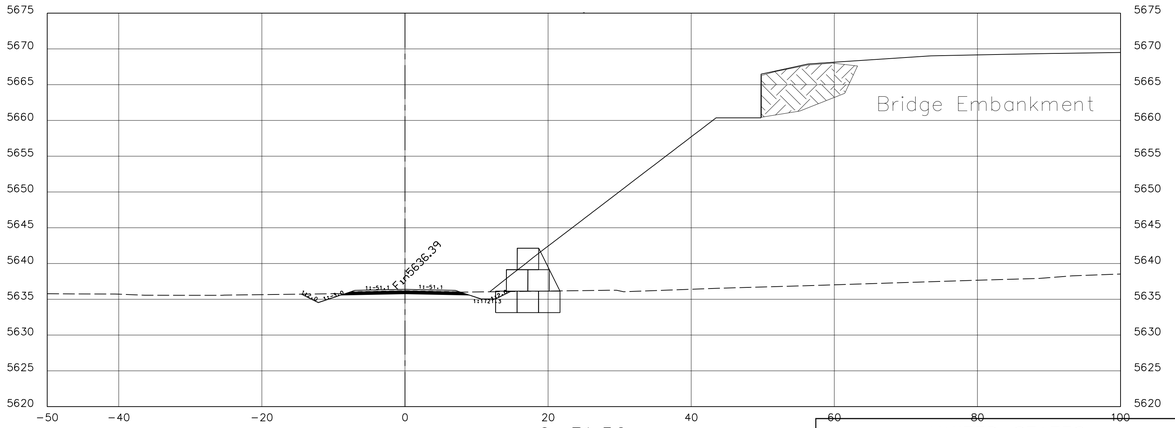


6+41.93



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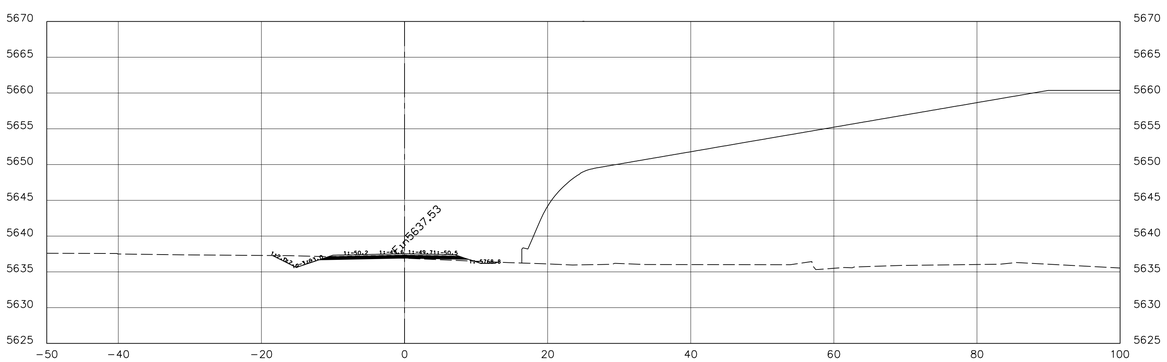

5+99.93

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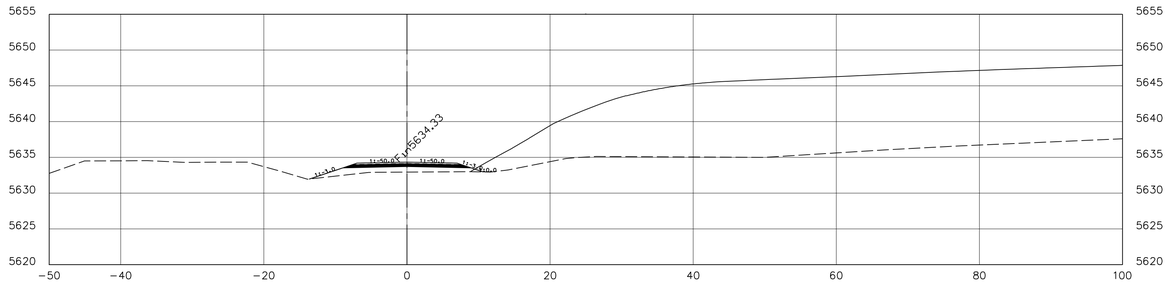
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

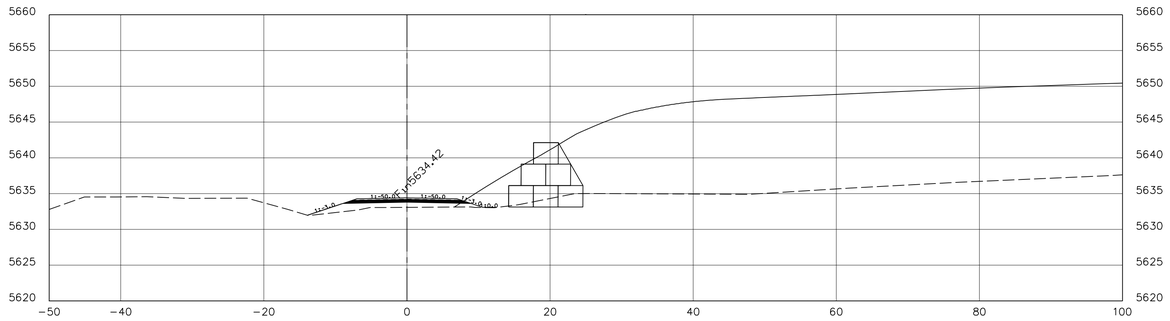
FRONTAGE & DETOUR RD SECTIONS

DRAWN BY: B.O.R.	DATE: 06/03/11		
DESIGNED BY: Design 2	DATE: 06/03/11		
REVISED: 07/11	FILENAME: Pipe.dwg.		
BY: B.O.R.	SCALE:1:10 (Horiz. & Vert.)		

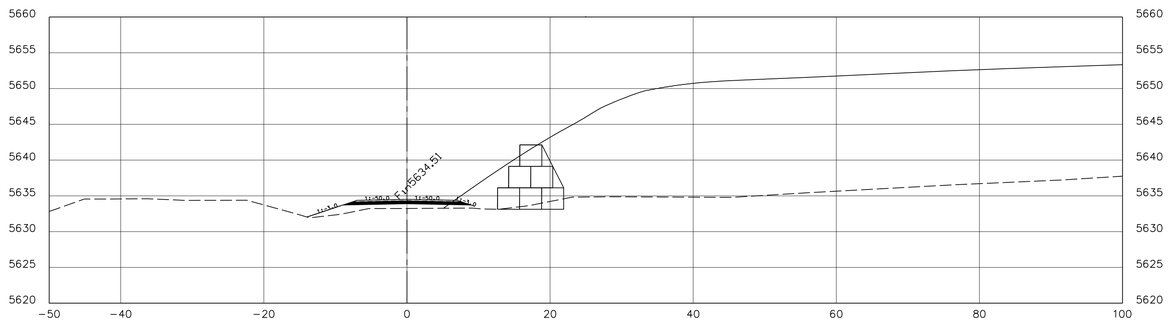
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2,4	37	63



7+55.01



7+49.82



7+44.02

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NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

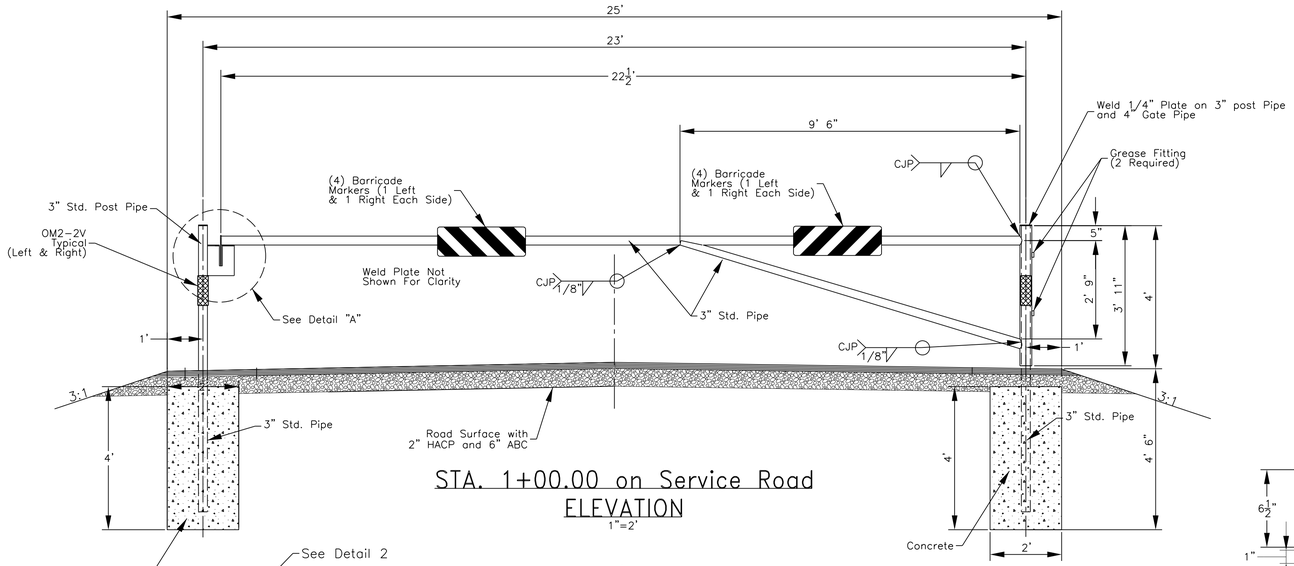
FRONTAGE & DETOUR RD SECTIONS

DRAWN BY: B.O.R.	DATE: 06/03/11	
DESIGNED BY: Design 2	DATE: 06/03/11	
REVISED: 07/11	FILENAME: Pipe.dwg.	
BY: B.O.R.	SCALE:1:10 (Horiz. & Vert.)	

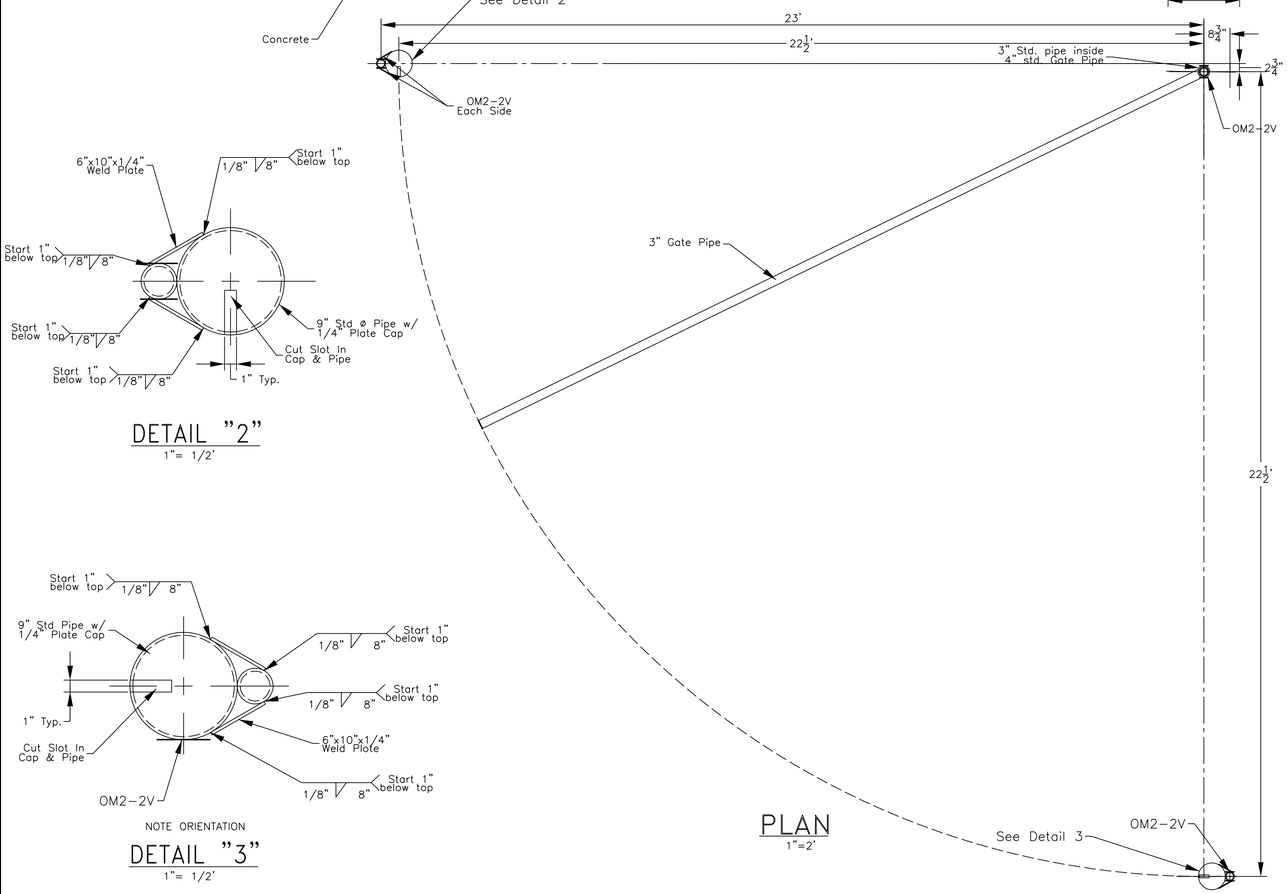
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2,4	38	63

GENERAL NOTES

1. All Pipe Shall be ASTM A53 Grade B Steel Pipe
2. Entire Structure Shall Receive a Steel Coating System 5 From FP-03 Table 563-1 or System 7 From Table 563-2 as Applicable. Surface Preparation Shall Conform to FP-03 563.07(b). All Coats will be Shop Applied. Paint Shall Comply With FP-03 708. Color Shall be Traffic Yellow as Approved by the AOTR.
3. Grind All Corner and Welds Smooth.
4. All Materials Shall be Free of Rust.
5. Concrete Shall be 3000 PSI and May be Blended Pre-Approved Bag Mix Conforming to ASTM C-387.
6. Closure Gate Pay Item Includes all Required Attached Signs.
7. Attach all Signs with Vandal-Proof Fitting to be Approved by the AOTR.
8. "OM2-2V" and Barricade Markers Shall Have Retroreflective Sheeting of ASTM D 4956 Type II "Super Engineering Grade".
9. Field Verify Post Length for Fill Slope Side.



STA. 1+00.00 on Service Road
ELEVATION
1"=2'

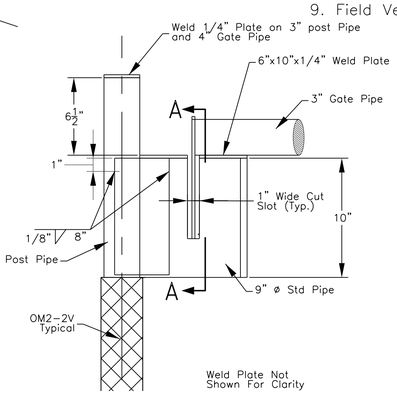


PLAN
1"=2'

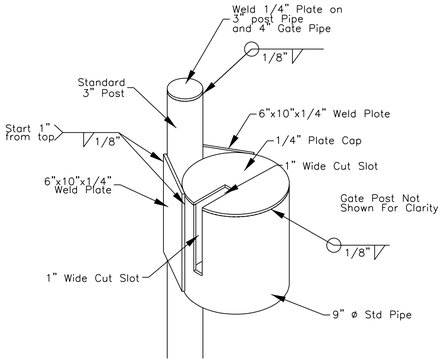
DETAIL "2"
1"= 1/2'

NOTE ORIENTATION

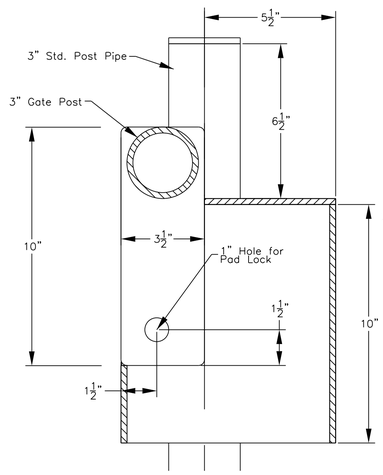
DETAIL "3"
1"= 1/2'



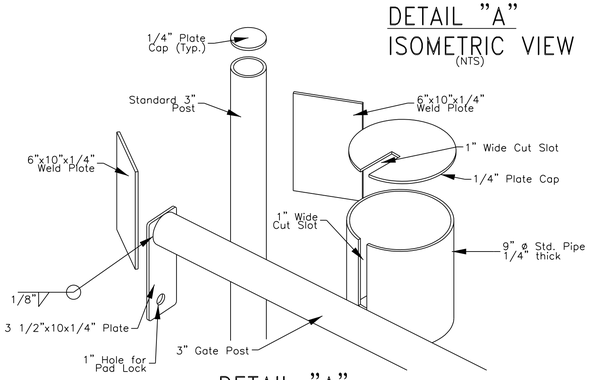
DETAIL "A"
(NTS)



DETAIL "A"
ISOMETRIC VIEW
(NTS)



SECTION A-A



DETAIL "A"
EXPLODED VIEW
(NTS)

Revised on 6/27/17

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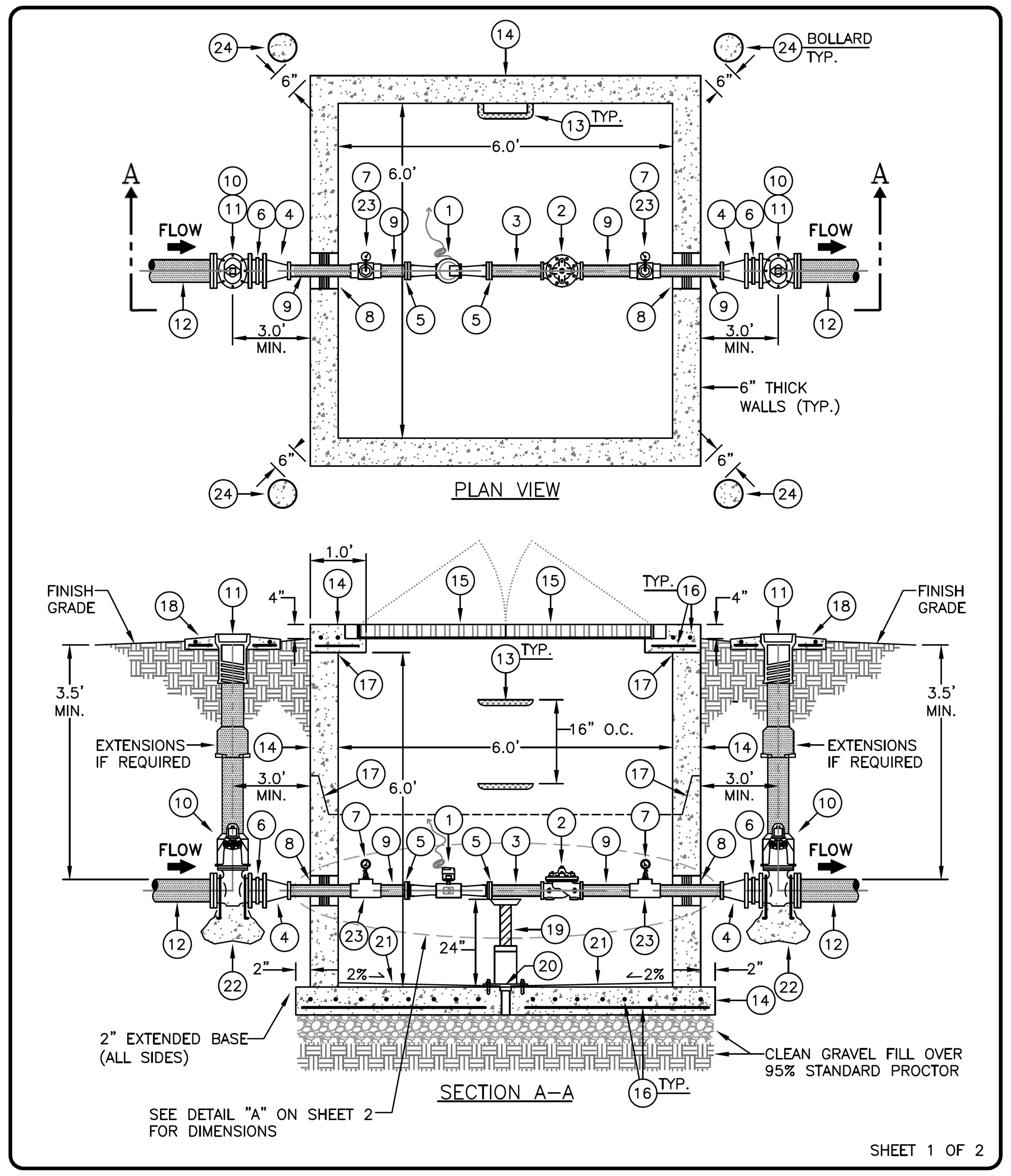
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

25' TYPE 3 STEEL LOCKING GATE DETAILS

DRAWN BY: NRDOT	DATE: 1/16/2014
DESIGNED BY: NRDOT	DATE: 1/16/2014
REVISED: 1/16/2014	BY: DESIGN 2
Locking Gate	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1)1,2&4	40	63

N2007 WATER & SEWERLINE ADJUSTMENT



NAVAJO TRIBAL UTILITY AUTHORITY
WATER–WASTEWATER OPERATIONS DEPT.
2" MAG METER
W/ 2" P.R.V.
HEADQUARTERS – E.C.O. DIVISION FT.DEFIANCE, AZ

DETAIL NO. CUSTOM DTL. FOR BIA

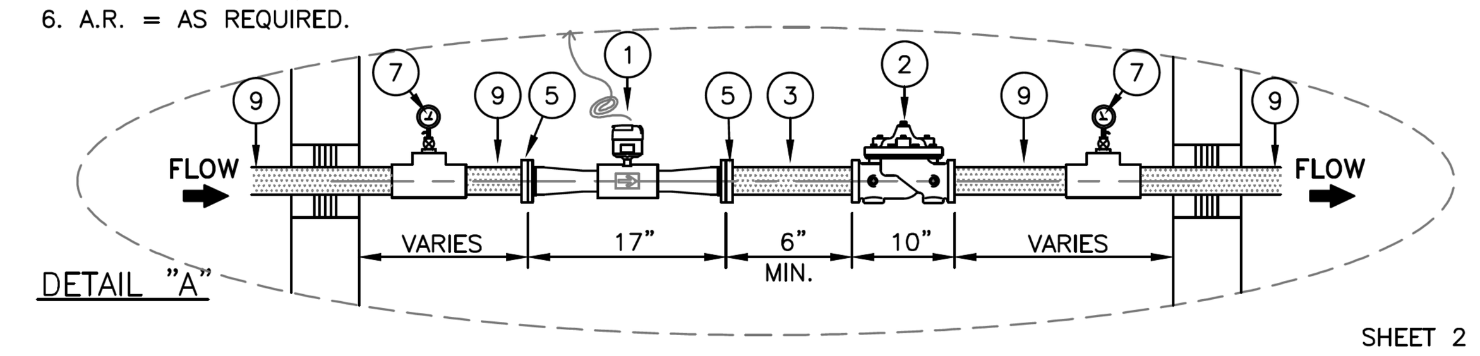
REVISIONS

2" MAG METER W/ 2" P.R.V.

MATERIAL LIST

ITEM	QTY	DESCRIPTION
1	1	2" ELSTER EVO–Q2 MAG METER, FLANGED, GALLONS, W/ E.A. WATER MODULE (AMI)
2	1	2" CLA–VAL, PRESSURE REDUCING VALVE, F.I.P.T., 90 SERIES W/ OPTIONS A, B, C, D, & V.
3	A.R.	2" STAINLESS STEEL (S.S.) SPOOL PIECE (LENGTH = 6" MIN.)
4	2	4" x 2" D.I. REDUCER, CLASS 350, FLANGED OR A 2" THREADED FLANGE MAY BE USED
5	2	2 BOLT F.I.P.T. FLANGE
6	2	4" MECHANICAL JOINT ADAPTOR (FOSTER ADAPTOR)
7	2	PRESSURE GAUGE W/ 1/4" BRASS SHUTOFF VALVE (GLYCERIN)
8	2	VAULT BORE DONUTS, 6" W/ 2" HOLE
9	A.R.	2" S.S. PIPE, PLAIN END, CUT AND THREAD AS NEEDED
10	2	4" GATE VALVE, M.J., RESILIENT SEAT, FLANGED, N.R.S., R.H.T., W/ 2" OPERATING NUT
11	2	VALVE BOX, 2–PIECE SCREW TYPE, 5–1/4" SHAFT W/ CAST IRON DROP LID
12	–	NEW 4" PVC C–900, WATERLINE
13	A.R.	PLASTIC COATED STEEL OR ALUMINUM STEP @ 16" O.C., INSTALL TO 12" ABOVE VAULT FLOOR
14	1	6' x 6' x 6' (INT. DIM.) PRECAST CONCRETE VAULT (4,000 PSI MIN.), 6" THICK WALLS W/ 6" THICK REINFORCED CONCRETE TOP (8" THICK FOR TRAFFIC RATING) AND 6" REINFORCED CONCRETE BASE
15	1	5' x 5' SQ., INSULATED, DOUBLE DOOR COVER AND SAFETY GRATE, ALUMINUM CHANNEL FRAME W/ HANDLE SLAM LOCK AND COVERED PADLOCK CLIP
16	A.R.	#4 REBAR, E.W.O.C.
17	A.R.	VAULT JOINTS TO BE SEALED WITH BITUMASTIC OR GASKET
18	2	24" x 24" x 4" CONCRETE COLLAR W/ #4 REBAR, E.W., INDICATE PIPE SIZE & FLOW DIRECTION
19	A.R.	ADJUSTABLE METAL PIPE SUPPORT
20	1	2" FLOOR DRAIN W/ SCREEN, DRAIN TO 5" CLEAN GRAVEL (ADJUST PER FIELD CONDITIONS)
21	A.R.	CEMENT, NON–SHRINK GROUT, SLOPE FINISH @ 2% (0.02%) TOWARD VAULT DRAIN
22	A.R.	CONCRETE ANCHOR BLOCK PER NTUA STD. DTL. WS–19 & WS–19a
23	2	2" S.S. TEE W/ 2" x 3/4" BUSHING & 3/4' x 1/4" BUSHING FOR PRESSURE GAUGE
24	4	6" DIA. BOLLARDS AT 6" MIN. FROM VAULT CORNERS PER MAG. STD. 140, TYPE 1

GENERAL NOTES:
1. PROVIDE ADEQUATE CLEARANCE BETWEEN FLANGE BOLTS AND VAULT WALLS FOR MAINTENANCE.
2. GATE VALVES TO BE SUPPORTED ON 95% STANDARD PROCTOR.
3. ALL PIPES AND FITTINGS 4" OR LESS TO BE STAINLESS STEEL.
4. E.A. = EA_WATER MODULE (ENERGY.AXIS MANAGEMENT SYSTEM) FOR AMI.
5. HEX HEAD BOLTS/NUTS TO BE STAINLESS STEEL, TYPE 18–8.
6. A.R. = AS REQUIRED.



SHEET 2 OF 2

NAVAJO TRIBAL UTILITY AUTHORITY
WATER–WASTEWATER OPERATIONS DEPT.
MATERIAL LIST:
2" MAG METER W/ 2" P.R.V.
HEADQUARTERS – E.C.O. DIVISION FT.DEFIANCE, AZ

REVISIONS

GENERAL NOTES

1. The contractor shall perform the waterline adjustment work in an orderly manner under the guidance of a full–time foreman who shall be in charge of the utility work. The contractor shall complete all work as shown on the drawings, and such additional work required to deliver a fully functional system. The contractor shall alert and brief NTUA, BNSF, and BIA operating personnel of upcoming critical phases of the work – especially water outages. The contractor will be expected to send out notices to residences regarding the interruption of water services, and will be required to keep the outage time to a minimum.

2. The pipe shall be carefully placed within an unyielding trench on a minimum of 4" of compacted (90% Standard Proctor) granular material which is defined as 100% passing the 3/4", 40% – 99% passing the No. 4 Sieve, and 20% or less passing the No. 200 Sieve. The materials shall be non–plastic and provide a uniform support for the bottom segment of the pipe. This select material shall continue to be placed and compacted to a minimum of 6" above the top of pipe. If the natural material in the trench bottom meets the above gradation requirements, only accurate shaping of the trench bottom to provide adequate pipe support is required.

3. The backfill material from the point 6" above the top of the pipe to the ground level shall be loose, moist earth free of rocks and debris with no single rock larger than 3" in diameter. For all pipe except Ductile Iron, compaction within one foot of the top of the pipe shall be limited to hand compaction or small vibrators that shall not jeopardize the integrity of the line. All compaction from one foot above the top of the pipe to the finished grade may be compacted with jumping jacks or larger vibratory rollers and the compaction effort shall be increased from 90% to 95% Standard Proctor within roadway rights–of–way and turnout crossing. The contractor shall be responsible for demonstrating that he has achieved the appropriate compaction.

4. The contractor shall be responsible for coordinating with the BIA Branch of Roads in establishing the appropriate concrete collar valve box and manhole finished grade elevations as applicable. The contractor shall replace all fencing, driveways, and other such improvements removed and/or destroyed during construction as called for in the design plans. The contractor shall be responsible for all safety aspects involved in construction, shall abide by all OSHA and related requirements, and shall provide the necessary traffic control in accordance with section 635 of the FP–03 and the contractor's approved traffic control plan.

5. Any provisions or procedures not shown on the plans shall be covered in BNSF and NTUA standard utility technical installation requirements attachedandthe BIA AOTR & BNSF Engineer shall be the sole parties in tendering a decision that does not conflict with water and sewer installation activities or standards.

6. The pressure testing and disinfecting of all joints and lines shall be in accordance with the Navajo Tribal Utility Authorityspecifications attached as outlined below:

All new pipeline shall be tested for water tightness up to the individual building service meter. The test equipment will be provided by the contractor, but is subject to inspection by NTUA. Arrangements for water used in pipeline testing shall be coordinated with the operating utility. Pressure gauges used in testing shall be graduated at a maximum of 5 psi increments. Two gauges will be used simultaneously for verification of the gauges functionality. Prior to the test, the pipeline will be pressured to 10 psi above the test pressure, and then the pressure will be decreased to the test pressure so that gauge responsiveness can be observed. The test pressure shall be at least 100 percent of the pressure rate of the pipe under test and be measured at the lowest point of elevation in the test section. It is to be understood if 200 psi pressure rated pipe (or above) is installed, it may be tested as if it were 160 psi pressure rated pipe. A lower test pressure may be authorized in writing by the COR (or designated representative) if line valving, saddles, etc. are a limiting consideration in pipeline pressure capability. At no time will two different pipe pressure ratings be tested simultaneously in the same test section if designed to operate at different pressures. No section greater than one mile or with a 25 psi pressure change due to elevation shall be tested withoutwritten authorization from the AOTR. The test shall be conducted in such a manner that existing lines and services user's plumbing is not damaged.

All connections, blow–offs, hydrants, house services up to the meter yoke, and valves, shall be tested with the main as far as is practicable.

BID ITEM	DESCRIPTION	QUANTITY	UNTS	UNIT PRICE	TOTAL PRICE	REMARKS
61001–1000	Cap BNSF 4" dia sewerline	LS	All Reqd			Cut exiting line to the west and place a cap
61102–0700	200'x2" dia H20 line PVC SDR–21 installed with 180' of 8" steel casing Sch 40 with 90° elbow, 1 Each	200	ft			new line to cross over the main road and under the ditch of the BNSF access road to the building
61100–0100	1" x 162' OD 1" dia H20 line – PE	162	ft			1" line connecting to 2" line along the ditch line of BNSF Access road
61100–0200	1" dia H20 line to be removed	138	ft			existing to BNSF building
61102–1100	8"x8"x2" Tee	1	ea			connection from 8" main to 2" H20 line
61102–1101	8"x8"x4" Tee	1	ea			connection from 8" main to 4" H20 line
61102–1102	2" Gate Valve	2	ea			connection from 8" main to 2" H20 line under the main overpass road
61102–1102	8" Gate Valve	1	ea			installed just north on the 8"x8"x4" Tee
61102–1150	4" 22.5 degree Ductile Iron Elbow	1	ea			connect new 4" to existing west of new vault
61102–1160	4" ROMAC Coupling	1	ea			for connection to the 4" Steel Waterline
61102–1000	4" dia H20 line to be removed	28	ft			exiting line just south of the tracks with the section under the tracks to remain in place
61102–1100	4" dia PVC C–900 H20 line to be installed	49	ft			new line taped into the 8 inch line
61102–1100	4" dia PVC C–900 H20 line to be installed	20	ft			line to connect from Elbow to ROMAC Coupling
61102–0100	Water meter 1" size w/ TANDEM Yoke (INV. PRV)	1	ea			meter for BNSF building
61102–0200	Water meter 2" size w/ TANDEM Yoke (INV. PRV)	1	ea			Meter for the 4" line connecting to 8" main line
61104–0400	1" Curb Stop, Domestic STOP	2	ea			for new 1inch line
61104–0600	4" Gate Valve	3	ea			2 for new 4 inch line and one on the 4: steel line just outside ROW west
61104–0400	2" Pressure reducing valve	1	ea			for 4 inch line
61001–0000	Waterline removal and new installation with all materials, labor & incidentals	All Req'd	Lump Sum			
				Total Cost	$	

**Note: all materials required on NTUA Detail (CUSTOM DTL for BIA) attached installed in place and accepted as one unit.

*** Note: all materials required on NTUA 1" water meter detail (WS–1 DWG) drawing attached in place and accepted as one unit.

Sht 39_40 N2007 Wateline Adjustment 022618.dgn

N2007 WATER & SEWERLINE ADJUSTMENT

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1)1,2&4	39	63

Sta. 23+00.00 Lt. To 24+62.06 Lt.
Install New 1" Waterline (Pe) 162' In Length At A Min. 3.5' Below Access Road Ditchline. Install Watermeter At The Juction At Sta. 24+62.06 Lt.

Sta. 23+00.189, Adjust 2" Gate Valve To The New Coordinates Below And Install Flush With The Existing Ground Line For Access
Offset -110.197
N 1501342.044
E 888565.611

1" Meter To Be Adjusted to the East Per The Coodinates Below Flush With Existing Ground Sta. 24+61.847, Offset 96.359 ft Left.
N 1501204.801
E 888652.150

23+00.189
1501342.044
888565.611
0.000

2" Gate Valve
2"x1" Reducer Sch. 60

24+62.061
1501201.193
888647.737
0.000

BNSF Maintenance Building

1 INCH PVC

S31°16'47"E
444.809'

N75°52'26"W
98.303'

8" X 180' OF STEEL CASING Sch. 40

Sta 25+95.95 to 26+34.000 remove the 4" waterline before drilling pier shafts

Sta. 25+32.054 to 25+95.904
64.20ft of 4 inch ø Steel Waterline
To be left in place. Once construction of the access road paralleling the railroad tracks begins, only the portion of the waterline crossing the access road (approx. 19ft) shall be removed as required. The remaining waterline under the railroad tracks shall be injected with 0.2cy of concrete grout to seal both ends as incidental work under the waterline adjustments.

Sta. 23+00.00 Lt. & Rt.
Install New 200ft of 2 inch ø PVC-SDR-21 inside 8 inch ø steel casing with 90° elbow 3.5 ft below ground under main roadway and 3.5 ft below BNSF access road ditchline.
N 1501221.177
E 888405.286

Sta. 24+62.498 Lt. & Rt.
Remove 138.27ft of 1 inch ø PVC Waterline & Valve To The Right Where It Connects to 4 inch Waterline

Sta. 24+00.00
Offset 89.855
N 1501141.719
E 888466.351

8"X8"X4" TEE @ STA. 24+00 RT.

Sta. 24+00.00 to 25+11.243
184ft of 4 inch ø Steel Waterline
To be abandoned in-place total.

Existing 8 inch waterline with
14 inch steel casing @ railroad crossing

2" Gate Valve
8"x8"x2" Tapping Tee
@ STA. 23+00 RT.

8" G.V. Downstream

8 INCH PVC

4" G.V.
4"X2" RED.
2" W.M.
2" P.R.V.
4"X2" RED.
4" G.V.

22+99.790
1501221.177
888405.286
0.000

6'x6'x6' CONC. VAULT (SEE NTUA DETAIL)

49'x4" PVC-C900

Min. Pipe Deflection

22.5°x4" ELL

Min. Pipe Deflection

20'x4" PVC-C900 w/ 4" Gate Valve
X=888413.8569
Y=1501110.7095

Sta. 24+00.00 Lt. & Rt.
Install 49.0ft of 4 inchø PVC-C900 Waterline & Valve To The Right Where It Connects to Existing 4 inch Steel Waterline

R/W Line

Sta. 24+00.000 to 26+39.788
4 inch ø Steel Waterline
To be abandoned in place except as noted and the valve at Sta. 26+39.788 Shall be shut off.

4" ROMAC COUPLING

4 INCH STEEL

RR SIGNAL LINE

50ft Zone

Scale 1"= 25'
Note: Coordinates Shown For Utilities are aproximate

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				Total Cost	$	

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*** Note: all materials required on NTUA 1" water meter detail (WS-1 DWG) drawing attached in place and accepted as one unit.

GENERAL NOTES

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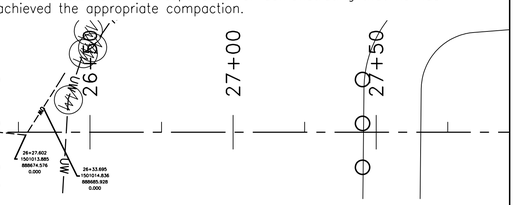

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5. Any provisions or procedures not shown on the plans shall be covered in BNSF and NTUA standard utility technical installation requirements attachedandthe BIA AOTR & BNSF Engineer shall be the sole parties in tendering a decision that does not conflict with water and sewer installation activities or standards.

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All connections, blow-offs, hydrants, house services up to the meter yoke, and valves, shall be tested with the main as far as is practicable.

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-1	63

BRIDGE GENERAL NOTES

1. SPECIFICATIONS: DESIGN; AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1992, 15th EDITION. CONSTRUCTION: STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-03, ENGLISH EDITION, AND SUPPLEMENTAL SPECIFICATIONS.

2. UNITS: THIS PROJECT HAS BEEN DESIGNED AND DRAWN USING THE U.S. CUSTOMARY (ENGLISH) SYSTEM OF UNITS. UNLESS OTHERWISE NOTED, ALL VALUES ARE GIVEN IN U.S. CUSTOMARY (ENGLISH) UNITS. SLOPES DESIGNATED ON THESE PLANS ARE IN ACCORDANCE WITH SECTION 101.03(d) OF THE FP-03, i.e.; V:H (VERTICAL : HORIZONTAL).

3. DESIGN LOADS: DEAD LOADS; CONCRETE = 150 pcf, STEEL = 490 pcf, FUTURE WEARING SURFACE = 25 psf OF ROADWAY SURFACE, EARTH PRESSURE = FLUID WEIGHING 36 pcf. LIVE LOADS; HS 20-44 PLUS IMPACT. IMPACT = 50/(L+125) WHERE L = SPAN LENGTH IN FEET. MAXIMUM IMPACT FACTOR = 0.30.

4. RATINGS: INVENTORY RATING = HS 22.0. OPERATING RATING = HS 36.8.

5. DESIGN PARAMETERS: REINFORCED CONCRETE DESIGNED BY LOAD FACTOR DESIGN WITH f'c = 4000 psi AND fy = 60,000 psi. TRANSVERSE DECK SLAB SERVICEABILITY STRESSES LIMITED TO f'c = 1,400 psi AND MAXIMUM STRESS IN REINFORCING STEEL OF fs = 20,000 psi. PRECAST, PRESTRESSED GIRDERS DESIGNED IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1992, 15th EDITION CRITERIA. ULTIMATE STRENGTH OF ½" DIA. SEVEN WIRE, BRIGHT, STRESS RELEIVED, LOW RELAXATION, PRESTRESSING STRAND SHALL BE 41,300 POUNDS WITH A MINIMUM f's = 270,000 psi.

6. CONCRETE: ALL CAST IN PLACE CONCRETE SHALL BE CLASS A(AE) WITH THE 28 DAY COMPRESSIVE STRENGTH INDICATED IN THESE PLANS. THE AIR CONTENT FOR ALL CLASS A(AE) CONCRETE SHALL NOT BE LESS THAN THAT SPECIFIED IN THE FP-03. CONCRETE IN PRECAST, PRESTRESSED CONCRETE GIRDERS SHALL BE CLASS P AND SHALL HAVE THE MINIMUM STRENGTHS INDICATED IN THESE PLANS. CONCRETE FOR THE DECK SLAB AND ALL DIAPHRAGMS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF f'c = 4,500 psi. ALL OTHER CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF f'c = 4,000 psi. CONCRETE IN PRESTRESSED GIRDERS SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH f'c = 6,000 psi, WITH A MINIMUM INDICATED CONCRETE STRENGTH AT TIME OF TRANSFER OF PRESTRESS OF f'ci = 5,400 psi. CHAMFER EXPOSED CORNERS OF ALL CONCRETE 3/4" UNLESS OTHERWISE SHOWN ON THE PLANS. ALL SUBSTRUCTURE CONCRETE SHALL CONTAIN TYPE II PORTLAND CEMENT. ALL CONCRETE SHALL BE VIBRATED IN ACCORDANCE WITH SPECIFICATIONS. ALL CEMENT SHALL BE LOW ALKALAI CEMENT AND NO ADDITIVES CONTAINING CALCIUM CHLORIDE SHALL BE USED. THE TIME LIMITS FOR CONCRETE DISCHARGE SPECIFIED IN TABLE 552-4 OF THE FP-03 SHALL APPLY. IF CONCRETE CANNOT BE DISCHARGED WITHIN THE SPECIFIED TIME LIMIT, AN ALTERNATE METHOD OF DELIVERY SUCH AS DRY BATCHING, AN ONSITE BATCHING PLANT CONFORMING TO APPLICABLE SPECIFICATIONS, OR AN APPROVED CONCRETE MIX DESIGN CONTAINING SET RETARDING ADMIXTURES SHALL BE USED. ALTERNATE METHODS OF DELIVERY SHALL BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO IMPLEMENTATION. APPROVAL OF ALTERNATE METHODS SHALL BE BASED ON DATA FROM PAST USE SHOWING CONFORMANCE TO THE SPECIFICATIONS FOR SIMILAR CONCRETE PLACED IN SIMILARLY REMOTE LOCATIONS. TOP SURFACES OF THE BRIDGE DECK AND APPROACH SLABS, INCLUDING WALK WAY, SHALL BE GIVEN A GROOVED FINISH IN ACCORDANCE WITH SECTION 552.14 (a), (b) AND (c)(1) OF THE FP-03. THE CONCRETE BARRIER AND PARAPET SURFACES, VERTICAL EDGE OF BRIDGE DECK SURFACES AND BOTTOM OF BRIDGE DECK OVERHANG SURFACES SHALL BE GIVEN A CLASS 2 RUBBED FINISH. ALL OTHER CONCRETE SURFACES SHALL BE IN ACCORDANCE WITH SECTION 552.16 OF THE FP-03. ALL STEEL OTHER THAN REINFORCING STEEL EMBEDDED IN CONCRETE SUCH AS EXPANSION JOINTS, GUARD ANGLES, ANCHOR BOLTS, ETC... SHALL BE CONSIDERED INCIDENTAL TO ITEM 55201-0200, STRUCTURAL CONCRETE CLASS A(AE) UNLESS OTHERWISE NOTED.

7. REINFORCING STEEL: ALL REINFORCING STEEL SHALL CONFORM TO AASHTO M31, GRADE 60. EPOXY COATED REINFORCING STEEL SHALL ALSO CONFORM TO AASHTO M284. CONVENTIONAL AND EPOXY COATED REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF fy = 60,000 psi. REINFORCING STEEL SIZES SHOWN ON THESE PLANS ARE U.S. CUSTOMARY (ENGLISH) REINFORCING STEEL SIZES. EPOXY COATED REINFORCING STEEL SHALL BE USED IN THE CONCRETE DECK, ALL DIAPHRAGMS, PARAPETS AND APPROACH SLABS. THE MINIMUM COVER FOR ALL REINFORCING STEEL SHALL BE 2 INCHES UNLESS OTHERWISE SPECIFIED. LENGTHS OF REINFORCING STEEL BARS SHOWN IN PLANS INCLUDE REQUIRED SPLICE LENGTHS FOR SPLICES SHOWN. ANY OTHER SPLICES FOR THE CONVENIENCE OF THE CONTRACTOR AND/OR NOT SHOWN ON THE PLANS SHALL FIRST BE REQUESTED FOR APPROVAL BY THE CONTRACTOR AND SHALL NOT BE UTILIZED UNTIL WRITTEN APPROVAL IS GRANTED BY THE AWARDING OFFICIAL/CONTRACTING OFFICER (AO/CO). REINFORCING STEEL QUANTITIES FOR APPROVED SPLICES FOR THE CONVENIENCE OF THE CONTRACTOR AND NOT SHOWN IN THE PLANS SHALL NOT BE PAID FOR BUT SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

8. PRESTRESSING STEEL: PRETENSIONED, PRESTRESSING STEEL STRANDS SHALL BE 270 ksi, 1/2 INCH ø, SEVEN WIRE BRIGHT, LOW RELAXATION PRESTRESSING STEEL STRANDS CONFORMING TO AASHTO M203, INCLUDING THE REQUIREMENTS OF SUPPLEMENT 1. EACH STRAND SHALL BE PRETENSIONED TO A TOTAL LOAD OF 31,000 POUNDS AT fsi = 0.75 (f's) = 202,500 psi. ESTIMATED LOSSES AND FINAL PRESTRESSED FORCES ARE AS FOLLOWS; SPAN 1 AND 4 GIRDERS = 47,200 psi LOSSES, 23,800 POUNDS PER STRAND; SPAN 2 AND 3 = 48,400 psi LOSSES, 23,600 POUNDS PER STRAND.

9. PRESTRESSED CONCRETE GIRDERS: PRESTRESSED CONCRETE GIRDERS SHALL BE MANUFACTURED AS DETAILED IN THESE PLANS. ALL CONCRETE, REINFORCING STEEL, PRESTRESSING STEEL, LIFTING DEVICES, INSERTS AND ACCOMPANYING BOLTS, NEOPRENE ELASTOMERIC BEARING PADS, AND ANY OTHER MATERIALS NECESSARY FOR THE FABRICATION, TRANSPORTATION AND ERECTION OF THE PRESTRESSED CONCRETE GIRDERS SHALL BE CONSIDERED INCIDENTAL TO ITEM 55301-2000 AND ITEM 55301-2010. NEOPRENE ELASTOMERIC BEARING PADS SHALL CONFORM TO AASHTO M251 AND SHALL BE 60 DUROMETER HARDNESS.

10. STRUCTURAL STEEL: STRUCTURAL STEEL FOR EXPANSION JOINT RAILS AND PLATES SHALL CONFORM TO AASHTO M270 GR. 36. WELDED ANCHOR STUDS SHALL CONFORM TO AASHTO 169. DIAPHRAGM ANCHOR BOLTS SHALL CONFORM TO ASTM A307. ALL THE ABOVE ITEMS INCLUDING GIRDER SHOE PLATES AND ALL BOLTS, EXCEPT DIAPHRAGM ANCHOR BOLTS, SHALL BE GALVANIZED AFTER FABRICATION.

11. WELDING: ALL WELDING SHALL BE IN ACCORDANCE WITH ANSI/AASHTO/AWS D1.5M/D1.5:2008 BRIDGE WELDING CODE, INCLUDING MATERIALS, WORKMANSHIP, INSPECTION AND QUALITY CONTROL. INSPECTION OF SHOP WELDS SHALL BE OUTLINED AND PERFORMED IN THE SHOP AS PART OF THE QUALITY CONTROL PROCESS OF THE FABRICATION PLANT. QUALITY CONTROL PLANS OF THE FABRICATION PLANT SHALL BE SUBMITTED ALONG WITH SHOP DRAWINGS FOR ALL FABRICATED PRODUCTS. INSPECTION OF ALL FIELD WELDS SHALL BE IN ACCORDANCE WITH SPECIAL CONTRACT REQUIREMENT 16(k) AND SHALL BE MEASURED AND PAID UNDER ITEM 15301-0000.

12. STRUCTURE TRANSITION RAILINGS: QUANTITIES SHOWN UNDER ITEM 61707-0000 ARE FOR THE THRIEBEAM TRANSITIONS BETWEEN CONCRETE PARAPET AND STANDARD GUARDRAIL SHOWN ON SHEET B-21, INCLUDING THE THRIE BEAM TERMINAL CONNECTOR ATTACHMENT TO THE CONCRETE PARAPET, ALL ATTACHMENT HARDWARE AND WORK, THE W-BEAM TO THRIE BEAM TRANSITION RAIL, ALL POSTS AND BLOCKS AS DETAILED ON SHEET B-21, AND ALL ASSOCIATED HARDWARE. SEE SHEET 3 OF THE ROADWAY PLANS FOR STANDARD GUARDRAIL QUANTITIES AND SHEETS 12 AND 13 OF THE ROADWAY PLANS FOR STANDARD GUARDRAIL DETAILS.

13. DRILLED SHAFTS: CASING OF THE DRILLED SHAFTS MAY BE REQUIRED TO PREVENT CAVING OF SURROUNDING MATERIAL. PAYMENT FOR ANY NECESSARY CASING WORK, INCLUDING MATERIALS, EQUIPMENT AND LABOR, SHALL BE INCLUDED IN ITEMS 56501-0600 AND 56501-0800. ITEMS 56501-0600 AND 56501-0800 QUANTITIES INCLUDE DRILLED SHAFTS FROM THE APPROVED TIP ELEVATIONS TO THE BOTTOM OF ABUTMENT CAP ELEVATIONS AT ABUTMENTS, AND FROM THE APPROVED TIP ELEVATIONS TO THE CONSTRUCTION JOINT (CJ) ELEVATIONS SHOWN ON SHEET B-11 FOR ALL PIERS, AND INCLUDES ALL WORK, LABOR, MATERIALS (INCLUDING CONCRETE AND REINFORCING STEEL), EQUIPMENT AND WORKMANSHIP NECESSARY FOR THE CONSTRUCTION OF THE DRILLED SHAFTS. CONSTRUCTION OF THE CONCRETE COLUMNS FROM THE CJ ELEVATIONS TO THE PIER CAPS, INCLUDING THE HORIZONTAL STRUTS SHALL NOT BE PAID UNDER THE DRILLED SHAFT ITEMS BUT SHALL BE MEASURED AND PAID FOR UNDER ITEM 55201-0200, STRUCTURAL CONCRETE, CLASS A(AE) AND ITEM 55401-1000, REINFORCING STEEL, GRADE 60.

14. PERMANENT STEEL DECK FORMS: PERMANENT STEEL (STAY IN PLACE) DECK FORMS SHALL BE USED FOR THE CONSTRUCTION OF THE CONCRETE DECK OF SPAN 1. AT THE CONTRACTOR'S OPTION, PERMANENT STEEL (STAY IN PLACE) DECK FORMS MAY ALSO BE USED FOR THE CONSTRUCTION OF THE CONCRETE DECK FOR SPANS 2, 3 AND 4. COMPLETE SHOP DRAWINGS/PLANS, DESIGN CALCULATIONS, AND REQUIREMENTS SHALL BE SUBMITTED FOR REVIEW AND SHALL BE APPROVED IN WRITING BY THE AO/CO PRIOR UTILIZATION OF THE PROPOSED SYSTEM. ALL MATERIALS AND WORK (INCLUDING SUBMITTALS INDICATED ABOVE) SHALL BE IN ACCORDANCE WITH SECTION 562 OF THE FP-03 AND SUPPLEMENTAL SPECIFICATIONS.

15. REMOVAL OF EXISTING BRIDGE: EXISTING BRIDGE N666 IS TO REMAIN IN PLACE DURING AND AFTER CONSTRUCTION OF THE NEW BRIDGE. THE APPROACH ROADWAYS TO EXISTING BRIDGE N666 SHALL BE OBLITERATED AFTER THE NEW BRIDGE IS CONSTRUCTED AND TRAFFIC IS USING THE NEW BRIDGE, AND CONCRETE BARRIERS SHALL BE PLACED AT THE ENDS OF THE EXISTING BRIDGE N666 AS SHOWN ELSEWHERE IN THESE PLANS TO PREVENT VEHICLES FROM DIRVING ONTO EXISTING BRIDGE N666.

16. SPAN 1 CONSTRUCTION: THE CONTRACTOR SHALL COORDINATE THE CONSTRUCTION OF SPAN 1, INCLUDING ABUTMENT 1 AND PIER 1, WITH THE BURLINGTON NORTHERN SANTA FE (BNSF) RAILROAD IN ORDER TO PREVENT ANY UNNECESSARY DOWN TIME OR INTERRUPTION OF TRAIN TRAFFIC THROUGH THE CONSTRUCTION SITE. ALL PROJECT STAKEHOLDERS SHALL BE NOTIFIED OF COORDINATION EFFORTS SO THAT ALL WORK CAN BE PERFORMED AS SMOOTHLY AS POSSIBLE.

17. SEE SECTION 107 OF THE SUPPLEMENTAL SPECIFICATIONS FOR SECTION (c) AND (c1), RAIL ROAD REQUIREMENTS. THE CONTRACTOR IS ALSO REFERRED TO THE BNSF AGREEMENT WITH THE BIA, SECTION C-1 FOR ADDITIONAL REQUIREMENTS.

18. ARTICULATED CONCRETE BLOCK REVETMENT: THIS WORK SHALL CONSIST OF FURNISHING ALL LABOR, EQUIPMENT AND MATERIALS TO PLACE AN ARTICULATED CONCRETE BLOCK REVETMENT SYSTEM ON THE SLOPES OF THE ABUTMENT EMBANKMENTS AS DETAILED IN THESE PLANS. THE SYSTEM SHALL CONSIST OF 8 FT. BY 16 FT. SECTIONS PLACED ADJACENT TO EACH OTHER AND POSITIVELY CONNECTED BY THE MANUFACTURERS RECOMMENDED METHOD TO PROVIDE A HOMOGENEOUS EROSION PROTECTION SYSTEM. IF NECESSARY, IRREGULARLY SHAPED SECTIONS SHALL BE DESIGNED AND FABRICATED TO FIT CORNERS AND OTHER IRREGULAR AREAS. THE SECTIONS SHALL BE MADE OF CONCRETE BLOCKS INTERCONNECTED LATERALLY AND TRANSVERSELY BY STAINLESS STEEL CABLES CAST INTO THE CONCRETE BLOCKS. A GEOTEXTILE FABRIC CONFORMING TO SPECIFICATIONS SHALL BE PLACED/ATTACHED TO THE BOTTOM OF EACH SECTION. THE CONCRETE BLOCKS SHALL BE A TRUNCATED PYRAMID SHAPE WITH THE TOP SURFACE 11.5 IN. BY 11.5 IN. SQUARE AND THE BASE SURFACE 15.5 IN. BY 15.5 IN. SQUARE. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESIGN DATA FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION AND USE OF THE SYSTEM.

19. CONCRETE BARRIER: ALL CONCRETE AND REINFORCING STEEL SHALL BE PAID UNDER ITEMS 55201-0200 AND 55401-2000.

20. 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.

BRIDGE ESTIMATED QUANTITIES

ITEM	DESCRIPTION	QUANTITY	UNIT	AS BUILT
20403-0000	Unclassified Borrow (Bridge Abutment Embankments)	9868	c.y.	
25112-3000	Articulated Concrete Block Revetment	2846	s.y.	
25302-1000	Gabions, galvanized coated, Class 2.	721	c.y.	
55201-0200	Structural Concrete Class A(AE)	1888	c.y.	
55301-2000	Precast Prestressed Concrete BT-72 Grider 72", 130'-5" long	12	ea.	
55301-2010	Precast Prestressed Concrete BT-72 Girder 72", 129'-4" long	12	ea.	
55401-1000	Reinforcing Steel, Grade 60	186,034	lb	
55401-2000	Reinforcing Steel, Epoxy Coated, Grade 60 △	236,909	lb	
56501-0600	Drilled Shafts, 4'-0" diameter	507	lf	
56501-0800	Drilled Shafts, 5'-0" diameter	407	lf	
61707-0000	Structure Transistion Railing (Thrie Beam)	75	lf	
61711-5000	Impact Attenuator, QUADGUARD	2	ea.	
61901-1300	Fence, Chain Link Pedestrain Fence	552	lf	
61901-1800	Fence, Chain Link, 60-inch height	552	lf	
63308-3000	Object Markers, Type 3, 1 Post and Hardware; 2.00 lb/ft.	4	ea.	

The quantites shown above are related to bridge construction only and are not included in the quantities shown on Sheet 3. The quantities shown above shall be combined with the quantities shown on Sheet 3 to obtain the total estimated quantities for the entire project. The total estimated quantities for the entire project are shown on the Bid Schedule.

ITEM 61707-0000
STRUCTURE TRANSITION RAILING

STATION TO STATION	LOCATION	LENGTH (ft)
24+49.83 to 24+68.58	LT.	18.75
24+49.83 to 24+68.58	RT.	18.75
30+21.92 to 30+40.67	LT.	18.75
30+21.92 to 30+40.67	RT.	18.75
	TOTAL:	75.00

The quantities show above include only thrie-beam transitions from concrete barriers to standard guardrailing as detailed on Sheet B-21.

ITEM 20403-0000
UNCLASSIFIED BORROW (Bridge Abutment Embankments)

LOCATION - STATION TO STATION	CUT (c.y.)	FILL (c.y.)	* BORROW (c.y.)	WASTE (c.y.)
ABUT 1 - 24+83.00 to 25+24.98	0	2246	2808	0
ABUT 2 - 29+23.75 to 30+07.50	299	5947	7060	0
TOTAL . . .	299	8193	9868	0

** 25% Shrinkage Factor applied*

NOTE: The quantity shown above is not included in the quantity shown on Sheet 3 for Item 20403-0000.

△ - Revised Item 55401-2000 quantity.

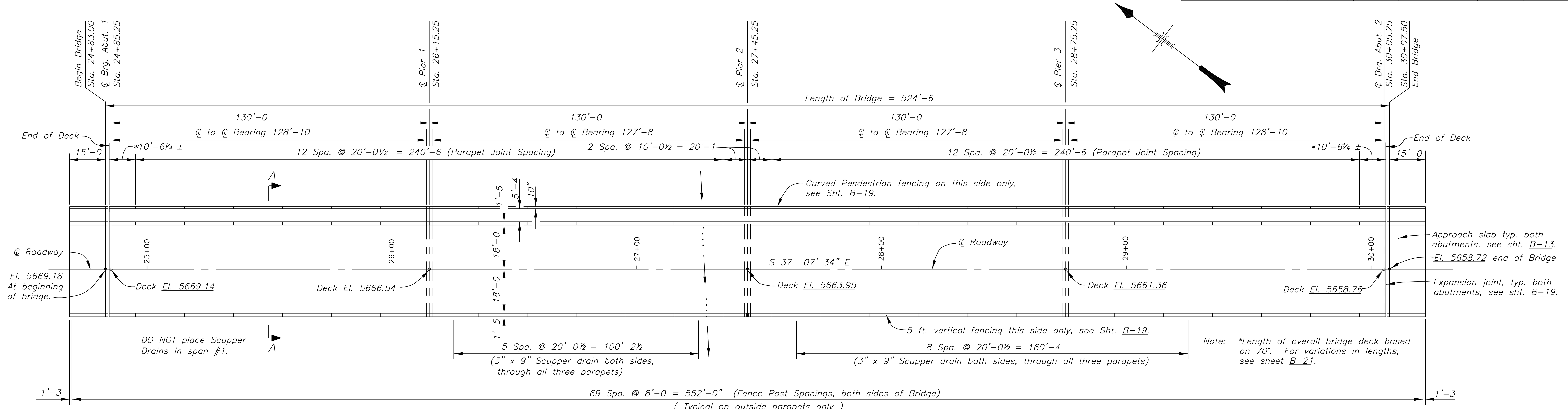
REVISED 04/21/2015

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

RIO PUERCO BRIDGE
BRIDGE GENERAL NOTES,
ESTIMATED QUANTITIES & TABLES

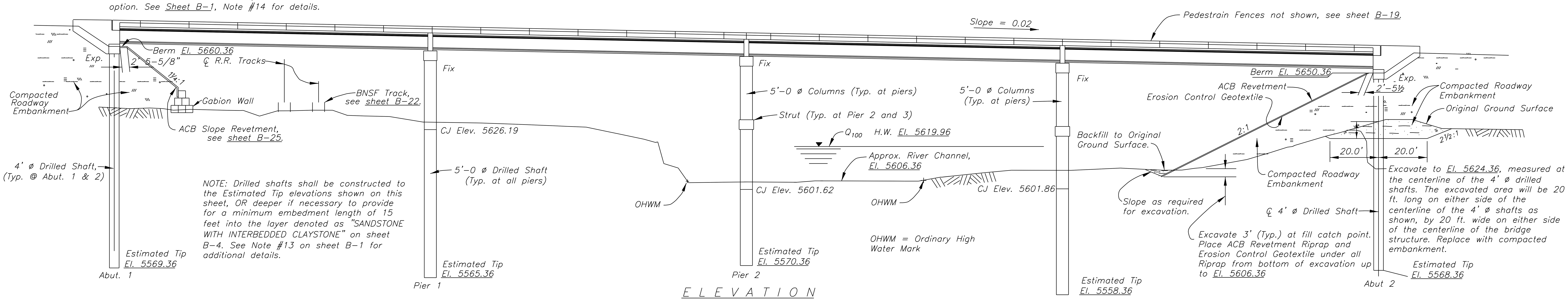
Designed by: cdh	
Drawn by: rsh, dc, cdh	Date: 01/17/14
Revised by: cdh	Date: 04/21/2015
File Name: 01_BIAgnrl	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-2	63



P L A N
NTS

NOTE: Permanent steel (stay-in-place) deck forms shall be utilized for the construction of Span 1. Permanent steel deck forms may also be used for the construction of Spans 2, 3 and 4 at the Contractor's option. See Sheet B-1, Note #14 for details.



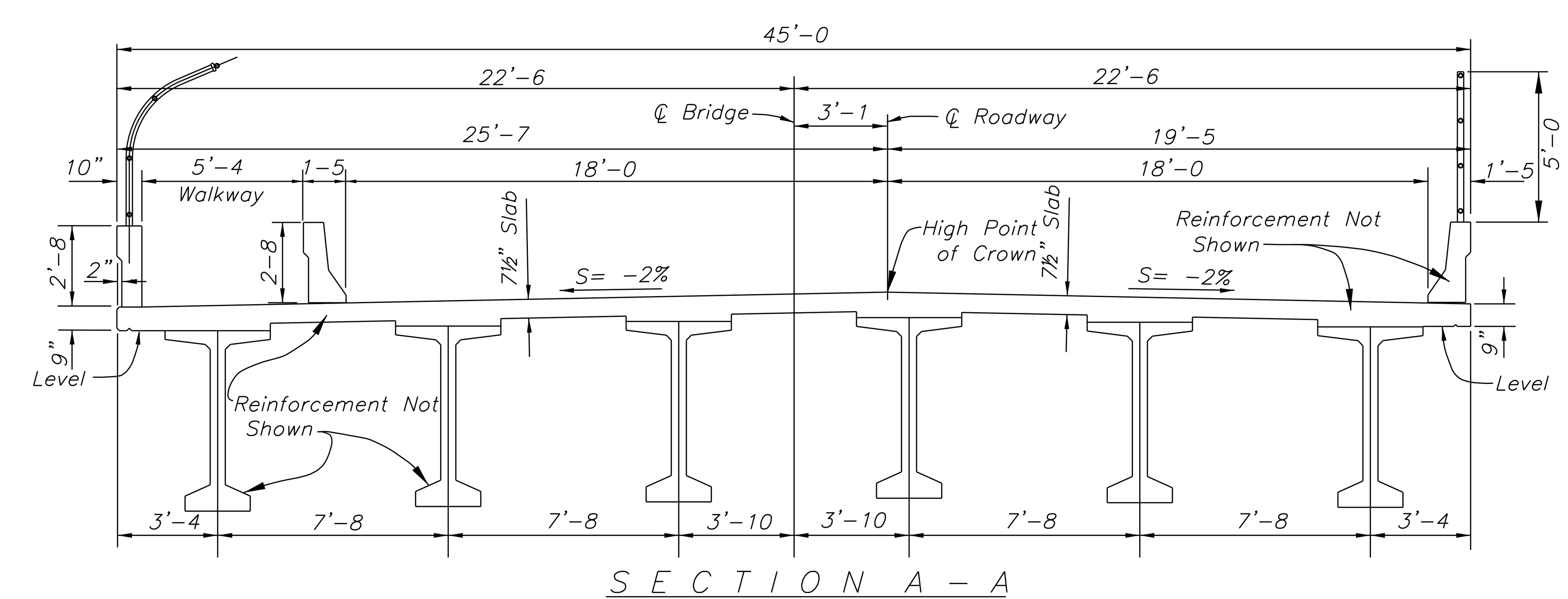
E L E V A T I O N
NTS

Note: Backfilling of abutment caps and backwalls is restricted to berm elevations shown, prior to girder placement. (Typ. at both abutments).

HYDRAULIC DATA
Drainage area = 2160 sq. mi.
Q_{50} = 23,200 cfs El. 5619.46 V=10.0 ft./s
Q_{100} = 26,100 cfs El. 5619.96 V=10.0 ft./s

APPLIED STRUCTURAL LOADS

Abutment #1	: 314	tons/shaft (max.)
Pier #1	: 527	tons/shaft (max.)
Pier #2	: 525	tons/shaft (max.)
Pier #3	: 545	tons/shaft (max.)
Abutment #2	: 308	tons/shaft (max.)



S E C T I O N A - A
NTS

N O T E
For specific location of the beginning and ending Bridge stations, see Abutment Plan on Sheet B-9.

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RIO PUERCO BRIDGE
STRUCTURE LAYOUT

Designed by: BUREAU OF RECLAMATION
Drawn by: BOR, dc, rsh, cdh Date: 01/17/14
Revised by: - - Date: - -
File Name: 02_BIA_plan

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-3	62

WEATHERING

FRESH (W1): Body of rock that is not oxidized or discolored; fracture surfaces are not oxidized or discolored*; no separation of grain boundaries; no change of texture and no solutioning. Hammer rings when crystalline rocks are struck.

SLIGHTLY WEATHERED TO FRESH (W2):**

SLIGHTLY WEATHERED (W3): Discoloration or oxidation is limited to surface of, or short distance from fracture; some feldspar crystals are dull; olivine or pyroxene phenocrysts may be altered to iddingsite; fracture surfaces have minor to complete discoloration or oxidation; no visible separation of grain boundaries; texture preserved and minor leaching of soluble minerals may present. Hammer rings when crystalline rocks are struck, body of rock is not weakened by weathering.

MODERATELY TO SLIGHTLY WEATHERED (W4):**

MODERATELY WEATHERED (W5): Discoloration or oxidation extends from fractured, usually throughout body of rock; ferromagnesian minerals are "rusty". feldspar crystals are "cloudy;" all fracture surfaces are discolored or oxidized; partial opening of grain boundaries visible; texture generally preserved, but soluble minerals may be mostly leached. Hammer does not ring when rock is struck, body of rock is slightly weakened.

INTENSELY TO MODERATELY WEATHERED (W6):**

INTENSELY WEATHERED (W7): Body of rock is discolored or oxidized throughout; all feldspar and ferromagnesian minerals are altered to clay to some extent. All fracture surfaces are discolored or oxidized, surface friable; partial separation of grain boundaries, rock is friable; in situdisaggregation of granitics common in semi-arid regions; texture altered and leaching of soluble minerals may be complete. Rock has dull sound when struck with hammer, rock is weakened, usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness.

VERY INTENSELY WEATHERED (W8):**

DECOMPOSED (W9): Body of rock is discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspar and ferromagnesian minerals are completely altered to clay; complete separation of grain boundaries (disaggregated), partial or complete remnant rock structure may be preserved, but resembles a soil.

NOTE: Weathering categories are established primarily for crystalline rock and those with ferromagnesian minerals, weathering in various sedimentary rocks will not always fit the categories established. The term "weathering" includes all alterations due to any process including surface weathering and hydrothermal alteration.

*Characteristics of fracture surfaces does not include directional weathering along sherars or faults and their associated fracture zones; for example a shear that carries weathering to great depths in a fresh rock mass would not require the whole rock mass to be classified as weathered.

** Combination description are used where equal distribution of both weathering characteristics are present over signification intervals or where characteristics noted are "in between" the diagnostic characteristics.

SOIL CONSISTENCY

Vary soft	Thumb will penetrate soil more than 1 in. (25 mm).
Soft	Thumb will penetrate soil about 1 in. (25 mm).
Firm	Thumb will indent soil about 1/4 in. (5 mm).
Hard	Thumb will not indent soil but readily indented with thumbnail.
Very hard	Thumbnail will not indent soil.

BEDROCK HARDNESS / STRENGTH

EXTREME HARD (H1): Core, fragment or exposure cannot be scratched with knife or sharp pick; can only be chipped with repeated heavy hammer blows.

VERY HARD (H2): Cannot be scratched with knife or sharp pick. Core or fragments breaks with repeated heavy hammer blows.

HARD (H3): Can be scratched with knife or sharp pick with difficulty (heavy pressure). Heavy hammer blow required to break specimen.

MODERATELY HARD (H4): Can be scratched with knife or sharp pick with light or moderate pressure. Core or fragment breaks with moderate hammer blow.

MODERATELY SOFT (H5): *Can be grooved 1/16 in. (2 mm) deep by knife or sharp pick with (moderately or heavy) pressure. Core or fragment breaks with hammer blow or heavy manual pressure.

SOFT (H6): Can be grooved or gouged easily by knife or sharp pick with light pressure, can be scratched with fingernail. Breaks with light to moderate manual pressure.

VERY SOFT (H7): Can be readily indented, grooved or gouged with fingernail, or carved with a knife. Breaks with light pressure.

NOTE: Bedrock units softer than H7, Very Soft, are described using USCS (soils) consistency descriptors.

FRACTURE DENSITY

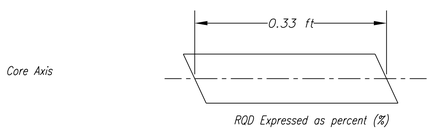
Alpha-numeric descriptor	Descriptor	Criteria
FD0	Unfractured	No fractures.
FD1	Very slightly fractured	Core recovered mostly in lengths greater than 3 feet (1 m).
FD2	Slightly to very slightly fractured	
FD3	Slightly fractured	Core recovered mostly in lengths from 1 to 3 feet (300 to 1000 mm) with few scattered lengths less than 1 foot (300 mm) or greater than 3 feet (1000 mm).
FD4	Moderately to slightly fractured	
FD5	Moderately fractured	Core recovered mostly in 0.33 to 1.0 foot (100 to 300 mm) lengths with most lengths about 0.67 foot (200 mm)
FD6	Intensity to moderately fractured	
FD7	Intensity fractured	Lengths average from 0.1 to 0.33 foot (30 to 100 mm) with scattered fragmented intervals. Core recovered mostly in lengths less than 0.33 foot (100 mm).
FD8	Very intensely to intensely fractured	
FD9	Very intensely fractured	Core recovered mostly as chips and fragments with a few scattered short core lengths.

Sedimentary and Pyroclastic rock particle-size descriptors

Size in mm (inches)	SEDIMENTARY Rounded, Subrounded, subangular		PYROCLASTIC	
	Particle or fragment	Lithified product	Fragment	Lithified product
300 (12)	Boulder	BOULDER CONGLOMERATE	Boulder	AGGLOMERATE (Boulder, cobble, gravel, and sand)
256 (10)	Cobble	COBBLE CONGLOMERATE	Cobbler	
75 (3)	Coarse gravel	PEBBLE CONGLOMERATE	Coarse gravel	
64 (2.5)	Fine gravel		Fine gravel	
20 (0.8)	Coarse sand	SANDSTONE (Coarse sand, medium sand and fine sand)	Coarse sand	
4.75 (0.2)	Medium sand		Medium sand	
2.00 (0.08)	Fine sand		Fine sand	TUFF (Coarse, gravel to fine sand, and ash)
0.42 (0.02)	Silt	SILTSTONE/ SHALE	Ash	
0.074 (0.003)	Clay	CLAYSTONE/ SHALE		
0.005				

ROCK QUALITY DESCRIPTION (RQD)

$$RQD = \frac{\text{Sum of length of solid core pieces greater than or equal to 0.33 ft long}}{\text{Length of the run in feet}} \times 100$$



RQD Expressed as percent (%)

Rock Color

All colors used to describe rock are taken from the Geological Society of America Rock color Chart (7th pprinting, 1991, with revised text).
Unless indicated all colors are described from wet samples.

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NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE

STANDARD DESCRIPTIONS AND DESCRIPTIVE CRITERIA FOR ROCK

Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, cdh, rsh	Date: 01/24/13
Revised by: - -	Date: - -
File Name: 03_BIAsoil	

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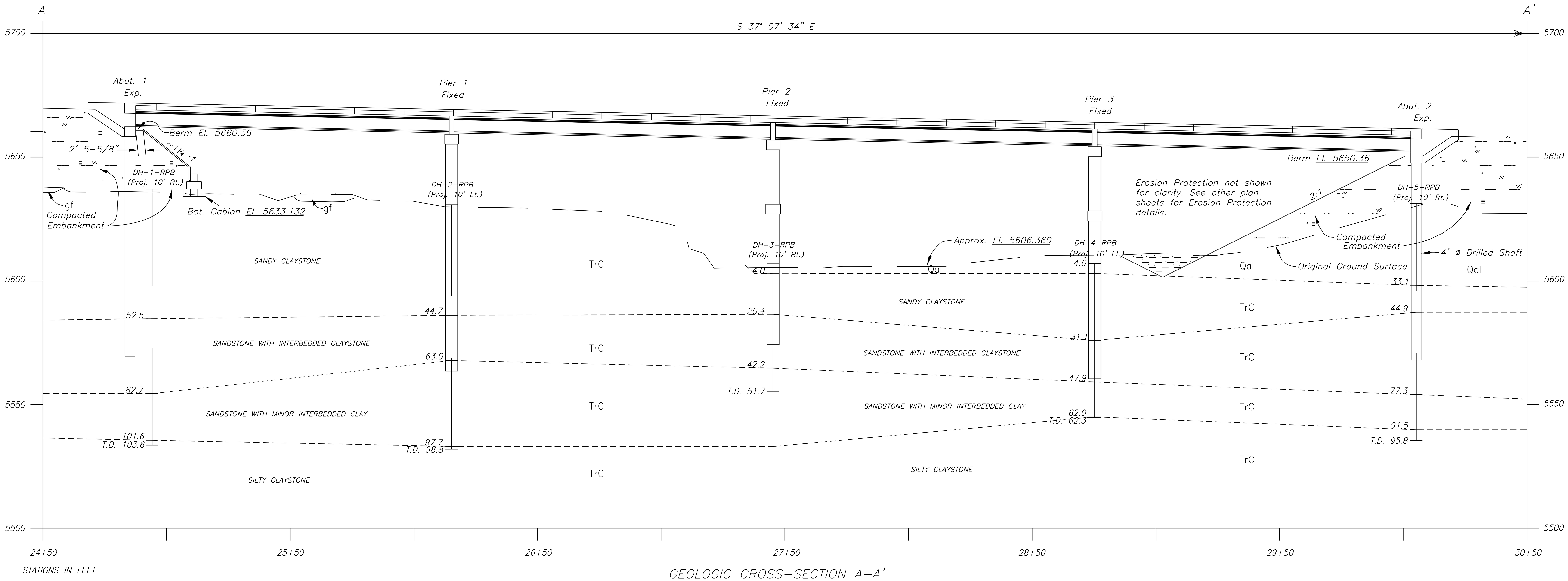
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-4	63



GEOLOGIC CROSS-SECTION A-A'

NOTE: DRILLED SHAFTS HAVE BEEN DESIGNED TO BE FOUNDED IN THE LAYER DENOTED AS "SANDSTONE WITH INTERBEDDED CLAYSTONE". DRILLED SHAFTS SHALL BE CONSTRUCTED TO THE ESTIMATED TIP ELEVATIONS SHOWN ON THIS SHEET, OR DEEPER IF NECESSARY TO PROVIDE FOR A MINIMUM EMBEDMENT LENGTH OF 15 FEET INTO THE LAYER SPECIFIED LAYER. SEE NOTE #13 ON SHEET B-1 FOR ADDITIONAL DETAILS.

GENERAL GEOLOGIC LEGEND

gf *General Fill*: The railroad tracks have a foundation consisting of poorly graded gravel (GP) that varies in thickness from 1.0 to 3.0 feet. The dirt road is composed of a combination of poorly graded sand (SP) and sandy lean clay s(CL). The roadfill material is the same as the alluvium, but it has been reworked and graded.

Qal *Quaternary Alluvium*: In the river channel, alluvium is composed predominately of poorly graded sand (SP) that is generally medium to fine grained, subangular to subrounded, no reaction with HCl, with a trace of subrounded gravel and nonplastic fines. In thicker sections of alluvium (the southern river bank) the poorly graded sand (SP) is interbedded with lenses of sandy lean clay s(CL) and clay seams CL.

TrC *Triassic Chinle Formation*: For the purposes of this work, the section of rock encountered on the surface and in drill holes has been divided into four subunits. These units, from top to bottom, consist of a sandy claystone that ranges from 10 to 52 feet thick. A sandstone with interbedded claystone that ranges in thickness from 16 to 32 feet thick. The bottom of this subunit is marked by a pebble conglomerate which ranges in thickness from 1.1 to 3.3 feet. A sandstone with minor interbedded claystone that ranges in thickness from 10 to 35 feet. At the base of the sandstone with minor interbedded clay lies a silty claystone. Since all five drill holes were terminated in or above this unit its thickness is unknown.

GENERAL GEOLOGIC EXPLANATION

Qal / TrC — Contact between geologic units, dashed where approximate.

SANDY CLAYSTONE / SANDSTONE — Contact between geologic subunits, dashed where approximate.

● DH-1-RPB — Location of drill hole.

■ TP-1-RPB — Approximate location of test pit.

Stick log, dashed where projected to cross-section.

DH-3-RPB (Proj. 10' Lt.) — Drill hole number, with distance and direction projected.

Qal — Typical abbreviation for geologic unit.

SANDSTONE WITH INTERBEDDED CLAYSTONE — Typical name.

4.0, 20.35, 42.2 — Depth (feet) and contact of geologic unit.

T.D. 51.7 — Total depth (feet).

A — A' — Location of geologic cross-section.

GENERAL GEOLOGIC NOTES

For Standard Desciptions and Descriptive Criteria for Rock, see Sheet B-3.

For complete descriptions of test pit and drill holes, see the geologic logs which can be provided upon written request.

Qal was not mapped when found in thicknesses of less than 2.5 feet.

NOTE: Subsurface investigation information has been obtained for designer use only. The Government shall not be responsible for any misinterpretation or assumptions made by the Contractor based on the subsurface investigation information presented on these plans.

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RIO PUERCO BRIDGE

SOIL PROFILE SHEET

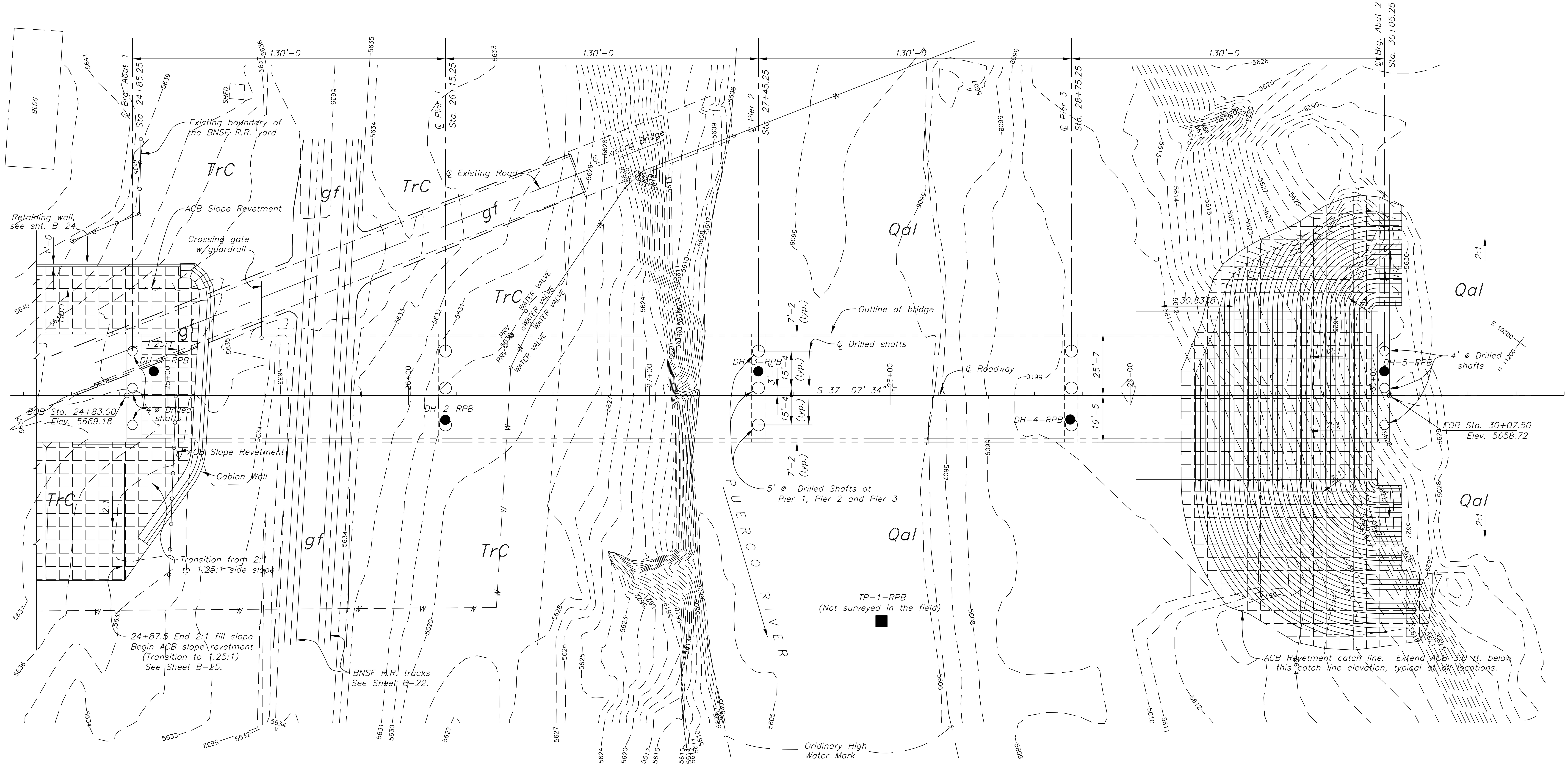
Designed by: BUREAU OF RECLAMATION

Drawn by: BOR, rsh, dc, cdh Date: 01/17/14

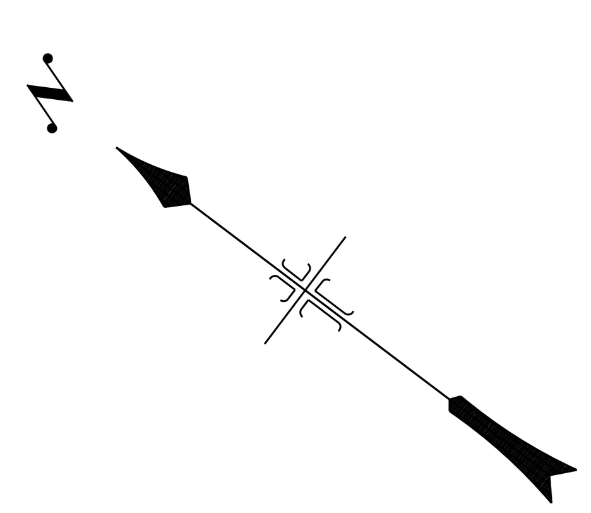
Revised by: - - Date: - -

File Name: 04_BIA0a33034

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-5	63



DRILL HOLE	STATION	OFFSET
DH-1-RPB	24+95.25	10' Lt.
DH-2-RPB	26+15.25	10' Rt.
DH-3-RPB	27+45.25	10' Lt.
DH-4-RPB	28+75.25	10' Rt.
DH-5-RPB	30+05.25	10' Lt.



FOUNDATION PLAN
NTS

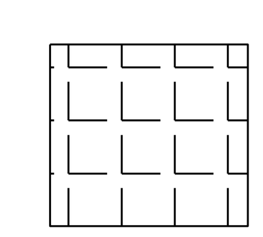
GEOLOGIC NOTES

For General Geologic Legend, Explanation, and Notes, see Sheet B-4.

For Standard Descriptions and Descriptive Criteria for Rock, see Sheet B-3.

Qal was not mapped when found in thicknesses of less than 2.5 feet.

For complete descriptions of drill holes, see the geologic logs which can be provided upon written request.



- Articulated Concrete Block-CC20 (ACB) Revetment erosion protection.

NOTE: The engineering data shown is preliminary only. for final design, see appropriate specification dwg's.

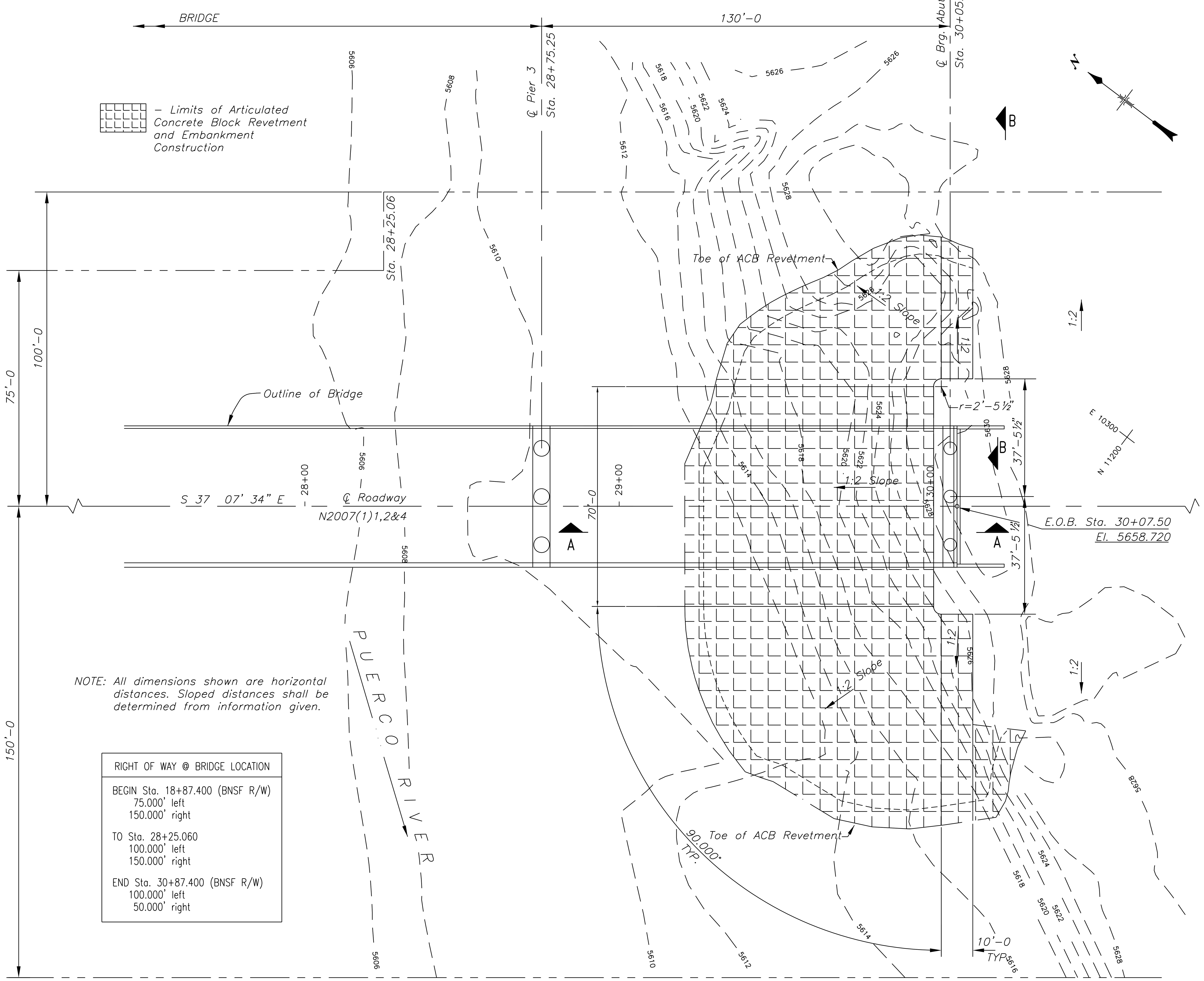
UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE
FOUNDATION PLAN
EXPLORATION AND SURFACE GEOLOGY LOCATION

Designed by: BUREAU OF RECLAMATION
Drawn by: BOR, rsh, dc, cdh Date: 01/17/14
Revised by: - - Date: - -
File Name: 05_Rbia35

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-6	63



RIGHT OF WAY @ BRIDGE LOCATION
BEGIN Sta. 18+87.400 (BNSF R/W) 75.000' left 150.000' right
TO Sta. 28+25.060 100.000' left 150.000' right
END Sta. 30+87.400 (BNSF R/W) 100.000' left 50.000' right

REVETMENT LAYOUT
N.T.S.

EROSION PROTECTION GENERAL NOTES

1. Articulated Concrete Block (ACB) Revetment shall conform to Section 251 of the FP-03, all applicable Supplemental Specifications and to the details shown in these plans.

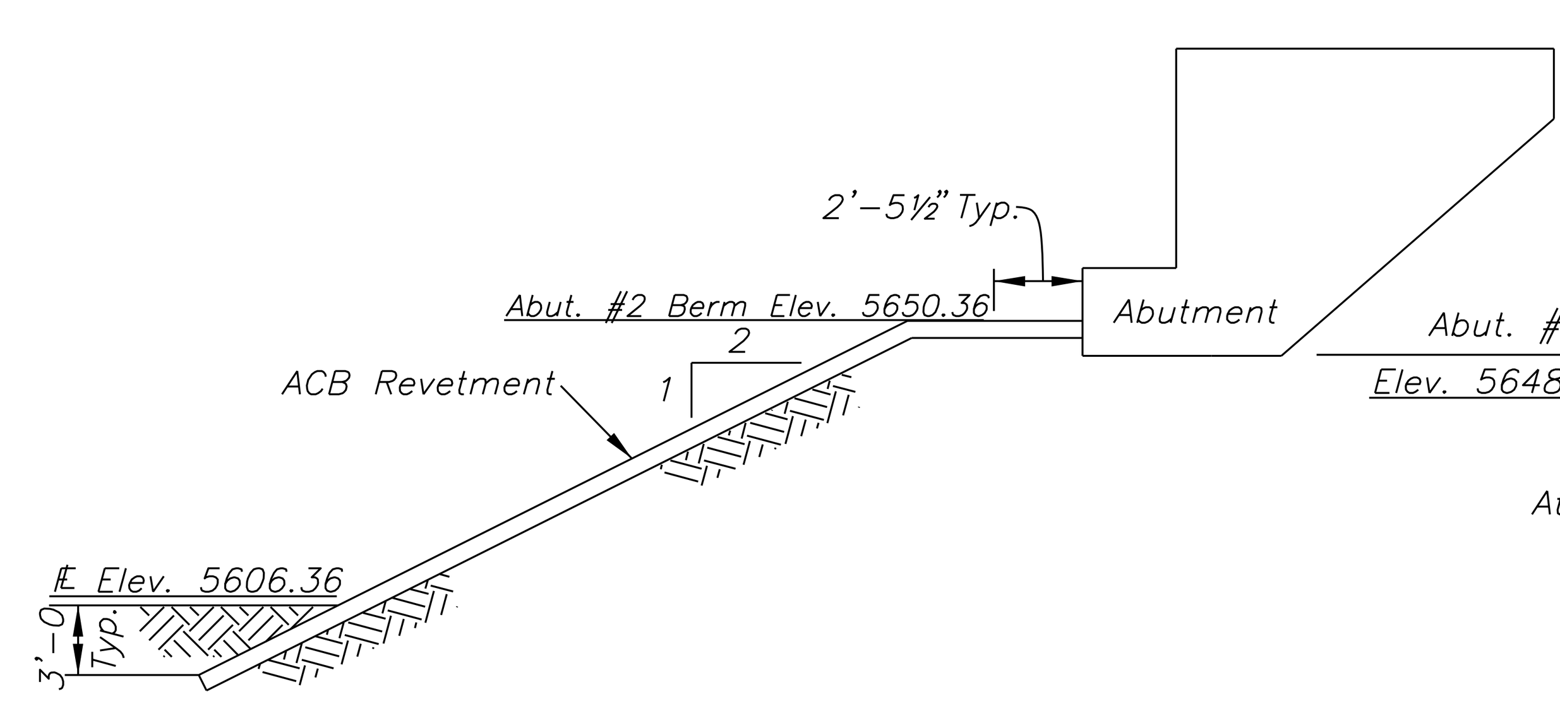
2. Embankment construction below ACB Revetment shall conform to Section 204 of the FP-03. Excavation for ACB Revetment shall conform to Section 209 of the FP-03. All embankment above natural ground at abutments is included in the quantity for Item 20403-0000 Unclassified Borrow and shall be paid for under Item 20403-0000, Unclassified Borrow. All excavation for ACB Revetment toe construction shall be considered incidental to Item 25112-3000, ACB Revetment and shall not be measured for payment. Suitable excavated material may be used as embankment material on the project as long as the material conforms to the specifications for embankment construction.

3. ACB Revetment shall have Erosion Control Geotextile place below it as shown on this sheet and elsewhere on the plans. Erosion Control Geotextile shall conform to Section 714.01 (a) (4) Type IV-C of the FP-03.

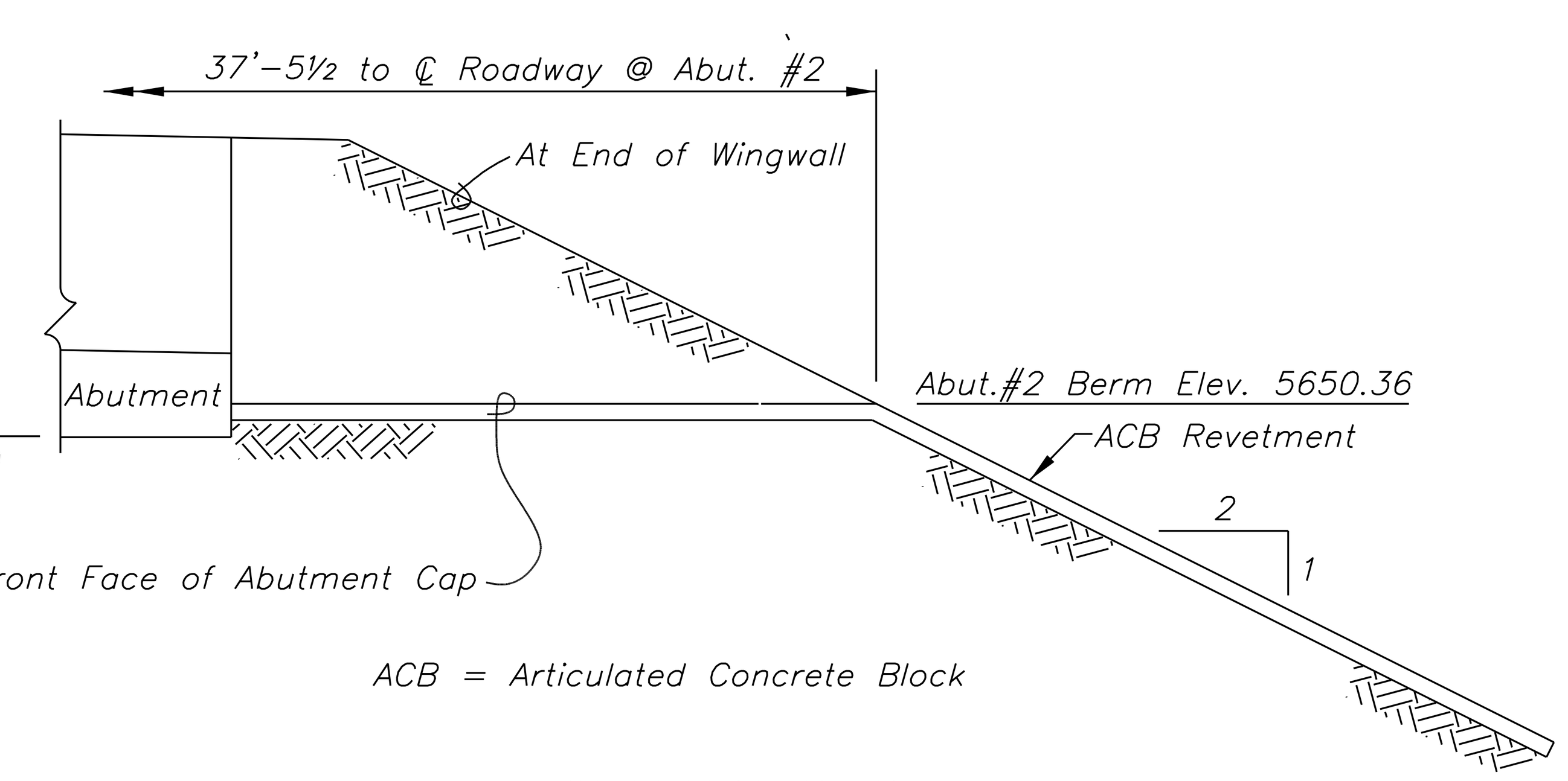
4. See sheet B-23 for additional ACB Revetment details. All work involved in the furnishing, fabricating and installation of the ACB Revetment shall be measured and paid for under Item 25112-3000.

5. See sheets B-22 through B-25 for ABUTMENT 1 details and installation details.

LOCATION	CUT(c.y.)	FILL(c.y.)	BORROW(c.y.)	WASTE(c.y.)
LEFT ABUT#2	3,525	618	0	2907
CENTER ABUT#2	415	2225	1810	0
RIGHT ABUT#2	945	2104	1159	0
TOTAL (c.y.)	4,885	4947	62	0



SECTION A-A
N.T.S.



ACB = Articulated Concrete Block

SECTION B-B
N.T.S.

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

RIO PUERCO BRIDGE
EROSION PROTECTION DETAILS ABUTMENT 2

Designed by: STRUCTURAL UNIT
Drawn by: rsh, dc, cdh Date: 05/21/14
Revised by: - - Date: - -
File Name: 06_BIAersn

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-7	63

G4

GEOLOGIC LOG OF DRILL HOLE DH-1-RPB

SHEET 1 OF 1

FEATURE: RIO PUERCO BRIDGE
LOCATION: NORTHERN BANK OF RIVER CHANNEL
BEGUN: 8/25/93 FINISHED: 8/26/93
DEPTH OF ELEV. OF WATER
LEVEL AND DATE MEASURED: SEE NOTES

PROJECT: O.N.H.I.R.
COORDINATES: N. 11645.26 E. 9947.98
TOTAL DEPTH: 103.6
DEPTH TO BEDROCK: 0.0

STATE: ARIZONA
GROUND ELEVATION: 5637.21
ANGLE FROM HORIZONTAL AND BEARING: 90°
HOLE LOGGED BY: R. LUNG
REVIEWED BY:

NOTES

PURPOSE OF HOLE:
DETERMINE FOUNDATION CONDITIONS AT PROPOSED ABUTMENT NO. 1 (STA. 24+94.10, OFFSET 10 FT. LT.), DETERMINE DEPTH TO ROCK AND CORE BEDROCK FOR 20 FT.

DRILL SITE AND SET-UP:
SITE LOCATED ON ORIGINAL GROUND AT STA. 24+95.25 ABOUT 50 FEET NORTH OF THE NORTH BANK OF THE RIVER CHANNEL.

DRILL EQIUPMENT:
CME 1250 TRACK MOUNTED EARTH AUGER; 5 FT. LONG 7-1/2 INCH HOLLOW-STEM FLIGHT AUGERS; 9-INCH CARBIDE TIPPED BIT; 5 FT. LONG HQ CORE BARREL WITH SPLIT TUBE INNER BARREL; SURFACE SET, DIAMOND BIT; AND HQ RODS.

WATER TESTING EQUIPMENT;
NO WATER TESTS REQUIRED.

DRILLER;
J. HAYDEN.

DRILL FLUID:
NO DRILL FLUID FROM 0.0 TO 52.5 FT., USED WATER AS DRILL FLUID FROM 52.5 TO 103.6 FT..

DRILL FLUID RETURN:
INTERVAL (FT.) % RETURN 0.0 - 52.5 FA-NA 52.5 - 103.6 95.

DRILL FLUID RETURN COLOR:
INTERVAL (FT.) COLOR 0.0 - 52.5 FA-NA 52.5 - 103.6 REDDISH BROWN

DRILLING METHODS:
INTERVAL METHOD/ (FT.) BARREL SIZE 0.0 - 52.5 7-1/2 IN. FA 52.5 - 103.6 HQ CORE

DRILLING CONDITIONS AND DRILLER'S COMMENTS:
0.0 - 40.5 FT. AUGERED SMOOTH; 40.5 TO 52.5 AUGERED ROUGH; AT 52.5 FT. AUGER REFUSAL.

CASINS RECORD (FA):

CASING SIZE	CASING DEPTH	INTERVAL. DRILLED
7-1/2 IN.	0.0-52.5	0.0-52.5
7-1/2 IN.	52.5	52.5-103.6

DEPTH TO WATER DURING DRILLING;
NOT DETERMINED.

HOLE COMPLETION;
BACKFILLED WITH EXCAVATED MATERIAL.

REASON FOR HOLE TERMINATION:
HOLE TERMINATED AT THE DISCRETION OFFICE OF NAVAJO HOPI INDIAN RELOCATION ON SITE REPRESENTATIVE (O.N.H.I.R.)

ESTIMATED DRILLING TIME:
10-HOUR SHIFTS
SET-UP AND DRILLING 2

LOG

LITHOLOGIC LOG: TrC (0.0 to 103.6); ELEVATION 5529.3 at 103.6

DEPTH	CORE RECOVERY	RQD
52.5	0	
	86	76
	100	76
	100	86
	96	96
	100	100
	100	88
	100	100
	100	88
	100	98
103.6	100	69

FRACTURE DENSITY (top to bottom): 5, 7, 2, 5, 2, 5
HARDNESS (top to bottom): 4, 3, 7
WEATHERING (top to bottom): 4, 5, 3

GEOLOGIC DESCRIPTION

0.0 TO 103.6 FT. TRIASSIC CHINLE FORMATION (TrC)

0.0 TO 52.5 FT. SANDY CLAYSTONE:
DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTING IN AUGERED INTERVALS. COLOR RANGES FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDY CLAYSTONE IS THINLY TO MODERATELY BEDDED AND INTENSELY (W7) TO MODERATELY (W5) WEATHERED WITH DEPTH (APPROXIMATELY 10 TO 12 FEET), VERY SOFT (H7) BREAKING WITH LIGHT MANUAL PRESSURE, LOWER CONTACT IS CONFORMABLE AND GRADATIONAL. MINOR SANDSTONE LENSES RANGING FROM 0.1 TO 0.5 FT. ARE ENCOUNTERED FROM 2.0 TO 5.0 FT. ABOVE THE LOWER CONTACT.

52.5 TO 82.7 FT. SANDSTONE WITH INTERBEDDED CLAYSTONE:
COLOR RANGES FROM GRAYISH PINK (5R 8/2) TO VERY LIGHT GRAY (N8) WITH CLAYSTONE INTERBEDS RANGING FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDSTONE IS FINE TO MEDIUM GRAINED, SUBANGULAR TO SUBROUNDED, THINLY BEDDED, SLIGHTLY (W3) TO PREDOMINATELY (W5) WEATHERED, AND MODERATELY HARD (H4). MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 56.0 TO 82.7 FEET. CLAYSTONE INTERBEDS ENCOUNTERED FROM 60.1 TO 61.2 FT., 64.4 TO 65.0 FT., AND 78.6 TO 80.1 FT., UPPER CONTACT IS CONFORMABLE AND GRADATIONAL WHILE LOWER CONTACT IS CONFORMABLE AND SHARP. THE LOWER CONTACT IS LOCATED AT THE BASE OF A GRAVEL TO PEBBLE CONGLOMERATE FROM 81.6 TO 82.7 FT. THIS CONGLOMERATE IS CLAST SUPPORTED (90%) WITH A CLAY MATRIX. CLASTS COMPOSED OF INTENSELY (W7) WEATHERED SANDSTONE; LARGEST CLAST 0.15 FT. .

82.7 TO 101.6 FT. SANDSTONE WITH INTERBEDDED CLAY:
COLOR RANGES FROM VERY LIGHT GRAY (N8) TO DARK GRAY (N3), FINE TO MEDIUM GRAINED, SUBANGULAR TO SUBROUNDED, LAMINAR TO THINLY BEDDED, SLIGHTLY WEATHERED (W3), AND HARD (H3). INTENSELY FRACTURED (FD7), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.1 TO 0.33 FOOT FROM 82.7 TO 83.5 FEET. SLIGHTLY TO VERY SLIGHTLY FRACTURED (FD2), RECOVERED IN LENGTH FROM 1.0 TO MORE THAN 3 FEET FROM 85.9 TO 91.0 FEET. MODERATELY FRACTURED (FD5), RECOVERED PREDOMIATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 91.0 TO 96.0 FEET. SLIGHTLY TO VERY SLIGHTLY FRACTURED (FD2), RECOVERED IN LENGTHS FROM 1.0 TO MORE THAN 3 FEET FROM 96.0 TO 101.0 UPPER AND LOWER CONTACTS ARE CONFORMABLE AND SHARP.. .

101.6 TO 103.6 FT. SILTY CLAYSTONE:
COLOR IS PALE OLIVE (10Y 6/2). MODERATELY TO THICKLY BEDDED, SLIGHTLY WEATHERED TO FRESH (W2) BUT VERY SOFT (H7). MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 101.00 TO 103.6 FEET. UPPER CONTACT IS CONFORMABLE AND SHARP WHILE LOWER CONTACT IS UNKNOWN. .. .

PROBABLE REASON FOR CORE LOSS:

INTERVAL (FT.)	AMOUNT	INTERPRETATION
52.5 - 56.0	3.5	BLOCKED OFF THROUGHOUT
56.0 - 61.0	0.7	WASHED OUT CLAY THROUGHOUT
71.0 - 76.0	0.2	WASHED OUT CLAY THROUGHTOUT

COMMENTS:
FA = 7-1/2 IN. FLIGHT AUGER
NA = NOT APPLICABLE

PAGE 1 OF 1 | DRILL HOLE DH-1-RPB

G6

GEOLOGIC LOG OF DRILL HOLE DH-2-RPB

SHEET 1 OF 1

FEATURE: RIO PUERCO BRIDGE
LOCATION: NORTHERN BANK OF RIVER CHANNEL
BEGUN: 8/24/93 FINISHED: 8/25/93
DEPTH OF ELEV. OF WATER
LEVEL AND DATE MEASURED: SEE NOTES

PROJECT: O.N.H.I.R.
COORDINATES: N. 11536.60 E. 10005.11
TOTAL DEPTH: 98.8
DEPTH TO BEDROCK: 0.0

STATE: ARIZONA
GROUND ELEVATION: 5630.85
ANGLE FROM HORIZONTAL AND BEARING: 90°
HOLE LOGGED BY: R. LUNG
REVIEWED BY:

NOTES

PURPOSE OF HOLE:
DETERMINE FOUNDATION CONDITIONS AT PROPOSED PIER NO. 2 (STA. 26+15.25, OFFSET 10 FT. RT.), DETERMINE DEPTH TO ROCK AND CORE BEDROCK FOR 20 FT.

DRILL SITE AND SET-UP:
SITE LOCATED ON ORIGINAL GROUND AT STA. 26+15 ABOUT 50 FEET NORTH OF THE NORTH BANK OF THE RIVER CHANNEL.

DRILL EQIUPMENT:
CME 1250 TRACK MOUNTED EARTH AUGER; 5 FT. LONG 7-1/2 INCH HOLLOW-STEM FLIGHT AUGERS; 9-INCH CARBIDE TIPPED BIT; 5 FT. LONG HQ CORE BARREL WITH SPLIT TUBE INNER BARREL; SURFACE SET, DIAMOND BIT; AND HQ RODS.

WATER TESTING EQUIPMENT;
NO WATER TESTS REQUIRED.

DRILLER;
J. HAYDEN.

DRILL FLUID:
NO DRILL FLUID FROM 0.0 TO 44.7 FT., USED WATER AS DRILL FLUID FROM 44.7 TO 98.8 FT.

DRILL FLUID RETURN:

INTERVAL (FT.)	% RETURN
0.0 - 44.7	FA-NA
44.7 - 61.3	95
61.3 - 86.3	90
86.3. - 98.8	95

DRILL FLUID RETURN COLOR:
INTERVAL (FT.) COLOR
0.0 - 44.7 FA-NA
44.7 - 98.8 REDDISH BROWN

DRILLING METHODS:
INTERVAL METHOD/
(FT.) BARREL SIZE
0.0 - 44.7 7-1/2 IN. FA
44.7 - 98.8 HQ CORE

DRILLING CONDITIONS AND DRILLER'S COMMENTS:
0.0 - 20.3 FT. AUGERED SMOOTH; 20.3 TO 44.7 AUGERED ROUGH; AT 44.7 FT. AUGER MET REFUSAL.

CASINS RECORD (FA):

CASING SIZE	CASING DEPTH	INTERVAL. DRILLED
7-1/2 IN.	0.0-44.7	0.0-44.7
7-1/2 IN.	44.7	44.7-98.8

DEPTH TO WATER DURING DRILLING;
NOT DETERMINED.

HOLE COMPLETION;
BACKFILLED WITH EXCAVATED MATERIAL.

REASON FOR HOLE TERMINATION:
HOLE TREMINATED AT THE DISCRETION OF OFFICE OF NAVAJO HOPI INDIAN RELOCATION ON SITE REPRESENTATIVE (O.N.H.I.R.).

ESTIMATED DRILLING TIME:
10-HOUR SHIFTS
SET-UP AND DRILLING 2

LOG

LITHOLOGIC LOG: TrC (0.0 to 98.8); ELEVATION 5527.7 at 98.8

DEPTH	CORE RECOVERY	RQD
44.7	100	53
	100	100
	96	66
	98	66
	94	72
	100	100
	95	95
	100	100
	100	100
	100	98
	100	92
98.8	92	28

FRACTURE DENSITY (top to bottom): 5, 7, 5, 2, 5
HARDNESS (top to bottom): 4, 7
WEATHERING (top to bottom): 4, 5, 3

GEOLOGIC DESCRIPTION

0.0 TO 98.8 FT. TRIASSIC CHINLE FORMATION (TrC)

0.0 TO 44.7 FT. SANDY CLAYSTONE:
DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTING IN AUGERED INTERVALS. COLOR RANGES FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDY CLAYSTONE IS THINLY TO MODERATELY BEDDED AND INTENSELY (W7) TO MODERATELY (W5) WEATHERED WITH DEPTH (APPROXIMATELY 10 TO 12 FEET), VERY SOFT (H7) BREAKING WITH LIGHT MANUAL PRESSURE, LOWER CONTACT IS CONFORMABLE AND GRADATIONAL, MINOR SANDSTONE LENSES RANGING FROM 0.1 TO 0.5 FT. ARE ENCOUNTERED FROM 2.0 TO 5.0 FT. ABOVE THE LOWER CONTACT.

44.7 TO 63.0 FT. SANDSTONE WITH INTERBEDDED CLAYSTONE:
COLOR RANGES FROM GRAYISH PINK (5R 8/2) TO VERY LIGHT GRAY (N8) WITH CLAYSTONE INTERBEDS RANGING FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDSTONE IS FINE TO MEDIUM GRAINED, SUBANGULAR TO SUBROUNDED, THINLY BEDDED, SLIGHTLY (W3) TO PREDOMINATELY MODERATELY (W5) WEATHERED, HARD (H3) TO PREDOMINATELY MODERATELY HARD (H4).. MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 44.7 TO 61.3 FEET,.INTENSELY FRACTURED (FD7), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.1 TO 0.33 FOOT FROM 61.3 TO 63.0 FEET. CLAYSTONE INTERBEDS ENCOUNTERED FROM 53.7 TO 54.2 FT., 54.9 TO 55.4 FT., AND 58.2 TO 60.4 FT., UPPER CONTACT IS CONFORMABLE AND GRADATIONAL WHILE LOWER CONTACT IS CONFORMABLE AND SHARP. THE LOWER CONTACT IS LOCATED AT THE BASE OF A GRAVEL TO PEBBLE CONGLOMERATE FROM 61.3 TO 63.0 FT. THIS CONGLOMERATE IS CLAST SUPPORTED (90%) WITH A CLAY MATRIX. CLASTS COMPOSED OF INTENSELY (W7) WEATHERED SANDSTONE; LARGEST CLAST 0.15 FT. .

63.0 TO 97.7 FT. SANDSTONE WITH MINOR INTERBEDDED CLAY:
COLOR RANGES FROM VERY LIGHT GRAY (N8) TO DARK GRAY (N3), FINE TO MEDIUM GRAINED, SUBANGULAR TO SUBROUNDED, LAMINAR TO THINLY BEDDED, SLIGHTLY WEATHERED (W3), MODERATELY HARD (H4) TO HARD (H3). MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 63.0 TO 66.3 FEET. SLIGHTLY TO VERY SLIGHTLY FRACTURED (FD2), RECOVERED IN LENGTH FROM 1.0 TO MORE THAN 3 FEET FROM 66.3 TO 96.3 FEET. UPPER AND LOWER CONTACTS ARE CONFORMABLE AND SHARP.

97.7 TO 98.8 FT. SILTY CLAYSTONE:
COLOR IS PALE OLIVE (10Y 6/2). MODERATELY TO THICKLY BEDDED, SLIGHTLY WEATHERED TO FRESH (W2) BUT VERY SOFT (H7). MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 96.3 TO 98.8 FEET. UPPER CONTACT IS CONFORMABLE AND SHARP WHILE LOWER CONTACT IS UNKNOWN.

PROBABLE REASON FOR CORE LOSS:

INTERVAL (FT.)	AMOUNT	INTERPRETATION
51.3 - 56.3	0.2	WASHED OUT CLAY THROUGHOUT
56.3 - 61.3	0.1	WASHED OUT CLAY THROUGHOUT
61.3 - 66.3	0.3	WASHED OUT CLAY THROUGHOUT
71.3 - 76.3	0.25	WASHED OUT CLAY THROUGHOUT
96.3 - 98.8	0.4	WASHED OUT CLAY THROUGHOUT

COMMENTS:
FA = 7-1/2 IN. FLIGHT AUGER
NA = NOT APPLICABLE

PAGE 1 OF 1 | DRILL HOLE DH-2-RPB

NOTE: Subsurface investigation information has been obtained for designer use only. The Government shall not be responsible for any misinterpretation or assumptions made by the Contractor based on the subsurface investigation information presented on these plans.

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GEOLOGIC LOG OF DRILL HOLE DH-3-RPB

SHEET 1 OF 1

FEATURE: RIO PUERCO BRIDGE
LOCATION: MID CHANNEL OF RIO PUERCO
BEGUN: 8/17/93 FINISHED: 8/18/93
DEPTH AND ELEV. OF WATER
LEVEL AND DATE MEASURED: SEE NOTES

PROJECT: O.N.H.I.R.
COORDINATES: N. 11444.7 E. 10099.9
TOTAL DEPTH: 51.7
DEPTH TO BEDROCK: 4.0

STATE: ARIZONA
GROUND ELEVATION: 5606.96
ANGLE FROM HORIZONTAL AND BEARING: 90°
HOLE LOGGED BY: R. LUNG
REVIEWED BY:

NOTES

PURPOSE OF HOLE:
DETERMINE FOUNDATION CONDITIONS AT PROPOSED PIER NO. 3 (STA. 27+45.3, OFFSET 10 FT. LT.), PERFORM STANDARD PENETRATION TESTING (SPTS), COLLECT SOIL SAMPLES FOR LABORATORY ANALYSIS AND DETERMINE DEPTH TO ROCK.

DRILL SITE AND SET-UP:
SITE LOCATED ON ORIGINAL GROUND AT STA. 27+45, ABOUT 20 FEET SOUTH OF THE NORTH BANK OF THE RIVER CHANNEL.

DRILL EQIUPMENT:
CME 1250 TRACK MOUNTED EARTH AUGER WITH AUTOMATIC PENETRATION TEST HAMMER; 5 FT. LONG 7-1/2 INCH HOLLOW-STEM FLIGHT AUGERS; 9-INCH CARBIDE TIPPED BIT; 1-3/8 IN. I.D. STANDARD SPLIT-SPOON SAMPLER; 5 FT. LONG HQ CORE BARREL WITH SPLIT TUBE INNER BARREL; SURFACE SET, DIAMOND BIT; AND HQ RODS.

WATER TESTING EQUIPMENT;
NO WATER TESTS REQUIRED.

DRILLER;
J. HAYDEN.

DRILL FLUID:
NO DRILL FLUID FROM 0.0 TO 20.2 FT., USED WATER AS DRILL FLUID FROM 20.2 TO 51.7 FT.

DRILL FLUID RETURN:

INTERVAL (FT.)	% RETURN
0.0 - 20.2	FA-NA
20.2 - 51.7	90

DRILL FLUID RETURN COLOR:
INTERVAL (FT.) COLOR
0.0 - 20.2 FA-NA
20.2 - 51.7 REDDISH BROWN

DRILLING METHODS:
INTERVAL METHOD/ (FT.) BARREL SIZE
0.0 - 52.5 7-1/2 IN. FA; SPTS AT 5 FT. INTERVALS
20.2 - 51.7 HQ CORE

DRILLING CONDITIONS AND DRILLER'S COMMENTS:
0.0 - 4.0 FT. AUGERED SMOOTH; 4.0 TO 19.0 FT. AUGERED PREDOMINATELY SMOOTH; AT 19.0 FT. AUGERED VERY HARD, PROBABLY FIRST SIGNIFICANT SANDSTONE LENSE AT 20.2 FT. AUGER REFUSAL.

CASINS RECORD (FA):

CASING SIZE	CASING DEPTH	INTERVAL. DRILLED
7-1/2 IN.	0-20.2	0-20.2
7-1/2 IN.	20.2	20.2-51.7

DEPTH TO WATER DURING DRILLING;
NOT DETERMINED.

HOLE COMPLETION;
BACKFILLED WITH EXCAVATED MATERIAL.

REASON FOR HOLE TERMINATION:
HOLE TERMINATED AT THE DISCRETION OFFICE OF NAVAJO HOPI INDIAN RELOCATION ON SITE REPRESENTATIVE (O.N.H.I.R.)

ESTIMATED DRILLING TIME:
10-HOUR SHIFTS
SET-UP AND DRILLING 2

LOG

LITHOLOGIC LOG: QaL (0.0 to 4.0), ELEVATION 5598.6; TrC (4.0 to 51.7), ELEVATION 5550.9 at 51.7

Soil samples (SPT):

CORE RECOVERY	USCS	PERCENT RECOVERY	PERCENT MOISTURE CONTENT	STANDARD PENETRATION TEST (SPT) N-VALUE
100	(CL)s	100	2.8	57
100	CL	100	5.9	30
100	(CL/CH)s	100	3.9	77
100	CL/CH	100	5.5	55

Core (20.2 to 51.7):

CORE RECOVERY	RQD	PERCENT RECOVERY
100	25	100
97	68	97
100	92	100
100	94	100
88	75	88
100	56	100
100	100	100
100	90	100

FRACTURE DENSITY (top to bottom): 9, 5, 7, 5, 7, 2
HARDNESS (top to bottom): 7, 4, 3
WEATHERING (top to bottom): 7, 4, 5, 3

GEOLOGIC DESCRIPTION

0.0 TO 4.0 FT. QUATERNARY ALLUVIUM (TrC):
POORLY GRADED, SUBANGULAR TO SUBROUNDED SAND WITH MINOR AMOUNTS OF FINE GRAVEL. DESCRIPTIONS BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

4.0 TO 51.7 FT. TRIASSIC CHINLE FORMATION (TrC):

4.0 TO 20.4 FT. SANDY CLAYSTONE:
DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTING IN AUGERED INTERVALS. COLOR RANGES FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDY CLAYSTONE IS THINLY TO MODERATELY BEDDED AND INTENSELY (W7) TO MODERATELY (W5) WEATHERED WITH DEPTH (APPROXIMATELY 10 TO 12 FEET), VERY SOFT (H7) BREAKING WITH LIGHT MANUAL PRESSURE. THE UPPER CONTACT IS UNCONFORMABLE AND SHARP WHILE LOWER CONTACT IS CONFORMABLE AND GRADATIONAL. MINOR SANDSTONE LENSES RANGING FROM 0.1 TO 0.5 FT. ARE ENCOUNTERED FROM 2.0 TO 5.0 FT. ABOVE THE LOWER CONTACT.

4.0 TO 5.8 FT. SANDY CLAYSTONE:
DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTINGS..

5.8 TO 6.8 FT. CLAYSTONE VISUALLY CLASSIFIED AS A LEAN CLAY WITH SAND; (CL)s;
ABOUT 80% FINES WITH MEDIUM PLASTICITY, SLOW DILATANCY, HIGH TOUGHNESS, HIGH DRY STRENGTH, ABOUT 20% FINE, SUBANGULAR TO SUBROUNDED SAND, MAX. SIZE FINE SAND; MODERATELY RED; WEAK REACTION WITH HCl.

LAB DATA; 45% SAND; 55% FINES; 0% GRAVEL, PI 17%; LL 35%; MC 12.8%; LEAN CLAY TO CLAYEY SAND CL/SC.

6.8 TO 10.8 FT. SANDY CLAYSTONE:
DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTINGS..

10.8 TO 11.8 FT. CLAYSTONE VISUALLY CLASSIFIED AS A LEAN CLAY; (CL);
ABOUT 95% FINES WITH MEDIUM PLASTICITY, MEDIUM TOUGHNESS, SLOW DILATANCY, HIGH DRY STRENGTH, ABOUT 5% FINE, SUBANGULAR TO SUBROUNDED SAND, MAX. SIZE FINE SAND; MODERATELY RED; WEAK REACTION TO HCl.

LAB DATA; 45% SAND; 55% FINES; 0% GRAVEL, PI 14%; LL 35%; MC 15.9%; LEAN CLAY TO CLAYEY SAND CL/SC.

11.8 TO 15.9 FT. SANDY CLAYSTONE:
DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTINGS.

15.9 TO 16.9 FT. CLAYSTONE VISUALLY CLASSIFIED AS A LEAN TO FAT CLAY WITH; SAND (CL/CH):
ABOUT 75% FINES WITH HIGH PLASTICITY, MEDIUM TOUGHNESS, SLOW DILATANCY, HIGH DRY STRENGTH; ABOUT 25% FINE TO COARSE, SUBANGULAR TO SUBROUNDED SAND; MAX. SIZE FINE SAND; MODERATE RED; WEAK REACTION TO HCl.

LAB DATA; 74% SAND; 26% FINES; 0% GRAVEL; PI 0%; LL 31%; MC 13.9%; CLAYEY SAND SC.

16.9 TO 20.2 FT. SANDY CLAYSTONE; DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTINGS.

20.2 TO 20.4 FT. CLAYSTONE; VISUALLY CLASSIFIED AS A LEAN TO FAT CLAY: CL/CH;
ABOUT 95% FINES WITH HIGH PLASTICITY, MEDIUM TOUGHNESS, SLOW DILATANCY, HIGH DRY STRENGTH; ABOUT 5% FINE, SUBANGULAR TO SUBROUNDED SAND; MAX. SIZE FINE SAND; MODERATE RED; WEAK REACTION TO HCl.

LAB DATA; 26% SAND; 74% FINES; 0% GRAVEL; PI IS; LL IS; MC 5.5%; LEAN CLAY WITH SAND (CL)s.

20.4 TO 42.2 FT. SANDSTONE WITH INTERBEDDED CLAYSTONE:

COLOR RANGES FROM GRAYISH PINK (5R 8/2) TO VERY LIGHT GRAY (N8) WITH CLAYSTONE INTERBEDS RANGING FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDSTONE IS FINE TO MEDIUM GRAINED, THINLY BEDDED, SLIGHTLY (W3) TO PREDOMINATELY MODERATELY (W5) WEATHERED, AND MODERATELY HARD (H4). VERY INTENSELY FRACTURED (FD9), RECOVERED PREDOMINATELY AS CHIPS AND FRAGMENTS FROM 20.2 TO 21.5 FEET. MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 21.5 TO 25.4 FEET. INTENSELY FRACTURED (FD7), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.1 TO 0.33 FOOT FROM 25.4 TO 26.4 FEET, MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 26.4 TO 39.6 FEET, INTENSELY FRACTURED (FD7), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.1 TO 0.33 FOOT FROM 39.6 TO 42.2 FEET. CLAYSTONE INTERBEDS ENCOUNTERED AT; 29.6 TO 29.9 FT., 36.7 TO 36.9 FT., UPPER CONTACT IS CONFORMABLE AND GRADATIONAL WHILE LOWER CONTACT IS CONFORMABLE AND SHARP. THE LOWER CONTACT IS LACATED AT THE BASE OF A GRAVEL TO PEBBLE CONGLOMERATE FROM 39.6 TO 42.2 FT., THIS CONGLOMERATE IS CLAST SUPPORTED (90%) WITH A MATRIX. CLASTS COMPOSED OF INTENSELY (W7) WEATHERED SANSTONE; LARGEST CLAST 0.15 FT.

42.2 TO 51.7 FT. SANDSTONE WITH MINOR INTERBEDDED CLAY:
COLOR RANGES FROM VERY LIGHT GRAY (N8) TO DARK GRAY (N3), FINE TO MEDIUM GRAINED, SUBANGULAR TO SUBROUNDED, LAMINAR TO THINLY BEDDED, SLIGHTLY WEATHERED (W3), AND HARD (H3). SLIGHTLY TO VERY SLIGHTLY FRACTURED (FD2), RECOVERED IN LENGTHS FROM 1.0 TO MORE THAN 3 FEET FROM 42.2 TO 51.7 FEET. UPPER CONTACT IS CONFORMABLE AND SHARP. LOWER CONTACT IS UNKNOWN.

PROBABLE REASON FOR CORE LOSS:

INTERVAL (FT.)	AMOUNT	INTERPRETATION
22.2 - 26.7	0.15	WASHED OUT CLAY THROUGHOUT
36.7 - 39.1	0.30	WASHED OUT CLAY THROUGHOUT

COMMENTS:
FA = 7-1/2 IN. FLIGHT AUGER
IS = INSUFFICIENT SAMPLE
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
NA = NOT APPLICABLE
MC = MOISTURE CONTENT

PAGE 1 OF 1 | DRILL HOLE DH-3-RPB

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE

BORING LOGS - SHEET 1 OF 2

Designed by: BUREAU OF RECLAMATION
Drawn by: BOR, rsh, dc Date: 01/17/14
Revised by: - - Date: - -
File Name: 07_BIAdrillhole1

U.S. DEPARTMENT OF THE INTERIOR 1824 BUREAU OF INDIAN AFFAIRS

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-8	63

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GEOLOGIC LOG OF DRILL HOLE DH-4-RPB

SHEET 1 OF 1

FEATURE: RIO PUERCO BRIDGE
LOCATION: SOUTHERN SIDE OF RIVER CHANNEL
BEGUN: 8/21/93 FINISHED: 8/23/93
DEPTH OF ELEV. OF WATER LEVEL AND DATE MEASURED: SEE NOTES

PROJECT: O.N.H.I.R.
COORDINATES: N. 11329.25 E. 10162.02
TOTAL DEPTH: 62.3
DEPTH TO BEDROCK: 4.0

STATE: ARIZONA
COLLAR ELEVATION: 5607.09
ANGLE FROM HORIZONTAL AND BEARING: 90°
HOLE LOGGED BY: R. LUNG
REVIEWED BY:

NOTES

PURPOSE OF HOLE:
DETERMINE FOUNDATION CONDITIONS AT PROPOSED PIER NO. 4 (STA. 28+75.25, OFFSET 10 FT. RT.), DETERMINE DEPTH TO ROCK AND CORE FOR 20 FT.

DRILL SITE AND SET-UP:
SITE LOCATED ON ORIGINAL GROUND AT STA. 28+75 ABOUT 130 FEET SOUTH OF THE NORTH BANK OF THE RIVER CHANNEL.

DRILL EQUIPMENT:
CME 1250 TRACK MOUNTED EARTH AUGER; 5 FT. LONG 7-1/2 INCH HOLLOW-STEM FLIGHT AUGERS; 9-INCH CARBIDE TIPPED BIT; 5 FT. LONG HQ CORE BARREL WITH SPLIT TUBE INNER BARREL; SURFACE SET, DIAMOND BIT; AND HQ RODS.

WATER TESTING EQUIPMENT;
NO WATER TESTS REQUIRED.

DRILLER;
J. HAYDEN.

DRILL FLUID;
NO DRILL FLUID FROM 0.0 TO 31.1 FT., USED WATER AS DRILL FLUID FROM 31.1 TO 62.3 FT.

DRILL FLUID RETURN:
INTERVAL (FT.) % RETURN
0.0 - 31.1 FA-NA
31.1 - 62.3 95

DRILL FLUID RETURN COLOR:
INTERVAL (FT.) COLOR
0.0 - 31.1 FA-NA
31.1 - 62.3 REDDISH BROWN

DRILLING METHODS:
INTERVAL METHOD/ (FT.) BARREL SIZE
0.0 - 31.1 7-1/2 IN. FA
31.1 - 62.3 HQ CORE

DRILLING CONDITIONS AND DRILLER'S COMMENTS:
0.0 - 4.0 FT. AUGERED SMOOTH; 4.0 TO 31.1 AUGERED MOSTLY SMOOTH; AT 31.1 FT. AUGER REFUSAL.

CASING RECORD (FA):

CASING SIZE	CASING DEPTH	INTERVAL DRILLED
7-1/2 IN.	0.0-31.1	0.0-31.1
7-1/2 IN.	31.1	31.1-62.3

DEPTH TO WATER DURING DRILLING;
NOT DETERMINED.

HOLE COMPLETION;
BACKFILLED WITH EXCAVATED MATERIAL.

REASON FOR HOLE TERMINATION:
HOLE TREMINATED AT THE DISCRETION OF OFFICE OF NAVAJO HOPI INDIAN RELOCATION ON SITE REPRESENTATIVE (O.N.H.I.R.).

ESTIMATED DRILLING TIME: 10-HOUR SHIFTS
SET-UP AND DRILLING 2

LITHOLOGIC LOG / ELEVATION	DEPTH	CORE RECOVERY	ROD	FRACTURE DENSITY	HARDNESS	WEATHERING
QaL						
5598.7						
	10					
	20					
	30					
TrC		88	76	5	4	4
	40	99	28	7		5
		93	76			
	50	100	78	5		
		100	100	2	3	3
	60	100	93			
5540.4	62.3				7	2
	70					
	80					
	90					
	100					

GEOLOGIC DESCRIPTION

0.0 TO 4.0 FT. QUATERNARY ALLUVIUM (QaL)
POORLY GRADED, SUBANGULAR TO SUBROUNDED SAND WITH MINOR AMOUNTS OF FINE GRAVEL. DESCRIPTIONS BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

4.0 TO 51.7 FT. TRIASSIC CHINLE FORMATION (TrC)

4.0 TO 31.1 FT. SANDY CLAYSTONE:
DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTING IN AUGERED INTERVALS. COLOR RANGES FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDY CLAYSTONE IS THINLY TO MODERATELY BEDDED AND INTENSELY (W7) TO MODERATELY (W5) WEATHERED WITH DEPTH (APPROXIMATELY 10 TO 12 FEET), VERY SOFT (H7) BREAKING WITH LIGHT MANUAL PRESSURE. THE UPPER CONTACT IS UNCONFORMABLE AND SHARP WHILE LOWER CONTACT IS CONFORMABLE AND GRADATIONAL. MINOR SANDSTONE LENSES RANGING FROM 0.1 TO 0.5 FT. ARE ENCOUNTERED FROM 2.0 TO 5.0 FT. ABOVE THE LOWER CONTACT.

31.1 TO 47.9 FT. SANDSTONE WITH INTERBEDDED CLAYSTONE:
COLOR RANGES FROM GRAYISH PINK (5R 8/2) TO VERY LIGHT GRAY (N8) WITH CLAYSTONE INTERBEDS RANGING FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDSTONE IS FINE TO MEDIUM GRAINED, SUBANGULAR TO SUBROUNDED, THINLY BEDDED, SLIGHTLY (W3) TO MOSTLY MODERATELY (W5) WEATHERED, AND MODERATELY HARD (H4). MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 31.1 TO 44.6 FEET..INTENSELY FRACTURED (FD7), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.1 TO 0.33 FOOT FROM 44.6 TO 47.9 FEET. CLAYSTONE INTERBEDS ENCOUNTERED FROM 34.6 TO 34.9 FT., 40.3 TO 41.3 FT., UPPER CONTACT IS CONFORMABLE AND GRADATIONAL WHILE LOWER CONTACT IS CONFORMABLE AND SHARP. THE LOWER CONTACT IS LOCATED AT THE BASE OF A GRAVEL TO PEBBLE CONGLOMERATE FROM 44.6 TO 47.9 FT. THIS CONGLOMERATE IS CLAST SUPPORTED (90%) WITH A CLAY MATRIX. CLASTS COMPOSED OF INTENSELY (W7) WEATHERED SANDSTONE; LARGEST CLAST 0.15 FT.

47.9 TO 62.0 FT. SANDSTONE WITH MINOR INTERBEDDED CLAY:
COLOR RANGES FROM VERY LIGHT GRAY (N8) TO DARK GRAY (N3), FINE TO MEDIUM GRAINED, SUBANGULAR TO SUBROUNDED, LAMINAR TO THINLY BEDDED, SLIGHTLY WEATHERED (W3), HARD (H3) MODERATELY FRACTURED (FD5), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 47.9 TO 52.3 FEET. SLIGHTLY TO VERY SLIGHTLY FRACTURED (FD2), RECOVERED IN LENGTHS FROM 1.0 TO MORE THAN 3 FEET FROM 52.3 TO 62.3 FEET. UPPER AND LOWER CONTACTS ARE CONFORMABLE AND SHARP.

62.0 TO 62.3 FT. SILTY CLAYSTONE:
COLOR IS PALE OLIVE (10Y 6/2). MODERATELY TO THICKLY BEDDED, SLIGHTLY WEATHERED TO FRESH (W2) BUT VERY SOFT (H7). UPPER CONTACT IS CONFORMABLE AND SHARP WHILE LOWER CONTACT IS UNKNOWN.

PROBABLE REASON FOR CORE LOSS:

INTERVAL (FT.)	AMOUNT	INTERPRETATION
31.1 - 37.3	0.8	WASHED OUT CLAY THROUGHOUT
37.3 - 42.3	0.05	WASHED OUT CLAY THROUGHOUT
42.3 - 47.3	0.35	WASHED OUT CLAY THROUGHOUT

COMMENTS:
FA = 7-1/2 IN. FLIGHT AUGER
NA = NOT APPLICABLE

PAGE 1 OF 1 | DRILL HOLE DH-4-RPB

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GEOLOGIC LOG OF DRILL HOLE DH-5-RPB

SHEET 1 OF 1

FEATURE: RIO PUERCO BRIDGE
LOCATION: SOUTH BANK OF THE RIO PUERCO
BEGUN: 8/19/93 FINISHED: 8/21/93
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED: SEE NOTES

PROJECT: O.N.H.I.R.
COORDINATES: N. 11237.58 E. 10256.43
TOTAL DEPTH: 95.8
DEPTH TO BEDROCK: 46.0

STATE: ARIZONA
GROUND ELEVATION: 5631.36
ANGLE FROM HORIZONTAL AND BEARING: 90°
HOLE LOGGED BY: R. LUNG
REVIEWED BY:

NOTES

PURPOSE OF HOLE:
DETERMINE FOUNDATION CONDITIONS AT PROPOSED PIER NO. 5 (STA. 30+05.3, OFFSET 10 FT. LT.), PERFORM STANDARD PENETRATION TESTING (SPTs), COLLECT SOIL SAMPLES FOR LABORATORY ANALYSIS AND DETERMINE DEPTH TO ROCK.

DRILL SITE AND SET-UP:
SITE LOCATED ON ORIGINAL GROUND AT STA. 30+05, 10.0 LT. ABOUT 10 FEET SOUTH OF THE SOUTH BANK OF THE RIVER CHANNEL.

DRILL EQUIPMENT:
CME 1250 TRACK MOUNTED DRILL RIG WITH AUTOMATIC PENETRATION TEST HAMMER; 5 FT. LONG 7-1/2 INCH HOLLOW-STEM FLIGHT AUGERS; 9-INCH CARBIDE TIPPED BIT; 1-3/8 IN. I.D. STANDARD SPLIT-SPOON SAMPLER; 5 FT. LONG HQ CORE BARREL WITH SPLIT TUBE INNER BARREL; SURFACE SET, DIAMOND BIT; AND HQ RODS.

WATER TESTING EQUIPMENT;
NO WATER TESTS REQUIRED.

DRILLER;
J. HAYDEN.

DRILL FLUID;
NO DRILL FLUID FROM 0.0 TO 46.0 FT., USED WATER AS DRILL FLUID FROM 46.0 TO 95.8 FT.

DRILL FLUID RETURN:
INTERVAL (FT.) % RETURN
0.0 - 46.0 FA-NA
46.0 - 50.8 90
50.8 - 95.8 95

DRILL FLUID RETURN COLOR:
INTERVAL (FT.) COLOR
0.0 - 46.0 FA-NA
46.0 - 95.8 REDDISH BROWN

DRILLING METHODS:
INTERVAL METHOD/ (FT.) BARREL SIZE
0.0 - 46.0 7-1/2 IN. FA; SPTs AT 5 FT. INTERVALS
46.0 - 95.8 HQ CORE

DRILLING CONDITIONS AND DRILLER'S COMMENTS:
0.0 - 33.1 FT. AUGERED SMOOTH; 33.1 TO 46.0 FT. AUGERED PREDOMINATELY SMOOTH; AT 45.0 FT. AUGERED VERY HARD, PROBABLY FIRST SIGNIFICANT SANDSTONE LENSE AT 46.0 FT. AUGER REFUSAL.

CASING RECORD (FA):

CASING SIZE	CASING DEPTH	INTERVAL DRILLED
7-1/2 IN.	0-46.0	0-46.0
7-1/2 IN.	46.0	46.0-95.8

DEPTH TO WATER DURING DRILLING;
NOT DETERMINED.

HOLE COMPLETION;
BACKFILLED WITH EXCAVATED MATERIAL.

REASON FOR HOLE TERMINATION:
HOLE TERMINATED AT THE DISCRETION OFFICE OF NAVAJO HOPI INDIAN RELOCATION ON SITE REPRESENTATIVE (O.N.H.I.R.)

ESTIMATED DRILLING TIME: 10-HOUR SHIFTS
SET-UP AND DRILLING 3

DEPTH	FLD CLASS / LITH / ELEVATION	% CORE RECOVERY	ROD	FRACTURE DENSITY	WEATHERING	HARDNESS
	QaL	100				
		100				
10		100				
		100				
20						
		100				
		100				
30	5593.9					
		100				
40		5				
		0				
		100	100	5		4
50				7		
		100	100			5
		96	96	5		
60	TrC	100	100		4	4
		98	98			
70		95	95			6
				7	5	
		100	100	2		4
80		100	100	3		
		100	100	7		
		100	100	3		7
90	5531.2			BOTTOM OF HOLE		

DEPTH	USCS	MOISTURE CONTENT (INP)	SPT
	SM	4 2	15
	SP	3 4	17
	SP	3 9	33
	s(CL)	14 7	31
	CL	22 8	29
	SP-SM	21 8	14
	CL-CH		

CLASSIFICATION AND PHYSICAL CONDITION

0.0 TO 33.1 FT. QUATERNARY ALLUVIUM (QaL):
POORLY GRADED, SUBANGULAR TO SUBROUNDED SAND WITH MINOR AMOUNTS OF FINE GRAVEL AND SILT. INTERBEDED WITH SANDY LEAN CLAY BEDS AND SEAMS. DESCRIPTIONS BASED ON VISUAL AND LAB ANALYSIS OF SPT SAMPLES OR DRILLING CONDITIONS AND VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

0.0 TO 4.5 FT. POORLY GRADED, SUBANGULAR TO SUBROUNDED SAND WITH A TRACE OF FINE GRAVEL. DESCRIPTIONS BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

4.5 TO 5.5 FT. SILTY SAND (SM):
ABOUT 75% COARSE TO FINE SUBANGULAR TO SUBROUNDED SAND; ABOUT 25% FINES WITH LOW PLASTICITY. LOW TOUGHNESS, RAPID DILATANCY, NO DRY STRENGTH; MAX. SIZE COARSE SAND; LIGHT BROWN; STRONG REACTION WITH HCl.

LAB DATA; 51% SAND; 49% FINES; 0% GRAVEL; PI HP; LL NT; MC 4.2%, POORLY GRADED SAND (SP/GP).

5.5 TO 9.5 FT. POORLY GRADED, SUBANGULAR TO SUBROUNDED SAND WITH MINOR AMOUNTS OF FINE GRAVEL AND SILT. DESCRIPTION BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

9.5 TO 10.5 FT. POORLY GRADED SAND (SP); ABOUT 100% MEDIUM TO FINE, SUBANGULAR TO SUBROUNDED SAND, TRACE OF NONPLASTIC FINES; MAX. SIZE MEDIUM GRAINED SAND; LIGHT BROWN; NO REACTION WITH HCl.

LAB DATA; 94% SAND; 6% FINES; 0% GRAVEL; PI NP; LL NT; MC 3.4%, POORLY GRADED SAND (SP-SM).

10.5 TO 14.5 FT. POORLY GRADED, SUBANGULAR TO SUBROUNDED SAND WITH MINOR AMOUNTS OF FINE GRAVEL. DESCRIPTION BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

14.5 TO 15.5 FT. POORLY GRADED SAND (SP); ABOUT 100% MEDIUM TO FINE, SUBANGULAR TO SUBROUNDED SAND, TRACE OF NONPLASTIC FINES; MAX. SIZE MEDIUM GRAINED SAND; LIGHT BROWN; NO REACTION WITH HCl (CLAY LENSE PRESENT IN SAMPLE).

LAB DATA; 74% SAND; 26% FINES; 0% GRAVEL; PI NP; LL NT; MC 3.9%, SILTY SAND (SM).

15.5 TO 19.5 FT. POORLY GRADED, SUBANGULAR TO SUBROUNDED SAND WITH MINOR AMOUNTS OF FINE GRAVEL. DESCRIPTIONS BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

19.5 TO 20.5 FT. SANDY LEAN CLAY (CL):
ABOUT 50% FINES WITH HIGH PLASTICITY, HIGH TOUGHNESS. NO DILATANCY, HIGH DRY STRENGTH; ABOUT 40% MEDIUM GRAINED. SUNROUNDED TO ROUNDED SAND; MAX. SIZE MEDIUM GRAINED SAND; MODERATE BROWN; WEAK REACTION WITH HCl.

COMMENTS:

FA = 7-1/2 IN. FLIGHT AUGER
LL = LIQUID LIMIT
NP = NON PLASTIC
NA = NOT APPLICABLE

PI = PLASTICITY INDEX
MC = MOISTURE CONTENT
NT = NOT TESTED
SPT = STANDARD PENETRATION TESTING

* MOIST CONT (INP) = 34.5 TO 34.9 12.3
39.5 TO 40.0 11.4
44.5 TO 44.9 13.1

* % CORE RECOVERY = 34.0 TO 34.9 100
44.0 TO 44.9 100

* SPT = 34.5 TO 34.9 94/0.4
39.5 TO 40.0 76/0.5
44.5 TO 44.9 74/0.4

* USCS = 34.0 TO 34.9 CL/CH
44.0 TO 44.9 CL/CH

PAGE 1 OF 1 | DRILL HOLE DH-5-RPB

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GEOLOGIC LOG OF DRILL HOLE DH-5-RPB

SHEET 1 OF 1

FEATURE: RIO PUERCO BRIDGE
LOCATION: SOUTH BANK OF THE RIO PUERCO
BEGUN: 8/19/93 FINISHED: 8/21/93
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED: SEE NOTES

PROJECT: O.N.H.I.R.
COORDINATES: N. 11237.58 E. 10256.43
TOTAL DEPTH: 95.8
DEPTH TO BEDROCK: 46.0

STATE: ARIZONA
GROUND ELEVATION: 5631.36
ANGLE FROM HORIZONTAL AND BEARING: 90°
HOLE LOGGED BY: R. LUNG
REVIEWED BY:

CLASSIFICATION AND PHYSICAL CONDITION

LAB DATA; 19% SAND; 81% FINES; 0% GRAVEL; PI 18%; LL 32%; MC 14.7%; LEAN CLAY WITH SAND (CL)s.

20.5 TO 24.5 FT. CLAY WITH A TRACE OF FINE GRAINED SAND SILT. DESCRIPTION BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

24.5 TO 25.5 FT. LEAN CLAY (CL):
ABOUT 90% FINES WITH HIGH PLASTICITY, HIGH TOUGHNESS. NO DILATANCY, HIGH DRY STRENGTH; ABOUT 10% FINE. SUBANGULAR TO SUBROUNDED SAND; MAX. SIZE MEDIUM SAND; MODERATE BROWN; NO TO STRONG REACTION WITH HCl.

LAB DATA; 25% SAND; 75% FINES; 0% GRAVEL; PI 16%; LL 30%; MC 22.8%, LEAN CLAY WITH SAND (CL).

25.5 TO 27.0 FT. CLAY WITH A TRACE OF FINE GRAINED SAND. DESCRIPTION BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

27.0 TO 29.5 FT. POORLY GRADED SUBANGULAR TO SUBROUNDED SAND WITH MINOR AMOUNTS OF FINE GRAVEL. DESCRIPTIONS BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

29.5 TO 30.5 FT. POORLY GRADED SAND WITH CLAY (SP-SM):
ABOUT 90% COARSE TO FINE, SUBANGULAR TO SUBROUNDED SAND; ABOUT 10% FINES WITH MEDIUM PLASTICITY, MEDIUM TOUGHNESS, NO DILATANCY, MEDIUM DRY STRENGTH; MAX. SIZE COARSE SAND; LIGHT BROWN; NO TO WEAK REACTION WITH HCl.

LAB DATA; 67% SAND; 13% FINES; 0% GRAVEL; PI NP; LL NT; MC 21.6%, SILTY SAND (SM).

30.5 TO 33.1 FT. POORLY GRADED, SUBANGULAR TO SUBROUNDED SAND WITH MINOR AMOUNTS OF FINE GRAVEL. DESCRIPTIONS BASED ON VISUAL ANALYSIS OF CUTTINGS IN AUGERED INTERVALS.

33.1 TO 95.6 FT. TRIASSIC CHINLE FORMATION (TrC):

33.1 TO 44.0 FT. SANDY CLAYSTONE: DESCRIPTION BASED ON VISUAL ANALYSIS OF DRILLING CONDITIONS AND CUTTINGS IN AUGERED INTERVALS. COLOR RANGES FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/6). SANDY CLAYSTONE IS THINLY TO MODERATELY BEDDED AND INTENSELY (W7) TO MODERATELY (W5) WEATHERED WITH DEPTH (APPROXIMATELY 10 TO 12 FEET). VERY SOFT (M7) BREAKING WITH LIGHT MANUAL PRESSURE. THE UPPER CONTACT IS UNCONFORMABLE AND SHARP WHILE LOWER CONTACT IS CONFORMABLE AND GRADATIONAL. MINOR SANDSTONE LENSES RANGING FROM 0.1 TO 0.5 FT. ARE ENCOUNTERED FROM 2.0 TO 5.0 FT. ABOVE THE LOWER CONTACT.

34.5 TO 34.9 FT. CLAYSTONE VISUALLY CLASSIFIED AS A LEAN TO FAT CLAY CL/CM; ABOUT 85% FINES WITH HIGH PLASTICITY, HIGH TOUGHNESS. NO DILATANCY, HIGH DRY STRENGTH; ABOUT 15% FINE. SUBANGULAR TO SUBROUNDED SAND; MAX. SIZE FINE SAND; MODERATE RED; NO REACTION WITH HCl.

LAB DATA; 45% SAND; 55% FINES; 0% GRAVEL; PI 10%; LL 30%; MC 12.3%, LEAN CLAY TO CLAYEY SAND CL/SC.

34.9 TO 39.5 FT. SANDY CLAYSTONE; DESCRIPTION BASED ON DRILLING CONDITIONS AND CUTTINGS.

39.5 TO 40.0 FT. CLAYSTONE VISUALLY CLASSIFIED AS A LEAN TO FAT CLAY CL/CH; ABOUT 85% FINES WITH HIGH PLASTICITY, HIGH TOUGHNESS. NO DILATANCY, HIGH DRY STRENGTH; ABOUT 15% FINE. SUBANGULAR TO SUBROUNDED SAND; MAX. SIZE FINE SAND; MODERATE RED; NO REACTION WITH HCl.

LAB DATA; 38% SAND; 62% FINES; 0% GRAVEL; PI 7%; LL 29%; MC 11.4%, SANDY CLAYEY SILT s(CL-ML).

40.0 TO 44.0 FT. SANDY CLAYSTONE; DESCRIPTION BASED ON DRILLING CONDITIONS AND CUTTINGS.

CLASSIFICATION AND PHYSICAL CONDITION

44.0 TO 44.9 FT. CLAYSTONE VISUALLY CLASSIFIED AS A SANDY LEAN TO FAT CLAY: s(CL-CH);
ABOUT 60% FINES WITH HIGH PLASTICITY, HIGH TOUGHNESS, NO DILATANCY, HIGH DRY STRENGTH; ABOUT 40% MEDIUM GRAINED. SUBROUNDED TO ROUNDED SAND; MAX. SIZE MEDIUM GRAINED SAND; MODERATE RED; WEAK REACTION WITH HCl.

LAB DATA; 73% SAND; 27% FINES; 0% GRAVEL; PI NP; LL NT; MC 13.1%, SANDY SILT SM.

44.9 TO 77.3 FT. SANDSTONE WITH INTERBEDDED CLAYSTONE:
COLOR RANGES FROM GRAYISH PINK (5R 6/2) TO VERY LIGHT GRAY (N8) WITH CLAYSTONE INTERBEDS RANGING FROM PALE RED (5R 6/2) TO MODERATE RED (5R 4/2). FINE TO MEDIUM GRAINED. THINLY BEDDED, SLIGHTLY (W3) TO PREDOMINATELY MODERATELY (W5) WEATHERED; HARD (H3) TO PREDOMINATELY MODERATELY HARD (H4). MODERATELY FRACTURED (FD3), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 46.0 TO 46.6 FEET. INTENSELY FRACTURED (FD7), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.1 TO 0.33 FOOT FROM 46.6 TO 51.6 FEET. MODERATELY FRACTURED (FD5). RECOVERED PREDOMINATELY IN LENGTHS FROM 0.33 TO 1.0 FOOT FROM 51.6 TO 75.1 FEET INTENSELY FRACTURED (FD7), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.1 TO 0.33 FOOT FROM 75.1 TO 77.3 FEET. CLAYSTONE INTERBEDS ENCOUNTERED FROM: 47.3 TO 47.6 FEET., 51.6 TO 54.0 FT., 55.6 TO 56.1 FT., 57.6 TO 58.0 FT., 61.9 TO 62.4 FT., 65.4 TO 66.6 FT., 67.6 TO 69.4 FT., AND 73.4 TO 75.1 FT., FROM 48.6 TO 51.6 FT., GRAVEL TO PEBBLE CONGLOMERATE CLAST SUPPORTED (90%) WITH A CLAY MATRIX. CLASTS COMPOSED OF INTENSELY WEATHERED SANDSTONE. CONGLOMERATE HAS A STRONG REACTION WITH HCl. UPPER CONTACT IS CONFORMABLE AND GRADATIONAL WHILE LOWER CONTACT IS CONFORMABLE AND SHARP. THE LOWER CONTACT IS INDICATED BY A GRAVEL TO PEBBLE CONGLOMERATE FROM 75.8 TO 77.3 FT. THIS CONGLOMERATE IS CLAST SUPPORTED (90%) WITH A CLAY MATRIX, CLASTS COMPOSED OF INTENSELY (W7) WEATHERED SANDSTONE; LARGEST CLAST 0.15 FT.

77.3 TO 91.5 FT. SANDSTONE WITH MINOR INTERBEDDED CLAY:
COLOR RANGES FROM VERY LIGHT GRAY (N8) TO DARK GRAY (N3), FINE TO MEDIUM GRAINED, SUBANGULAR TO SUBROUNDED. LAMINAR TO THINLY BEDDED; SLIGHTLY WEATHERED (W3); MODERATELY HARD (H4) TO HARD (H5). SLIGHTLY TO VERY SLIGHTLY FRACTURED (FD2), RECOVERED IN LENGTHS FROM 1.0 TO MORE THAN 3 FEET FROM 77.3 TO 90.3 FEET. INTENSELY FRACTURED (FD7), RECOVERED PREDOMINATELY IN LENGTHS FROM 0.1 TO 0.33 FOOT FROM 90.3 TO 91.5 FEET. UPPER CONTACT IS CONFORMABLE AND SHARP, LOWER IS CONFORMABLE AND SHARP.

91.5 TO 95.8 FT. SILTY CLAYSTONE:
COLOR IS PALE OLIVE (10Y 6/2), MODERATELY TO THICKLY BEDDED. SLIGHTLY WEATHERED TO FRESH (W2) BUT VERY SOFT (H7). SLIGHTLY FRACTURED (FD3). RECOVERED PREDOMINATELY IN LENGTHS FROM 1 TO 3 FEET FROM 91.5 TO 95.8 FEET. UPPER CONTACT IS CONFORMABLE AND SHARP WHILE LOWER CONTACT IS UNKNOWN.

PROBABLE REASON FOR CORE LOSS:

INTERVAL (FT.)	AMOUNT	INTERPRETATION
55.8 - 60.8	0.2	WASHED OUT CLAY THROUGHOUT
65.8 - 70.8	0.1	WASHED OUT CLAY THROUGHOUT
70.8 - 75.8	0.25	WASHED OUT CLAY THROUGHOUT

PAGE 1 OF 1 | DRILL HOLE DH-5-RPB

NOTE: Subsurface investigation information has been obtained for designer use only. The Government shall not be responsible for any misinterpretation or assumptions made by the Contractor based on the subsurface investigation information presented on these plans.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

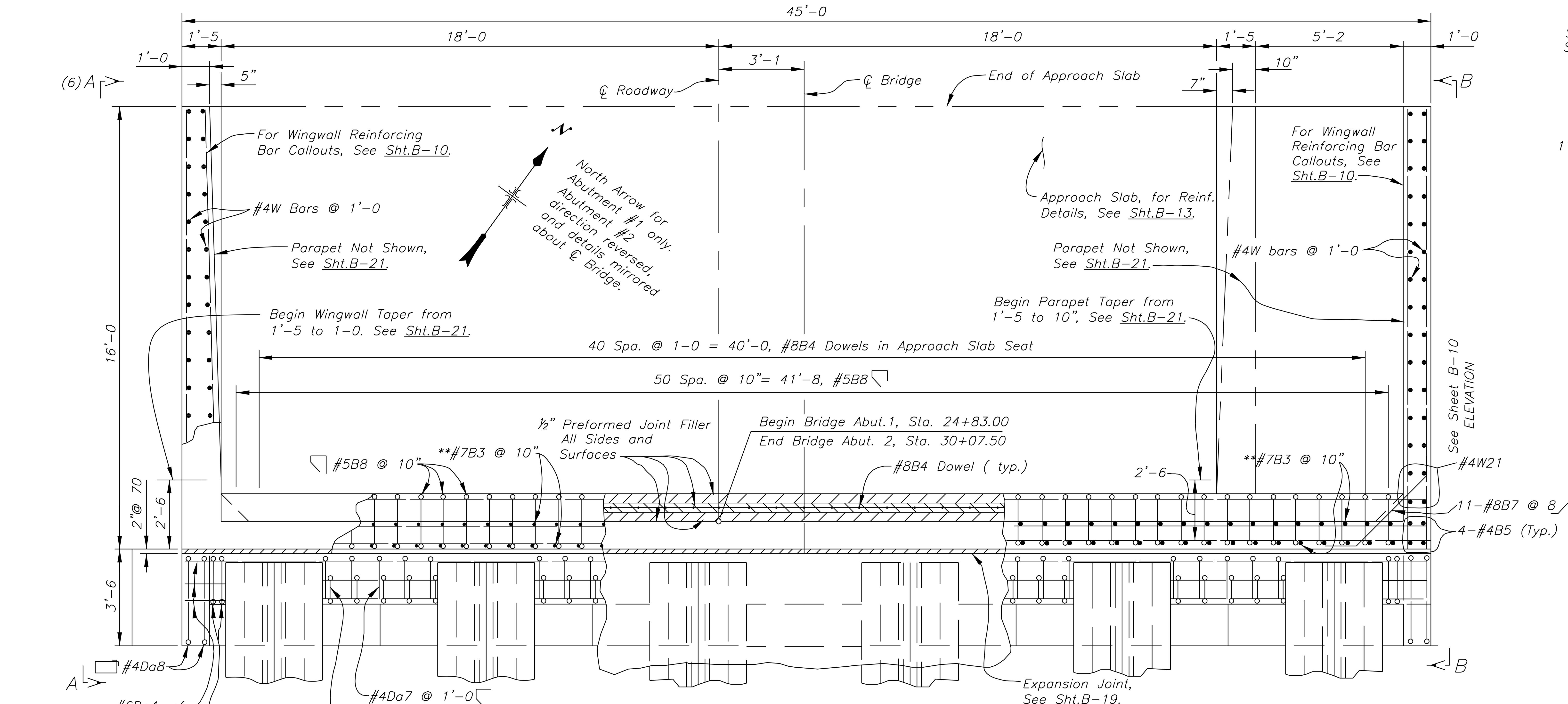
RIO PUERCO BRIDGE

BORING LOGS - SHEET 2 OF 2

Designed by: BUREAU OF RECLAMATION
Drawn by: BOR, rsh, dc Date: 01/17/14
Revised by: - - Date: - -
File Name: 08_BIAdrillhole2

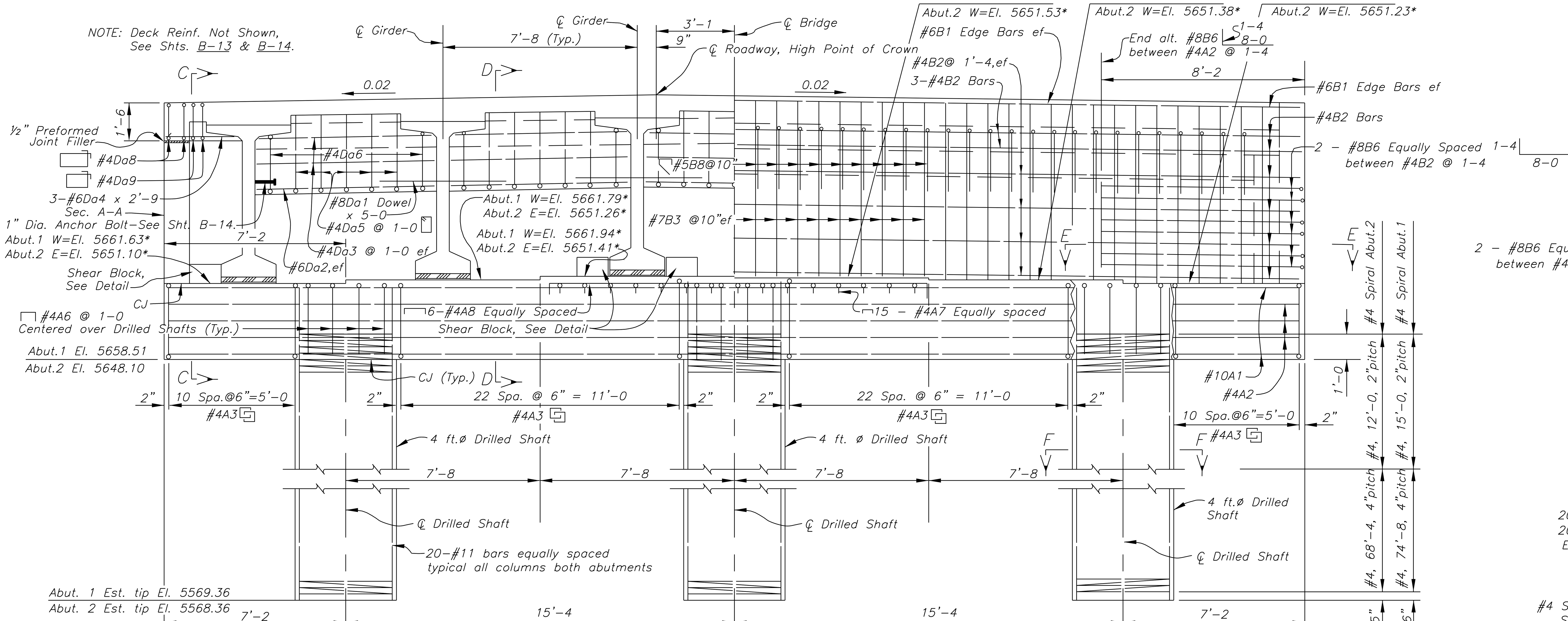
K:\CURRENT PROJECTS\N00\N2007(1-1)_ Navajo Bridge_026494\Design_BIA_2001-02-28\CAD 07300Z\Bridge_Plan Drawings PRELIM 051109\08_BIAdrillhole2_2014-01-17.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-9	63



ABUTMENT PLAN

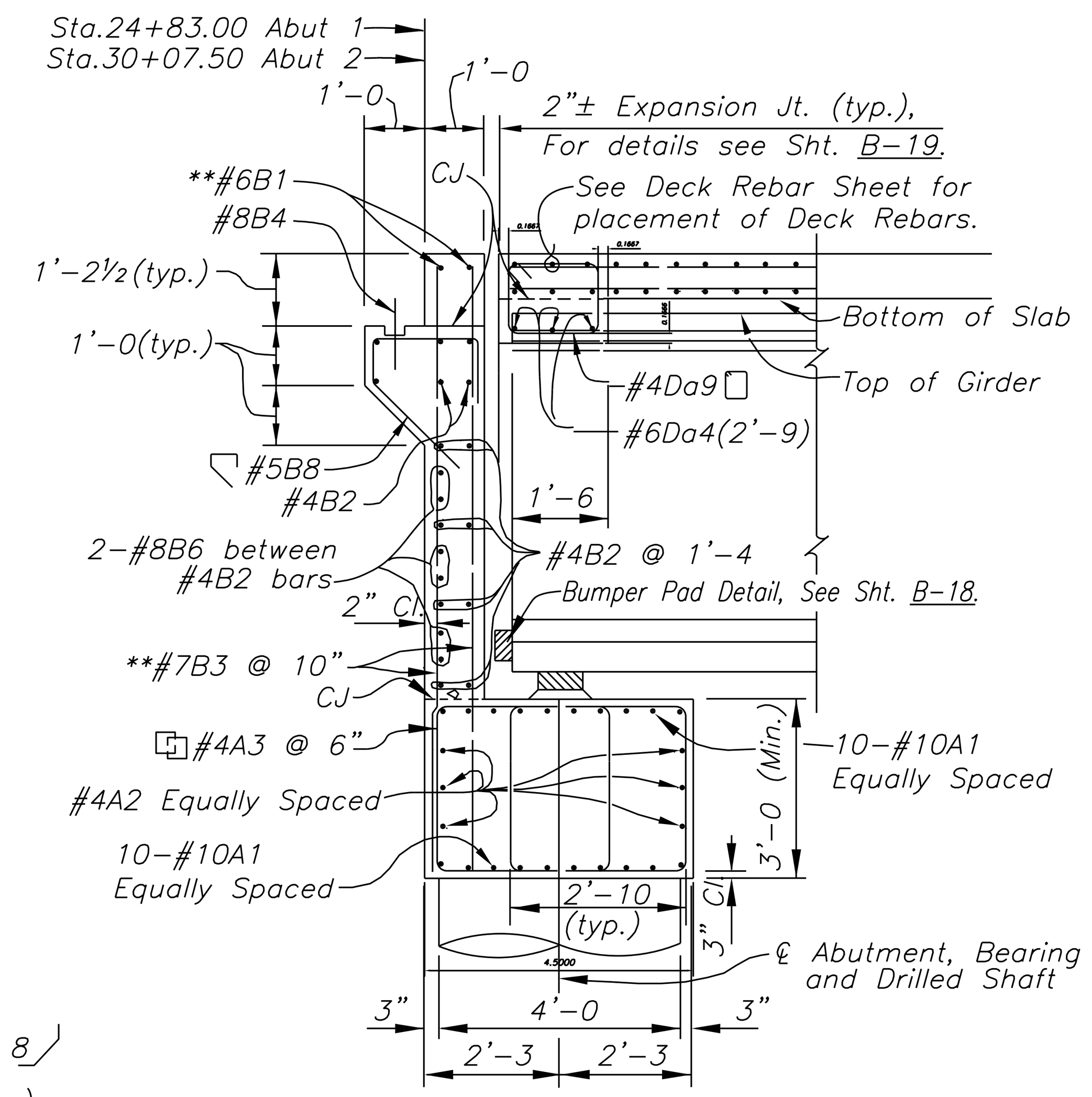
(ABUTMENT 1 SHOWN, ABUTMENT 2 SIMILAR, MIRRORED ABOUT BRIDGE ℄)
(FOR WINGWALL SECTION A-A & B-B DETAILS, SEE SHEET B-10.)



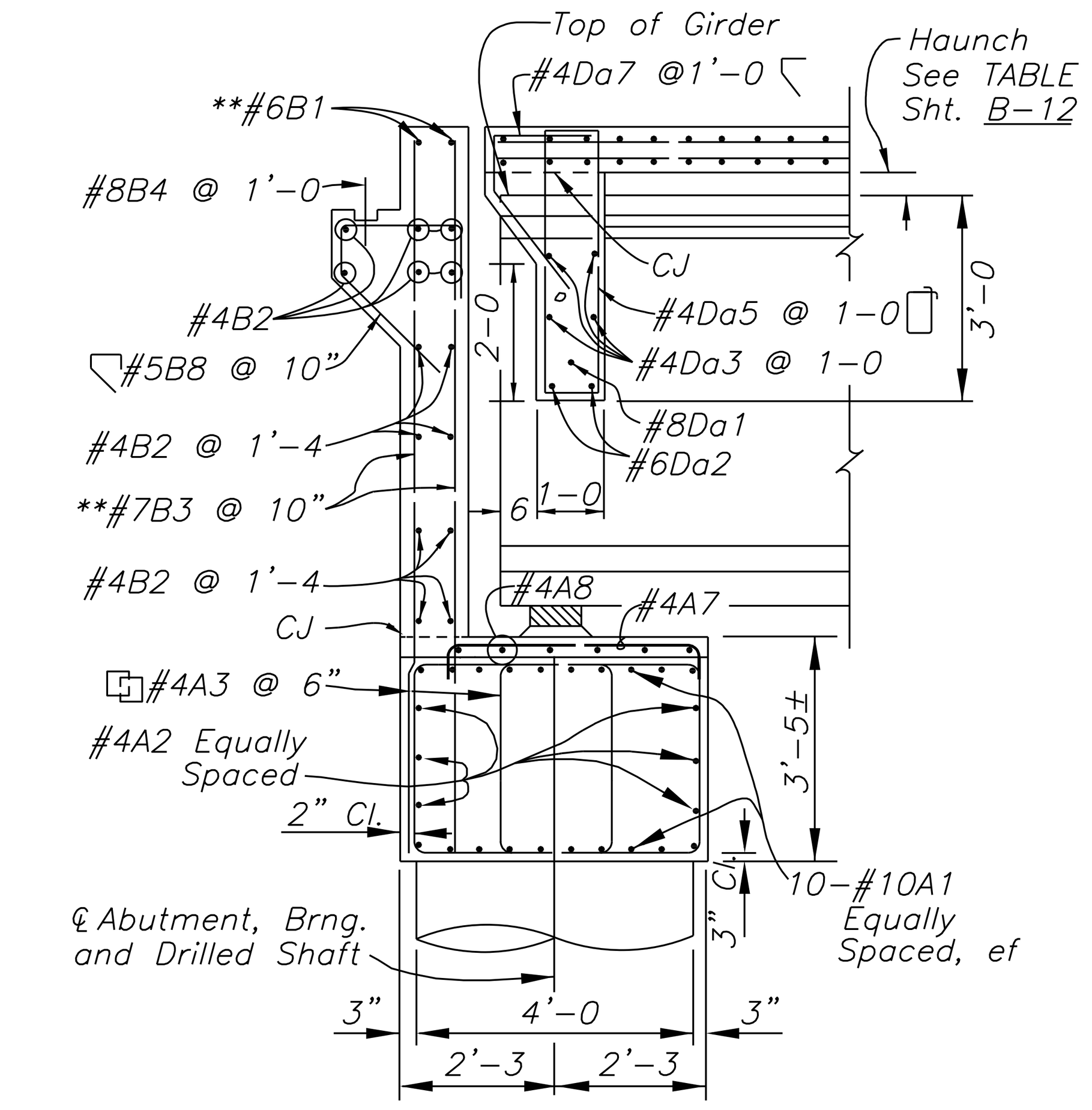
ABUTMENT ELEVATION

(ABUTMENT 1 SHOWN, ABUTMENT 2 SIMILAR, MIRRORED ABOUT BRIDGE ℄)
(NOTE: FOR TOP OF GROUT PAD ELEVATIONS, SEE DWG. B-11.)

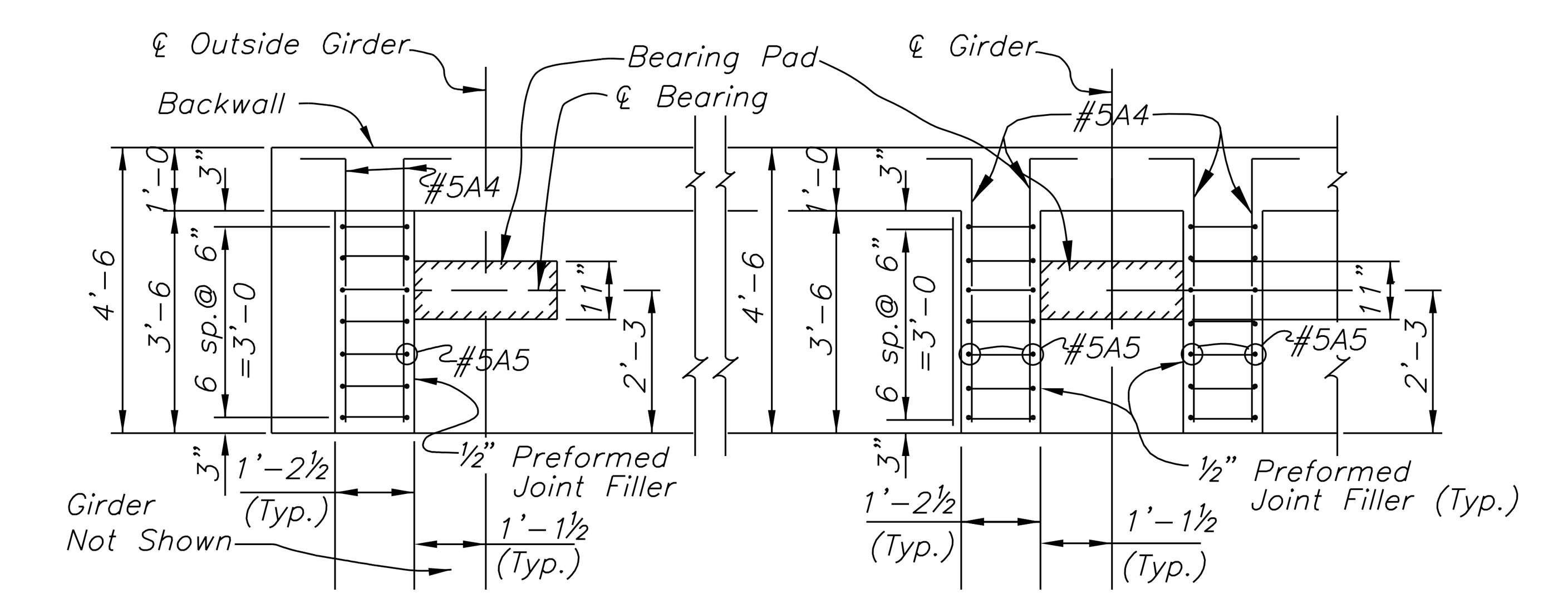
Note: See Column Cage Alignment Detail on Sheet B-18 for cage alignment bars for Abutment's drilled shafts.



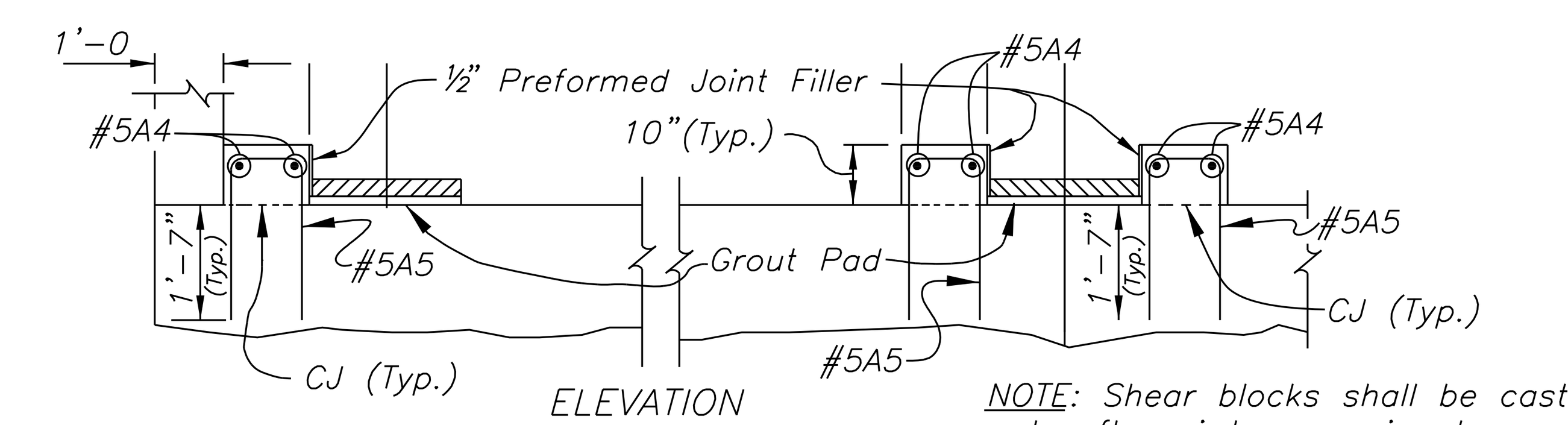
SECTION C-C



SECTION D-D

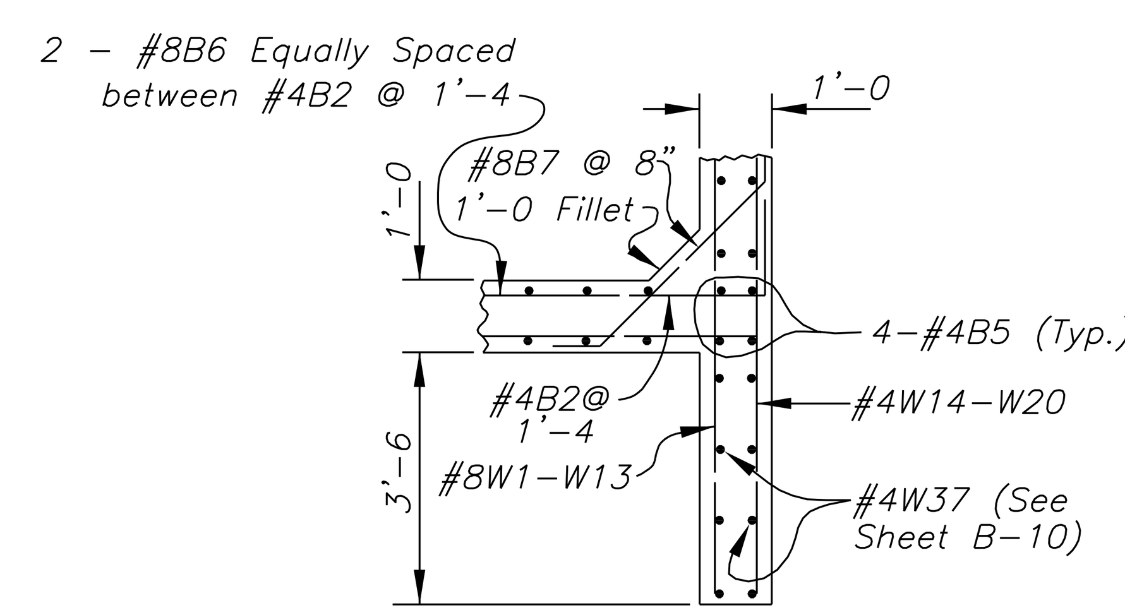


SHEAR BLOCK PLAN

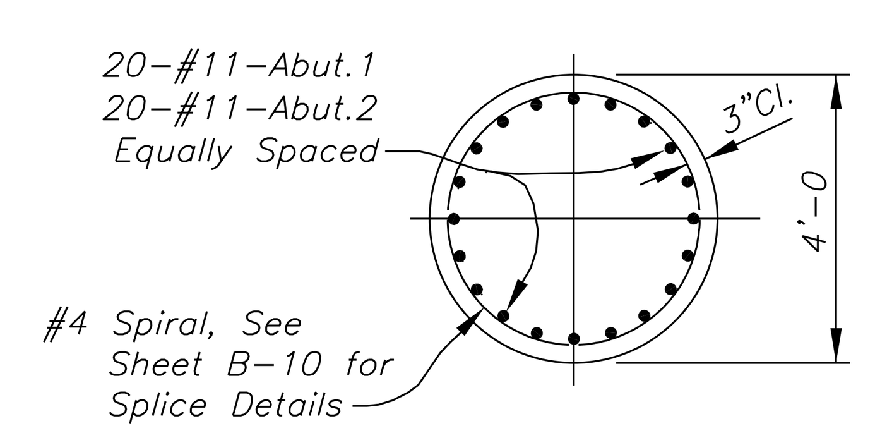


SHEAR BLOCK DETAIL

NOTE: Shear blocks shall be cast only after girders are in place. All reinforcement in shear block is No. 5.



SECTION E-E



SECTION F-F

NOTE

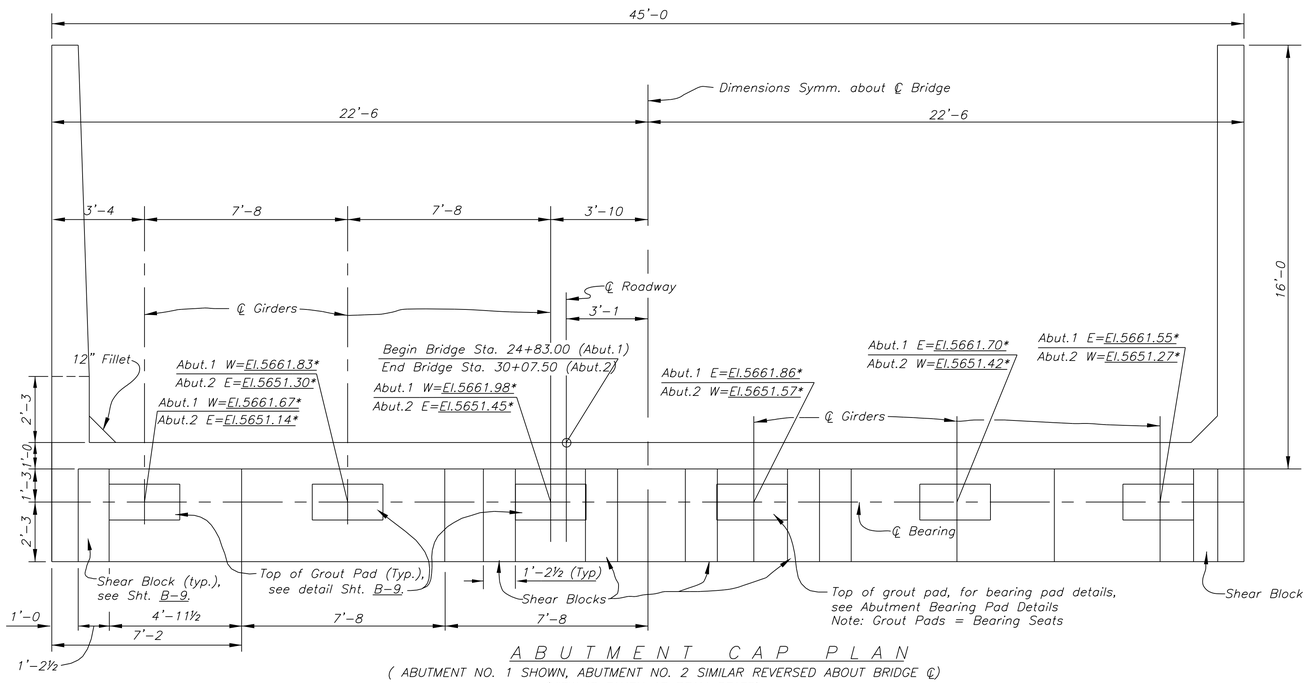
* W = West Side = Downstream Side of Abutment 1 and 2.
* E = East Side = Upstream Side Abutment 1 and 2.
** Epoxy Coated Reinforcing bars

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

RIO PUERCO BRIDGE
ABUTMENT 1 AND ABUTMENT 2
DETAILS, SHEET 1

Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, dc, rsh	Date: 05/17/14
Revised by:	Date:
File Name: 09_BIAabut	

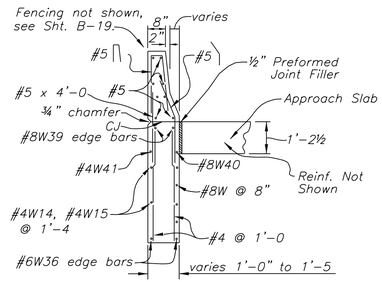
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-10	63



A B U T M E N T C A P P L A N

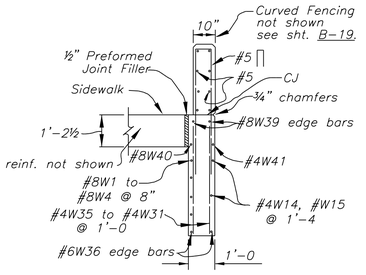
(ABUTMENT NO. 1 SHOWN, ABUTMENT NO. 2 SIMILAR REVERSED ABOUT BRIDGE ℄)

(VIEW IS TAKEN AT BEAM SEATS)



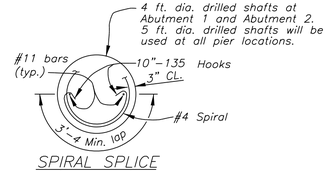
SECTION A-A

(West Side Wingwall, Abutment 1 and Abutment 2)



SECTION B-B

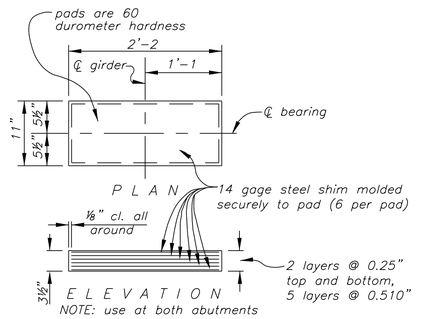
(East Side Wingwall, Abutment 1 and Abutment 2)



SPIRAL SPLICE

(No Scale)

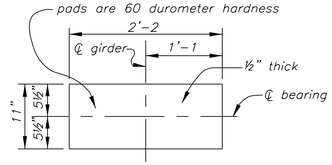
NOTE: Spiral reinf. shall conform to AASHTO M31, Grade 60 (½" ø) or AASHTO M32 (W20 smooth). Splices shall be as detailed. Hooks may be field bent and shall go around vert. #11 bars as shown. Add 1½ turns of spiral and 135° hook with 10" tail at top and bottom of spiral length.



ABUTMENT BEARING PAD DETAIL

(12 REQUIRED)

No Scale



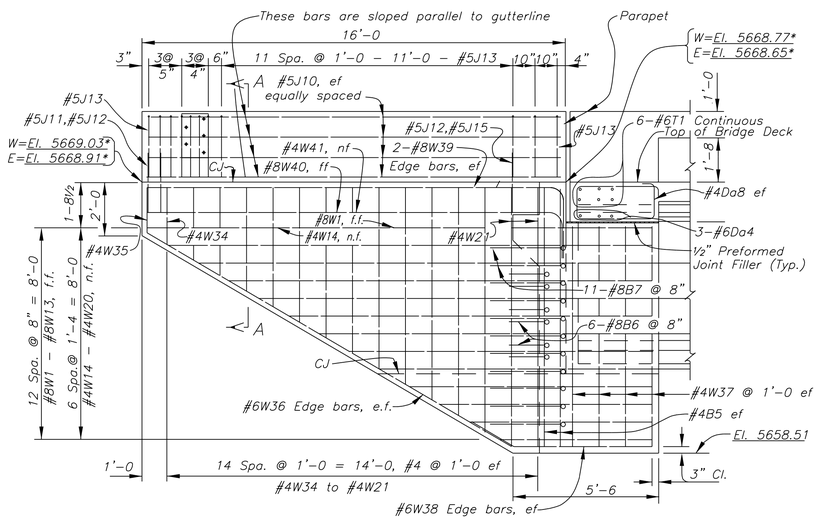
P L A N

NOTE: use at all piers

PIER BEARING PAD DETAIL

(36 REQUIRED)

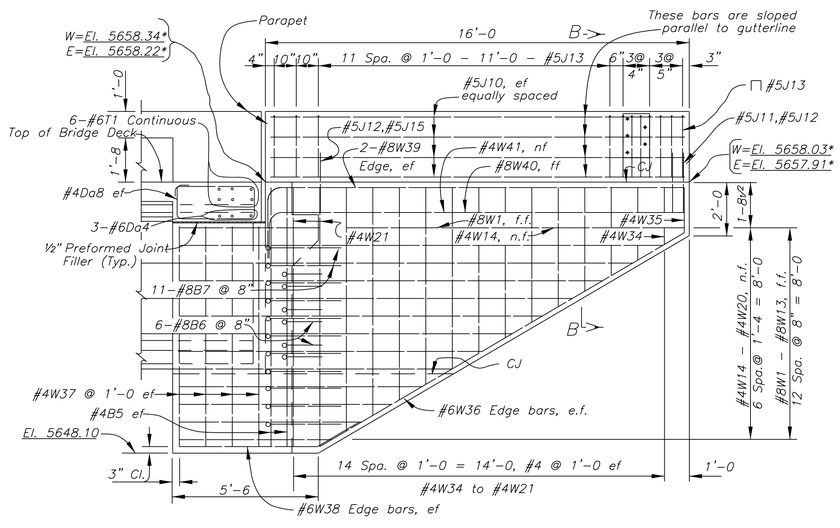
No Scale



E L E V A T I O N

(WEST SIDE WINGWALL - ABUTMENT 1)

(EAST SIDE WINGWALL SIMILAR)



E L E V A T I O N

(WEST SIDE WINGWALL - ABUTMENT 2)

(EAST SIDE WINGWALL SIMILAR)

N O T E

* W = West Side = Downstream side of abutment 1 and 2

* E = East Side = Upstream side of abutment 1 and 2

UNITED STATES
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BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE

ABUTMENT 1 AND ABUTMENT 2 DETAILS, SHEET 2

Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, dc, rsh	Date: 01/17/14
Revised by: - -	Date: - -
File Name: 10_BIAwing	

I:\DESIGN\Users\DESIGN2\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Plans 01-18-2013\Revised drawing per precon 081516\10_BIAwing_2014-05-17.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-11A	63

PIER CAP PLAN
NTS
45'-0
22'-6
7'-2
7'-8
Step spacing
Top of grout pad elev.'s (typ.)
Pier #1
Pier #2
Pier #3
El. 5659.32
El. 5656.73
El. 5654.14
El. 5659.47
El. 5656.88
El. 5654.29
El. 5659.63
El. 5657.04
El. 5654.45
El. 5659.50
El. 5656.91
El. 5654.32
El. 5659.35
El. 5656.76
El. 5654.17
El. 5659.20
El. 5656.61
El. 5654.02
El. 5659.27
El. 5656.68
El. 5654.09
El. 5659.43
El. 5656.84
El. 5654.25
El. 5659.58
El. 5656.99
El. 5654.40
El. 5659.46
El. 5656.87
El. 5654.28
El. 5659.30
El. 5656.71
El. 5654.12
El. 5659.15
El. 5656.56
El. 5653.97
℄ Bearing
Southwest Side (Down Stream)
Northeast Side (Upstream)
℄ Pier
Fixed restrainer (typ.) See detail Sht. B-18.
Grout pad and blockout See Groud Pad Detail
℄ Bridge
6½" min x 8"x 5'-0 Raised key (typ.)
½" Expanded Polystyrene
Girder Spacing
3'-4
3'-10
NOTE: Pier cap steps are level at elevations shown.
PIER DECK DIAPHRAGM
Deck placement CJ location. See Deck Placement Diagram on Sht. B-18.
℄ Pier
4-#6T1 Continuous
Deck Reinf. not shown
8" (Typ.)
#4Dp5
#4Dp13 @ 8
6-#4Dp5 @ 1'-2
#4Dp10 @ 8
#6Dp1 Bars full length of diaphragm
#11Dp7 dowel at fixed restrainer
½" Expanded Polystyrene
#6Dp3
Fixed restrainer, see detail Sht. B-18.
#11P15 dowel at fixed restrainer
#6P17 x 5'-4(Typ)
Pier reinf. not shown
Coat with bond prohibitor on all sides of raised keys
11-#5Dp14 equally spaced at shear key
GROUT PAD DETAIL
℄ Girder
Slope parallel to bottom of girder
SECTION C-C
℄ Bearing
Bearing pad
Top of pier elevation
Top of grout pad elevation
1:1 Slopes
Grout pad blockout
Note: For pier bearing pad details, see Sht. B-10.
PIER ELEVATION
(View looking backstation)
NTS
NOTE: Grout pads and raised keys are not shown
9'-10
20 Spa. @ 6"= 10'-0=#5P9
5'-4
Pier #1 (typ.) El. 5659.18
Pier #2 (typ.) El. 5656.59
Pier #3 (typ.) El. 5654.00
El. 5659.33
El. 5656.74
El. 5654.15
El. 5659.48
El. 5656.89
El. 5654.30
El. 5659.36
El. 5656.77
El. 5654.18
El. 5659.21
El. 5656.62
El. 5654.03
El. 5659.05
El. 5656.46
El. 5653.87
#5P10-(Tot. 5)
#5P11-(8 Tot. each end)
WEST END
EAST END
El. 5655.05
El. 5652.46
El. 5649.87
#5P13 @ 1'-0 (15 tot.)
6-#4P14 Equally spaced
#5P12 @ 1'-0 (typ. over columns)
11-#11P3 thru P8 equally spaced no splices
8-#5P11 Equally spaced
6-#5P2 Equally spaced ef
4'-0 (min.)
#5P9 @ 6"
Level (typ.)
15'-4 (typ.)
11-#11P1 equally spaced-no splices
7'-2 (Typ.)
℄ Column (typ.)
Allowable CJ, typ. at all columns at all piers
20-#5Sc5 Equally Spaced
9-#5Sc5 - e.f. Equally spaced
#5Sc4 - 10 Spa. @ 1'-0 = 10'-0 (Typical between columns)
Strut typical at Pier 2 and Pier 3 only
5-#7Sc1 Equally spaced
#7Sc3 (7 Total each end)
Level
14-#8Sc2
2'-6 (Typ.)
28-#11 bars equally spaced typical at all columns and piers
A CJ will be located 5'-0 below original ground surface. The cast in place drilled shafts will be terminated at elevations shown
Finished Grade
NOTE: Add 1½ turns of spiral and 135 hook with 10" tail at top and bottom of spiral length.
CJ, El. 5626.19 (Pier 1 typ.)
Roughened Surface, (Typ.).
CJ, El. 5601.62 (Pier2 typ.)
CJ, El. 5601.86 (Pier3 typ.)
See Construction Joint Detail sheet B-18
18'-4
5'-0 ø Conc. piles cast in drilled holes (typ.)
Symmetrical about ℄ pier
5'-0 ø Column (typ.)
NOTE: Contractor shall submit to the Engineer a detail drawing for approval for splicing the full length #11 bars in the columns. If more than half of the bars are spliced at the same location, use 9-9 laps; otherwise use 7-1 laps.
℄ Column and ℄ pier
Est. tip El. 5565.36 (typ.) Pier #1
Est. tip El. 5570.36 (typ.) Pier #2
Est. tip El. 5558.36 (typ.) Pier 3
#4 Spiral @ 2"pitch = 37'-4
#4 Spiral @ 2"pitch = 58'-8
#4 Spiral @ 2"pitch = 56'-0
#4 Spiral @ 4" pitch = 53'-0
#4 Spiral @ 4" pitch = 24'-0
#4 Spiral @ 4" pitch = 36'-0
Pier #1
Pier #2
Pier #3
NOTE: See Column Cage Alignment Detail on Sht. B-18 for cage alignment bars for Pier's drilled shafts.
SECTION B-B
5'-6
4'-0 (Typ)
#11P3 thru P8 equally spaced (No splices allowed)
#5P9 @ 6
6-#5P2 Equally spaced
#11P1 equally spaced (No splices allowed)
2'-9
VIEW F-F
#11P3
#11P4
#11P5
#11P6
#11P7
#11P8
8-#5P11 Equally spaced
#5P10 Equally spaced (5 tot.)
#5P9 @ 6"
#5P12 @ 1'-0
SECTION D-D
6'-0
14-#8Sc2 Equally spaced (No splices allowed)
#5Sc4 @ 1'-0
#7Sc1 Equally spaced 5 each face (e.f.)
4'-0(Typ)
SECTION E-E
3'-0
10" hook
20-#5Sc5 Equally spaced
7-#7Sc3 Equally spaced
28-#11 Equally spaced
#4 Spiral 2½" pitch
SECTION A-A
5'-0 Dia.
#4 Spiral, see Sht. B-10, for splice details
3"Cl.
28-#11 bars equally spaced (for splice details see sheet B-18)
SECTION G-G
(Typical Reinf. at all locations)
7'-8
Typical ℄ girders
5'-0 (Typ)
Diaphragm reinf. not shown
Level
Coat with bond prohibitor all vertical sides
For restrainer detail see Sht. B-18.
#5 bars(typ)
#5 bars (typ) ef
11-#5P16 bars(typ)
3'-0

NOTE: CJ = Construction Joint.

Revised 09-15-2017
correct elevation error

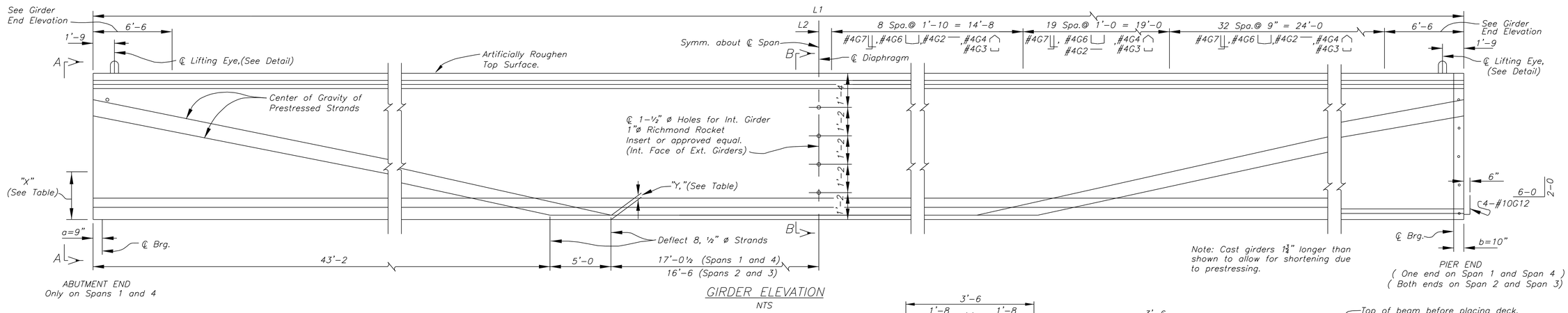
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

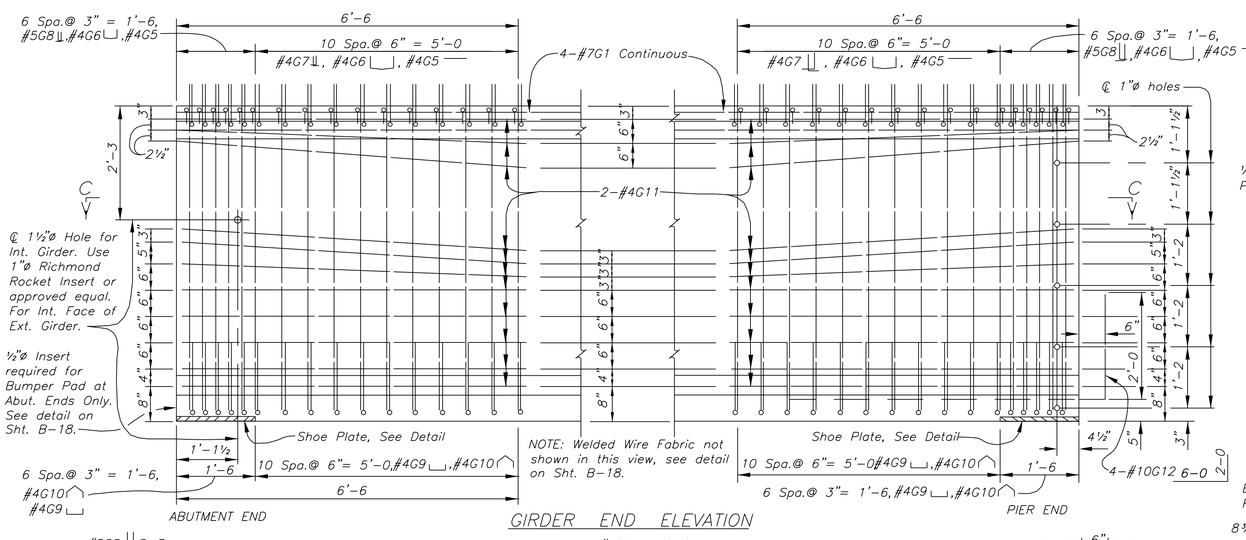
RIO PUERCO BRIDGE
PIER 1, PIER 2 AND PIER 3
DETAILS

Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, dc, rsh	Date: 05/22/2014
Revised by: - -	Date: - -
File Name: 11_BIApier	

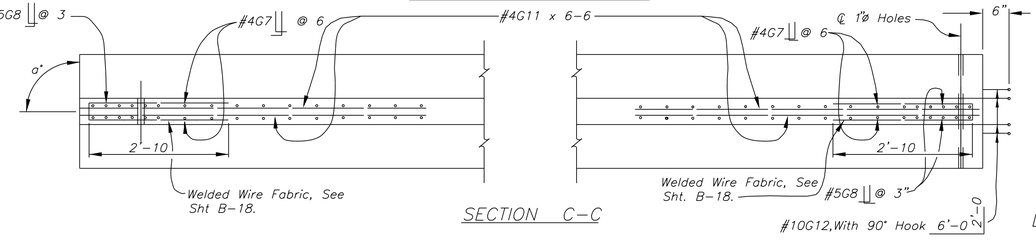
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-12	63



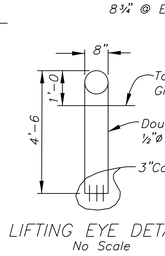
GIRDER ELEVATION
NTS



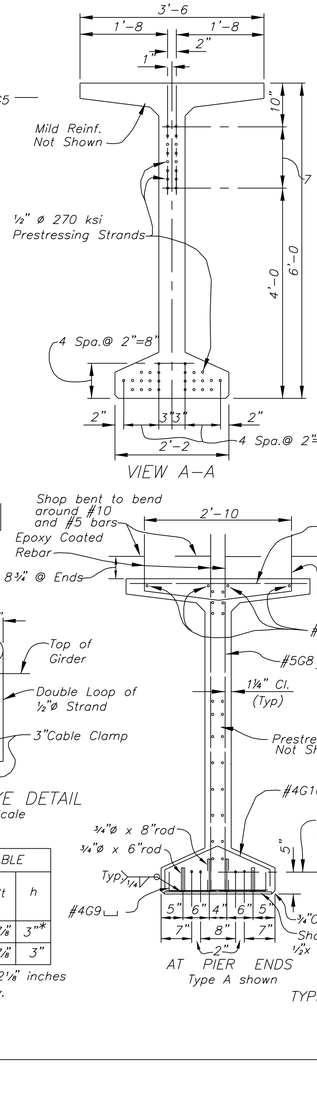
GIRDER END ELEVATION

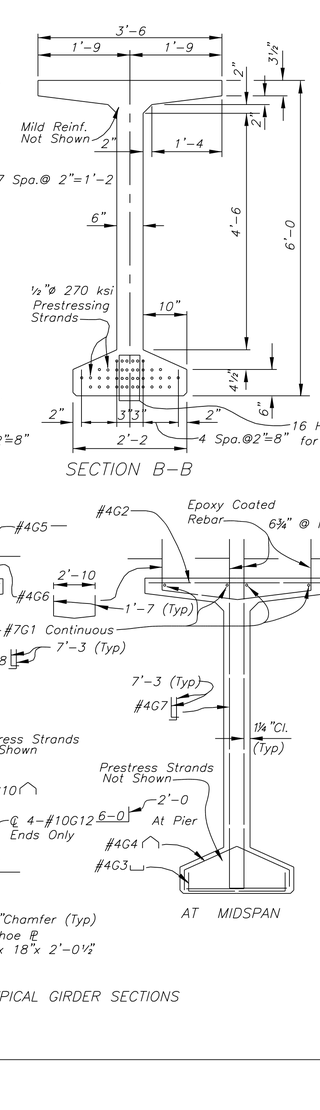


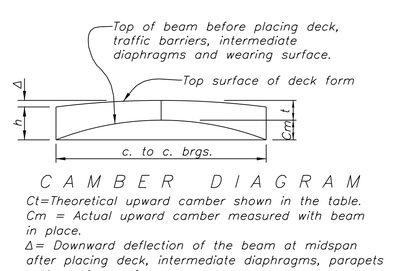
SECTION C-C



LIFTING EYE DETAIL
No Scale





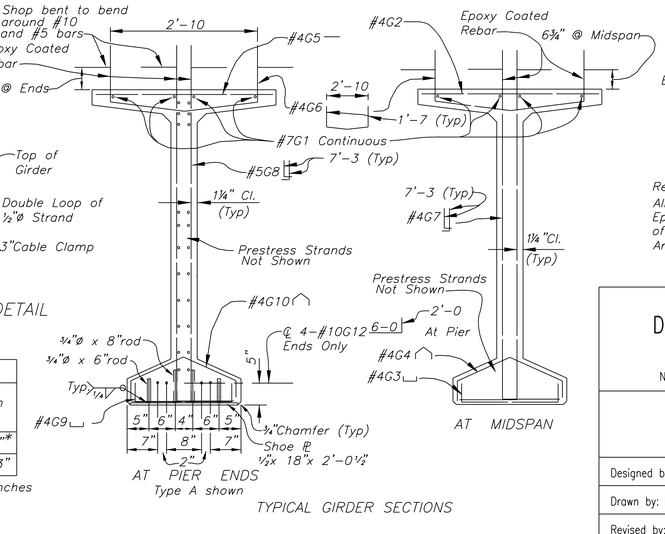


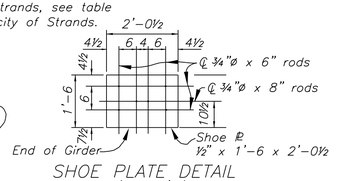
CAMBER DIAGRAM

Ct=Theoretical upward camber shown in the table.
Cm = Actual upward camber measured with beam in place.
Δ= Downward deflection of the beam at midspan after placing deck, intermediate diaphragms, parapets and wearing surface.
t = Haunch thickness at midspan.
h = Ct−Δ+t Haunch thickness at ends of span.
When the pretensioned beam is placed in position the actual upward camber "Cm" may vary from the theoretical value "Ct".
Elevations are calculated on the value of "h" shown in the table. To maintain the elevations adjust as follows. t = h+Δ − Cm, t ≥ 1"

BRIDGE	SPANS	α°	L_1	L_2	a AT ABUTMENTS	b AT PIERS	½"ø 270KSI PRESTRESSED STRANDS			CONCRETE		NUMBER OF BEAMS	HAUNCH TABLE			
							TOTAL NUMBER	y-INCHES C.G. of Pre-stressing strands	x-INCHES C.G. of Pre-stressing strands	MIN. COMP. 28 DAY STRENGTH f'_c (psi)	RELEASE STRENGTH f'_{ci} (psi)		t	Δ	Ct	h
RIO PUERCO BRIDGE	1 and 4	90° 00'00"	130'-5"	1'-0½"	9"	10"	42	4.26"	23.52"	6,000	5,400	12	1⅛"	2¼"	3⅛"	3"*
RIO PUERCO BRIDGE	2 and 3	90° 00'00"	129'-4"	6"	——	10"	42	4.26"	23.52"	6,000	5,400	12	1⅛"	2"	3⅛"	3"

*This haunch thickness will be 2⅛" inches at abutment 1 on span 1 only.





SHOE PLATE DETAIL
(48 req'd.)

NOTE

Reinforcing bars are to be Grade 60.
All chamfers on bottom of girder are ¾".
Epoxy coat all mild reinforcement within 6-6 of each beam end.
Artificially roughen 8" of each beam end.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

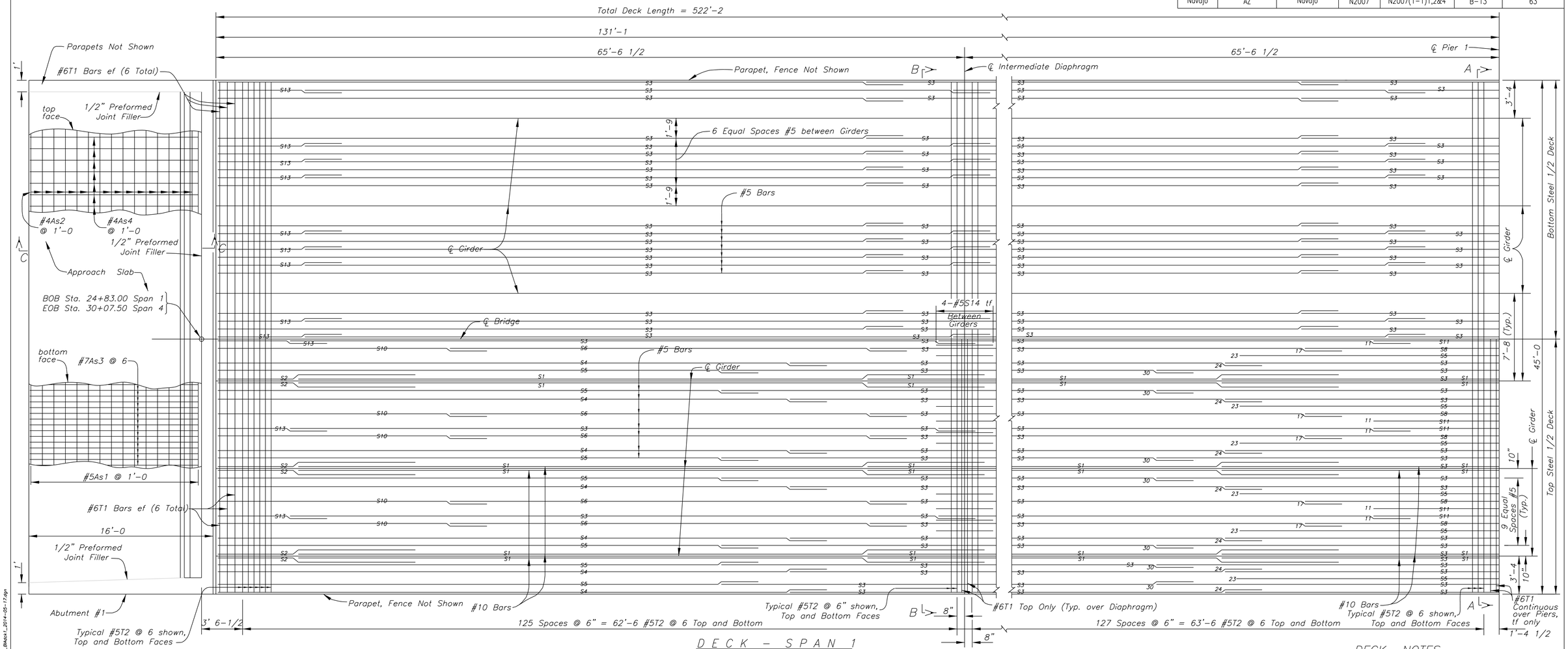
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE
PRESTRESSED GIRDER DETAILS
TYPE BT-72

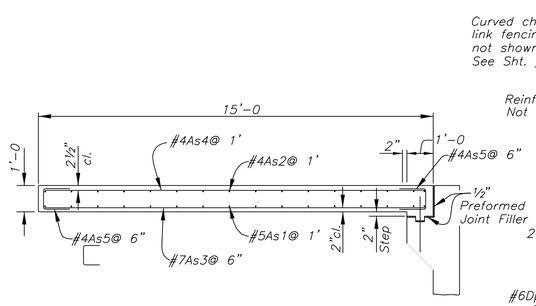
Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, rsh, dc	Date: 01/17/14
Revised by: - -	Date: - -
File Name: 12_BIAgird	

L:\CURRENT PROJECTS\N00\N2007(1-1)_ Navajo Bridge_032494\Design_BIA_2001-02-28\CAD 073002\Bridge_Plan Drawings PRELIM 051109\12_BIAgird_2014-01-17.dgn

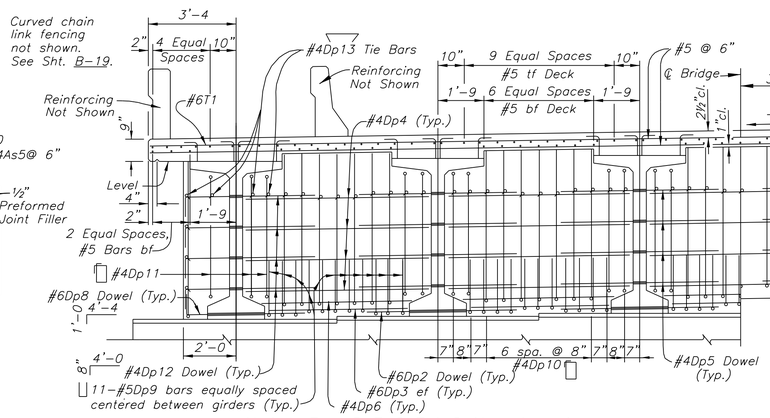
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-13	63



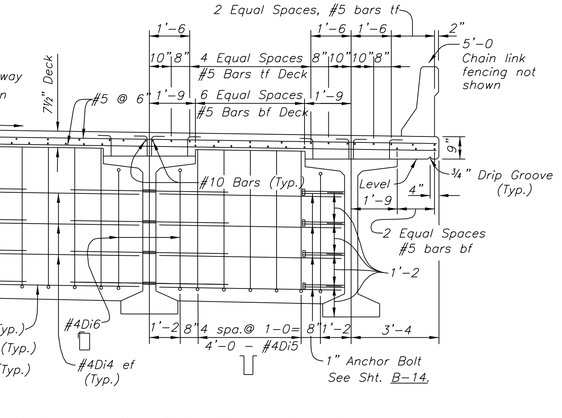
DECK - SPAN 1
(SPAN 4 - OPPOSITE HAND)
NTS



SECTION C - C
NTS



HALF SECTION A - A
(TYPICAL AT PIERS)
NTS



HALF SECTION B - B
(TYPICAL AT INTERMEDIATE DIAPHRAGMS)
NTS

DECK NOTES

Span #1 reinforcing layout shown, Span #4 reinforcing layout is mirrored about midpoint of bridge.

Numbers at ends of bars indicate distance in feet and inches from ℄ Pier to end of the longitudinal bars. Unless otherwise shown, #5 & #10 bars are spliced at these points.

All the reinforcement bars in the deck slab are epoxy coated.

The #5 reinforcement bar splice length = 39"

The #10 reinforcement bar splice length = 123"

Mirror longitudinal deck steel about bridge centerline.

Alternate #5S13 at each end of the deck.

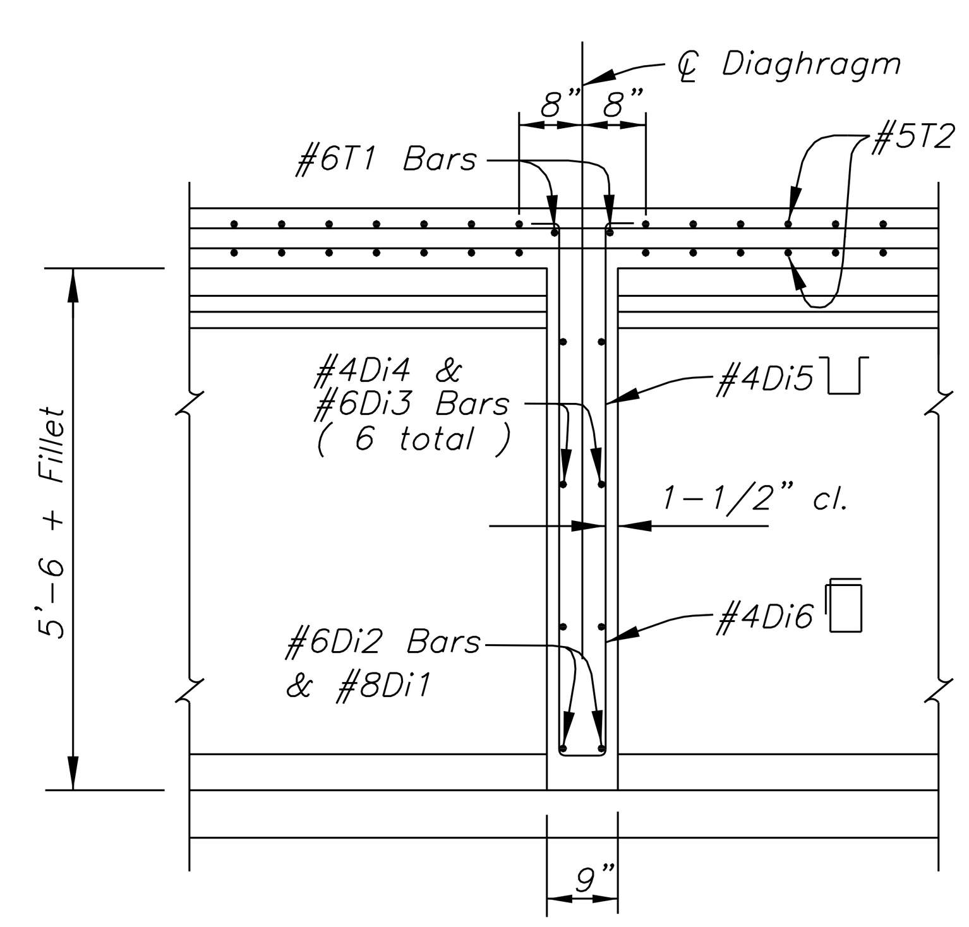
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE
SPAN 1 AND SPAN 4 DETAILS

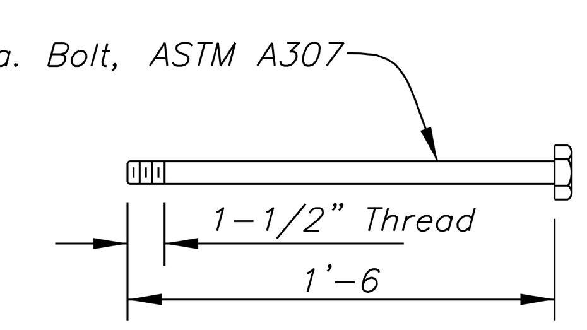
Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, ldh, dc, rsh	Date: 05/17/14
Revised by: - -	Date: - -
File Name: 13_BIAdck1	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-14	63

DECK - SPAN 2
(SPAN 3 - OPPOSITE HAND)
NTS



SECTION A-A
(Typical at all Intermediate Diaphragms)



DIAPHRAGM ANCHOR BOLT DETAIL
(36 REQUIRED)

DECK NOTES

Span #2 reinforcing layout shown, Span #3 reinforcing layout is mirrored about midpoint of bridge.

Numbers at ends of bars indicate distance in feet and inches from ℄ pier to end of the longitudinal bars. Unless otherwise shown, #5 bars, as shown are spliced on at these points.

All the reinforment bars in the deck slab are epoxy coated.

The #5 reinforcement bar splice length = 39"

The #10 reinforcement bar splice length = 123"

Mirror longitudinal deck steel about bridge centerline

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

RIO PUERCO BRIDGE
SPAN 2 AND SPAN 3 - DETAILS

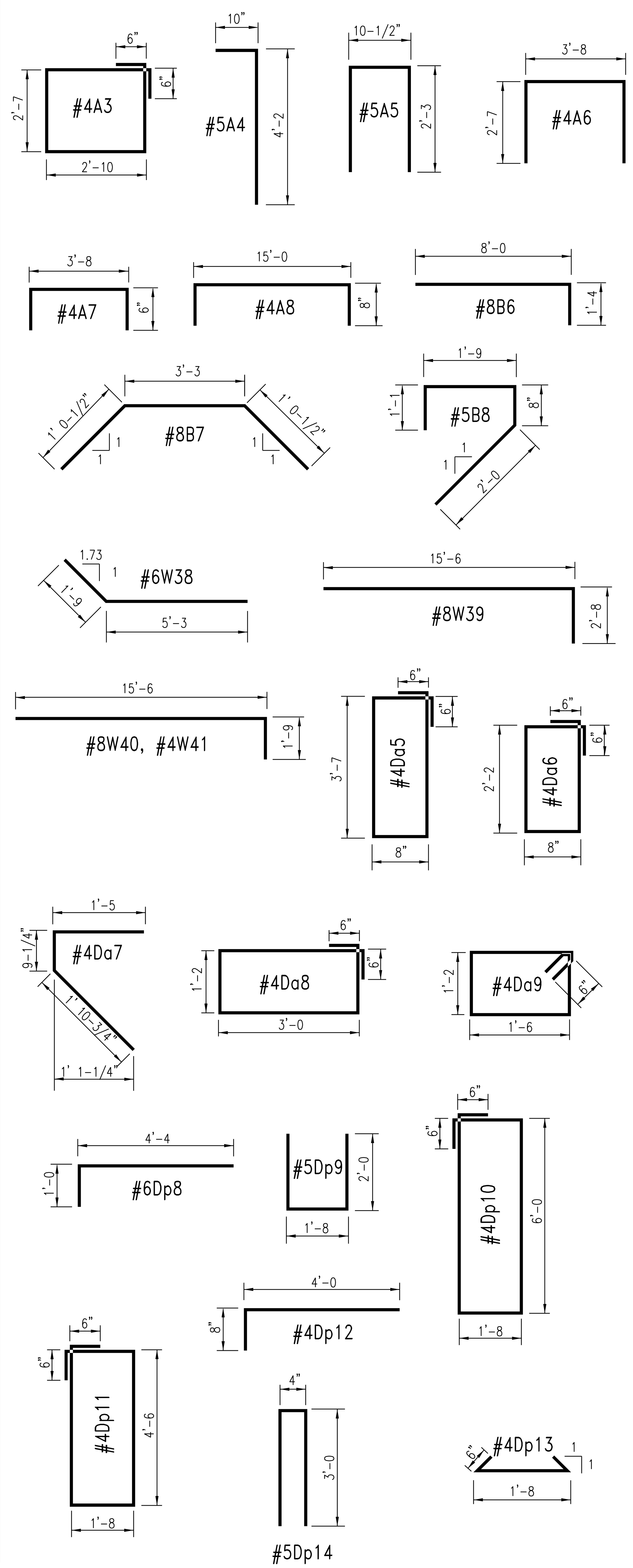
Designed by: BUREAU OF RECLAMATION
Drawn by: BOR, dc, rsh Date: 05/17/14
Revised by: - - Date: - -
File Name: 14_BIAdck2

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-15	63

LOCATION	STRAIGHT BARS MARK	QTY.	SIZE	LENGTH	BENT BARS MARK	QTY.	SIZE	LENGTH	SPACING
ABUTMENT CAP (2)									
Cap, Top & Bottom, Transversal	10A1	40	10	44'-8"					As Shown
Cap, Sides, Transversal	4A2	12	4	44'-8"					As Shown
Cap, Abutment Seat					4A3	272	4	11'-10"	6"
Shear Cap, Longitudinal					5A4	24	5	5'-0"	As Shown
Shear Cap					5A5	84	5	5'-5"	As Shown
Cap, Over Drilled Shaft					4A6	24	4	8'-10"	As Shown
Cap, Over Center Seat					4A7	30	4	4'-8"	As Shown
Cap, Over Center Seat					4A8	12	4	16'-4"	As Shown
ABUTMENT BACKWALL (2)									
Backwall, Horizontal, Top	* 6B1	4	6	44'-8"					
Backwall, Horizontal, Bottom	4B2	28	4	44'-8"					
Backwall, Vertical	* 7B3	204	7	9'-10"					
Approach Slab Seat, Dowel	8B4	82	8	1'-6"					
Ends, Vertical	4B5	16	4	9'-10"					As Shown
Backwall, over sidewalk ends					8B6	24	8	9'-4"	As Shown
Backwall to Wingwall, Fillet					8B7	44	8	5'-4"	As Shown
Approach Slab Seat					5B8	102	5	5'-6"	As Shown
ABUTMENT WINGWALLS (2)									
Wingwall, Horizontal	8W1	4	8	19'-0"					As Shown
Wingwall, Horizontal	8W2	4	8	18'-2"					As Shown
Wingwall, Horizontal	8W3	4	8	17'-0"					As Shown
Wingwall, Horizontal	8W4	4	8	15'-11"					As Shown
Wingwall, Horizontal	8W5	4	8	14'-9"					As Shown
Wingwall, Horizontal	8W6	4	8	13'-8"					As Shown
Wingwall, Horizontal	8W7	4	8	12'-6"					As Shown
Wingwall, Horizontal	8W8	4	8	11'-5"					As Shown
Wingwall, Horizontal	8W9	4	8	10'-3"					As Shown
Wingwall, Horizontal	8W10	4	8	9'-2"					As Shown
Wingwall, Horizontal	8W11	4	8	8'-0"					As Shown
Wingwall, Horizontal	8W12	4	8	6'-11"					As Shown
Wingwall, Horizontal	8W13	4	8	5'-9"					As Shown
Wingwall, Horizontal	4W14	4	4	19'-0"					As Shown
Wingwall, Horizontal	4W15	4	4	17'-0"					As Shown
Wingwall, Horizontal	4W16	4	4	14'-9"					As Shown
Wingwall, Horizontal	4W17	4	4	12'-6"					As Shown
Wingwall, Horizontal	4W18	4	4	10'-3"					As Shown
Wingwall, Horizontal	4W19	4	4	8'-0"					As Shown
Wingwall, Horizontal	4W20	4	4	5'-9"					As Shown
Wingwall, Vertical	4W21	16	4	9'-9"					As Shown
Wingwall, Vertical	4W22	8	4	9'-2"					As Shown
Wingwall, Vertical	4W23	8	4	8'-7"					As Shown
Wingwall, Vertical	4W24	8	4	8'-0"					As Shown
Wingwall, Vertical	4W25	8	4	7'-5"					As Shown
Wingwall, Vertical	4W26	8	4	6'-10"					As Shown
Wingwall, Vertical	4W27	8	4	6'-3"					As Shown
Wingwall, Vertical	4W28	8	4	5'-8"					As Shown
Wingwall, Vertical	4W29	8	4	5'-0"					As Shown
Wingwall, Vertical	4W30	8	4	4'-5"					As Shown
Wingwall, Vertical	4W31	8	4	3'-10"					As Shown
Wingwall, Vertical	4W32	8	4	3'-3"					As Shown
Wingwall, Vertical	4W33	8	4	2'-8"					As Shown
Wingwall, Vertical	4W34	8	4	2'-0"					As Shown
Wingwall, Vertical	4W35	8	4	1'-8"					As Shown
Wingwall, Edge bars (2)	6W36	8	6	16'-0"					As Shown
Wingwall, abutment	4W37	16	4	8'-4"					As Shown
Wingwall, Bottom (2)					6W38	8	6	7'-0"	As Shown
Wingwall, Longitudinal, Top					8W39	8	8	18'-2"	Tie w/ W36
Wingwall, Longitudinal					8W40	4	8	17'-3"	FF
Wingwall, Longitudinal					4W41	4	4	17'-3"	NF

BENDING DIAGRAMS

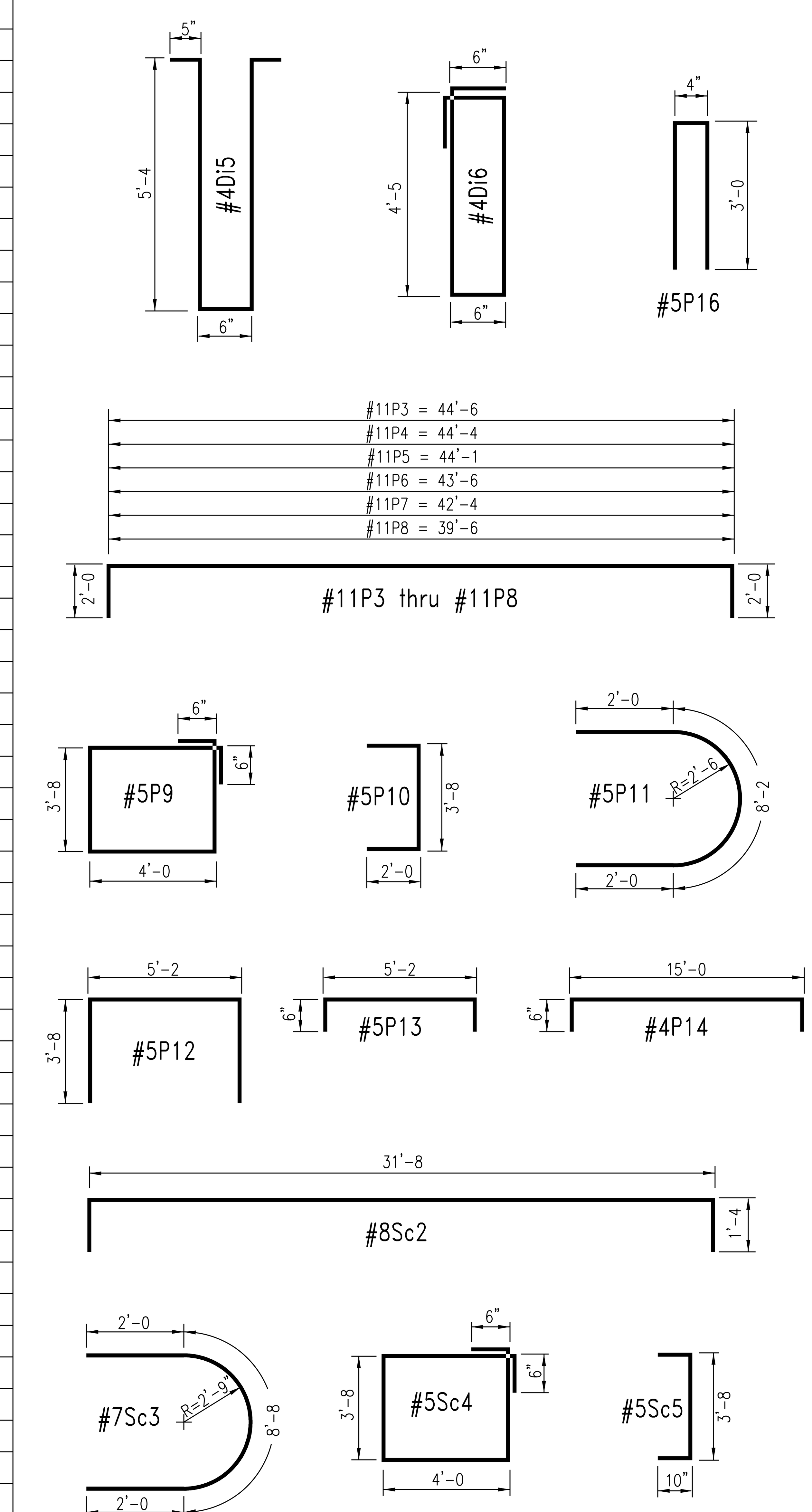
ALL DIMENSIONS ARE OUT TO OUT



LOCATION	STRAIGHT BARS MARK	QTY.	SIZE	LENGTH	BENT BARS MARK	QTY.	SIZE	LENGTH	SPACING
DIAPHRAGM (Abutment 1&2)									
Dowel thru inside beams, horiz.	* 8Da1	8	8	5'-0"					As Shown
Between beams, bottom, horiz.	* 6Da2	20	6	6'-10"					As Shown
Between beams, horiz.	* 4Da3	40	4	6'-10"					As Shown
Outside beams, horiz.	* 6Da4	12	6	2'-9"					As Shown
Inside – between beams, Vertical					* 4Da5	50	4	9'-6"	As Shown
Inside – Between beams, Vertical					* 4Da6	20	4	6'-8"	As Shown
Outside – Vertical					* 4Da7	50	4	4'-0"	As Shown
Outside – Vertical					* 4Da8	8	4	9'-4"	As Shown
Outside – Vertical					* 4Da9	8	4	6'-4"	As Shown
DIAPHRAGM (Pier) 3									
Between beam ends	* 6Dp1	6	6	42'-0"					As Shown
Inside beams, dowel, horizintal	* 6Dp2	24	6	5'-8"					As Shown
Between beams, bottom	* 6Dp3	30	6	5'-4"					As Shown
Between beams, horizontal	* 4Dp4	80	4	6'-4"					As Shown
Inside Beams, dowel, horizontal	* 4Dp5	96	4	6'-0"					As Shown
Between beams, horizontal	* 4Dp6	30	4	5'-9"					As Shown
Restrainer, between beam ends	* 11Dp7	30	11	1'-6"					As Shown
Inside beams, dowel, horizontal					* 6Dp8	12	6	5'-4"	As Shown
Between beams, vertical					* 5Dp9	165	5	5'-8"	As Shown
Between beams, vertical					* 4Dp10	105	4	16'-4"	As Shown
Next to beams, vertical					* 4Dp11	66	4	13'-4"	As Shown
End tie-bars, horizontal					* 4Dp12	24	4	4'-8"	As Shown
Tie-bars					* 4Dp13	177	4	2'-8"	As Shown
U-bars, seat					* 5Dp14	330	5	6'-4"	As Shown
DIAPHRAGM (Intermediate) 4									
Between Beams, Bottom	* 8Di1	16	8	6'-0"					As Shown
Between Beams, Top	* 6Di2	40	6	7'-0"					As Shown
Between Beams, Middle	* 6Di3	48	6	6'-0"					As Shown
Between Beams, Middle	* 4Di4	120	4	7'-0"					As Shown
U-bars, Inside					* 4Di5	100	4	12'-0"	As Shown
Tie-bars, Inside					* 4Di6	40	4	10'-10"	As Shown
PIER CAP (3)									
Transverse, bottom	11P1	33	11	40'-8"					As Shown
Transverse, Sides	5P2	36	5	40'-8"					As Shown
Tranvsverse, Top					11P3	3	11	48'-6"	No Splice
Tranvsverse, Top					11P4	6	11	48'-4"	No Splice
Tranvsverse, Top					11P5	6	11	48'-1"	No Splice
Tranvsverse, Top					11P6	6	11	47'-6"	No Splice
Tranvsverse, Top					11P7	6	11	46'-7"	No Splice
Tranvsverse, Top					11P8	6	11	43'-6"	No Splice
Seat, Vertical					5P9	312	5	16'-4"	As Shown
Tie bar, Ends, Vertical					5P10	30	5	7'-8"	As Shown
Round End bars, Horizontal					5P11	48	5	12'-2"	As Shown
Over Column, Vertical					5P12	36	5	12'-6"	As Shown
Top of seat, Tie bars, Vertical					5P13	45	5	6'-2"	As Shown
Tie bars, Middle, Transverse					4P14	18	4	16'-0"	As Shown
Restrainer tie bars	11P15	30	11	1'-6"					As Shown
U-bars, seat					5P16	165	5	6'-4"	As Shown
Shear Key bars	6P17	90	6	5'-4"					
STRUTS (1)									
Transverse, Sides	7Sc1	20	7	30'-8"					As Shown
Transverse, Top & bottom					8Sc2	56	8	34'-4"	As Shown
Horizontal, Ends					7Sc3	28	7	12'-8"	As Shown
Seat, Vertical					5Sc4	88	5	16'-4"	As Shown
Tie bars, middle & ends, vertical					5Sc5	116	5	5'-4"	As Shown

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT



* EPOXY COATED REINFORCING BARS

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

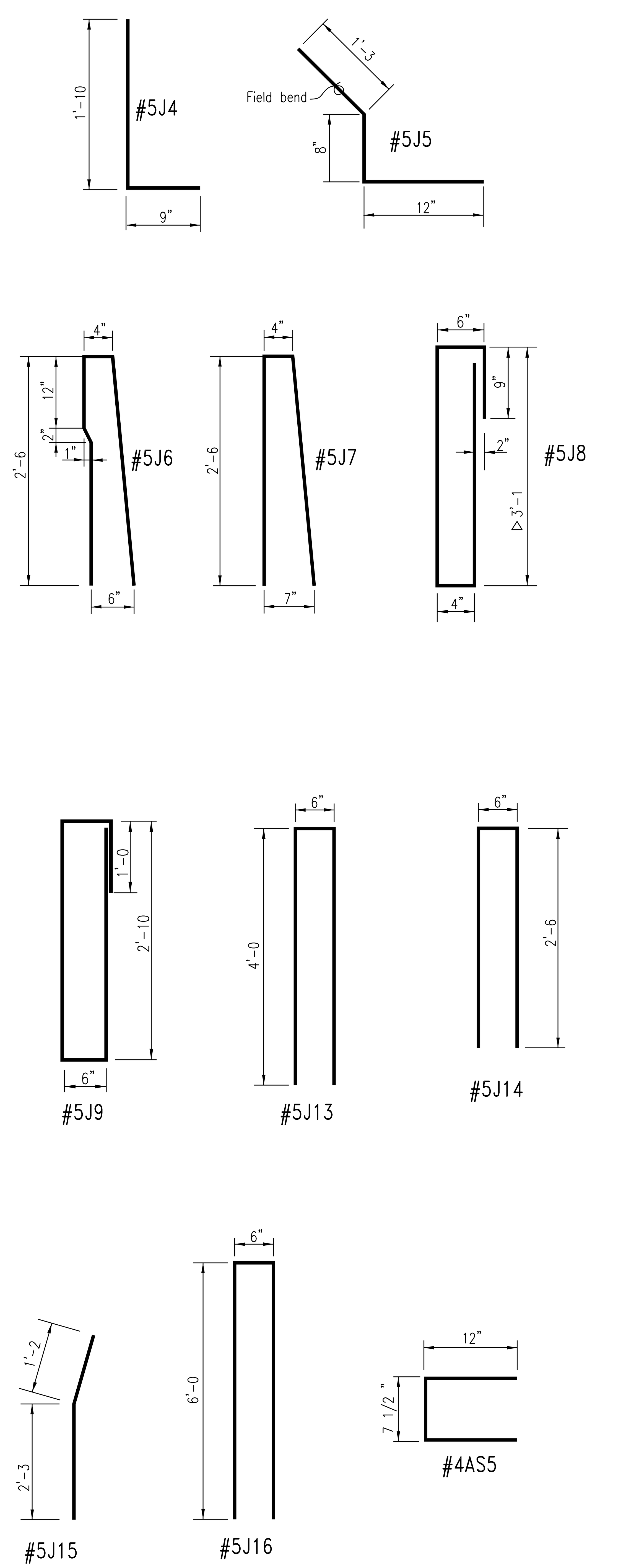
RIO PUERCO BRIDGE
REINFORCING STEEL SCHEDULE
SHEET 1 of 3

Designed by: BUREAU OF RECLAMATION
Drawn by: BOR, dc, rsh Date: 01/17/14
Revised by: – – Date: – –
File Name: 15_BIArnf1

LOCATION	STRAIGHT BARS				BENT BARS				SPACING
	MARK	QTY.	SIZE	LENGTH	MARK	QTY.	SIZE	LENGTH	
BARRIER / PARAPET WALLS									
Horizontal bars	* 5J1	576	5	19'-6"					As Shown
Horizontal bars	* 5J2	48	5	10'-0"					As Shown
Horizontal bars	* 5J3	48	5	9'-6"					As Shown
Vertical bars					* 5J4	△1042	5	2'-7"	As Shown
Vertical bars					* 5J5	△1042	5	2'-11"	As Shown
Vertical, tie J4 & J5					* 5J6	△1000	5	5'-4"	As Shown
Vertical bars					* 5J7	△ 32	5	5'-4"	As Shown
Vertical, Sidewalk					* 5J8	△ 500	5	7'-9"	As Shown
Vertical, Sidewalk					* 5J9	△ 4	5	7'-8"	As Shown
Horizontal bars	* 5J10	48	5	15'-6"					As Shown
Vertical bars	* 5J11	26	5	3'-0"					As Shown
Vertical bars	* 5J12	42	5	2'-9"					As Shown
Vertical, Transition					* 5J13	△ 38	5	8'-6"	As Shown
Vertical, Transition					* 5J14	52	5	5'-6"	As Shown
Vertical, Transition					* 5J15	16	5	3'-5"	As Shown
Horizontal, Transition					* 5J16	24	5	12'-6"	As Shown
APPROACH SLABS									
Bottom Face, Transverse	* 5As1	30	5	42'-10"					1'-0"
Top Face, Transverse	* 4As2	30	4	42'-10"					1'-0"
Bottom Face, Longitudinal	* 7As3	172	7	14'-11"					0'-6"
Top Face, Longitudinal	* 4As4	86	4	14'-11"					1'-0"
Edge					* 4As5	344	4	2'-8"	As Shown
BRIDGE DECK									
Deck, Longitudinal,Over Beam	* 10S1	120	10	60'					As Shown
Deck, Longitudinal,Over Beam	* 10S2	24	10	18'					As Shown
Deck, Longitudinal	* 5S3	573	5	60'					As Shown
Deck, Longitudinal	* 5S4	40	5	55'					As Shown
Deck, Longitudinal	* 5S5	84	5	48'					As Shown
Deck, Longitudinal	* 5S6	124	5	40'					As Shown
Deck, Longitudinal	* 5S7	12	5	36					As Shown
Deck, Longitudinal	* 5S8	20	5	34'					As Shown
Deck, Longitudinal	* 5S9	12	5	30'					As Shown
Deck, Longitudinal	* 5S10	20	5	24'					As Shown
Deck, Longitudinal	* 5S11	20	5	22'					As Shown
Deck, Longitudinal	* 5S12	12	5	18'					As Shown
Deck, Longitudinal	* 5S13	51	5	11'					As Shown
Deck, Top Face	* 5S14	80	5	5'					As Shown
Deck, Transverse, Over Pier	* 6T1	32	6	44'-8"					As Shown
Deck, Transverse	* 5T2	2032	5	44'-8"					As Shown

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT

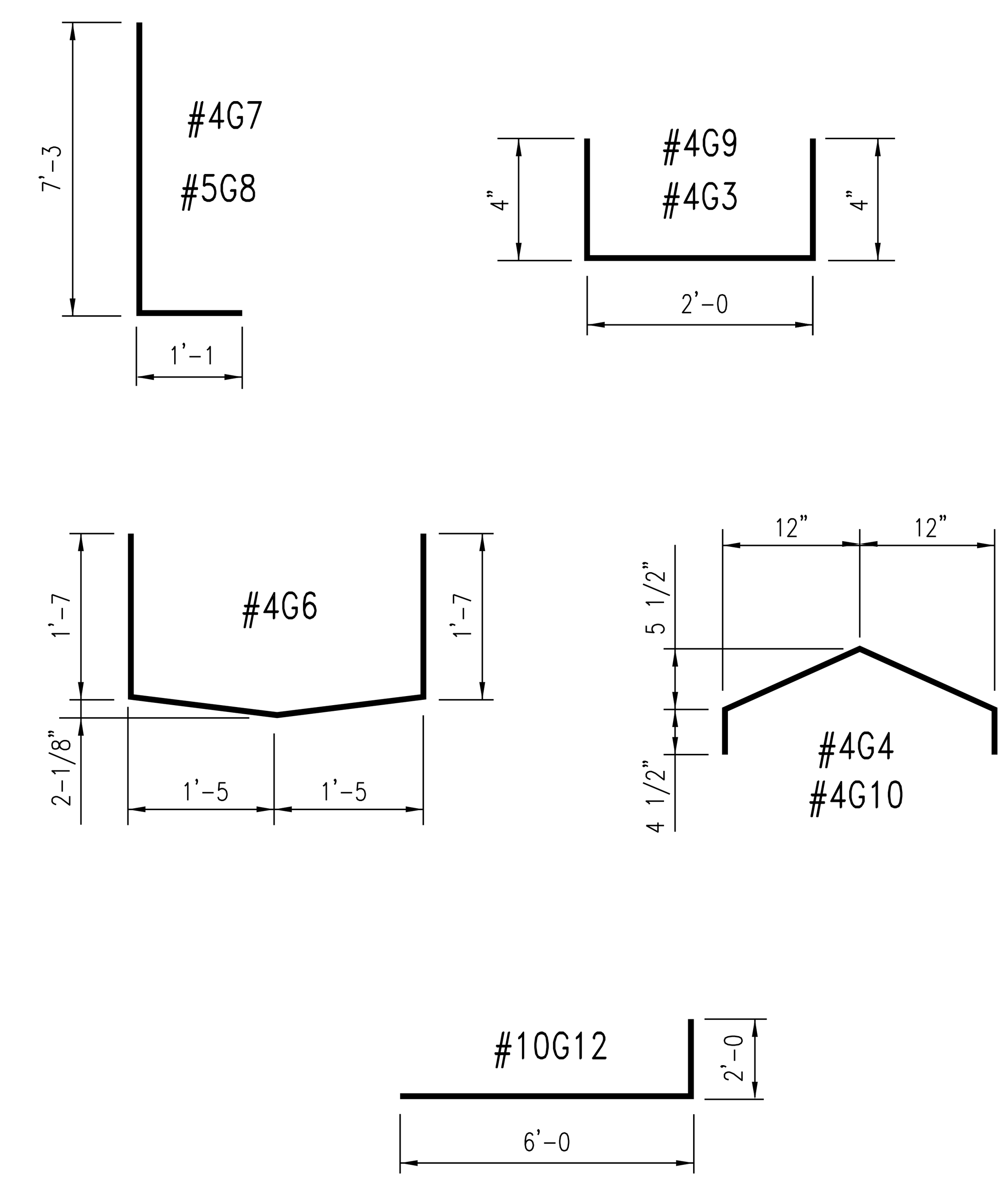


LOCATION	STRAIGHT BARS				BENT BARS				SPACING
	MARK	QTY.	SIZE	LENGTH	MARK	QTY.	SIZE	LENGTH	
PRESTRESSED BEAMS: (Quantities shown are for one beam only. Cost of furnishing, fabricating and installing									
reinforcing steel for beams is considered incidental to Item 55301-2000 and 55301-2010.									
CONVENTIONAL REINFORCING STEEL – G1 THRU G4									
Horizontal	7G1	12	7	44'-9"					As Shown
Stirrups @ Top	4G2	118	4	3'-4"					As Shown
Stirrups @ Bottom up					4G3	118	4	2'-8"	As Shown
Stirrups @ Bottom down					4G4	118	4	2'-10"	As Shown
EPOXY COATED REINFORCING STEEL – G5 THRU G12									
Stirrups @ Top	4G5	32	4	3'-4"					As Shown
Stirrups @ Top up					4G6	150	4	6'-0"	As Shown
Stirrups @ Middle					4G7	276	4	8'-4"	As Shown
Stirrups @ Ends					5G8	24	5	8'-4"	As Shown
Stirrups @ Bottom up					4G9	32	4	2'-8"	As Shown
Stirrups @ Bottom down					4G10	32	4	2'-10"	As Shown
Horizontals @ Ends	4G11	44	4	6'-0"					As Shown
Pier Hooks					10G12	12	10	8'-0"	As Shown

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-16	63

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT



△ – Revision 04/09/2015; Corrected quantities. Corrected length.

REVISED 04/09/2015

* EPOXY COATED REINFORCING BARS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

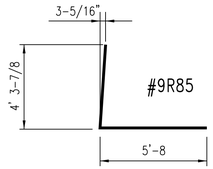
RIO PUERCO BRIDGE
REINFORCING STEEL SCHEDULE
SHEET 2 of 3

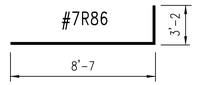
Designed by: BUREAU OF RECLAMATION
Drawn by: BOR, dc, rsh, cdh Date: 01/17/14
Revised by: cdh Date: 04/09/2015
File Name: 16_BIArnf2

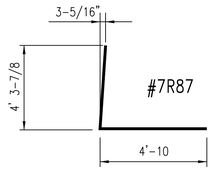
K:\CURRENT PROJECTS\NIXO\N2007(1-1)_ Navajo Bridge_032494\Design_BIA_2001-02-28\CAD 073002\Bridge_Plan Drawings PRELIM 051109\16_BIArnf2_2015-04-09.dgn

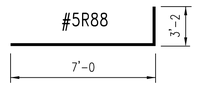
LOCATION	STRAIGHT BARS MARK	QTY.	SIZE	LENGTH	BENT BARS MARK	QTY.	SIZE	LENGTH	SPACING
RETAINING WALLS									
Horizontal stem	6R1	2	6	3'-4"					As Shown
Horizontal stem	6R2	2	6	6'-9"					As Shown
Horizontal stem	6R3	2	6	10'-1"					As Shown
Horizontal stem	6R4	2	6	13'-6"					As Shown
Horizontal stem	6R5	2	6	16'-10"					As Shown
Horizontal stem	6R6	2	6	20'-2"					As Shown
Horizontal stem	6R7	2	6	23'-7"					As Shown
Horizontal stem	6R8	2	6	26'-11"					As Shown
Horizontal stem	6R9	2	6	30'-3"					As Shown
Horizontal stem	6R10	2	6	33'-8"					As Shown
Horizontal Slab	6R11	60	6	36'-6"					As Shown
Horizontal Slab	6R12	76	6	22'-6"					1'-0"
Horizontal stem	6R13	2	6	38'-1"					1'-0"
Vertical stem	8R14	1	8	19'-11"					1'-0"
Vertical stem	8R15	3	8	19'-1"					1'-0"
Vertical stem	8R16	3	8	18'-2"					1'-0"
Vertical stem	8R17	3	8	17'-3"					1'-0"
Vertical stem	8R18	3	8	16'-5"					1'-0"
Vertical stem	8R19	3	8	15'-7"					1'-0"
Vertical stem	8R20	3	8	14'-8"					1'-0"
Vertical stem	8R21	3	8	13'-10"					1'-0"
Vertical stem	8R22	3	8	12'-11"					1'-0"
Vertical stem	8R23	3	8	12'-0"					1'-0"
Vertical stem	8R24	3	8	11'-2"					1'-0"
Vertical stem	8R25	3	8	10'-3"					1'-0"
Vertical stem	8R26	3	8	9'-5"					1'-0"
Vertical stem	8R27	1	8	9'-1"					1'-0"
Vertical stem	8R28	24	8	12'-9"					1'-0"
Vertical stem	6R29	1	6	16'-11"					1'-0"
Vertical stem	6R30	3	6	16'-1"					1'-0"
Vertical stem	6R31	3	6	15'-2"					1'-0"
Vertical stem	6R32	3	6	14'-4"					1'-0"
Vertical stem	6R33	3	6	13'-5"					1'-0"
Vertical stem	6R34	3	6	12'-6"					1'-0"
Vertical stem	6R35	3	6	11'-8"					1'-0"
Vertical stem	6R36	3	6	10'-10"					1'-0"
Vertical stem	6R37	3	6	9'-11"					1'-0"
Vertical stem	6R38	3	6	9'-0"					1'-0"
Vertical stem	6R39	3	6	8'-2"					1'-0"
Vertical stem	6R40	3	6	7'-3"					1'-0"
Vertical stem	6R41	2	6	6'-5"					1'-0"
Vertical stem	6R42	1	6	6'-1"					1'-0"
Horizontal Slab	6R43	188	6	30'-6"					1'-0"
Horizontal Slab	8R44	64	8	22'-6"					1'-0"
Vertical stem	8R45	11	8	20'-3"					1'-0"
Vertical stem	8R46	11	8	20'-1"					1'-0"
Vertical stem	6R47	10	6	20'-0"					1'-0"
Vertical stem	8R48	31	8	12'-9"					1'-0"
Vertical stem	6R49	11	6	17'-3"					1'-0"
Vertical stem	6R50	11	6	17'-2"					1'-0"
Vertical stem	6R51	10	6	17'-0"					1'-0"
Vertical stem	8R52	11	8	17'-11"					1'-0"
Vertical stem	8R53	11	8	17'-10"					1'-0"
Vertical stem	8R54	10	8	17'-8"					1'-0"
Vertical stem	7R55	31	7	11'-7"					1'-0"
Horizontal Slab	6R56	64	6	19'-4"					1'-0"
Vertical stem	6R57	11	6	14'-11"					1'-0"
Vertical stem	6R58	11	6	14'-10"					1'-0"
Vertical stem	6R59	10	6	14'-8"					1'-0"
Horizontal Slab	6R60	34	6	32'-5"				Field Cut	1'-0"
Horizontal Slab	6R61	62	6	16'-2"				Field Cut	1'-0"
Vertical stem	6R62	11	6	15'-7"					1'-0"
Vertical stem	6R63	11	6	15'-6"					1'-0"

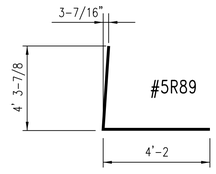
BENDING DIAGRAMS
ALL DIMENSIONS ARE OUT TO OUT

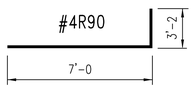


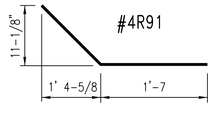








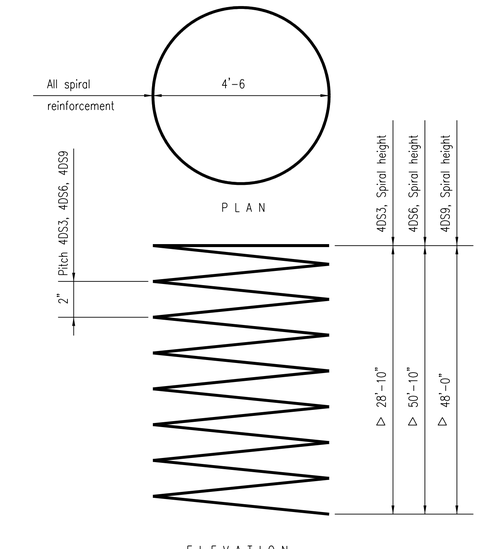




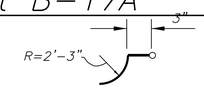
LOCATION	STRAIGHT BARS MARK	QTY.	SIZE	LENGTH	BENT BARS MARK	QTY.	SIZE	LENGTH	SPACING
RETAINING WALLS									
Vertical stem	6R64	10	6	15'-4"					1'-0"
Vertical stem	6R65	31	6	10'-6"					1'-0"
Vertical stem	6R66	31	6	12'-4"					1'-0"
Horizontal stem	6R67	26	6	28'-1"					1'-0"
Horizontal stem	6R68	2	6	28'-3"					1'-0"
Vertical stem	6R69	28	6	10'-6"					1'-0"
Vertical stem	6R70	6	6	15'-5"				Field Cut	1'-0"
Vertical stem	6R71	6	6	15'-0"				Field Cut	1'-0"
Vertical stem	6R72	6	6	14'-7"				Field Cut	1'-0"
Vertical stem	6R73	6	6	14'-2"				Field Cut	1'-0"
Vertical stem	6R74	5	6	13'-9"				Field Cut	1'-0"
Vertical stem	6R75	6	6	12'-5"					1'-0"
Vertical stem	6R76	6	6	12'-0"					1'-0"
Vertical stem	6R77	6	6	11'-6"					1'-0"
Vertical stem	6R78	6	6	11'-1"					1'-0"
Vertical stem	6R79	5	6	10'-9"					1'-0"
Horizontal slab	6R80	54	6	16'-2"					1'-0"
Horizontal slab	6R81	4	6	16'-2"				Field Cut	1'-0"
Horizontal slab	6R82	12	6	30'-1"				Field Cut	1'-0"
Horizontal slab	6R83	10	6	28'-8"					1'-0"
Horizontal slab	6R84	12	6	27'-0"					1'-0"
Vertical stem					9R85	68	9	10'-0"	1'-0"
Vertical stem					7R86	68	7	11'-9"	1'-0"
Vertical stem					7R87	31	7	9'-2"	1'-0"
Vertical stem					5R88	31	5	10'-2"	1'-0"
Vertical stem					5R89	59	5	8'-6"	1'-0"
Vertical stem					4R90	59	4	10'-2"	1'-0"
Horizontal Scupper Top					4R91	159	4	3'-3"	1'-0"
△ COLUMNS AT PIERS; 5'-0" Diameter (quantities shown are for 3 columns at eaah pier)									
Pier #1 Longitudinal	11DS1	42	11	25'-6"					28 Equal Spaces
Pier #1 Longitudinal	11DS2	42	11	32'-8"					28 Equal Spaces
Pier #1 Spiral					4DS3	3	4	2503'	2" Pitch
Pier #2 Longitudinal	11DS4a	42	11	18'-8"					28 Equal Spaces
Pier #2 Longitudinal	11DS4b	42	11	25'-9"					28 Equal Spaces
Pier #2 Longitudinal	11DS5	84	11	35'-11"					28 Equal Spaces
Pier #2 Spiral					4DS6	3	4	4369'	2" Pitch
Pier #3 Longitudinal	11DS7a	42	11	18'-8"					28 Equal Spaces
Pier #3 Longitudinal	11DS7b	42	11	25'-9"					28 Equal Spaces
Pier #3 Longitudinal	11DS8	84	11	33'-1"					28 Equal Spaces
Pier #3 Spiral					4DS9	3	4	4128'	2" Pitch
Cage Alignment Spacer					*4DS10	300	4	5'-0"	See Details

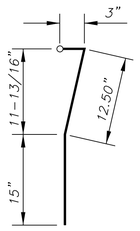
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-17	63

BENDING DIAGRAMS
ALL DIMENSIONS ARE OUT TO OUT



For revisions to Spiral Cage see sht B-17A △





ELEVATION
* 4DS10

△ REVISED: 05/06/2015

* EPOXY COATED REINFORCING BARS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

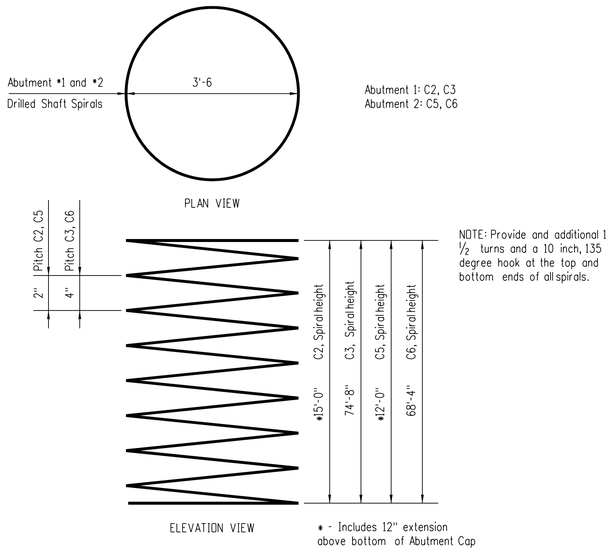
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

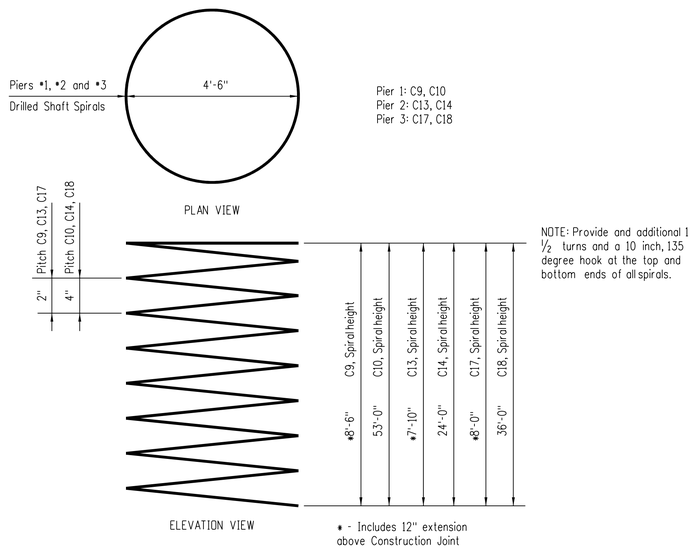
RIO PUERCO BRIDGE
REINFORCING STEEL SCHEDULE
SHEET 3 of 3

Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, rsh, dc	Date: 01/17/14
Revised by: cdh	Date: 05/06/2015
File Name: 17_BIArnf3	

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT





LOCATION	STRAIGHT BARS				BENT BARS				SPACING
	MARK	QTY.	SIZE	LENGTH	MARK	QTY.	SIZE	LENGTH	
ABUTMENTS 1 and 2: 4'-0" diameter Drilled Shafts (DS)									
Abut. 1: vertical bars	C1	60	11	91'-2"					20 equal spaces
Abut. 1: spiral, 2" pitch					C2	3	4	1010'-5"	upper section DS
Abut. 1: spiral, 4" pitch					C3	3	4	2466'-3"	lower section DS
Abut. 2: vertical bars	C4	60	11	81'-9"					20 equal spaces
Abut. 2: spiral, 2" pitch					C5	3	4	814'-10"	upper section DS
Abut. 2: spiral, 4" pitch					C6	3	4	2259'-10"	lower section DS
PIERs 1, 2 and 3: 5'-0" diameter Drilled Shafts (DS)									
Pier 1: vertical bars, short	C7	42	11	66'-0"					alternate with C8
Pier 1: vertical bars, long	C8	42	11	71'-6"					alternate with C7
Pier 1: spiral, 2" pitch					C9	3	4	756'-4"	upper section DS
Pier 1: spiral, 4" pitch					C10	3	4	2269'-1"	lower section DS
Pier 2: vertical bars, short	C11	42	11	36'-4"					alternate with C12
Pier 2: vertical bars, long	C12	42	11	41'-10"					alternate with C11
Pier 2: spiral, 2" pitch					C13	3	4	700'-1"	upper section DS
Pier 2: spiral, 4" pitch					C14	3	4	1050'-6"	lower section DS
Pier 3: vertical bars, short	C15	42	11	48'-6"					alternate with C16
Pier 3: vertical bars, long	C16	42	11	54'-0"					alternate with C15
Pier 3: spiral, 2" pitch					C17	3	4	714'-4"	upper section DS
Pier 3: spiral, 4" pitch					C18	3	4	1554'-8"	lower section DS

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-17A	63

DRILLED SHAFT REINFORCING NOTES:

1. The Contractor shall submit for approval a clearance/alignment detail/device for providing the specified clearance and alignment between the drilled shaft spiral reinforcement and the sides of the drilled shaft hole. Submit for review and approval the Contractor's detail/device prior to ordering/fabricating materials. The clearance/alignment details/device shall not be used until approval in writing from the AO is given. Specified details on Sheet B-18, COLUMN CAGE ALIGNMENT DETAIL shall apply.

2. Provide splices in #11 vertical bars with a minimum lap splice length of 5'-6". Splice locations shall be alternated between adjacent bars with no more than 14 splices in 28 bars at the same elevation. Submit splicing details (lengths of bars to be spliced) for review and approval before fabricating bars.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

N2007(1-1) RIO PUERCO BRIDGE

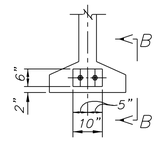
DRILLED SHAFTS – REINFORCING STEEL SCHEDULE

ADDED SHEET

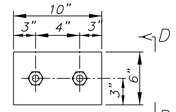
Designed by: BUREAU OF RECLAMATION	
Drawn by: CDH	Date: 09/28/16
Revised by: - -	Date: - -
File Name: 17A Drilled Shaft Rebar Sched	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-18	63

TYPICAL SECTION AT ABUTMENT (B-9)

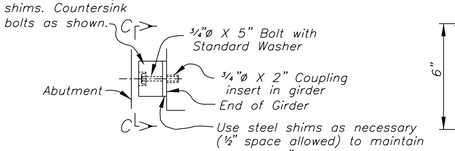


SECTION A-A

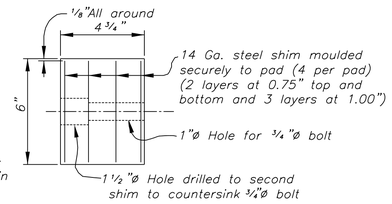


VIEW C-C

6" x 10" x 4¾" Thick elastomeric pad reinforced with 14 ga. steel shims. Countersink bolts as shown.



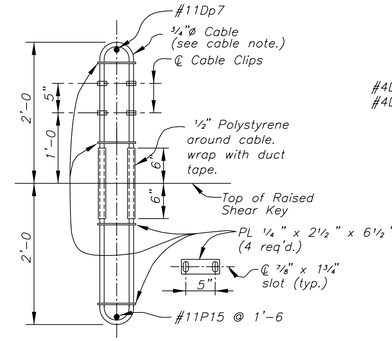
VIEW B-B



VIEW D-D

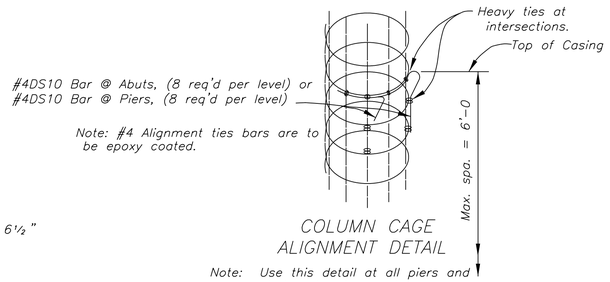
BUMPER PAD DETAILS (B-9)

(No Scale)



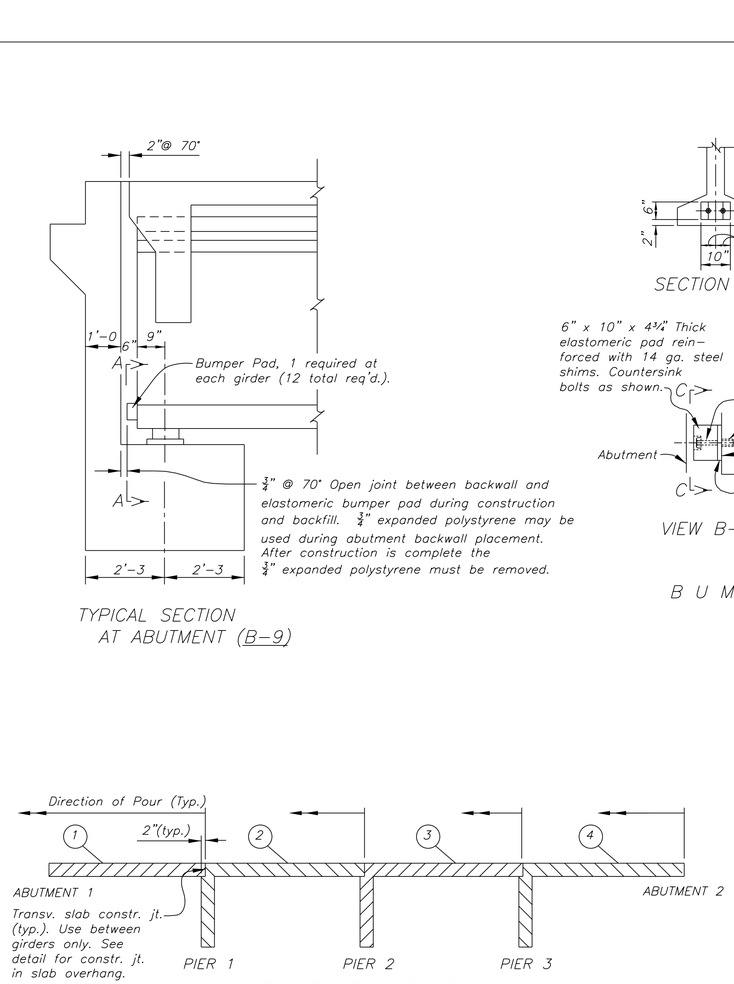
FIXED RESTRAINER DETAIL (B-11)

CABLE NOTE: Restrainer cables shall be ¾"ø min. preformed 6 x 19 galvanized wire rope and shall meet the requirement of AASHTO M30 with a min. breaking strength of 42 kips.



COLUMN CAGE ALIGNMENT DETAIL

Note: Use this detail at all piers and abutments where column cage steel needs to be aligned inside a casing.

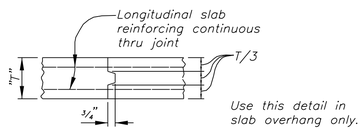


DECK POURING DIAGRAM

(No Scale)

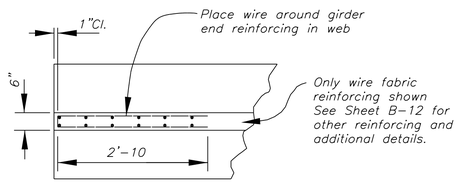
NOTE: Pour end diaphragms and intermediate diaphragms first. Then deck pours shall be made in numerial sequence and in the direction shown. Place pier diaphragms just before deck closures.

The purpose of this deck pouring diagram is to place all deck concrete on both sides of a pier diaphragm before casting the pier diaphragm. The contractor may submit an alternative sequence to the Engineer for approval provided that it accomplishes the same purpose.

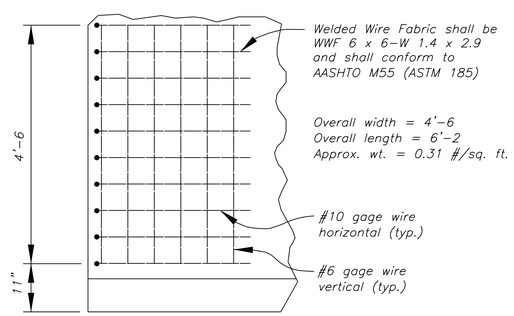


TRANSVERSE SLAB CONSTRUCTION JOINT

(No Scale)

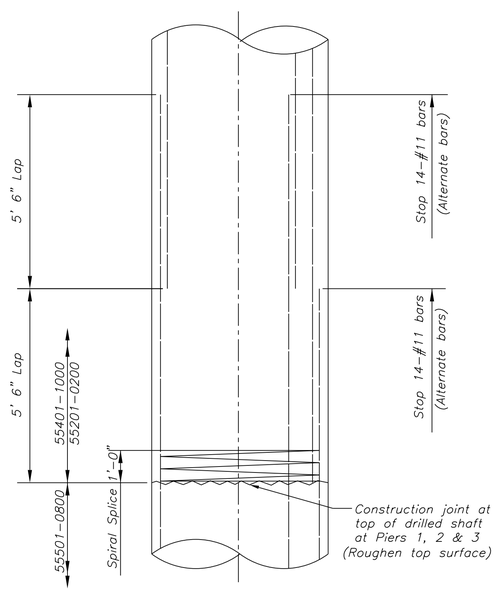


GIRDER END PLAN (B-12)

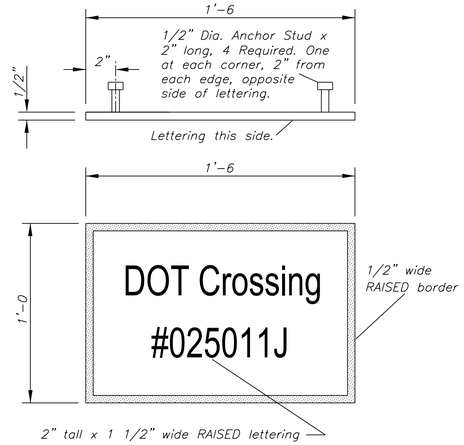


GIRDER END ELEVATION (B-12)

Note: The splice detail shown shall be used at the construction joint at top of drilled shaft for Piers 1, 2 & 3



CONSTRUCTION JOINT DETAIL



DOT CROSSING NUMBER PLAQUE DETAILS

NOTE: DOT Crossing number plaques shall be made of bronze with raised polished lettering and raised polished border conforming to the dimensions shown above. Two (2) bronze plaques are required, one (1) for each end of the bridge. Bronze plaques shall be installed as shown on Sheets B-20 and B-21. Submit shop drawings for bronze plaques for review and approval no later than 45 days prior to fabrication. No ordering of materials or fabrication shall occur before written approval of the shop drawings is obtained by the Contractor. All work for furnishing, fabricating and installing bronze plaques shall be considered an incidental obligation of, and included under, Item 55201-0200, Structural Concrete.

REVISED 04/08/2015

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

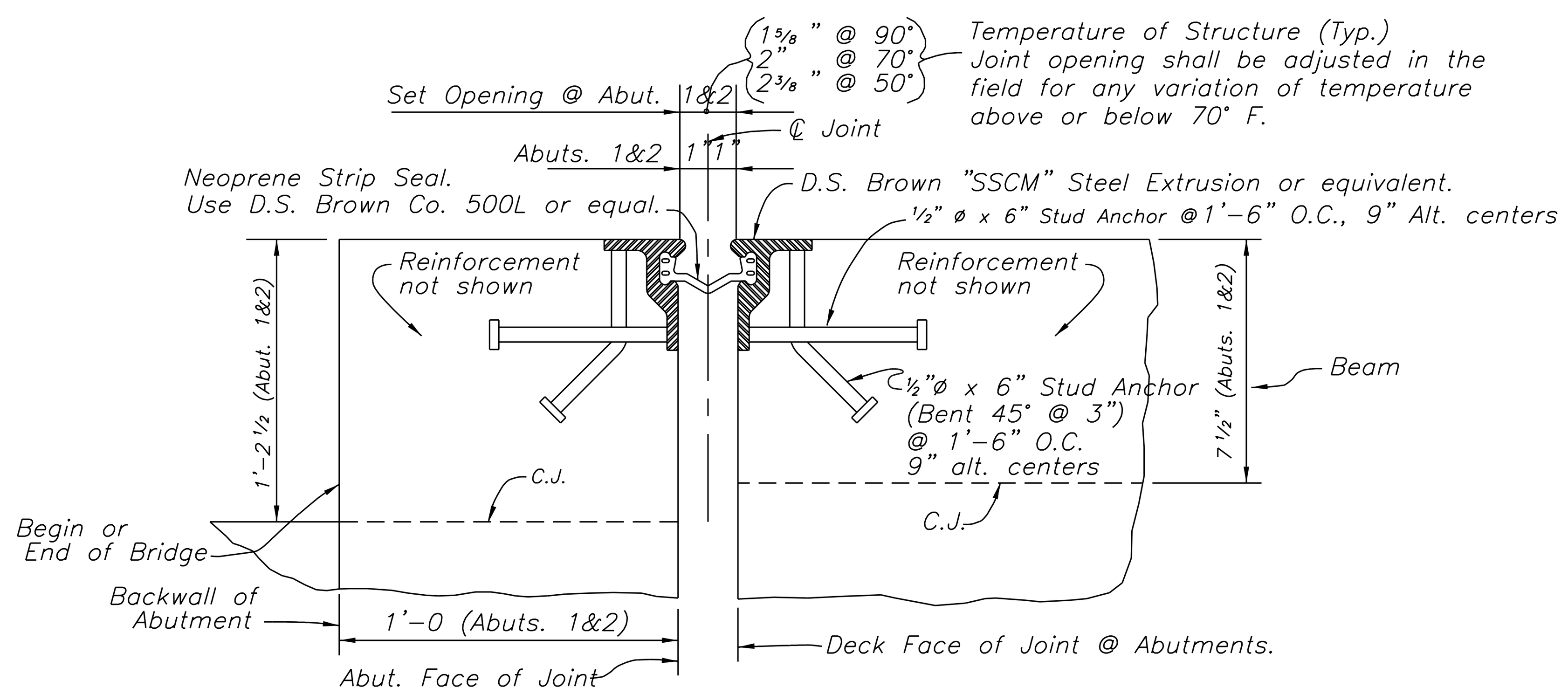
RIO PUERCO BRIDGE

MISCELLANEOUS DETAILS

Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, dc, rsh, cdh	Date: 01/17/14
Revised by: cdh	Date: 04/08/2015
File Name: 18_BIAmisc	

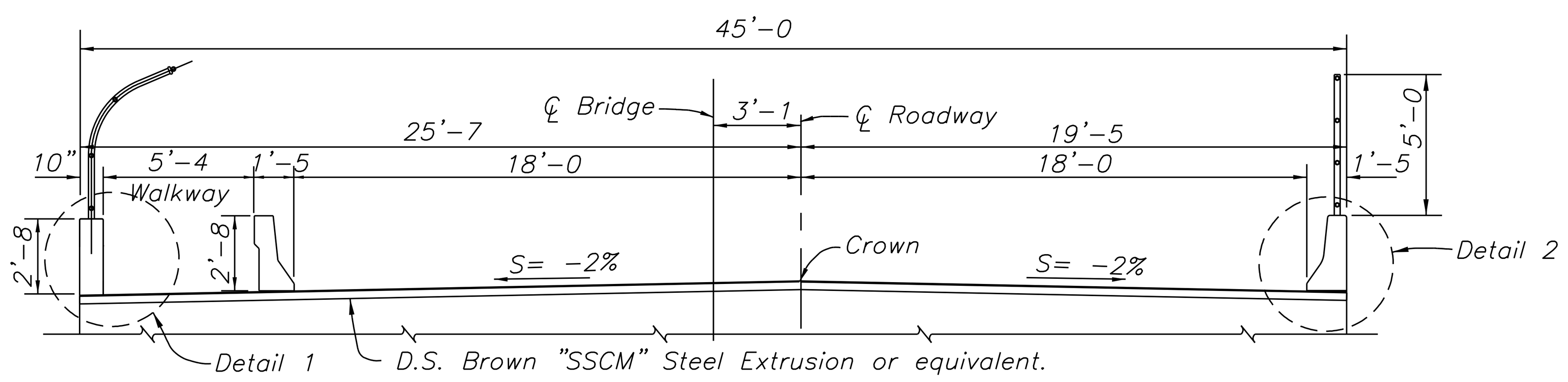
K:\CURRENT PROJECTS\N00\N2007(1-1)_ Navajo Bridge_032494\Design_BIA_2001-02-28\CAD 073002\Bridge_Plan Drawings PRELIM 051109\18_BIAmisc_RvSD_2015-04-08.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-19	63



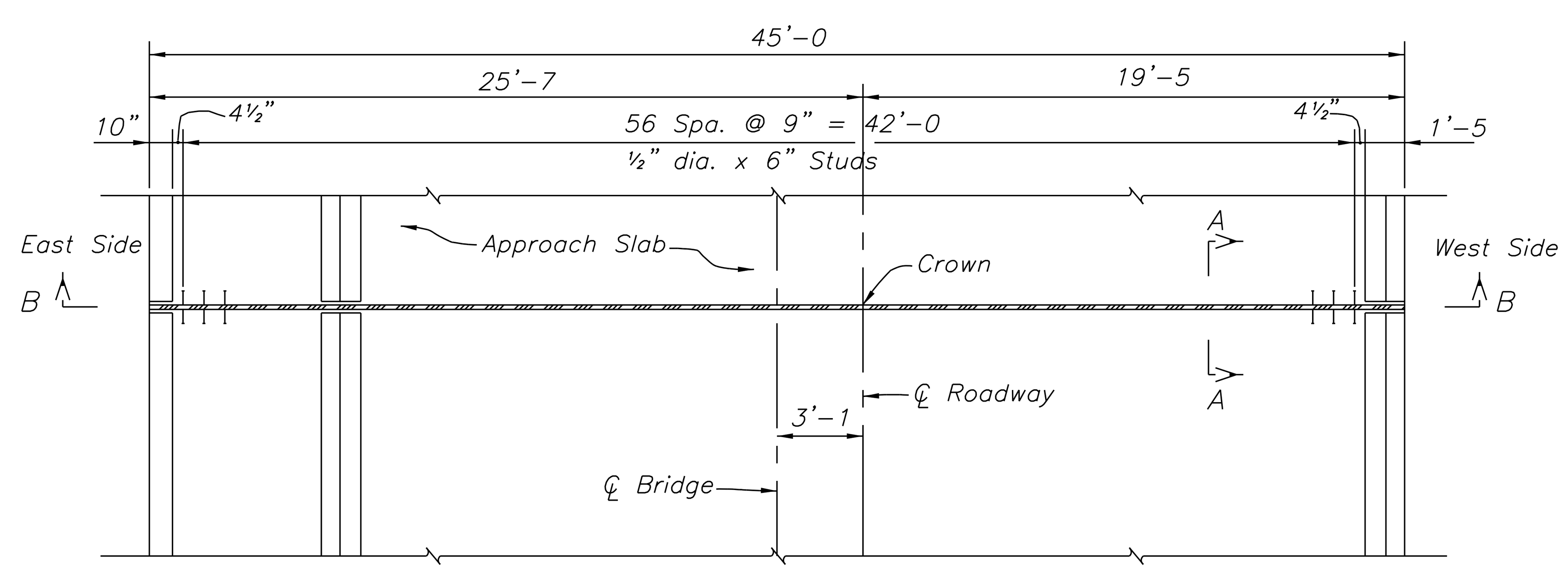
SECTION A-A

N.T.S.



SECTION B-B

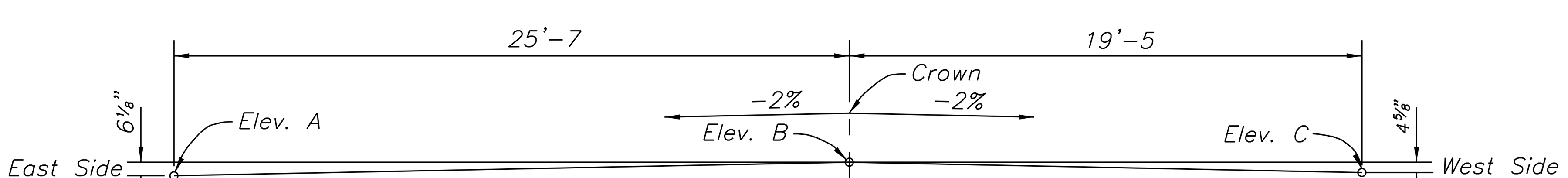
N.T.S.



PLAN

(Abutment #2 shown, Abutment #1 opposite hand)

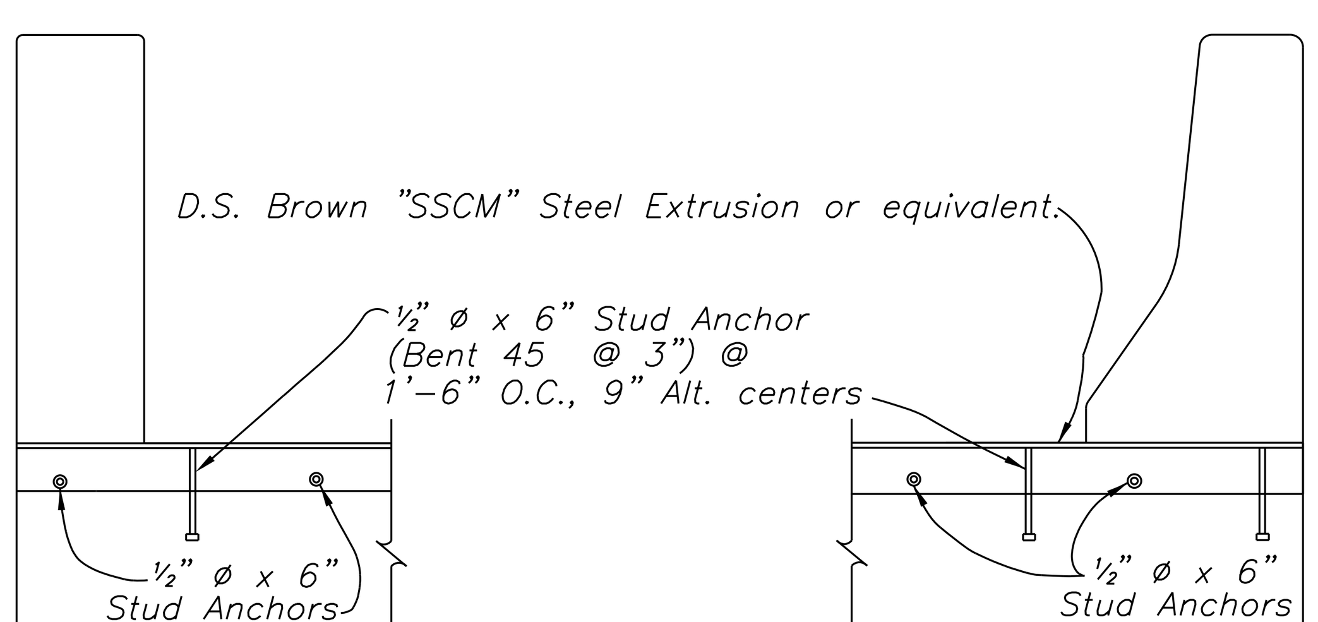
N.T.S.



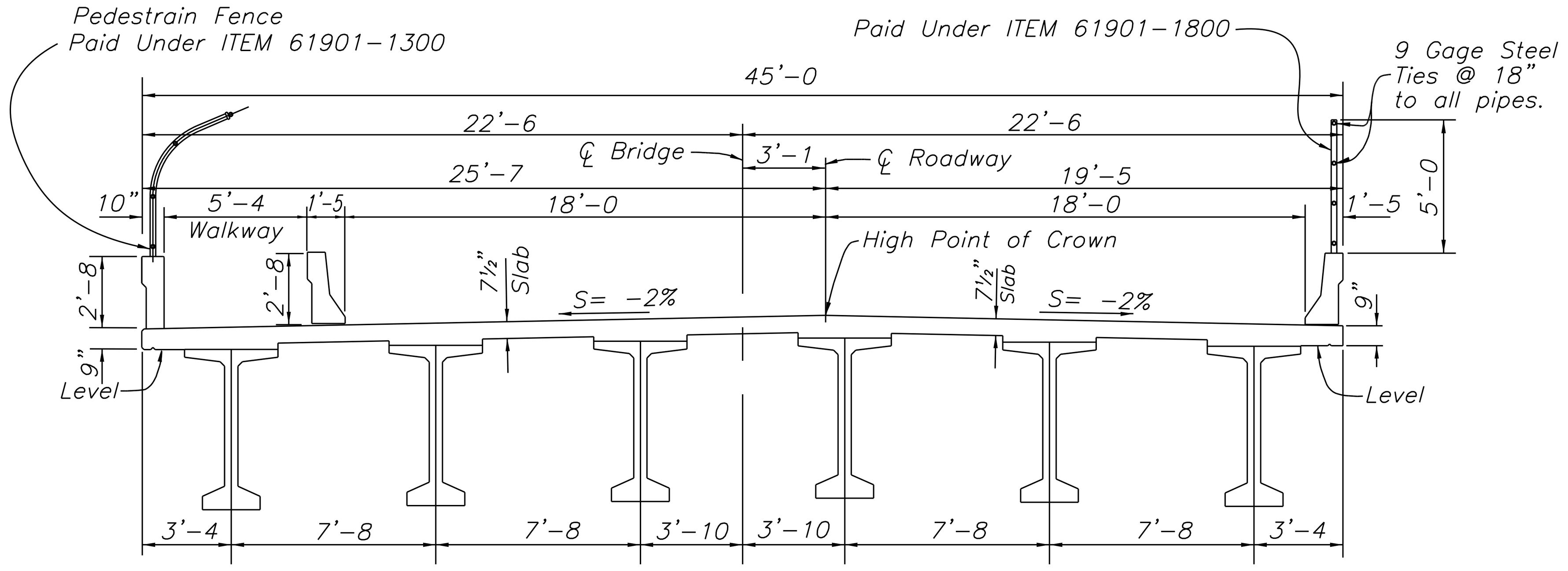
ELEVATION

JOINT	ELEV. A	ELEV. B	ELEV. C
Abut. 1	5668.65	5669.16	5668.77
Abut. 2	5658.22	5658.73	5658.34

Note: Elev. measured at ℄ of joint opening, top of deck.

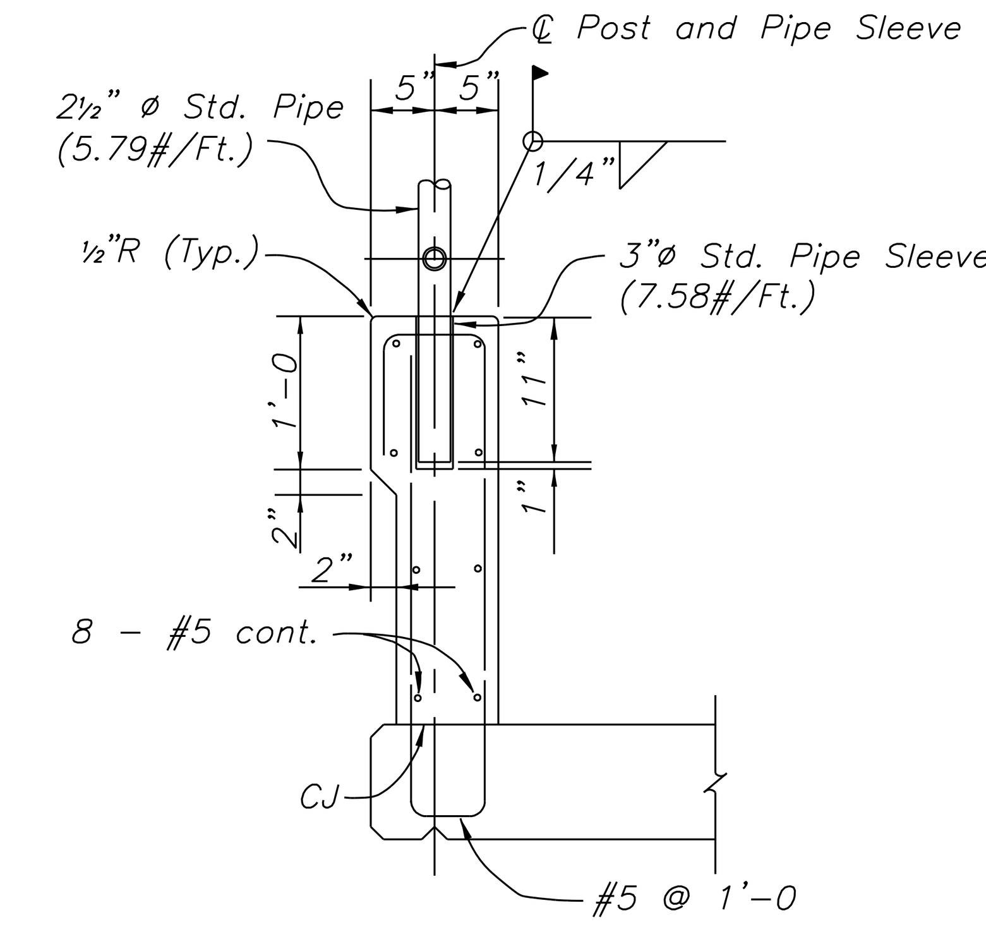


DETAIL 1 DETAIL 2

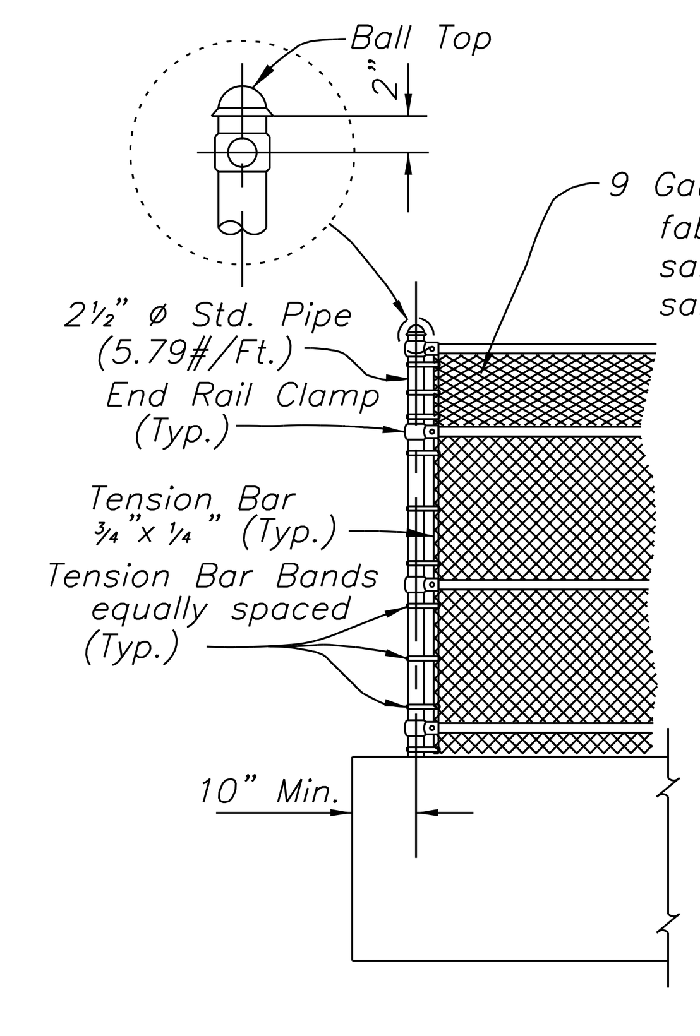


TYPICAL SECTION THRU BRIDGE DECK

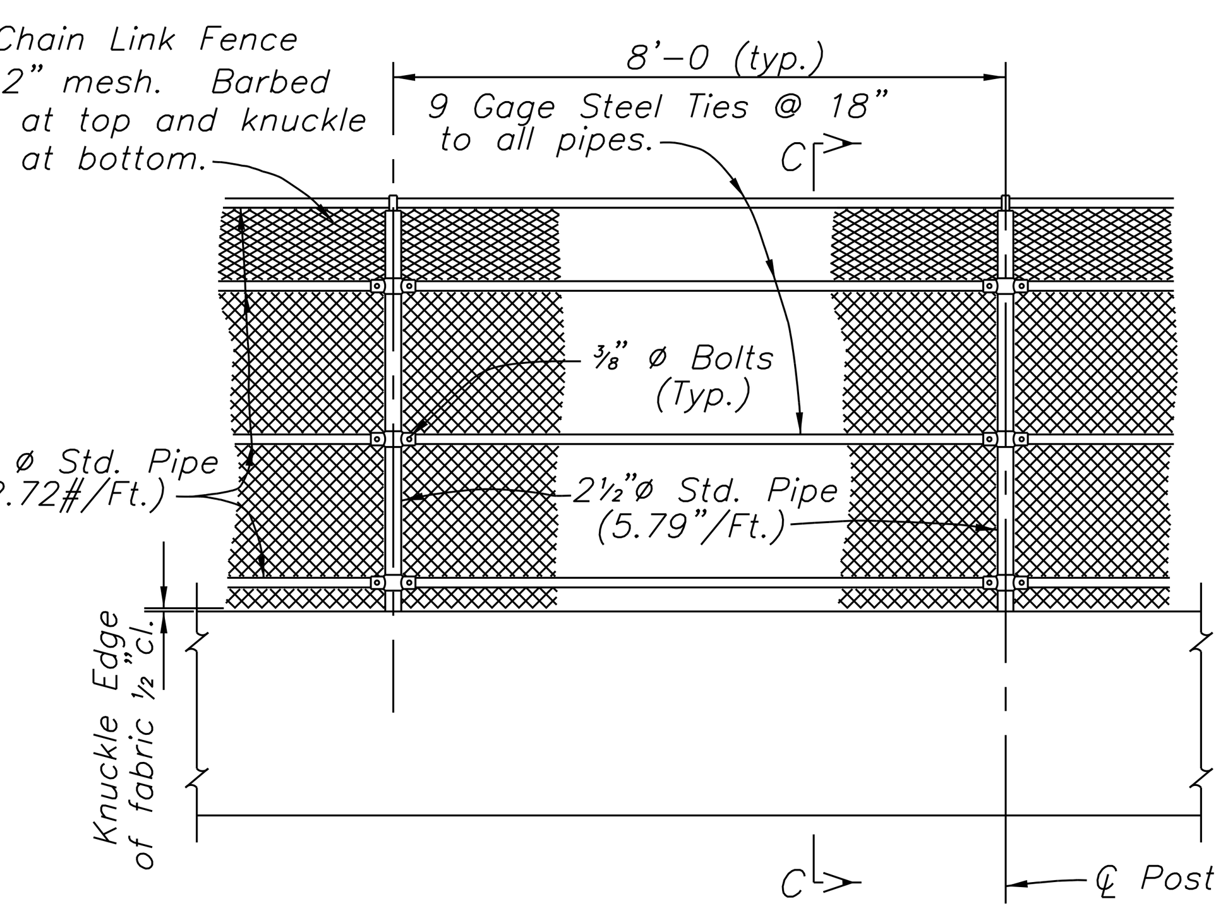
N.T.S.



DETAIL 4

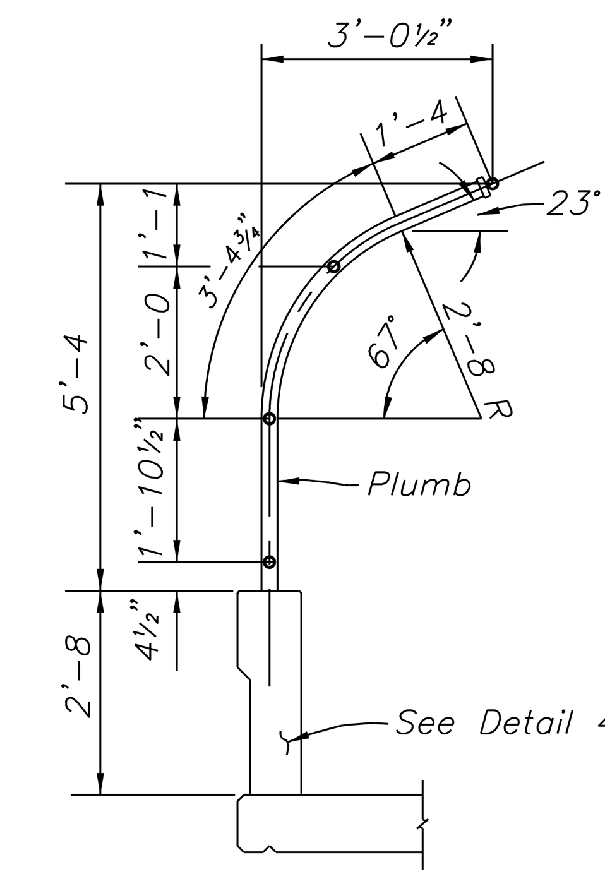


TYPICAL END POST ELEVATION



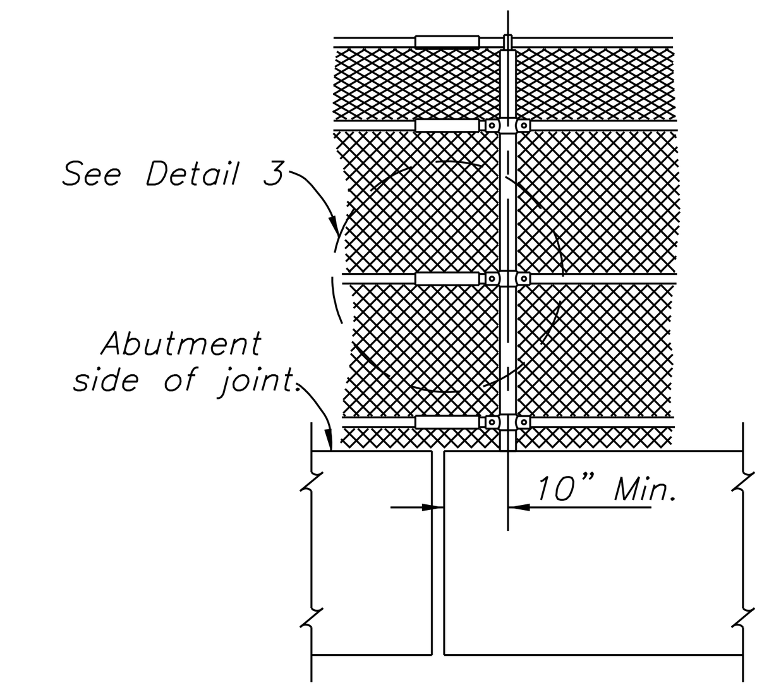
TYPICAL FENCE PANEL ELEVATION

N.T.S.

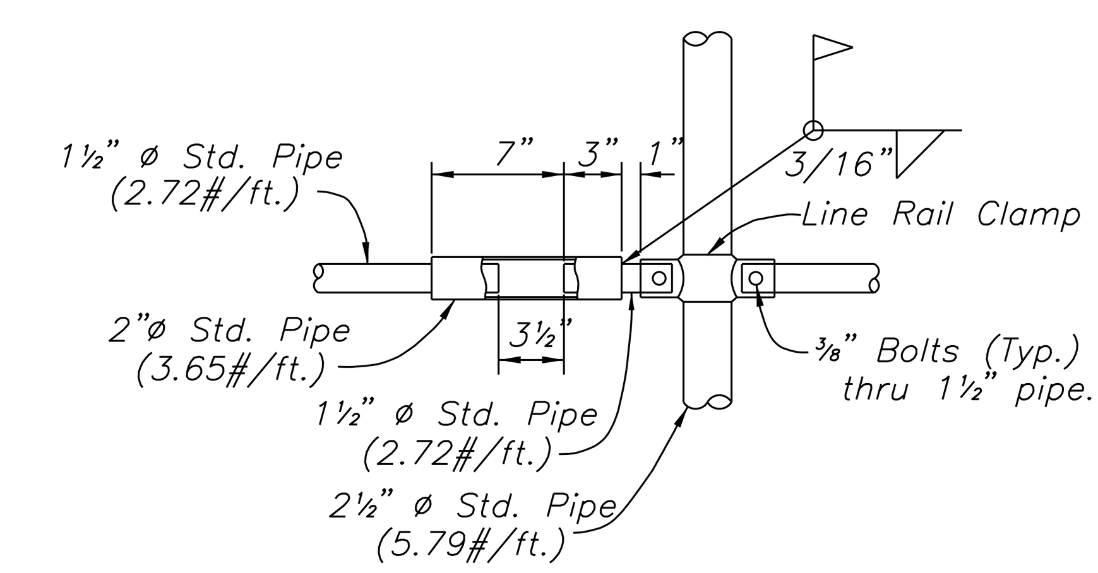


SECTION C-C

(Typical Interior Post)



FENCE DETAIL AT PARAPET EXPANSION JOINT



DETAIL 3

CHAIN LINK NOTES

1. Chain link fence fabric, posts, fittings and hardware shall conform to AASHTO M181 – Type I or II. For Type 1, the wire fabric coating shall be Class A.
2. All galvanizing that has been damaged in handling, transportation or welding shall be repaired by the application of a paste compound of an approved zinc powder and flux.
3. All exposed edges shall be smooth.
4. All bolt heads shall be to the inside.

EXPANSION JOINT GENERAL NOTES

1. Contractor shall submit shop drawings for the joint showing all fabrication details and material specifications according to specification requirements.
2. The joint shall be installed in accordance with the manufacture's instructions. A representative of the manufacture shall be present at the job site during installation.
3. Steel extrusions shall conform to AASHTO M270, Grade 36 or Grade 50W (ASTM A709, Grade 36 or Grade 50W). Welded anchors shall conform to AASHTO M169 (ASTM A108). The entire assembly consisting of extrusions and welded anchors shall be galvanized after fabrication. Neoprene strip seal shall conform to the physical properties prescribed in Table 1 of AASHTO 220 (ASTM D2628).

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE

EXPANSION JOINT DETAILS AND PEDESTRIAN FENCING DETAILS

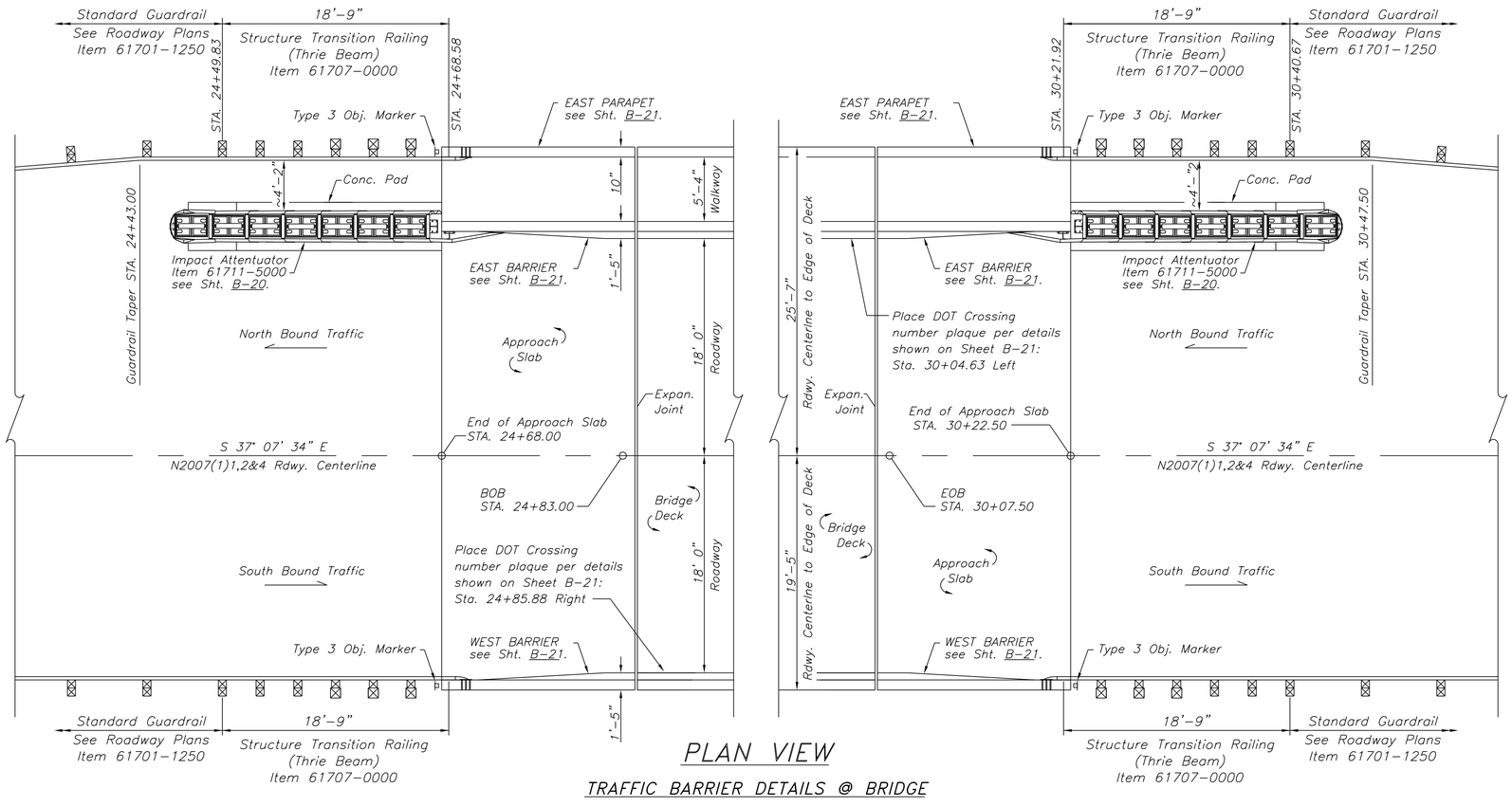
Designed by: BUREAU OF RECLAMATION

Drawn by: BOR, dc, rsh Date: 01/17/14

Revised by: - - Date: - -

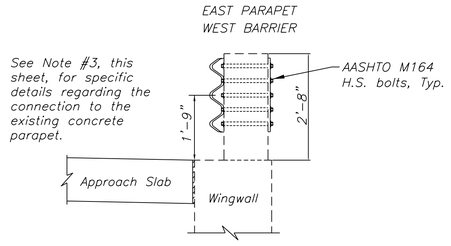
File Name: 19_BIA_expan

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-20	63



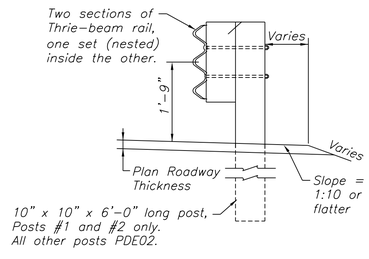
PLAN VIEW

TRAFFIC BARRIER DETAILS @ BRIDGE



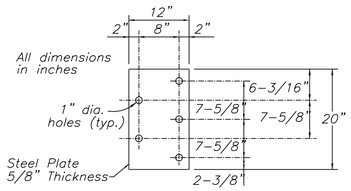
SECTION F-F

(from Sht. B-21)

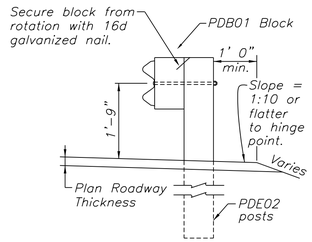


SECTION G-G

(from Sht. B-21)



THRIE BEAM TERMINAL CONNECTOR PLATE



SECTION H-H

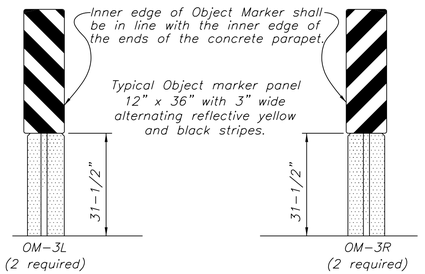
(from Sht. B-21)

STRUCTURE TRANSITION RAILING NOTES

NOTE: See Sheet B-21 for primary details regarding the STRUCTURE TRANSITION RAILING. See Sheet B-21 for location of Section views shown on this sheet.

1. Terminal connectors, metal blocks, block plates shall be furnished and installed with, and shall be incidental to the W-beam guardrail item.
2. The terminal connectors, blocks, and block plates shall be galvanized after fabrication in accordance with ASTM A123.
3. Connect ARTBA Standard RE-8 terminal connectors to barrier/parapet with 4-7/8"ø high strength bolts. Connect blocks to barrier/parapet with 5/8"ø high strength bolts. All high strength bolts shall be ASTM A325, Type 3 and shall be galvanized in accordance with ASTM A153.
4. ARTBA Standard RE-4 W-beam back-up plates shall be installed behind guardrail at metal blocks.
5. Structural steel shall conform to ASTM A36, unless otherwise specified.
6. The contractor shall be required to compact the asphalt all around each guardrail 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.

NOTE: Place object marker posts between structure transition rail posts #1 and #2 if object marker posts can not fit between existing wingwall and approach guardrail post #1.



TYPE 3 OBJECT MARKER @ PARAPET WALLS

N.T.S.

REVISED 04/08/2015

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

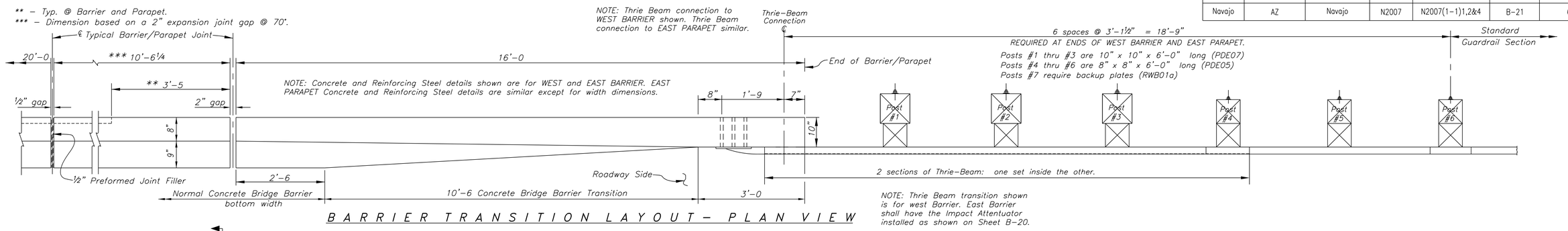
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE
GUARDRAIL TRANSITION PLAN VIEW

Designed by: CDH - Structural Unit	
Drawn by: rsh, cdh	Date: 01/17/14
Revised by: cdh	Date: 04/08/2015
File Name: 20_BIAguardrail_layout	

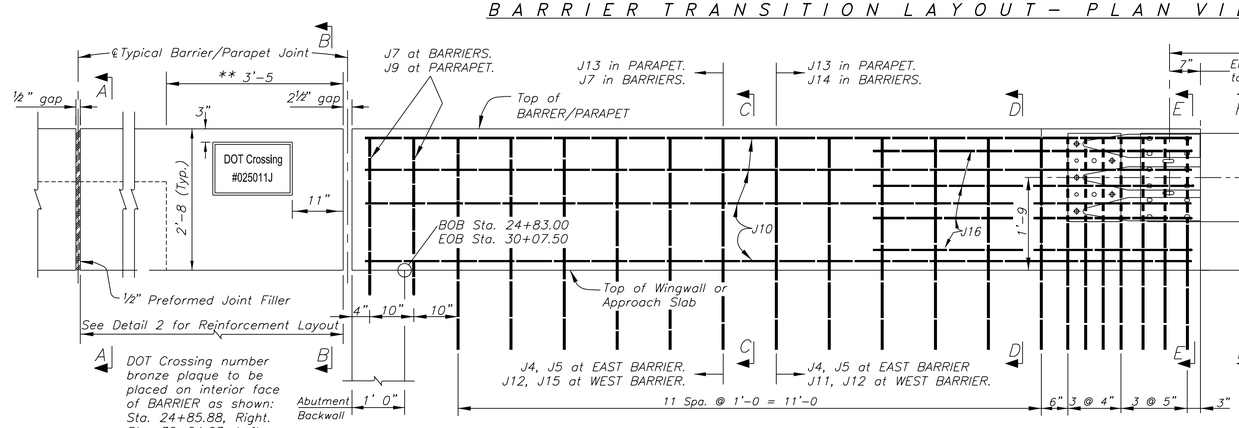
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-21	63

** – Typ. @ Barrier and Parapet.
*** – Dimension based on a 2" expansion joint gap @ 70°.



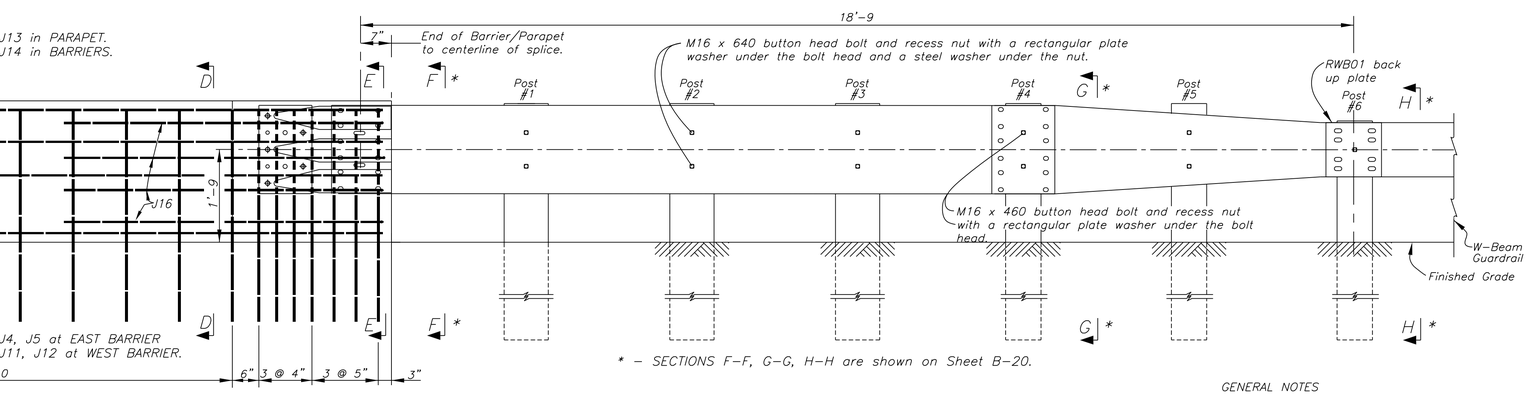
NOTE: Thrie Beam transition shown is for west Barrier. East Barrier shall have the Impact Attentuator installed as shown on Sheet B–20.

B A R R I E R T R A N S I T I O N L A Y O U T – P L A N V I E W



DOT Crossing number bronze plaque to be placed on interior face of BARRIER as shown:
Sta. 24+85.88, Right.
Sta. 30+04.63, Left.

E L E V A T I O N @ N O R T H W E S T C O R N E R (OTHER CORNERS SIMILAR)

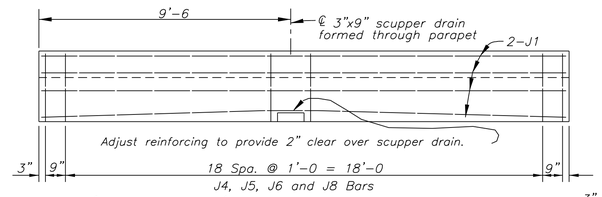


* – SECTIONS F–F, G–G, H–H are shown on Sheet B–20.

GENERAL NOTES

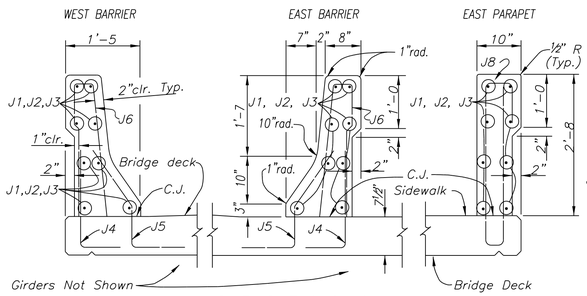
(NOTE: See Sheet B–20 for layout and additional details.)

Concrete for parapets and barriers shall have a 28 day strength of f'c = 4,000 p.s.i.
Reinforcing steel shall conform to AASHTO M31, Grade 60.
Ends of all concrete parapet and barrier shall be provided with connection hardware for Structure Transition Railing and Impact Attentuators.
Chamfer all corners ¾" unless otherwise noted.
Chain link fence not shown on these details. For fencing details, see Sht. B–19.
All threaded tubular expansion anchors are required to meet or exceed a tensile proof test load of 5,100 lbs. in 4,000 p.s.i. concrete.
No steel post to be used for post #1 thru #6 of Structure Transition Rail.

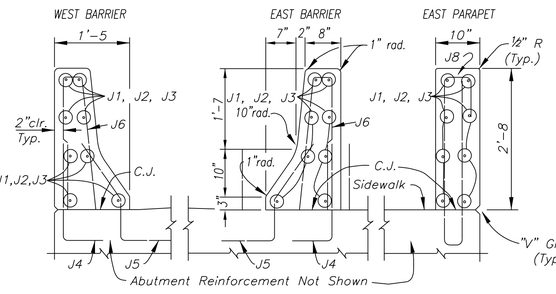


20'–0 BARRIER/PARAPET REINFORCEMENT DETAIL

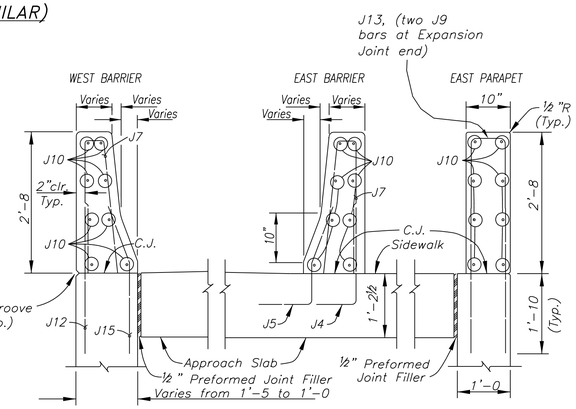
48 BARRIER sections Req'd (18 without Scupper drains)
24 PARAPET sections Req'd (9 without Scupper drains)
See Sheet B–2 for location of scupper drains.



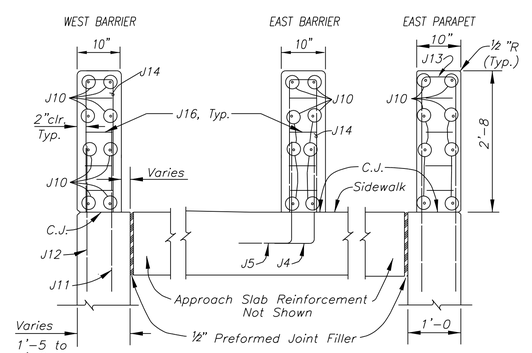
S E C T I O N A – A



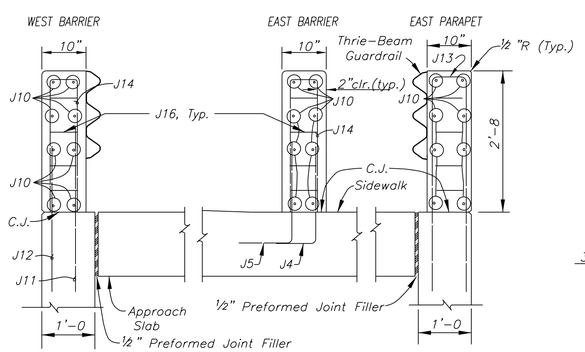
S E C T I O N B – B



S E C T I O N C – C

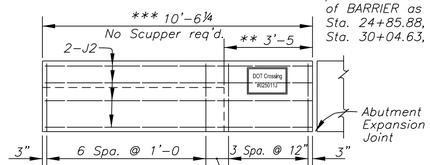


S E C T I O N D – D



S E C T I O N E – E

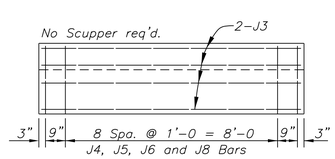
** – Typ. @ BARRIER/PARAPET
*** – Dimension based on a 2" expansion joint gap @ 70°.



D E T A I L 2

4 BARRIER sections Req'd (2 opposite hand)
2 PARAPET sections Req'd (1 opposite hand)

DOT Crossing number bronze plaque to be placed on interior face of BARRIER as shown:
Sta. 24+85.88, Right.
Sta. 30+04.63, Left.



10'–0 BARRIER/PARAPET REINFORCEMENT DETAIL

4 BARRIER sections Req'd (2 opposite hand)
2 PARAPET sections Req'd (1 opposite hand)

REVISED 04/07/2015

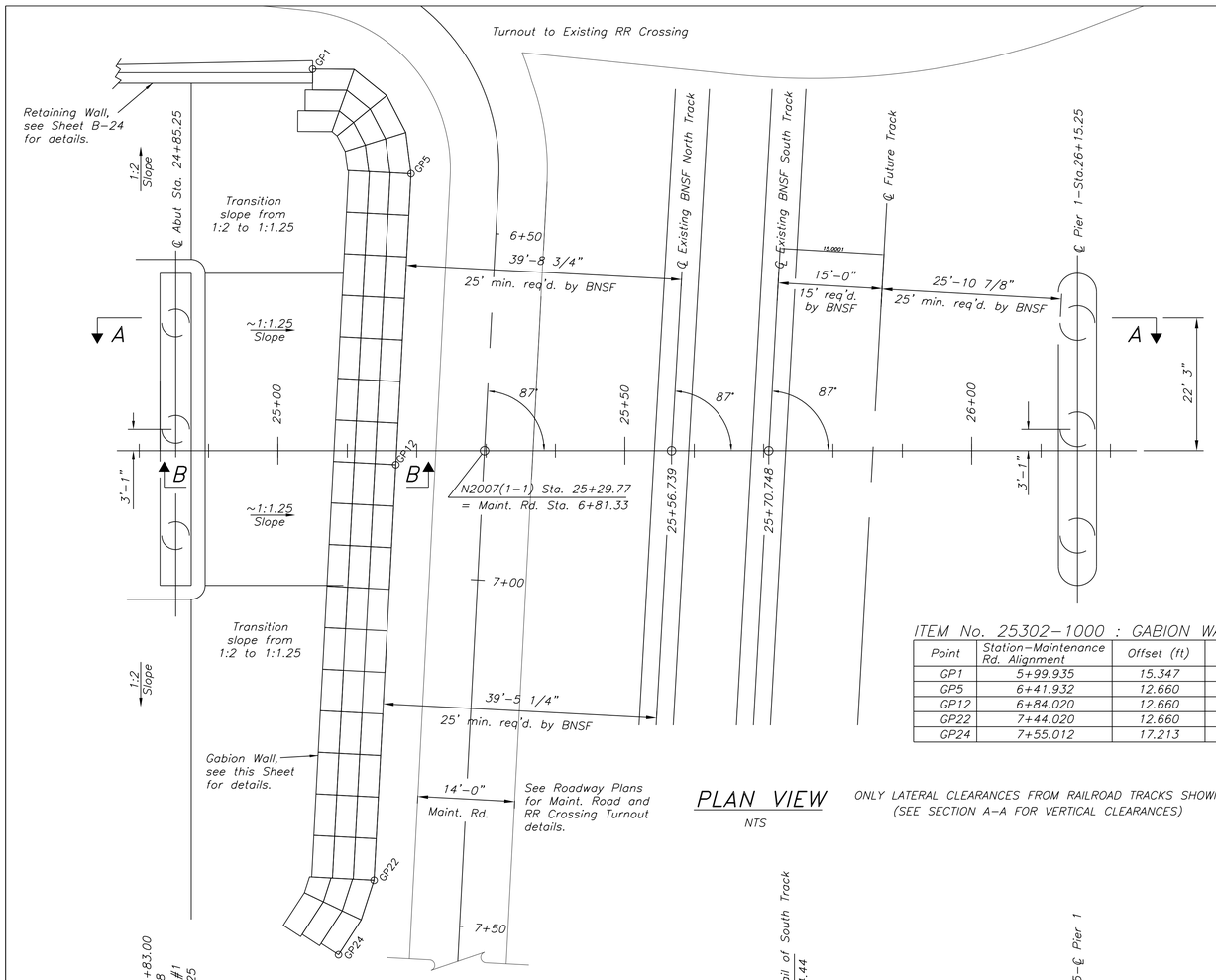
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE – DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE
CONCRETE BARRIER and GUARDRAIL TRANSITION DETAILS

Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, cdh, dc, rsh	Date: 01/17/14
Revised by: cdh	Date: 04/07/2015
File Name: 21_BIA_barr-ADOT	

K:\CURRENT PROJECTS\N00\V20\T(1)_ Navajo Bridge_032494\Design_BIA_2001-02-28\CAD 073002\Bridge_Plan Drawings PRELIM 051109\21_BIA_barr-ADOT_R-SD_2015-04-07.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
Navajo	AZ	Navajo	N2007	N2007(1-1)1,2&4	B-22	63



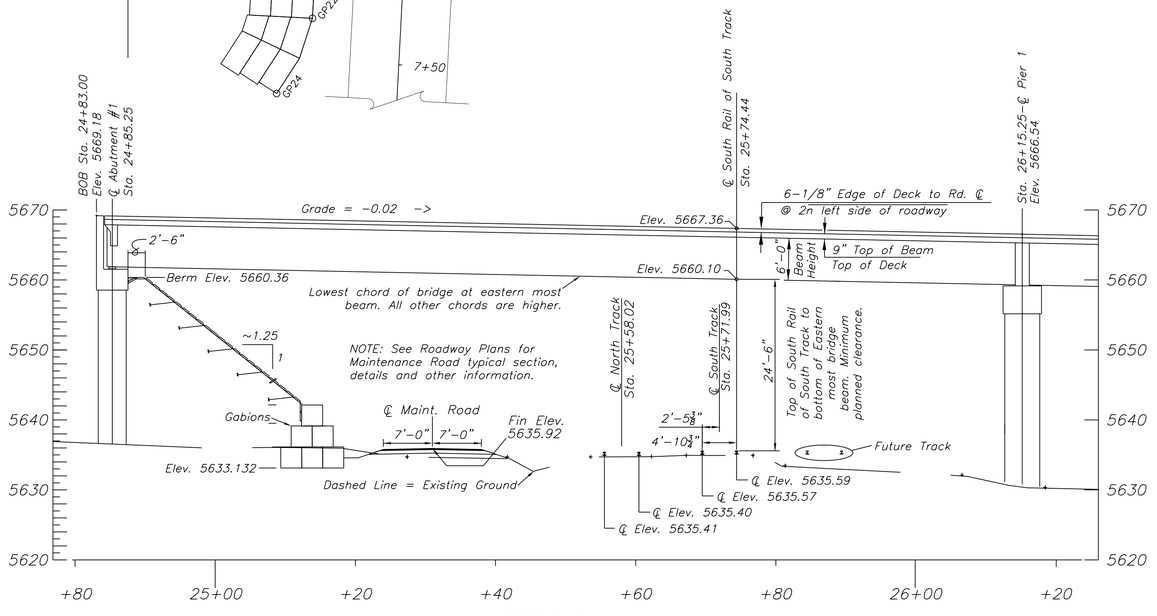
PLAN VIEW

NTS

ONLY LATERAL CLEARANCES FROM RAILROAD TRACKS SHOWN
(SEE SECTION A-A FOR VERTICAL CLEARANCES)

ITEM No. 25302-1000 : GABION WALL LAYOUT TABLE

Point	Station-Maintenance Rd. Alignment	Offset (ft)	Elevation
GP1	5+99.935	15.347	5,668.741
GP5	6+41.932	12.660	5,668.458
GP12	6+84.020	12.660	5,668.502
GP22	7+44.020	12.660	5,668.565
GP24	7+55.012	17.213	5,668.667



ONLY VERTICAL CLEARANCES FROM RAILROAD TRACKS SHOWN
(SEE PLAN VIEW DRAWING FOR LATERAL CLEARANCES)

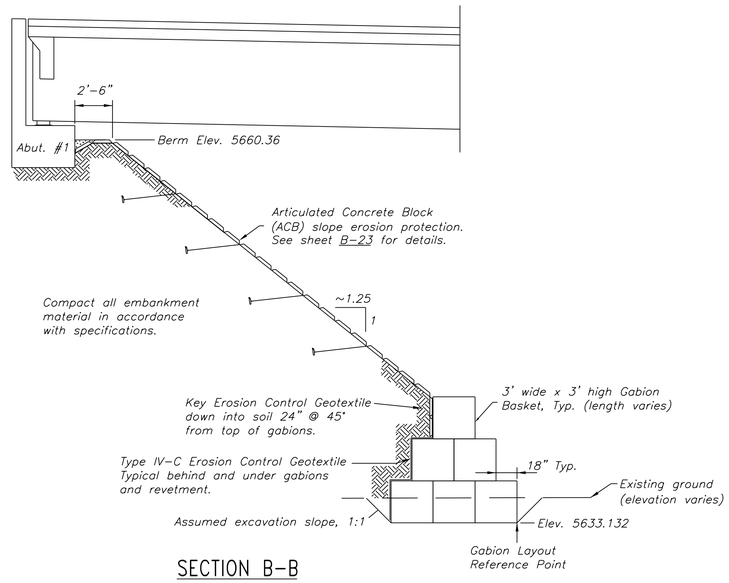
SECTION A-A

N.T.S.

NOTE: SECTION A-A is a profile view 22'-3" left of Rdwy ℄, along eastern most beam ℄ (lowest beam on bridge superstructure)

GABION NOTES

1. Wire mesh for gabion baskets shall be made from cold drawn steel wire with a minimum diameter of 0.120" conforming to ASTM A641 with a Class 3 zinc coating.
2. Tie wire shall be cold drawn steel wire with a minimum diameter of 0.092" conforming to ASTM A641 with a Class 3 zinc coating.
3. Rock for filling gabion baskets shall conform to Class 2 rock in Table 705-1 of the FP-03.
4. Erosion Control Geotextile under and behind gabions shall conform to Type IV--C of Table 714-4 of the FP-03. Furnishing and installation of Erosion Control Geotextile shall be incidental to Item 25302-1000.
5. Backfill material under and behind gabions shall be native material compacted to 95% per Section 253.07 of the FP-03.
6. Wire mesh for gabions shall be 6x8 mesh as manufactured by Maccaferri, or an approved equal. Furnishing, fabrication and installation shall be as per the manufacturer's recommendations and instructions. Material information and certifications shall be submitted for review and be approved prior to installation.
7. After construction of gabion structures, grade adjacent ground to the Maintenance Road typical section requirements. Material excavated for construction of gabion structures shall be utilized for backfill construction. Partial covering of the gabion structure (base) will be necessary to construct as shown. Material placed as backfill shall be compacted by thorough tamping and/or rolling by construction equipment while avoiding any damage to gabion structures. Any damage to gabion structures shall be repaired or replaced by the Contractor at no additional cost to the Government. All excavation, including all necessary rock excavation, embankment, grading and backfill necessary for the construction of the gabion structures shall be considered incidental to Item 25302-1000.
8. All material certifications for gabions and erosion control geotextile shall be submitted for review and shall be approval prior to the use of the material.
9. Any unsuitable or unstable material encountered during foundation bed preparation (not attributable to the Contractor's operations) shall be removed and replaced with suitable material as directed by the COR. This work, if necessary, shall be paid for in accordance with Section 109.02(m) of the FP-03.



SECTION B-B

TYPICAL SECTION THROUGH GABIONS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

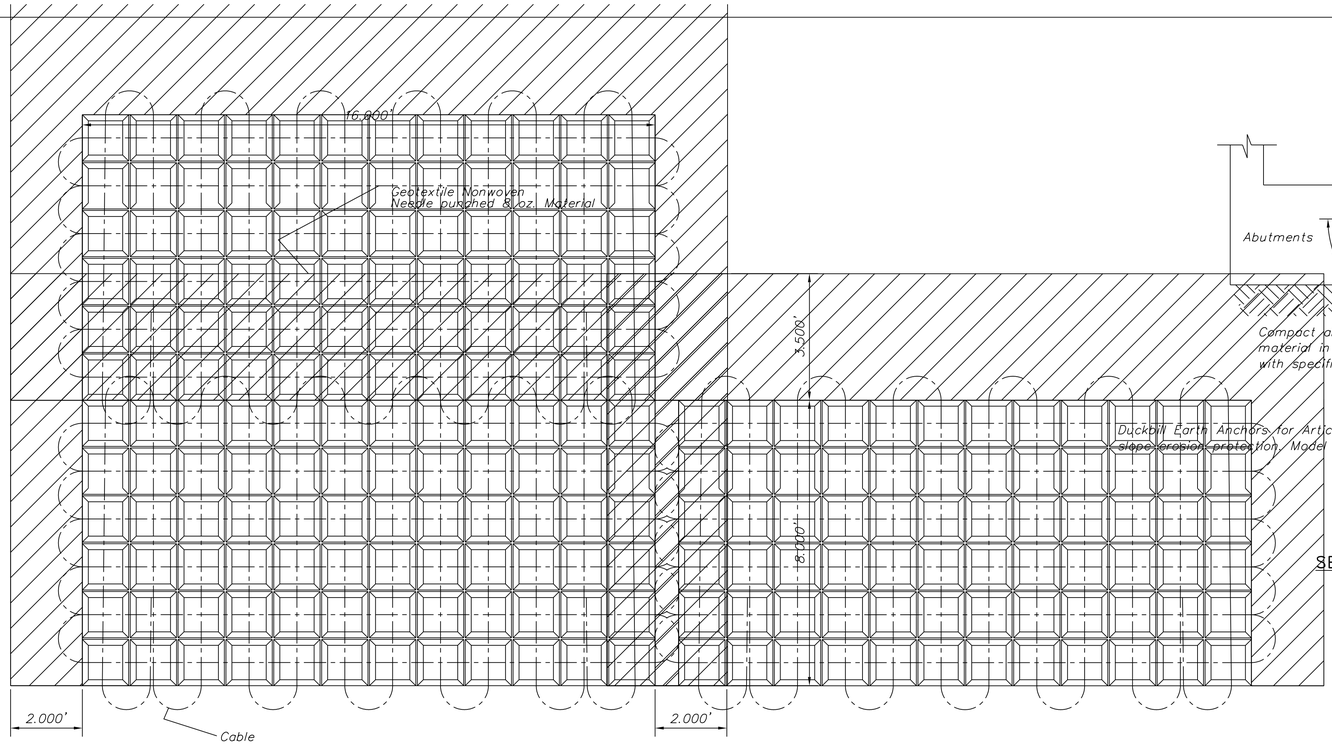
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE

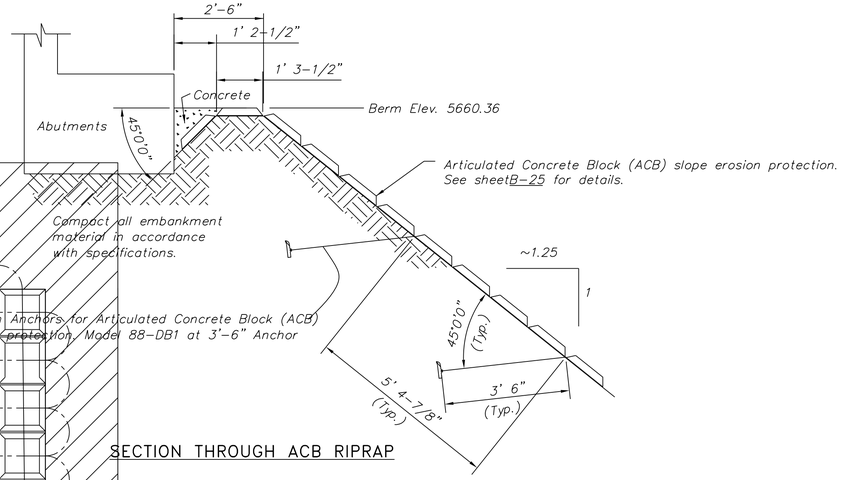
RAILROAD CLEARANCES & GABION DETAILS

Designed by: BUREAU OF RECLAMATION	
Drawn by: cdh, rsh	Date: 01/17/14
Revised by:	Date:
File Name: 22_Rbio42_GBN	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	B-23	63

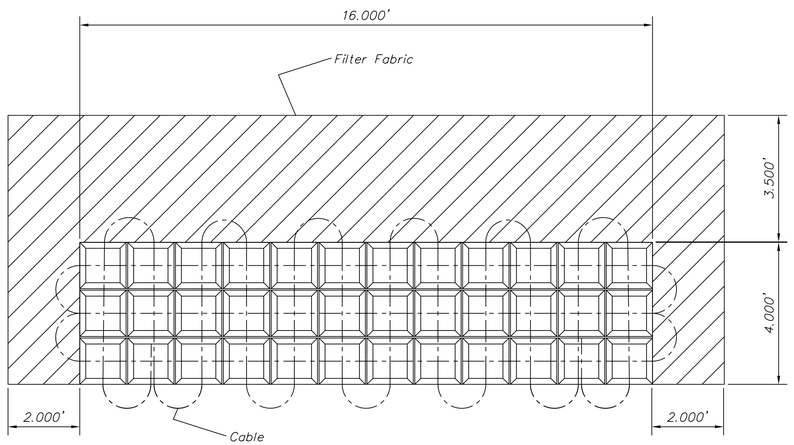


PLAN VIEW
8.000' x 16.000'
Articulated Concrete Block Revetment
(nts)

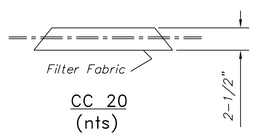


SECTION THROUGH ACB RIPRAP

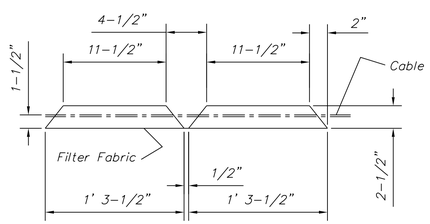
Revised 02-08-2018
See Sht B-23A



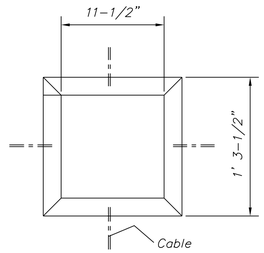
PLAN NEW
4.000' x 16.000'
Articulated Concrete Block Revetment



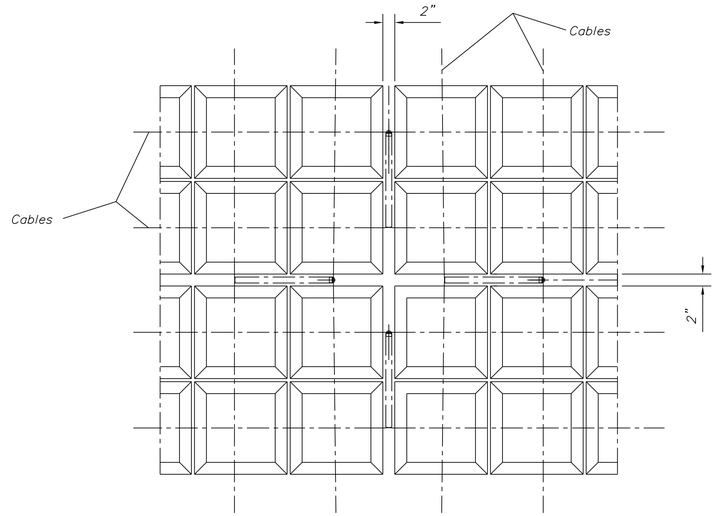
CC 20
(nts)



DETAIL "A"
(nts)



TOP VIEW
Concrete Block (Typ.)



ACB RIPRAP CABLE CLAMPS DETAIL

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

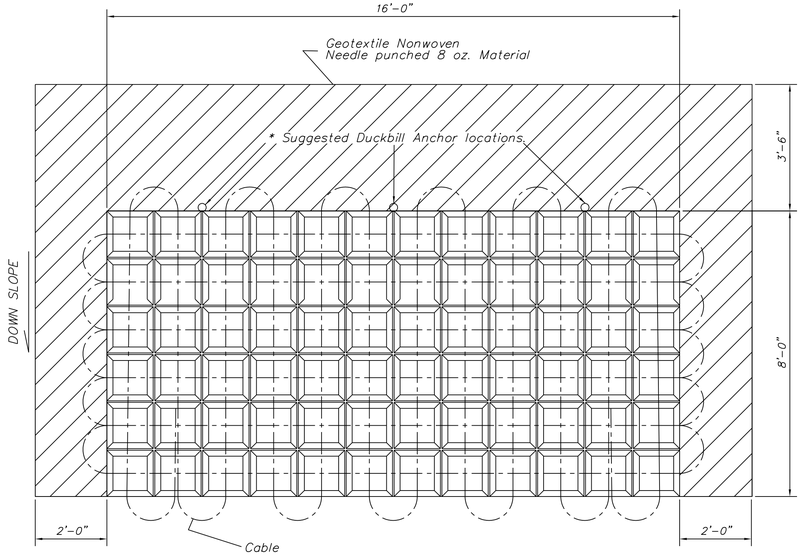
RIO PUERCO BRIDGE

ARTICULATED CONCRETE BLOCK CC-20
SLOPE PROTECTION

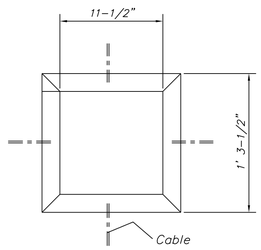
Designed by: STRUCT	
Drawn by: rsh, cdh	Date: 01/17/14
Revised by:	Date:
File Name: 23_slope_GBN	

Y:\CURRENT PROJECT_093008\N00_New Lands\N2007(1-1)2&4_092308\N2007 DESIGN DATA_092508\CADD Files 01-18-2013\N2007 Final Plans 02-28-18\Bridge Plans\23_slope_GBN_2014-01-17.dgn

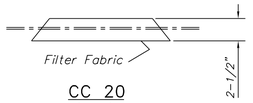
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	B-23A	63



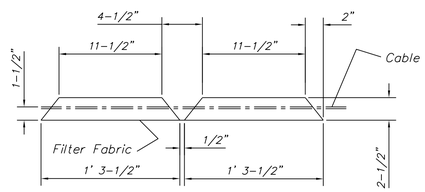
PLAN VIEW
8.000' x 16.000'
Articulated Concrete Block Revetment
(nts)



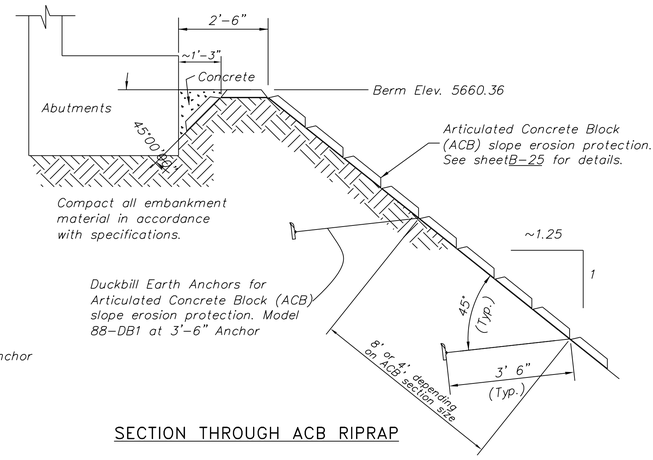
TOP VIEW
Concrete Block (Typ.)



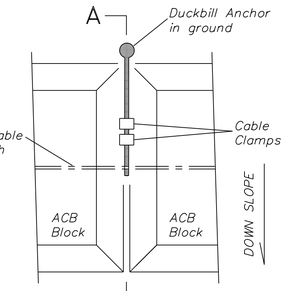
CC 20
(nts)



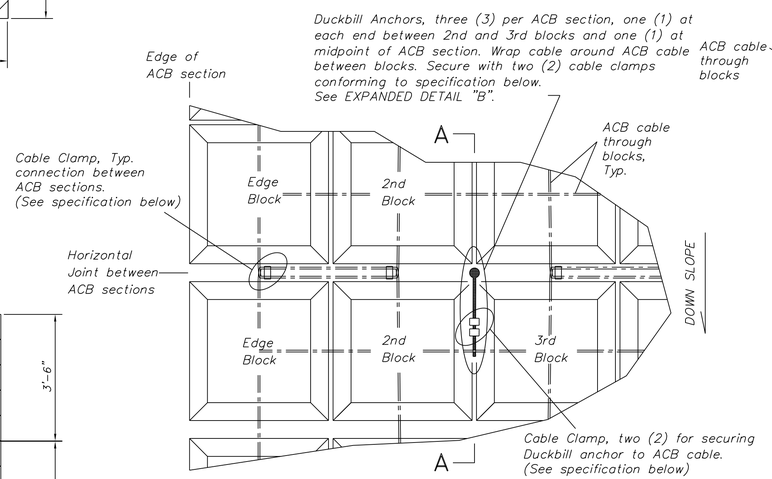
DETAIL "A"
(nts)



SECTION THROUGH ACB RIPRAP

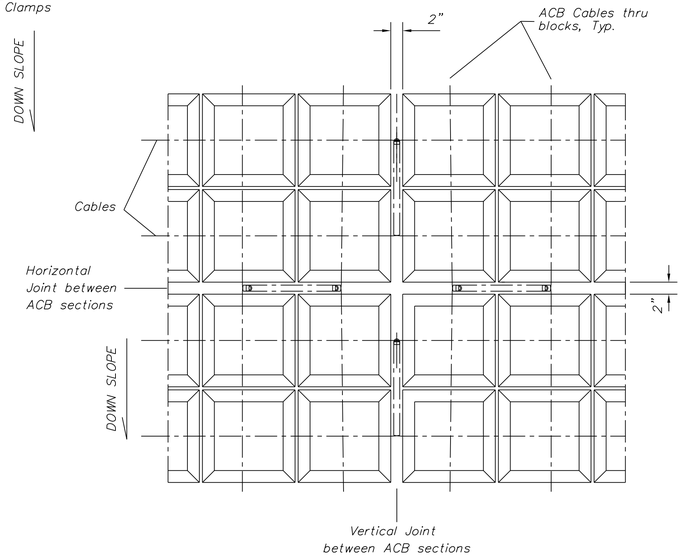


EXPANDED
DETAIL "B"



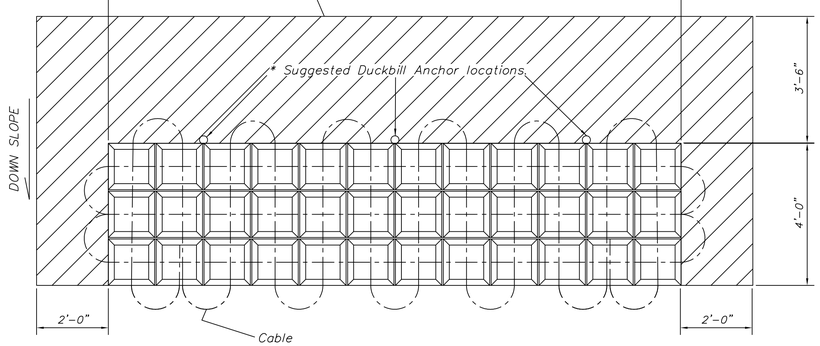
DETAIL "B"

* SUGGESTED DUCKBILL ANCHOR PLACMENT



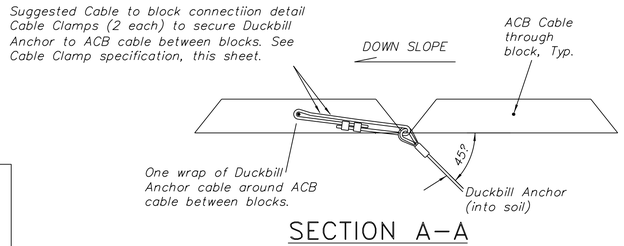
ACB RIPRAP CABLE CLAMPS DETAIL

(SEE DETAIL "B" FOR DUCKBILL ANCHOR PLACEMENT)



PLAN NEW
4.000' x 16.000'
Articulated Concrete Block Revetment

NOTE: If Duckbill Anchor cable does not reach ACB cable between blocks after recommended installation of Duckbill Anchor, provide and extension cable of the identical size and specification as the Duckbill Cable to connect to ACB cable. Provide Cable Clamps as specified to attach extenion cable per direction of the AOTR.



SECTION A-A

CABLE CLAMP NOTE: Cable Clamps shall conform to AASHTO F568, Class 4.6 material. Nuts shall conform to AASHTO M 291M, Class 5. All parts of the cable clamp shall be galvanized in accordance to AASHTO M232 Class C, or AASHTO M298 Class 50. Size of cable clamp shall be based on the diameter of the cable being secured.

* - THE DETAILS SHOWN ON THIS SHEET ARE FOR GENERAL INFORMATION ONLY. SPECIFIC DETAILS FOR INSTALLATION SHALL BE PER THE APPROVED SHOP DRAWINGS AND DESIGN DATA SUBMITTED BY THE CONTRACTOR PER NOTE #18 ON SHEET B-1.

REVISED: AUGUST 3, 2017

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

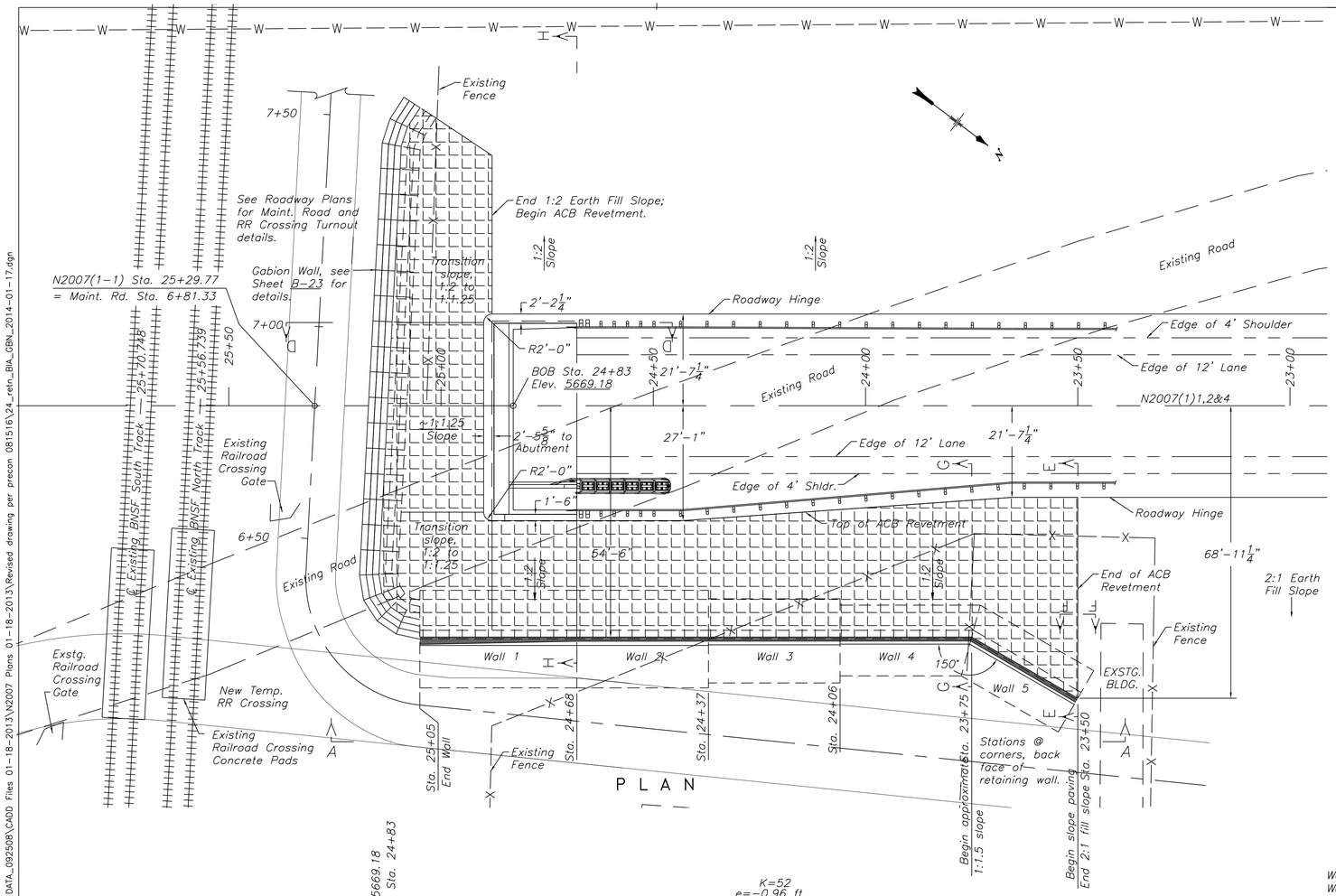
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

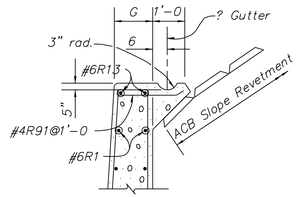
RIO PUERCO BRIDGE

ARTICULATED CONCRETE BLOCK CC-20
SLOPE PROTECTION

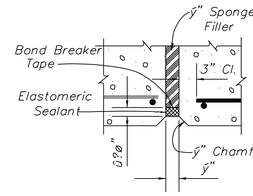
Designed by: STRUCT	
Drawn by: rsh, cdh	Date: 01/17/14
Revised by: CDH	Date: AUG. 3, 2017
File Name: 23_slope_GBN	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	B-24	63

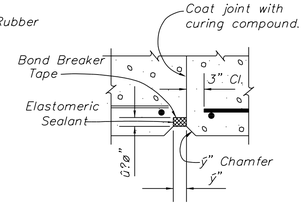




DETAIL 1



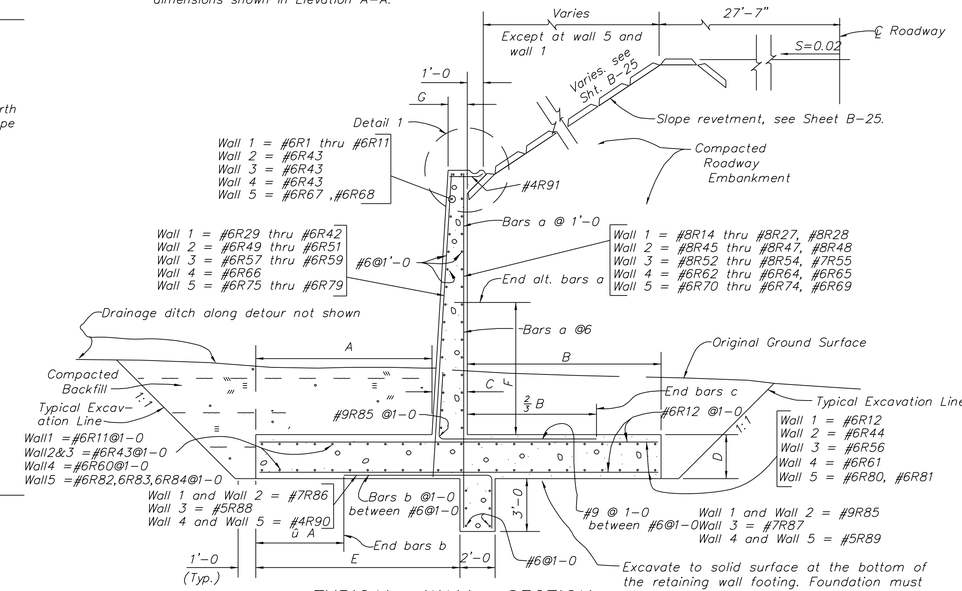
SECTION B-B
SECTION B'-B'



SECTION C-C
SECTION C'-C'

NOTES

Concrete for footing and key shall be placed against solid undisturbed earth or compacted foundation.
Vary dimension G (top of wall width) uniformly between dimensions shown in Elevation A-A.



TYPICAL WALL SECTION

TABLE OF DATA

	DIMENSIONS						REINF. BARS		
	A	B	C	D	E	F	a	b	c
WALL 1	10-0	11-0	2-0	2-6	11-7	7-6	#8	#7	#9
WALL 2	10-0	11-0	2-0	2-6	11-7	7-6	#8	#7	#9
WALL 3	9-0	9-0	1-10	2-4	10-5	6-6	#7	#5	#7
WALL 4	7-6	7-6	1-8	2-2	8-9	5-6	#6	#4	#5
WALL 5	7-6	7-6	1-8	2-2	8-9	5-6	#6	#4	#5

Note: For Dimension G, see Elevation A-A.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE

RETAINING WALL & SLOPE PAVING, SHEET 1 OF 2

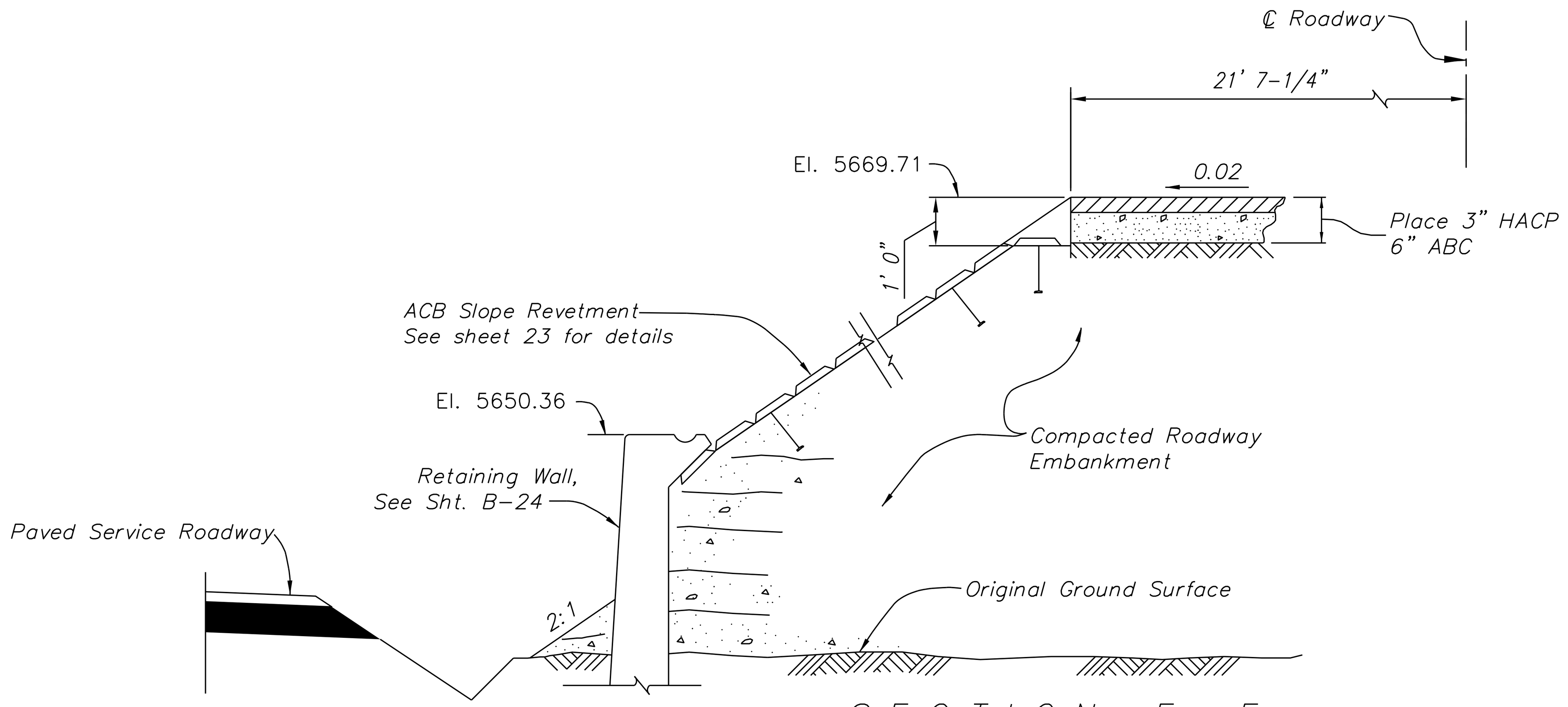
Designed by: BUREAU OF RECLAMATION

Drawn by: BOR, rsh, cdh, dc Date: 01/17/14

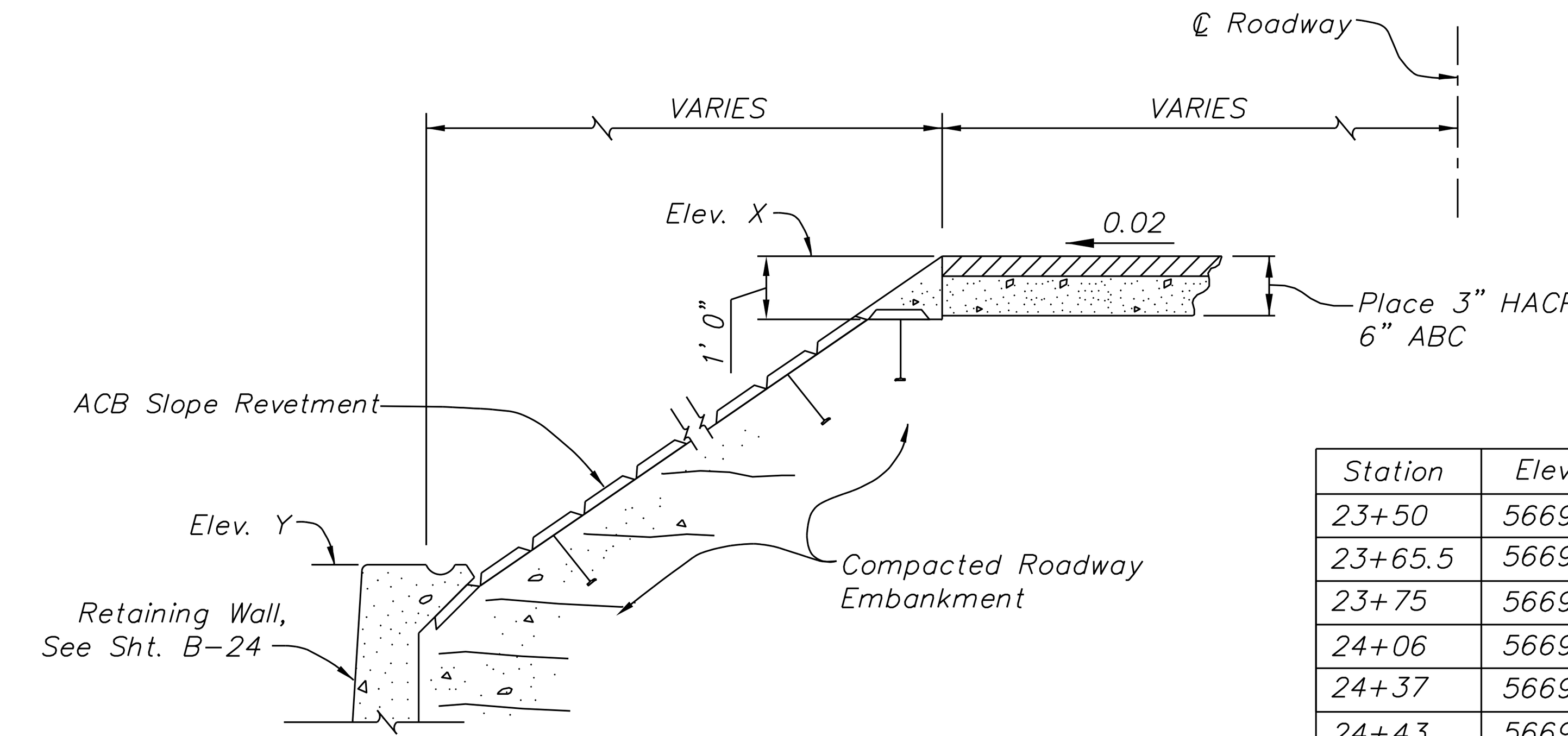
Revised by: Date:

File Name: 24_retn_BIA_GBN

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N2007	N2007(1-1)1,2&4	B-25	63

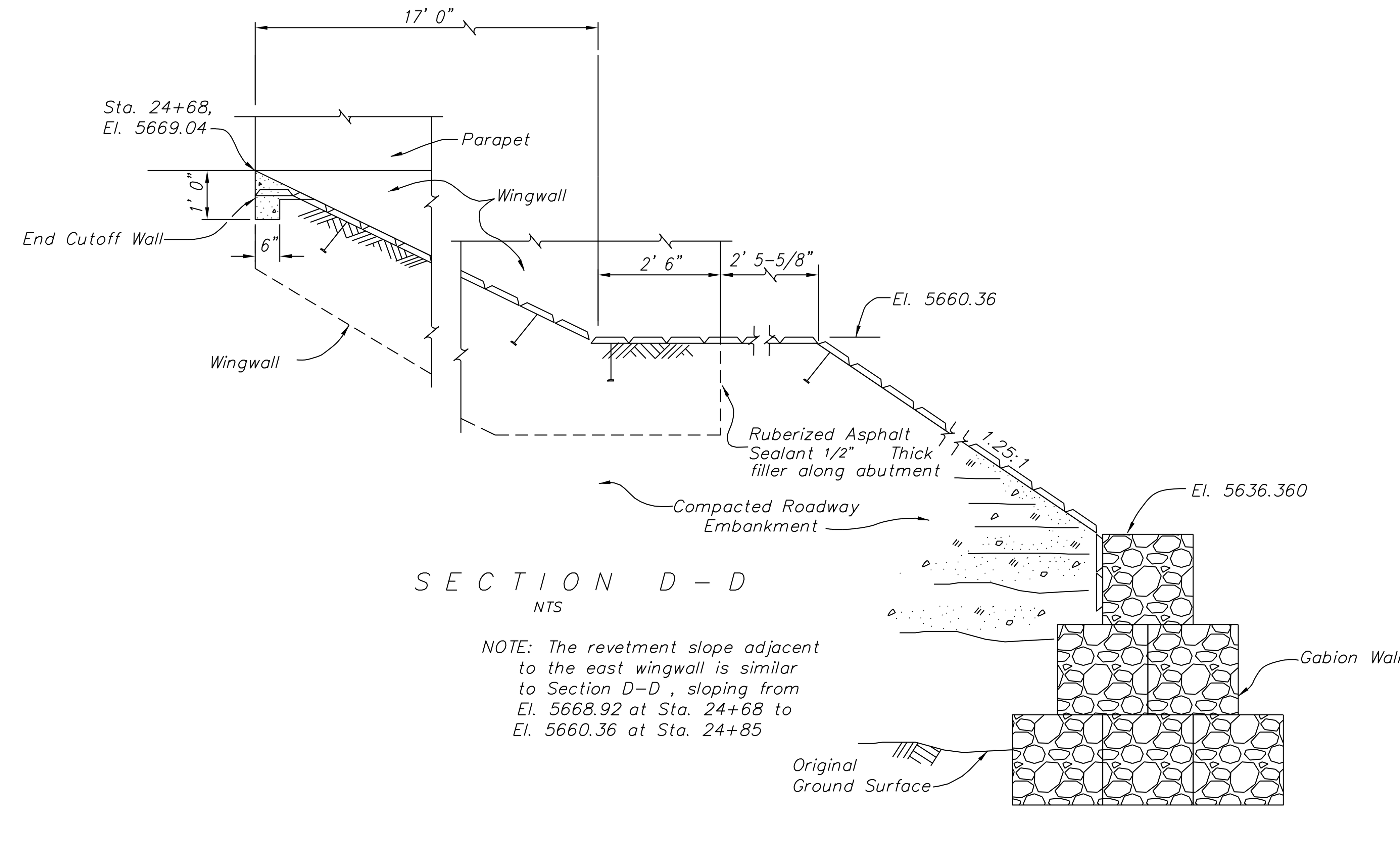


SECTION E-E
(STA. 23+50)



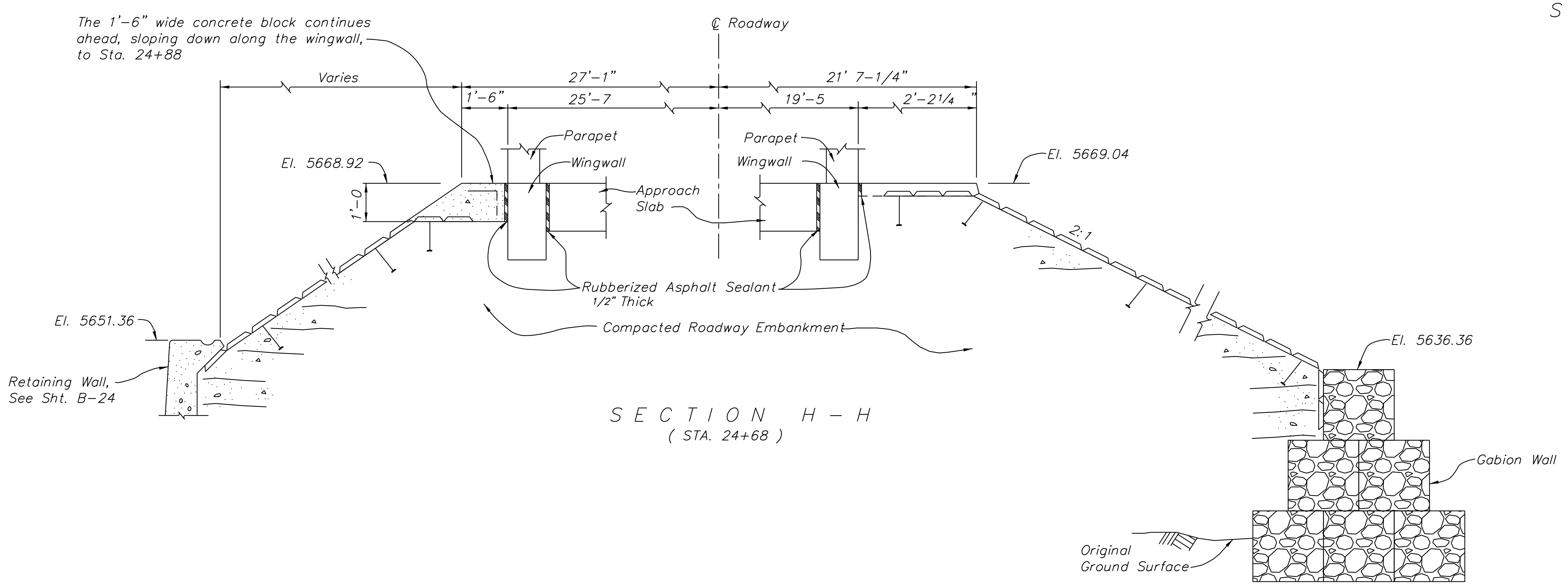
SECTION G-G
(TYPICAL-STA. 23+75 TO STA. 24+68)

Station	Elev.X	Elev. Y
23+50	5669.71	5650.36
23+65.5	5669.77	5651.60
23+75	5669.75	5652.36
24+06	5669.64	5652.03
24+37	5669.34	5651.69
24+43	5669.28	5651.63
24+68	5668.92	5651.36
24+83	5661.36	5646.90



SECTION D-D
NTS

NOTE: The revetment slope adjacent to the east wingwall is similar to Section D-D, sloping from El. 5668.92 at Sta. 24+68 to El. 5660.36 at Sta. 24+85



SECTION H-H
(STA. 24+68)

See RETAINING WALL DETAILS sheet B-24 for section locations.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

RIO PUERCO BRIDGE

RETAINING WALL & SLOPE PAVING, SHEET 2 OF 2

Designed by: BUREAU OF RECLAMATION	
Drawn by: BOR, rsh, cdh	Date: 01/17/14
Revised by:	Date:
File Name: 25_slope_GBN	