PROJECT: N6330(1)1,2&4
N6331(2)2&4, N6331(1–2)2,4
& N21(3A) Spur Road

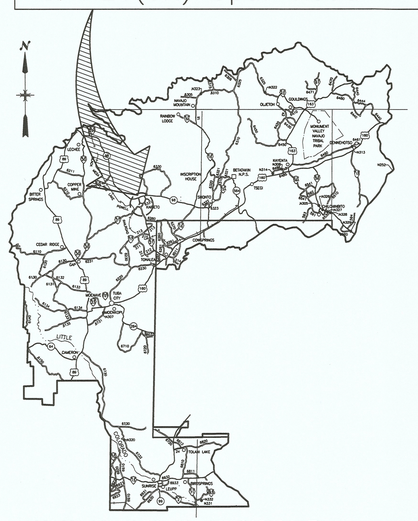
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL
ROUTE

6330 6331 21

5.661 km

I.D. No. N33706

APPROVED
By Harold J Riley-PE at 4:11 pm, Jul 18, 2018



NAVAJO RESERVATION MAP
N.T.S.

RIGHT–OF–WAY TABLE			
LEFT OF CENTERLINE		RIGHT OF CENTERLINE	
N21(3A) SPUR A STATION TO STATION	WIDTH (m)	N21(3A) SPUR A STATION TO STATION	WIDTH (m)
0+033.961 – 0+798.498	20	0+027.733 – 0+790.711	20
Total Length:	764.537m	Total Length:	762.978m
N6330(1) STATION TO STATION	WIDTH (m)	N6330(1) STATION TO STATION	WIDTH (m)
1+023.000 – 1+070.350	23	1+023.000 – 1+070.350	23
1+070.000 – 1+137.436	50	1+070.000 – 1+137.436	50
1+137.436 – 1+374.989	23	1+137.436 – 1+374.989	23
1+374.989 – 1+492.719	23	1+374.989 – 1+492.719	23
1+492.719 – 1+631.212	23	1+492.719 – 1+631.212	23
Total Length:	608.212	Total Length:	608.212
N6331(2) STATION TO STATION	WIDTH (m)	N6331(2) STATION TO STATION	WIDTH (m)
33+920.845 – 35+732.423	23	33+920.845 – 35+732.423	23
35+732.423 – 36+574.499	15	35+732.423 – 36+574.499	23
36+574.499 – 37+565.957	23	36+574.499 – 36+827.521	23
Total Length:	3645.112	36+827.521 – 36+969.975	14
		36+970.000 – 37+565.957	23
		Total Length:	3645.112
N6331(1–2) – Construction STATION TO STATION	WIDTH (m)	N6331(1–2) – Construction STATION TO STATION	WIDTH (m)
0+920.000 – 1+124.084	23	0+920.000 – 1+552.552 Construction Algn.	23
1+124.084 – 1+169.867	38.00		
1+127.544 – 1+169.867	38.00		
1+173.968 – 1+193.150	23.00		
1+194.060 – 1+552.552	11.00		
Total Length:	632.552	Total Length:	632.552

DESIGN DATA	
N6330	
2015 ADT	30 vpd
2035 Estimated ADT	43 vpd
Design Speed	50 km/h
Minimum Radius	100 m
Maximum Allowable Gradient	10%
Max. Superelevation	4%
Min. Stopping Sight Distance	65 m
Min. Passing Sight Distance	345 m
N6331	
2015 ADT	509 vpd
2035 Estimated ADT	685 vpd
Design Speed	60 km/h
Minimum Radius	150 m
Maximum Allowable Gradient	10%
Max. Superelevation	4%
Min. Stopping Sight Distance	85 m
Min. Passing Sight Distance	410 m
N21(3A)–Spur N6331(1)2&4	
2015 ADT	1622 vpd
2035 Estimated ADT	2717 vpd
Design Speed	60 km/h
Minimum Radius	135 m
Maximum Allowable Gradient	7.0%
Max. Superelevation	4%
Min. Stopping Sight Distance	85 m
Min. Passing Sight Distance	410 m

LENGTH OF PROJECT		
STATION TO STATION	LIN. METERS	KILOMETER
N6330(1)		
B.O.P. Station 1+005.100		
B.O.B. Station 1+093.994	70.994	0.071
E.O.B. Station 1+115.229	21.235	0.021
E.O.P. Station 1+631.212	515.983	0.516
TOTAL N6330	608.212	0.608
N6331(2)		
B.O.P. Station 33+885.404		
E.O.P. Station 37+564.614	3,646.760	3.646
TOTAL N6331	3,646.760	3.646
N6331(1–2)		
B.O.P. Station 0+920.000		
E.O.P. Station 1+552.522	632.522	0.633
TOTAL N6331(1–1)(2)	632.522	0.633
N21(3A)– Spur Road		
B.O.P. Station 0+020.163		
E.O.P. Station 0+793.697	773.534	0.774
TOTAL N21(3A)	773.534	0.774
PROJECT GRAND TOTAL	5,661.028	5.661

LEGEND

STATE LINE
RESERVATION LINE
COUNTY LINE
TOWNSHIP or RANGE LINE
SECTION LINE
NATIONAL FOREST LINE
HIGHWAY RIGHT–OF–WAY LINE
UNFENCED PROPERTY
CUT LIMITS
FILL LIMITS
SECTION CORNER and 1/4 CORNER
POWER LINE and POLES
TELEPHONE LINE and POLES
TELEVISION LINE
WATER LINE
POLE GUY and ANCHOR
TRAFFIC SIGN
GUARD RAIL
DELINEATOR
BARBED WIRE FENCE
WOVEN WIRE FENCE
CATTLE GUARD
CULVERTS
CONCRETE BOX CULVERTS
GROUND LINE – EARTH
GROUND LINE – ROCK
EXISTING ROAD
SIDE ROAD TURNOUT
ROADWAY OBLITERATION
TREES and SHRUBS
CHANNEL or DITCH
DIKE or DITCH BLOCK
RIPRAP
RAILROAD TRACK
GAS LINE
SANITARY SEWER LINE
WELL
DWELLING
SCHOOL
CHURCH
WINDMILL
RIGHT–OF–WAY MONUMENT
CONTROL POINT
BORING LOCATION
OBJECT MARKERS

SHADING ON INSIDE OF LINE

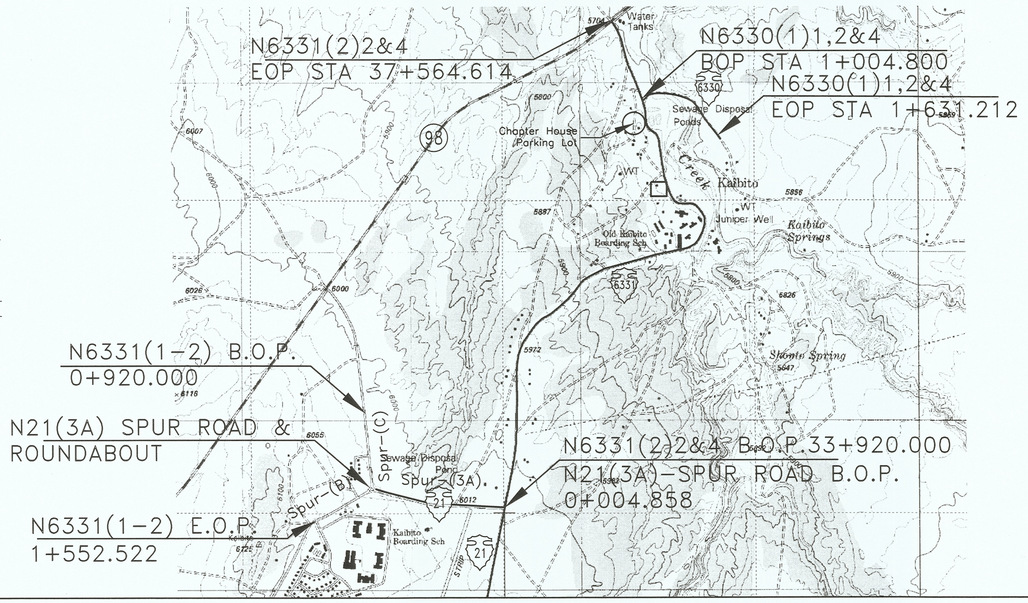
PLANNED EXISTING
ONE WAY–TYPE 1a TWO WAY–TYPE 1b GATE
WIDTH & TYPE
TYPE II TYPE III

INDIAN SERVICE COUNTY STATE FEDERAL

PAVED GRADED UNIMPROVED

PROJECT: N6330(1)1,2&4 N6331(2)2&4, N6331(1–2)2,4 & N21(3A) Spur Road

GRADE, DRAIN, AGGREGATE BASE COURSE, HOT ASPHALT CONCRETE PAVEMENT, AND MISCELLANEOUS CONSTRUCTION
– INCLUDING –
INSTALLATION OF 2–2.438 m SPAN x 1.820 m RISE QUADRUPLE OPENING CONCRETE BOX CULVERT
ROUNDABOUT & CHAPTER HOUSE PARKING LOT

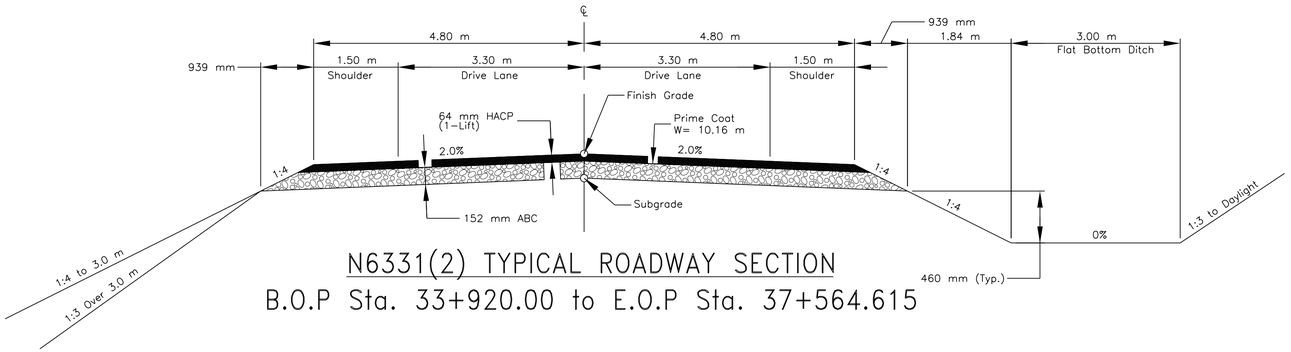


INDEX TO SHEETS	
SHT. NO.	DESCRIPTION
1	TITLE SHEET
2	TYPICAL SECTIONS N6330(1)–N6331(2)
3	TYPICAL CROSS SECTION – SPUR "B" & "C"
4	TYPICAL CROSS SECTION – N21(3A) SPUR ROAD & GENERAL NOTES
5	ROADWAY GENERAL NOTES CONTINUED
6–8	ESTIMATED QUANTITIES, & TURNOUT DETAILS
9–10	DRAINAGE STRUCTURES QTY. & SUPERELEV., ALIGN, & CONTROL POINT DATA
11	UTILITIES & QUANTITIES TABLES
12–17	ROADWAY PLAN AND PROFILE SHEET–N6330(1), 6331(2)
18–22	ROADWAY PLAN AND PROFILE SHEETS– N21(3A)
23	DRAINAGE STRUCTURE DETAILS & STRUCTURE QTY. TABLE FOR N21(3A)
24	ROUND–A–BOUT & INTERSECTION STRIPING DETAILS
25	HORIZONTAL ELEMENT TABLE FOR ROUND–A–BOUT
26	SIGN DETAILS FOR ROUND–A–BOUT
27	N21(3A) ROUND–A–BOUT GRADING PLAN
28–29	ROUNDABOUT DOME, SOLAR LIGHT POLE & SOLAR LED STREET LIGHT DETAILS
30	ROUND–A–BOUT–RPM SOLAR LED LIGHTING LOCATIONS
31	N21(3A)/N6331(1–2) ROUND–A–BOUT–RPM SOLAR LED LIGHTING DETAILS
32	CHAPTER HOUSE PARKING LOT TOPO DETAIL
33	CHAPTER HOUSE PARKING GRADING PLAN
34	CHAPTER HOUSE PARKING LOT PLAN & PROFILE
35	CHAPTER PARKING BASE LINE PLAN & PROFILE DETAILS
36	CHAPTER HOUSE STRIPING LAYOUT & SIGNS DETAILS
37	HANDICAP STRIPING, SIGNS & ASPHALT RAMP DETAILS
38	CHAPTER PARKING LOT STRIPING DETAILS
39	CONCRETE CURB, GUTTER AND SIDEWALK DETAILS
40	EMBEDMENT PANEL CURB RAMP TACTILE PAD DETAILS
41	CBC STRUCTURE LOCATION PLAN & PROFILE FOR N6330
42–43	BORING HOLES PLANS & BORING LOGS LOCATION
44	CAST–IN–PLACE 8 BARREL CONCRETE BOX CULVERT DETAILS
45	CONCRETE BOX WINGWALL DETAILS
46	CONCRETE BOX APRON DETAILS
47	CONCRETE JERSEY BARRIER & TRANSITION TO THRIE BEAM DETAILS
48	CAST–IN– PLACE CONCRETE BOX CULVERT REINFORCING BAR SCHEDULE
49	GRADING PLAN AND RIPRAP FOR BOX CULVERT STA.1+104.668 (N6330(1)
50	WIRE ENCLOSED RIPRAP EMBANKMENT DETAILS
51	GABION WALL DETAILS STA.36+560 TO STA.36+602
52–53	TEMPORARY TRAFFIC CONTROL DETAILS
54–55	STORMWATER POLLUTION PREVENTION CONTROL DETAILS
56	SIGN AND STRIPING DETAILS AND QUANTITIES
57	STRIPING AND SIGNING DETAIL & QUANTITIES
58	SQUARE TUBE, STEEL POST, REFLECTIVE PANEL & MILE POST MARKER DETAILS
59	SQUARE TUBE BREAK–A–WAY AND SIGN MOUNTING DETAILS
60	SQUARE TUBE POST SELECTION AND SIGN MOUNTING DETAILS
61	RIGHT OF WAY MONUMENT AND DELINEATOR LAYOUT DETAILS
62	CUT TO FILL TRANSITION AND SPILLWAY DETAIL
63	CULVERT RIPRAP DETAILS
64	TOE OF SLOPE RIPRAP & GABION LAYOUT DETAILS
65	GROUTED ROCK BERM DROP INLET DETAILS
66	WIRE ENCLOSED RIPRAP STILLING BASIN DETAILS
67	END SECTION AND CSPC LEAN CONCRETE BACKFILL DETAILS
68–70	GUARDRAIL CURBING, REFLECTOR TAB, TRANSITION AND THRIE BEAM DETAILS
71–73	GUARDRAIL & END TREAMMENT WITH STK–350 LAYOUT, 1 OF 3
74	GUARDRAIL CONCRETE SPILLWAY WITH WIRE ENCLOSED RIPRAP
75	DRAINAGE STRUCTURE INSTALLATION AND DITCH/DIKE DETAILS
76	PIPE GASKET AND HUGGER BAND DETAILS
77	PRECAST CONCRETE CATTLEGUARD DETAILS
78	CONCRETE DRAINAGE PAD FOR PRECAST CATTLEGUARD DETAILS
79	CATTLEGUARD LOCATION & WING BRACE DETAILS
80	STANDARD FENCING DETAIL
81	PAVEMENT RUMBLE STRIP DETAILS
82	WOVEN WIRE FENCE DETAILS
83–85	REVISE PIPE CROSS SECTION DETAIL FOR N6330, N6331
86	REVISED PIPE CROSS SECTION DETAIL FOR N21(3A)
87	N6330 PRECAST CONCRETE BOX CULVERTS WITH WINGWALL DETAILS
88	OPTIONAL PRECAST SEGMENT JOINT DETAILS
89	PRECAST BOX SEGMENT LAYOUT & LINK SLAB DETAILS
90	BOX HEADWALL CAP & CUTOFF WALL DETAILS
91	STANDARD PRECAST BOX CULVERT REBAR LAYOUT W/76mm CONC. COVER
92	PRECAST CONCRETE BOX CULVERT DETAILS–1
93	PRECAST CONCRETE BOX CULVERT DETAILS–4
94	PRECAST CONCRETE BOX CULVERT & WINGWALL DETAILS
95	MULTIPLE BARREL BOX CULVERT DETAILS
96	OPTIONAL WELDED WIRE REINFORCEMENT BENDING DIAGRAM

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

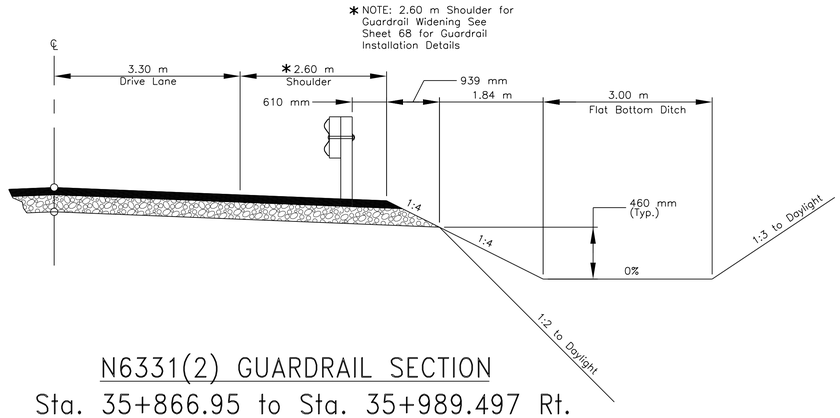
RECOMMENDED APPROVAL		APPROVAL	
AGENCY ROAD ENGINEER	DATE		
DIVISON MANAGER	7/18/18		
PLANNING & DESIGN BRANCH CHIEF	7/17/18	REGIONAL DIRECTOR	7/18/2018
			DATE

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	2	96
			N6331	N6331(2)2&4		



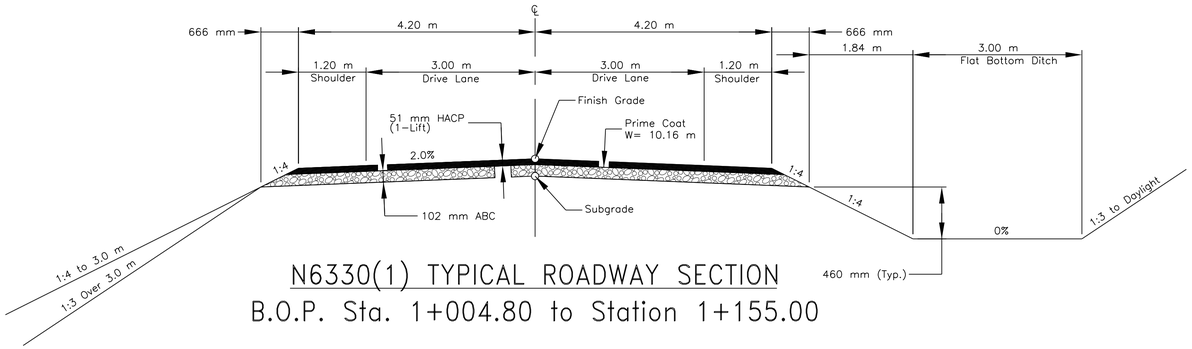
N6331(2) TYPICAL ROADWAY SECTION

B.O.P Sta. 33+920.00 to E.O.P Sta. 37+564.615



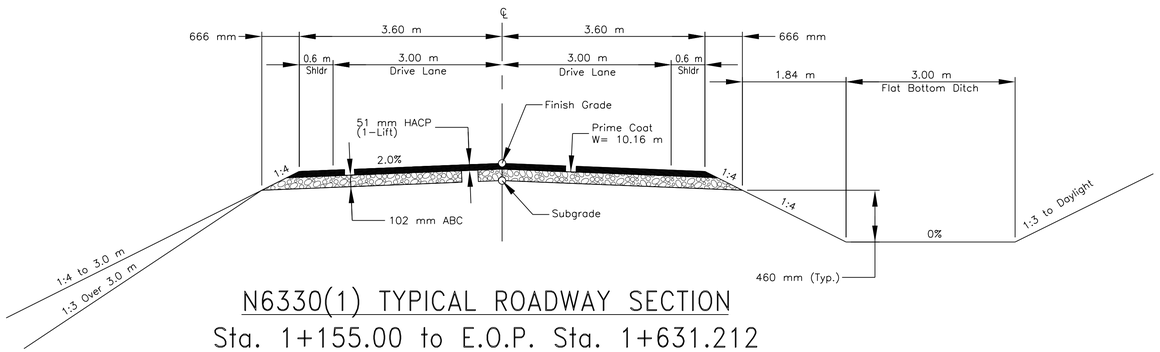
N6331(2) GUARDRAIL SECTION

Sta. 35+866.95 to Sta. 35+989.497 Rt.
Sta. 36+154.32 to Sta. 36+263.13 Rt.
Sta. 36+547.98 to Sta. 36+646.37 Rt.
Sta. 36+726.95 to Sta. 37+004.76 Rt.
Sta. 37+353.56 to Sta. 37+506.64 Rt.
Sta. 37+506.64 to Sta. 37+564.614 Lt. & Rt.



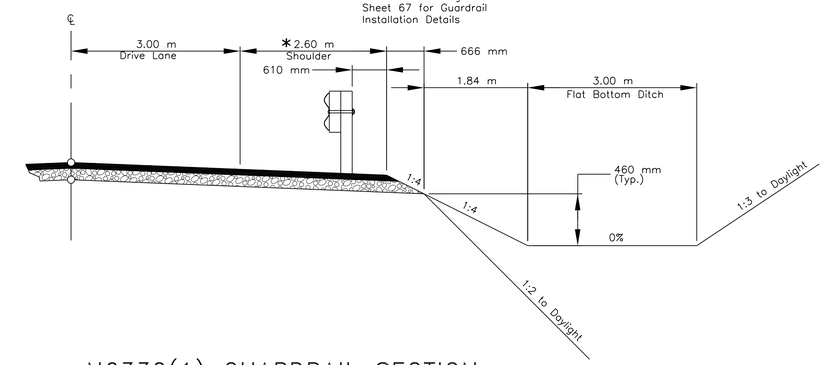
N6330(1) TYPICAL ROADWAY SECTION

B.O.P. Sta. 1+004.80 to Station 1+155.00



N6330(1) TYPICAL ROADWAY SECTION

Sta. 1+155.00 to E.O.P. Sta. 1+631.212



N6330(1) GUARDRAIL SECTION

Sta. 1+038.96 to Sta. 1+157.58 Lt. & Rt.
Sta. 1+272.13 to Sta. 1+375.00 Lt.

BASIS OF ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	GRADE	UNITS	APPLICATION
30101-2000	Aggregate Base Course	"D"	2244 kg/m^3	N6330(1) & Turnouts 102 mm N6331(2) 152 mm
40201-0500	Hot Asphalt Concrete Pavement, Class "B"	"B"	2404 kg/m^3	N6330(1) & Turnouts 51 mm (1-Lift) N6331(2) 64 mm (1-Lift)
40502-1100	Asphalt Cement	PG 58-28	0.9806 L/kg	6.0% By Weight Of Total Mix
41101-5000	Prime Coat	PEP	1056 L/t	1.36 L/sm , Apply on Top of ABC

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

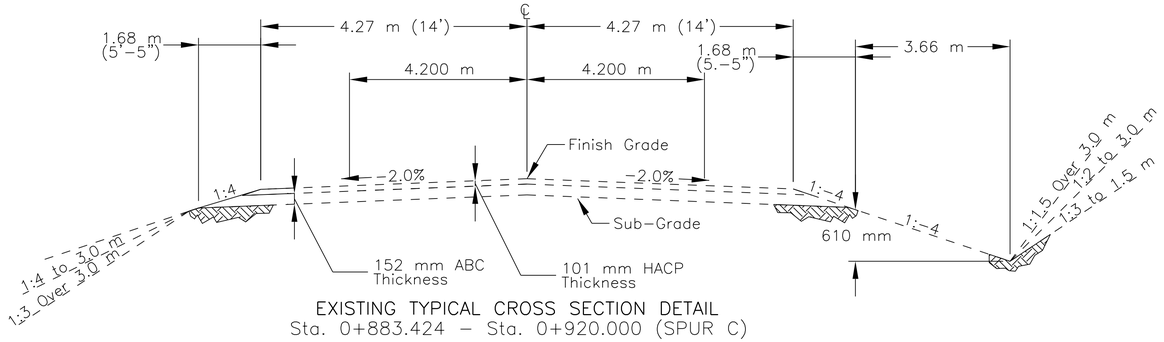
TYPICAL SECTIONS N6330(1)-N6331(2)

Designed by: RDL
Drawn by: RDL Date: 06-07
Revised by: 9/25/17 Date: 06/09/15
File Name: rev_N6331-Typical & Notes_72310

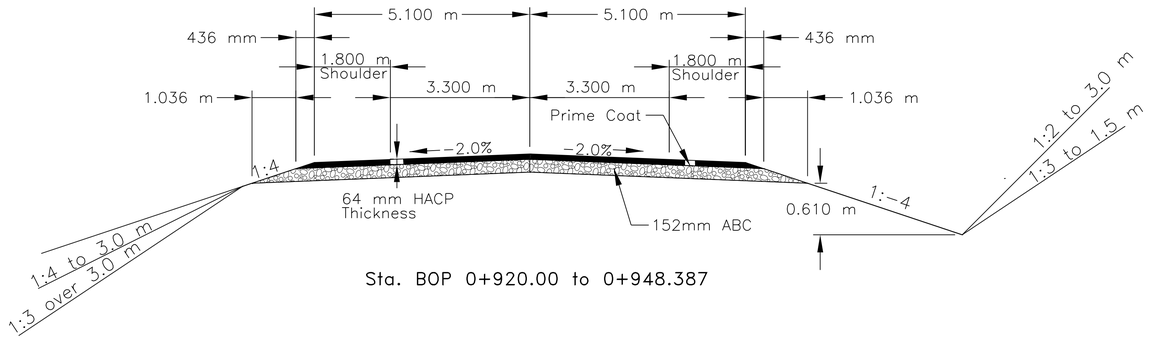
Sht_2 N6331-Typical Sections 06-16-2016.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A) SPUR	3	96
			N6331	N6331(1-2)		

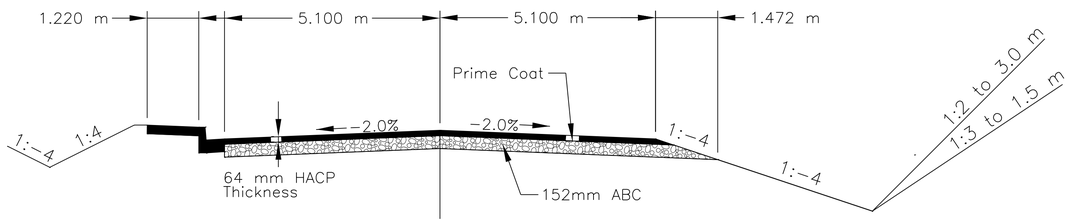
N6331(1-2); SPUR C



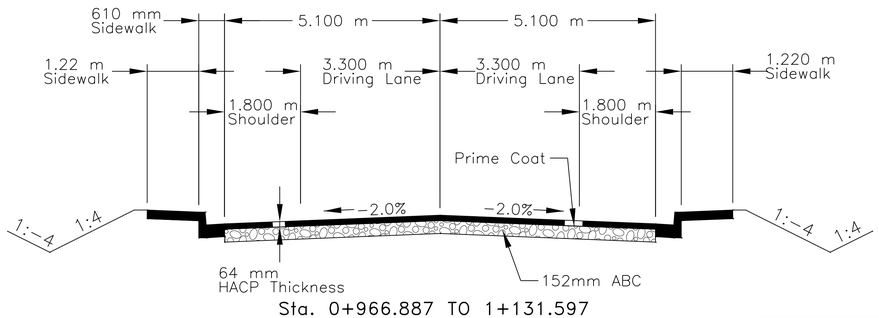
EXISTING TYPICAL CROSS SECTION DETAIL
Sta. 0+883.424 - Sta. 0+920.000 (SPUR C)



Sta. BOP 0+920.00 to 0+948.387

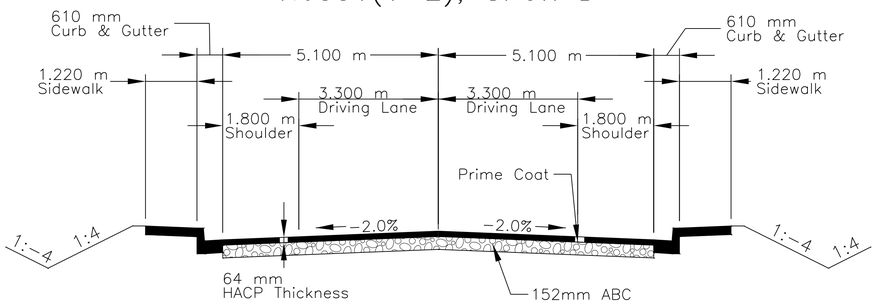


Sta. 0+948.387 TO 0+966.887

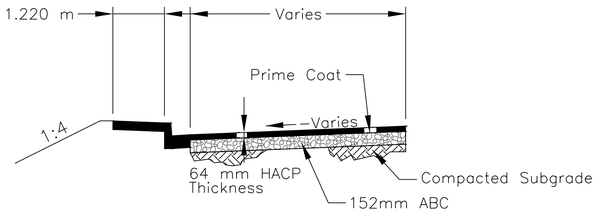


Sta. 0+966.887 TO 1+131.597

N6331(1-2); SPUR B



Sta. 1+171.597 TO EOP 1+552.522



CHAPTER HOUSE PARKING LOT
TYPICAL SECTION
(SEE SHEET 32 TO 36 FOR DETAIL)

SEQUENCE OF PAVEMENT RECONSTRUCTION

1. ON THE N6331(1-1) PROJECT, THE CONTRACTOR SHALL BE REQUIRED TO MILL THE ENTIRE EXISTING ASPHALTIC CONCRETE PAVEMENT STRUCTURE TO MINUS 76 mm SIEVE SIZE. THE CONTRACTOR HAS THE OPTION TO UTILIZE COLD MILLING MACHINE OR OTHER APPROVED CONSTRUCTION METHOD TO PULVERIZE THE EXISTING PAVEMENT STRUCTURE.
2. THIS PULVERIZED MATERIAL SHALL BECOME AVAILABLE EMBANKMENT MATERIALS FOR USE ON THE PROJECT IN THE LOWER EMBANKMENT LAYERS. PLACE NEW PCC CURB, GUTTER, SIDEWALK, AND ROUNDABOUT.
3. THE CONTRACTOR SHALL HAUL AND PLACE 152mm OF NEW AGGREGATE BASE COURSE ON TOP OF FINISHED SUBGRADE.
4. AT ALL NEW AND RECONSTRUCTED TURNOUTS, THE CONTRACTOR SHALL FINISH AND PLACE 152mm OF NEW AGGREGATE BASE COURSE ON THE FINISHED AND APPROVED SUBGRADE.
5. THE CONTRACTOR SHALL THEN PLACE 64 mm (ONE LIFT) OF HOT ASPHALTIC CONCRETE PAVEMENT AT ALL THE ABOVE PROJECT AND TURNOUTS.
6. THE CONTRACTOR SHALL SAW CUT THE EXISTING PAVEMENT AT BEGINNING OF PROJECT (BOP), AND ALL EXISTING TURNOUTS, AND MATCH THE NEW PAVEMENT WITH THE EXISTING TO PROVIDE A SMOOTH TRANSITION.
7. THE CONTRACTOR SHALL PROVIDE FOR A SAFE AND RELATIVELY DUST FREE DRIVING SURFACE THROUGHOUT THE RECONSTRUCTION PROCESS FOR ALL SCHOOL AND LOCAL TRAFFIC USE DAY AND NIGHT. THE CONTRACTOR'S TRAFFIC CONTROL AND CONSTRUCTION SEQUENCING PLAN SHALL INCLUDE THESE REQUIREMENTS AND SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BEFORE ANY GROUND DISTURBING ACTIVITIES TAKING PLACE.

BASIS OF ESTIMATED QUANTITIES

ITEM NO:	DESCRIPTION	GRADE	UNITS	APPLICATION
30101-2000	UNTREATED AGGREGATE BASE COURSE	"D"	2268 kg/m³	152 mm-Mainline, 102mm-Turnouts
40201-0500	HOT ASPHALT CONC. PVMT. CLASS "B"	"B"	2430 kg/m³	64 mm Mainline, (51 mm Turnouts)
40502-0800	ASPHALT CEMENT	PG-64-22	0.9806 L/kg	6% by weight of total mixture
41101-5000	ASPHALT PRIME COAT	PEP	1.056 L/kg	1.13 L/m²

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

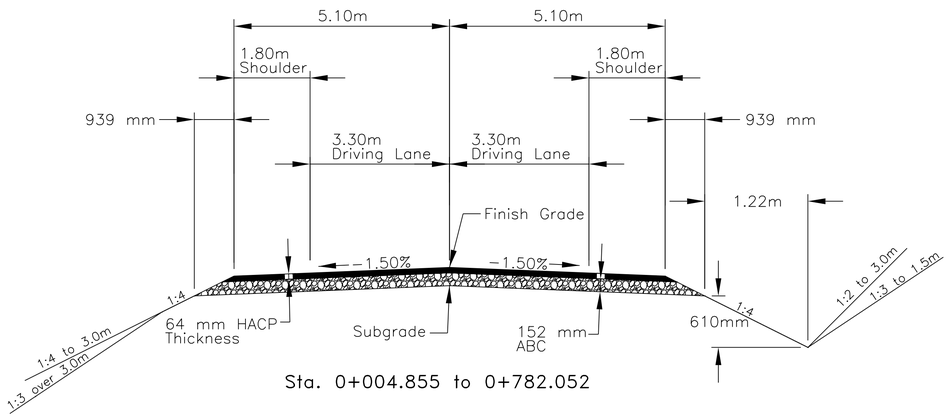
TYPICAL CROSS SECTION SPUR. "B"&"C"

DRAWN BY: NRDOT	DATE: 6/23/2015
DESIGNED BY: NRDOT	DATE: 6/23/2015
REVISED: 11/7/2017	BY: Design 2
Sht_3 Typical Section Spur C & B.dgn 062315.dgn	

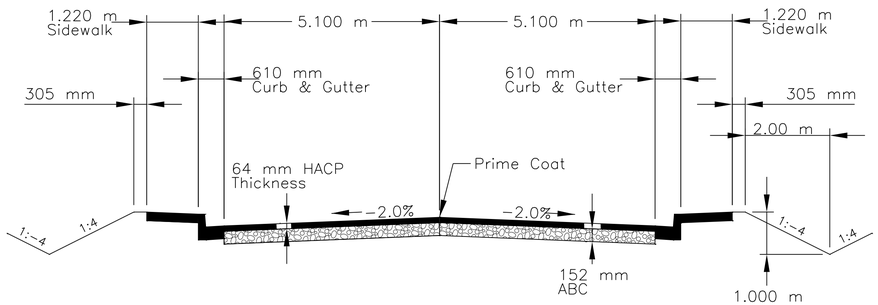
Sht_3 Typical Section Spur C & B.dgn 062315.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	4	96
			N6331	N6331(1-1)(2)2&4		
			N21	N21(3A)2&4		

N21(3A) SCHOOL ACCESS (SPUR A)



Sta. 0+004.855 to 0+782.052



Sta. 0+782.052 to EOP 0+796.914

GENERAL NOTES

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

2. ALL PERMANENT AND TEMPORARY ROADSIDE SIGNS, AND PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS (LATEST EDITION) AND IN ACCORDANCE WITH THE DETAILS ON THESE PLANS. PLACEMENT OF "STOP" BAR, PERMANENT TRAFFIC SIGNS AND OTHER PAVEMENT MARKINGS SHALL BE FIELD ADJUSTED AS DIRECTED BY THE COR/COTR, 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 GOVERNMENT SHALL SUBMIT A COPY OF THE CONTRACTORS TRAFFIC CONTROL PLAN, RELATED TO THE WORK AT THE SR98 JUNCTION, TO ADOT FOR APPROVAL

.

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 APPROVAL OF THE NAVAJO DIVISION OF TRANSPORTATION (NDOT) AND THE COTR THROUGH THE CONTRACTING OFFICER (CO), 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 APPROVAL OF THE COTR THROUGH THE NDOT.

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. BIDDERS ARE REFERRED TO THE CONTRACT CLAUSES OF THE SPECIAL CONTRACT REQUIREMENTS, EXHIBIT C.

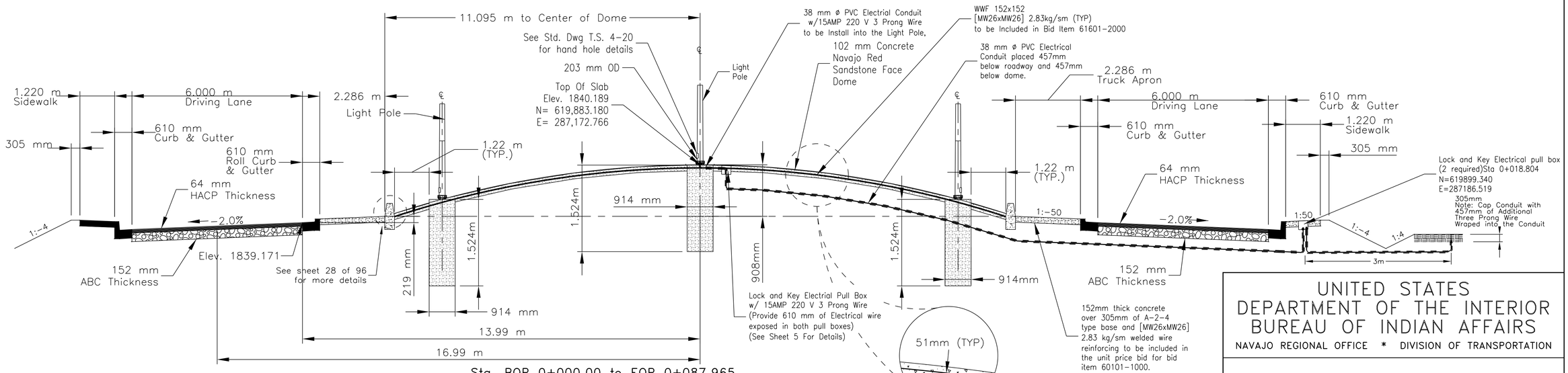
7. THE CONTRACTOR IS REQUIRED TO SUBMIT A REVISED PIPE LIST TO THE COR/COTR, THROUGH THE CONTRACTING OFFICER, BASED ON THE FIELD STAKING IN ACCORDANCE WITH SECTION 152 OF THE CONTRACT SUPPLEMENTAL SPECIFICATION. THE APPROVAL OF ANY AND ALL REVISED PIPE LISTS WITH ACCOMPANYING DRAWINGS IS RENDERED AS 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 THESE 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 APPROVAL BY THE OWNER UNLESS OTHERWISE SHOWN ON THESE PLANS. IN NO CASE SHALL ANY WORK BE PERFORMED OUTSIDE THE DESIGNATED RIGHT-OF-WAY LIMITS WITHOUT WRITTEN APPROVAL FROM THE OWNER. THE CONSTRUCTION LIMIT IS THE CATCH POINT EARTHWORK LIMIT PLUS 3.0 METERS, NOT TO EXCEED THE RIGHT-OF-WAY OR WORK AREA LIMITS UNLESS OTHERWISE SHOWED HEREIN.

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, EXHIBIT C. THE CONTRACTOR IS REQUIRED TO SUBMIT COURTESY COPY OF THE APPROVED SWPPP TO THE NAVAJO NATION EPA OFFICE AND HAVE A COPY AVAILABLE ON THE PROJECT SITE AT ALL TIMES.

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.

ROUND-ABOUT TYPICAL



Sta. BOP 0+000.00 to EOP 0+087.965
See Sheet 27 of 96 on Roundabout Details.

BASIS OF ESTIMATED QUANTITIES

ITEM NO:	DESCRIPTION	GRADE	UNITS	APPLICATION
30101-2000	UNTREATED AGGREGATE BASE COURSE	"D"	2244 kg/m³	152 mm-Mainline, 102mm-Turnouts
40201-0500	HOT ASPHALT CONC. PVMT. CLASS "B"	"B"	2404 kg/m³	64 mm Mainline, (51 mm Turnouts)
40502-0800	ASPHALT BINDER	PG-58-28	0.9806 L/kg	6% by weight of total mixture
41101-5000	ASPHALT PRIME COAT	PEP	1.056 L/kg	1.36 L/m²

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

TYPICAL SECTION N21(3A) SPUR ROAD & GENERAL NOTES

DRAWN BY: NRDOT	DATE: 7/24/2015
DESIGNED BY: NRDOT	DATE: 7/24/2015
REVISED: 11/07/2017	BY: Design 2

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_4 N21(3)&Round-a-bout_Typical 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	5	96
			N6331	N6331(2)2&4		

CONTINUE NOTES ON SHEET 4 of 96

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

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

13. AT ABANDONED TURNOUTS SPECIFIED ON THE PLANS TO BE BLOCKED, A TYPE "A" EARTHEN DITCH DIKE SHALL BE CONSTRUCTED ACROSS THE TURNOUT AS DIRECTED BY THE COR/COTR. THE DIKES SHALL BE 1.0 METER IN HEIGHT AND PAID FOR UNDER BID ITEM 20443-1000. ALL OBLITERATED AREAS SHALL BE SEEDED AND MULCHED AS PER SPECIFICATIONS AND PAID FOR UNDER BID ITEM 62510-1000.

14. STRUCTURAL EXCAVATION AND BEDDING/BACKFILL OF ALL DRAINAGE STRUCTURES (CULVERTS AND CONCRETE HEAD/WING WALLS) SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF STRUCTURES. BEDDING AND BACKFILL MATERIAL SHALL MEET ALL REQUIREMENTS OF FP-03, SECTIONS 209 AND 704. APPROVED EXCESS EXCAVATION MATERIAL MAY BE USED TO REBUILD TURNOUTS, AND EARTHEN DITCH BLOCKS.

15. 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. 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/COTR. THIS WORK SHALL BE INCIDENTAL TO BID ITEMS UNDER SECTIONS 602, 603, AND 607.

16. IMMEDIATELY PRIOR TO PLACING AGGREGATE BASE COURSE (ABC), THE TOP 152 mm OF THE ORIGINAL GROUND AND/OR FINISHED SUBGRADE (INCLUDING TURNOUTS) SHALL BE CHECKED FOR COMPACTION AND GRADE. IF THE SUBGRADE OR NOT MEET THE MINIMUM SPECIFIED COMPACTION AND TOLERANCE REQUIREMENTS, THE SUBGRADE SHALL BE 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 ABC SURFACING MATERIAL BE PLACED ON FROZEN, MUDDY OR UNSTABLE NATURAL GROUND OR SUBGRADE.

17. THE EARTHWORK TABLE SHOWN IS TO ASSIST THE CONTRACTOR IN ESTABLISHING A BID UNDER THE EARTHWORK ITEMS SHOWN IN THE BID SCHEDULE. ANY BORROW MATERIAL CALLED FOR ON THE PLANS SHALL BE TAKEN FROM CONTRACTOR IDENTIFIED SOURCES OUTSIDE THE RIGHT-OF-WAY LIMITS. IT IS THE SOLE RESPONSIBILITY AND EXPENSE OF THE CONTRACTOR TO PROVIDE ANY NECESSARY BORROW MATERIAL FOR THIS PROJECT INCLUDING ALL NECESSARY PERMITS. ALL EXCAVATION, BORROW, WASTE AND EMBANKMENT MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 20401-0000 AND 20403-0000.

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

19. 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 NAVAJO TRIBAL UTILITY AUTHORITY (NTUA) AT (928)-729-5721, FRONTIER COMMUNICATION COMPANY AT (928)-871-3748, NAVAJO HOUSING AUTHORITY (NHA) AT (928)-729-6605, AND NAVAJO NATION DIVISION OF NATURAL RESOURCES AT (928)-729-4003, 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.

20. 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 SCHOOL PROPERTY, AS DETERMINED BY THE COR SHALL BE TAKEN TO THE CHAPTER HOUSE ALONG N6331(2). THE SCHOOL AND CHAPTER AS PART OF THIS PROJECT SHALL BE OFFERED THE SALVAGED MATERIALS. IF THEY ACCEPT THE MATERIAL, THE CONTRACTOR SHALL HAUL AND STOCKPILED THE MATERIALS INSIDE THE SCHOOL OR CHAPTER PROPERTY DESIGNATED AREA. ANY MATERIALS DETERMINED TO BE UNUSEEABLE BY THE COR SHALL BE DISPOSED OF BY THE CONTRACTOR IN ACCORDANCE WITH SECTIONS 107, AND 203. THE SALAVAGE WORK SHALL BE INCLUDED IN THE APPROPRIATE UNIT PRICE BID ITEMS FOR SECTIONS 203 AND/OR 607.

21. 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 AS SHOWN. IN THIS CASE, THE NDOT COTR, 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.

22. THE CONTRACTOR SHALL SAW CUT (FULL DEPTH) THE EXISTING ASPHALT PAVEMENT (INCLUDING NHA DRIVEWAYS) WHERE OLD ASPHALT IS TO TIE INTO THE NEW 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. 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.

23. 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.

24. 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 FENCING 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 TENSION IS LOST IN THE EXISTING FENCE, THE CONTRACTOR SHALL RE-TIGHTEN THE FENCE AS DIRECTED BY THE COR.

25. THE CONTRACTOR SHALL REMOVE BIA ROUTE N21 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 AT LEAST THREE (3) WORKING DAYS IN ADVANCE OF SUCH SIGN REMOVAL. THESE ROADSIDE SIGNS SHALL BE SALVAGED AND TAKEN TO THE WESTERN AGENCY MAINTENANCE YARD. SIGNS NEEDED FOR SAFETY/INFORMATION SHALL BE TEMPORARILY RESET AS DIRECTED BY THE COR. ALL COUNTY ROUTE SIGNS SHALL BE REMOVED AND STOCKPILED, AND NOTIFY THE MAINTENANCE DEPARTMENT AT (928)-283-2299 FOR MATERIAL PICK UP. THIS WORK SHALL BE CONSIDERED AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.

26. GRADE AND SHAPE THE SHOULDER AND DITCHES (AS DIRECTED BY COR) 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

.

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

28. DUE TO NARROW RIGHT-OF-WAY WIDTHS AT VARIOUS LOCATIONS OF PROJECT N6331, 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. THIS WORK IS INCIDENTAL OBLIGATIONS OF THE CONTRACTOR UNDER THE EARTHWORK BID ITEMS.

29. THERE MAY BE A NUMBER OF ARCHAEOLOGICAL SITE MITIGATIONS THAT ARE NOTED ON THE PLANS. THE CONTRACTOR SHALL NOTIFY THE NDOT PROJECTS OFFICE, TAFT BLACKHORSE, 505-371-8394 AS REQUIRED PRIOR TO STARTING CONSTRUCTION ACTIVITIES IN THESE LOCATIONS. SEE THE SPECIAL CONTRACT REQUIREMENT SECTION OF THE CONTRACT FOR ADDITIONAL INFORMATION, AND REQUIREMENTS LOCATED ALONG THE PROJECT ROW. THEIR ARE A NUMBER OF ISOLATED ARCHAEOLOGICAL SITES, OUTSIDE OF THE ROAD RIGHT-OF-WAY, THAT ARE TO BE ENCIRCLED WITH FENCING. THE CONTRACTOR SHALL CONTACT AND WORK WITH NDOT IN ORDER TO ENSURE THE FENCINGS ARE PLACED CORRECTLY. THE CONTRACTOR SHALL PLACE TEMPORARY FLEXIBLE SAFETY FENCE AROUND THE ARCHAEOLOGY SITE(S). THE FENCING MATERIAL SHALL BE SQUARE LINK (ORANGE COLOR) PLASTIC TYPE MADE OF HI-DENSITY HDPE, AS PER SECTION 710.11 OF FP-03. TEMPORARY ARCHAEOLOGY FENCING SHALL BE CONSIDERED INCIDENTAL OBLIGATIONS OF THE CONTRACTOR AND NO ADDITIONAL PAYMENT SHALL BE MADE.

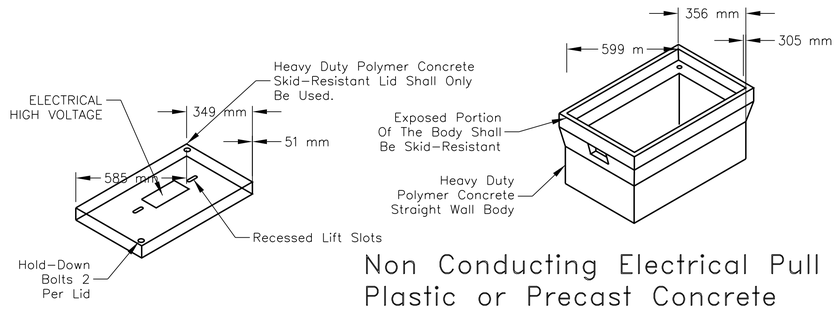
30. THE GEO-TECHNICAL REPORT FOR THIS PROJECT SHALL BE PROVIDED UPON WRITTEN REQUEST FROM THE CONTRACTOR THRU CO/COR.

31. 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/COR.

32. ANY EXISTING MAIL BOXES, ADVERTISING BILLBOARDS, OR HOUSE ADDRESS SIGNS ARE LOCATED ALONG THE ROADWAY PRISM SHALL BE REMOVED AND RE-INSTALLED OUTSIDE OF THE RIGHT-OF-WAY LIMIT OR AS DIRECTED BY THE COR/COTR. 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.

33. 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.

34. 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. THIS WORK TO BE INCIDENTAL TO BID ITEM 61901-1000, 62101-0000, AND 62102-0000, AND NO ADDITIONAL PAYMENT WILL BE MADE.



Non Conducting Electrical Pull Box
Plastic or Precast Concrete

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

ROADWAY GENERAL NOTES AND TURNOUT DETAILS

Designed by: RDL	
Drawn by: RDL	Date: 06-07
Revised by: 9/25/17	Date: 05/18/15
File Name: rev_N6331-Typical & Notes_72310	

Sht_5 N6331-Roadway General Notes & Turnout Details_051815.dgn

ESTIMATED QUANTITIES

	DESCRIPTION	N6330(1)	N6331(2)	N21(3A)	ROUNDABOUT	CHAPTER HOUSE	N6331(1-2) SPUR B & C	TOTAL	UNITS	AS-BUILT
10901-0000	Extra & Miscellaneous Work - Authorized under Section 109.02(m)	All Required	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum	
15101-0000	Mobilization	All Required	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum	
15201-0000	Construction Survey & Staking	All Required	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum	
15301-0020	Contractor Quality Control	2,050	3,000	500	200	200	100	6,050	Man Hr	
15701-0000	Temporary Erosion Control	All Required	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum	
15708-0000	Temporary Straw Mulching	1.14	5.46	0.31	0.05	0.29	0.64	7.9	ha	
20102-0000	Clearing and Grubbing	All Required	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum	
20304-1000	Removal of Structures and Obstructions	All Required	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum	
20401-0000	Roadway Excavation	20,514	27,368	147	4	829	1,573	50,435	m^3	
20402-0000	Sub-Excavation	218.00						218.00	m^3	
20403-0000	Unclassified Borrow		10,730	18,466	1,799	5,228	2,241	38,464	m^3	
20425-2000	Furrow Ditches	23.00	34.00					57.00	m	
20443-1000	Earthen Dike/Berm, Type "A"	10.00	30.00					40.00	m	
20601-0000	Development of Water Supply	2.41	8.50	2.11	0.22	1.11	0.75	15.10	M-liter	
20802-0000	Foundation Fill	260.00						260.00	m^3	
21102-2000	Roadway Obliteraton, Method 2	1,776.0	5,448.0					7,224.0	m^2	
25101-2000	Placed Riprap, Class 2	357.0	744.3	17.3		7.1	16.0	1,141.7	m^3	
25110-2000	Grouted Riprap, Class 2	8.1	1,051.8			29.3		1,089.2	m^3	
25112-2000	Wire Enclosed Riprap, Class 2	1,056.5	2,129.8					3,186.3	m^3	
25302-1000	Gabions, Aluminized Coated, Class 2		952.0					952.0	m^3	
25305-1000	Revet Mattress, Aluminized Coated Class 2		178.0					178.0	m^3	
30101-2000	Untreated Aggregate Base, Grading "Special"	1,542	15,897	3,463	243	2,108	2,419	25,672	t	
40201-0500	Hot Asphaltic Concrete Pavement, Class "B", Grade "B", Type III Smoothness	770	6,545	1,461	110	950	1,066	10,902	t	
40502-1100	Asphalt Cement, Grade PG 58-28	46.0	393.0	87.0	7.0	57.0	65.0	655.0	t	
41101-5000	Asphalt Prime Coat, Penetrating Emulsified Prime (PEP)	8.0	55.0	13.0	1.0	8.0	9.0	94.0	t	
60101-0000	Minor Concrete, Class A(AE)	13.0	4.0	3.0	28.3			48.3	m^3	
60101-1000	PCC Concrete, Truck Apron, 152mm Thick Class A(AE) rough broom finish with PCC navajo red chevron (30				175.5			175.5	m^2	
60201-0810	610 mm Corrugated Steel Pipe, Aluminized		120.00	24.00				144.00	m	
60201-0910	762 mm Corrugated Steel Pipe, Aluminized		96.00	52.00				148.00	m	
60201-1010	914 mm Corrugated Steel Pipe Aluminized		71.00					71.00	m	
60201-1210	1219 mm Corrugated Steel Pipe Aluminized		69					69.00	m	
60202-0510	711 mm Span x 508 mm Rise Corrugated Steel Pipe Arch - Aluminized	26.00	370.00	55.00		62.00		513.00	m	
60202-0610	889 mm Span x 610 mm Rise Corrugated Steel Pipe Arch - Aluminized		47.00	22.00				69.00	m	
60224-1900	2.44 m Span x 1.82 m Rise Quadruple Barrel Concrete Cast in Place Box Culvert with Headwalls, Cutoff Walls, Wingwalls, & Concrete Apron.	17.00						17.00	m	
60224-1901	2.44 m Span x 1.82 m Rise Quadruple Barrel Concrete PreCast Box Culvert with Headwalls, Cutoff Walls, Wingwalls & Concrete Apron (2.44m x 1.82m Box Segment) - Alternate	17.069						17.07	m	
60210-0810	End Section for 610 mm Pipe Culvert - Aluminized		12	4				16	Each	
60210-0910	End Section for 762 mm Pipe Culvert - Aluminized		3	2				5	Each	
60210-1010	End Section for 914 mm Pipe Culvert - Aluminized		5					5	Each	
60210-1210	End Section for 1219 mm Pipe Culvert - Aluminized		3					3	Each	
60211-0910	End Section for 711 mm Span x 508 mm Rise, CSPA Aluminized	3	44	7		2		56	Each	
60211-1010	End Section for 889 mm Span x 610 mm Rise, CSPA Aluminized		2					2	Each	
60701-1000	Remove, Clean & Stockpiling Culvert		66.00	28.00				94.00	m	
60812-0200	Concrete Spillway, Type IV-2 for Guardrail		2					2	Each	
60812-0410	Concrete Spillway, Type IV-1 for Concrete Curb					3	2	5	Each	
60901-2300	Asphalt Concrete Curb, 152 mm Depth for Guardrail		210.00					210.00	m	
60902-1000	PCC Curb & Gutter, Class A(AE), 305 mm Depth				137.40	479.00	1,085.00	1,701.40	m	
60902-1050	PCC Roll Curb & Gutter, Class A(AE), 305 mm Depth				215.0			215.00	m	
61401-0000	Lean Concrete Backfill		4.00					4.00	m^3	
61501-0100	Sidewalk, Concrete, 1.22 m Wide, 102mm thick					594.00	1,952.00	2,546.00	m^2	
61505-1000	Handicap Ramp, Concrete				6	8	11	25	Each	
61601-1000	Concrete Slope Paving, 102mm thickness	13.00						13.00	m^2	
61601-2000	Concrete Slope Paving with Navajo Red Concrete for Roundabout Dome and Islands 102mm thickness				455.90			455.90	m^2	
61701-5000	Guardrail System, SGR04b, Type PD02 with SKT-350 End Treatment and Concrete Transitions	300.00	814.00					1,114.00	m	
61801-0000	Precast Concrete Jersey Barrier for guardrail	61.00	24.00					85.00	m	
61801-0010	Concrete Wall barrier for Roundabout				10.00			10.00	m^3	
61901-0100	Woven Wire Fencing	145.00	7,230.00	1,430.00			1,338.00	10,143.00	m	
61901-1000	Barbed Wire Fence, 5 Strand	1,015.00					73.40	1,088.40	m	
61902-2600	Gate, Type II						1	1	Each	
61902-4510	Gate, Type III (Pedestrian)		35				1	36	Each	
61903-0310	Cattleguard, 2 Unit 4900 mm with Type II Gate	1	2				3	6	Each	
61903-0311	Cattleguard, 2 Unit 4900 mm without Gate	1	12	2				15	Each	
61903-0710	Cattleguard, 3 Unit 7190 mm with Type II Gate		1					1	Each	
61903-0711	Cattleguard, 3 Unit 7190 mm without Gate		23	7				30	Each	
61903-1010	Cattleguard, 4 Unit 9480 mm without Gate						1	1	Each	
61903-1211	Cattleguard, 5 Unit 12250 mm with Type II Gate		1					1	Each	
61921-1010	Removal of Fence		505.00		68.00	102.00		675.00	m	
62101-0000	Right-of-Way Monument	18	43	16			8	85	Each	
62102-0000	Reference Marker	18	43	16			8	85	Each	
62510-1000	Seeding, Dry Method	1.20	6.00	3.00	0.05	0.30	0.64	11.19	ha	
62901-1100	Erosion Control Matting, Type IV		2,210.00					2,210.00	m^2	
63302-2001	Sign Installation, 1 Post 38 mm x 38 mm Steel Square Tube	0.67	0.56	0.58	0.75	2.24		4.80	m^2	
63302-2002	Sign Installation, 1 Post 44 mm x 44 mm Steel Square Tube	5.80	10.23	6.48	3.12	1.56	0.92	28.11	m^2	
63302-2003	Sign Installation, 1 Post 50 mm x 50 mm Steel Square Tube	0.77	2.86		4.62		0.77	9.02	m^2	
63302-2004	Sign Installation, 1 Post 57 mm x 57 mm Steel Square Tube				2.88			2.88	m^2	
63302-2006	Sign Installation, 2 Post 50 mm x 50 mm Steel Square Tube	1.04	2.20	1.88			4.40	9.52	m^2	
63302-2007	Sign Installation, 2 Post 57 mm x 57 mm Steel Square Tube				5.01		1.12	6.13	m^2	
63308-2000	Object Marker, Type 2, 38 mm x 38 mm Steel square tube	2	24	8				34	Each	
63308-3000	Object Marker, Type 3, 38 mm x 38 mm Steel square tube	4						4	Each	
63309-0010	Delineators, Type "1a", 38 mm x 38 mm Steel square tube	4		8	4			16	Each	
63309-0020	Delineators, Type "1b", 38 mm x 38 mm Steel square tube	18	78	12				108	Each	
63313-0000	Rumble Strip		3					3	Each	
63318-1000	Milepost, 38 mm x 38 mm Steel square tube	4	8	4				16	Each	
63401-1510	Pavement Markings, Type "H", Double Solid Yellow 102mm wide each strip	606.00	3,641.00	701.00			521.00	5,469.00	m	
63401-1511	Pavement Markings, Type "H" Solid Yellow 102mm wide			67.60	90.80		135.20	293.60	m	
63401-1512	Pavement Markings, Type "H" Solid Yellow 200mm wide diagnol stripes				10.50			10.50	m	
63401-1520	Pavement Markings, Type "H", Solid White 102mm wide	1,168.00	6,382.00	1,291.00	25.00	980.00	850.00	10,696.00	m	
63401-1620	Pavement Markings, Type "H", Broken White 102mm wide				31.60			31.60	m	
63405-3160	Pavement Markings, Type "H", " YIELD" Word Message				3			3	Each	
63405-3250	Pavement Markings, Type "H", Handicap Symbol					12		12	Each	
63405-3260	Pavement Markings, Type "H", "Stop" Bar Solid White 203mm wide	2	3	4			4	13	Each	
63405-3280	Pavement Markings, Type "H", Zebra Crosswalk, Solid White 610mm wide				3		2	5	Each	
63405-3290	Pavement Markings, Type "H", Diagonal and Island Striping, Solid Yellow 102mm wide					10		10	Each	
63405-3300	Pavement Markings, Type "H", Handicap Island Striping, Solid Blue 305mm wide					15		15	Each	
63406-0000	Raised Pavement Markers, *"Solarmarkers"* Type MS200 Yellow Single with shaft				56			56	Each	
63501-0000	Temporary Traffic Control	All Required	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum	
63502-3000	Temporary Traffic Control, Raised Pavement Markers, Yellow	270	1,621	344			281	2,516	Each	
63509-1000	Flaggers	200.00	2,800.00	600.00	600.00	800.00	560.00	5,560.00	Man Hr	
63610-1600	15amp, 220v three prong wire with 38mm PVC Electrical Conduit installed				100.00			100.00	m	
63612-1300	Luminaire, Solar LED street light with 8.0 m pole, mast arms, solar panel, Control Box, wiring,				4			4	Each	
63621-1000	Utility box, pullbox				2			2	Each	

ITEM 20304-1000: REMOVAL OF STRUCTURES & OBSTRUCTIONS

N21(3A) SPUR "A"		
STATION	LOCATION	REMARKS
0+030.00	centerline	Remove and salvage 4 Unit cattleguard
0+200.00	Left	Remove church sign and set aside for owner
0+615.00 - 0+710.00	centerline	Remove existing 3- cattleguard and fencing
0+809.60	centerline	Remove 68m existing fence
SPUR C	centerline	Remove existing 3- cattleguard and fencing
0+620.00	Left	Remove existing 2- cattleguard and fencing

ITEM 61501-0100: PCC SIDEWALK

STATION TO STATION	LOCATION:	AREA (m^2)	REMARKS:
0+951.00 to 1+541.00	right	1,149.00	Spur Road "C"/Spur "B"
0+948.00 to 0+782.00	left	298.00	Spur Road "C"/N21(3A)
0+782.00 to 1+541.00	left	505.00	N21(3A)/Spur Road "B"
Varies		163.88	Parking Lot; Chapter Entrance
Varies		313.58	Parking Lot; South side.
Varies		117.12	Parking Lot; West side
	TOTAL:	2,546.58	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	6	96
			N6331	N6331(1-1)(2)2&4		
			N21	N21(3A)2&4		

PAVEMENT SURFACING ESTIMATED QUANTITIES

Description:	Location:	Offset:	Aggregate base course (t)	HACP (t)	Asphalt Cement PG58-28	Asphalt Prime coat (t)	Remark:
N21(3A)- Spur Road	centerline	centerline	3,112.00	1,290.00	77.00	11.00	Mainline
turnout; residential	0+132	right	30.99	14.77	0.89	0.17	4.50 m wide turnout
turnout; Chapter Warehouse	0+132	left	41.23	20.24	1.21	0.23	7.00 m wide turnout
turnout; Church	0+228	left	41.23	20.24	1.21	0.23	7.00 m wide turnout
turnout; residential	0+228	right	41.23	20.24	1.21	0.23	7.00 m wide turnout
turnout; clustered housing	0+362	left	41.23	20.24	1.21	0.23	7.00 m wide turnout
turnout; clustered housing	0+428	left	41.23	20.24	1.21	0.23	7.00 m wide turnout
turnout	0+538	right	30.99	14.77	0.89	0.17	4.50 m wide turnout
turnout; clustered housing	0+725	right	41.23	20.24	1.21	0.23	7.00 m wide turnout
turnout; proposed market	0+770	right	41.23	20.24	1.21	0.23	7.00 m wide turnout
		Sub-Total:	3,462.59	1,461.22	87.25	12.95	

Description:	Location:	Offset:	Aggregate base course (t)	HACP (t)	Asphalt Cement PG58-28	Asphalt Prime coat (t)	Remark:
N6331(1-2) BOP to Roundabout	centerline	centerline	183.00	76.00	5.00	0.70	Spur "C"
Roundabout	centerline	centerline	243.00	110.00	6.50	1.00	New surfacing.
N6331(1-2) after Roundabout to EC	centerline	centerline	1,898.00	857.00	52.00	7.20	Spur "B"
turnout; residential	0+685	left	48.70	18.73	1.12	0.18	Reconstruct 4.50 m wide turnout
turnout; residential	0+929	left	48.70	18.73	1.12	0.18	Reconstruct 4.50 m wide turnout
turnout; NHA	0+948	right	63.97	25.61	1.54	0.23	Reconstruct 7.00 m wide turnout
turnout; clustered housing	1+005.48	left	63.97	25.61	1.54	0.23	Reconstruct 7.00 m wide turnout
turnout; Market	1+050	left	63.97	25.61	1.54	0.23	Reconstruct 7.00 m wide turnout
turnout; residential	1+248	right	48.70	18.73	1.12	0.18	Reconstruct 4.50 m wide turnout
turnout; School	1+532	left	0.00	0.00	0.00	0.00	Existing turnout to remain inplace.
		Sub-Total:	2,662.01	1,176.02	71.48	10.13	

	Location:	Offset:	Aggregate base course (t)	HACP (t)	Asphalt Cement PG58-28	Asphalt Prime coat (t)	Remark:
CHAPTER HOUSE PARKING LOT	Varies	Varies	2,108.00	950.00	57.10	7.90	New Surfacing
		Sub-Total:	2,108.00	950.00	57.10	7.90	

	Location:	Offset:	Aggregate base course (t)	HACP (t)	Asphalt Cement PG58-28	Asphalt Prime coat (t)	Remark:
N6330(1)1,2&4	Centerline	Centerline	1,346.00	669.00	40.00	7.10	Mainline
turnout	1+395.00	left	31.73	15.11	0.91	0.17	4.50m Wide Turnout
turnout; local church	1+598.50	left	51.22	25.53	1.53	0.28	9.00 m wide turnout
Guardrail Widening	Varies	Lt. & Rt.	113.00	60.50	3.63	0.69	
		Sub-Total:	1,541.95	770.14	46.07	8.24	

	Location:	Offset:		HACP (t)			Remark:
N6331(2)2&4	Centerline	Centerline	13,595.00	5,601.00	336.00	47.70	Mainline
turnout	33+987.00	left	49.29	18.95	1.14	0.18	4.50m Wide Turnout
turnout	34+135.00	left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+244.00	left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+305.00	Right	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+361.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+453.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+525.00	Left	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	34+557.00	Left	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	34+600.00	Right	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	34+661.00	Left	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	34+722.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+751.00	Right	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+835.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+930.00	Right	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	34+983.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	35+036.00	Right	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	35+075.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	35+134.00	Left	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	35+510.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	35+915.00	Left	64.81	25.95	1.56	0.24	6.39m Wide Turnout to NHA Entrance
turnout	35+992.00	Left	64.81	25.95	1.56	0.24	7.00m Wide Turnout to NHA Entrance
turnout	36+110.00	Left	64.81	25.95	1.56	0.24	7.00m Wide Turnout to NHA Entrance
turnout	36+306.00	Right	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	36+586.00	Left	64.81	25.95	1.56	0.24	7.00m Wide Turnout to NHA Entrance
New Chapter Access	36+795.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
turnout	37+052.00	Left	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	37+065.00	Right	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	37+125.00	Left	49.29	18.95	1.14	0.18	4.50 m wide turnout
turnout	37+315.00	Left	64.81	25.95	1.56	0.24	7.00 m wide turnout
Guardrail Widening	Varies	Lt. & Rt.	577.90	261.70	15.70	1.20	
		Sub-Total:	15,897.19	6,545.25	392.74	55.26	

	Aggregate base course (t)	HACP (t)	Asphalt Cement PG58-28	Asphalt Prime coat (t)
GRAND TOTAL	25,671.74	10,902.63	654.64	94.48

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

SUMMARY OF ESTIMATED QUANTITIES

DRAWN BY: NRDOT	DATE: 8/10/2015
DESIGNED BY: NRDOT	DATE: 8/10/2015
REVISED: 10/12/2017	BY: Design 2
Sht_6 Project total quantities_073115.dgn	

Sht_6 Project total quantities_073115.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	7	96
			N6331	N6331(1-1)(2)2&4		
			N21(3A)	N21(3A)2&4		

EARTHWORK QUANTITIES

N6330(1) Station to Station	ITEM: 20401-0000 Cut (m^3)	* Fill (m^3)	ITEM: 20403-0000 Borrow (m^3)	Waste (m^3)**
1+023.00 to 1+137.61	2,971.00	2,961.00	0.00	10.00
1+137.61 to 1+370.76	4,293.50	6,069.00	1,775.50	0.00
1+370.76 to 1+631.21	13,249.90	99.00	0.00	13,150.90
Sub Total	20,514.40	9,129.00	1775.50	13,160.90
0.00				
N6331(2) Station to Station	**Cut (m^3)**	*** Fill (m^3)**	**Borrow (m^3)**	**(m^3)**
33+920.00 to 34+181.76	2,133.00	2,094.00	0.00	39.00
34+181.76 to 37+564.61	25,013.00	48,847.00	23,834.00	0.00
37+221.00 Rt. (N6331 & N6330 Intersecton)	222.00	58.00	0.00	164.00
SubTotal	27,368.00	50,999.00	23,834.00	203.00
* 12% Shrinkage Factor Applied to Fill				
N21(3A)2&4 Station to Station	**Cut (m^3)**	*** Fill (m^3)**	**Borrow (m^3)**	**(m^3)**
0+004.89 to 0+033.20	126.40	27.70	0.00	98.70
0+033.20 to 0+796.91	20.50	18,486.10	18,465.60	0.00
SubTotal	146.90	18,513.80	18,465.60	98.70
N21 "C" Station to Station	**Cut (m^3)**	*** Fill (m^3)**	**Borrow (m^3)**	**(m^3)**
0+920.00 to 0+984.71	177.70	148.30	0.00	29.40
0+984.71 to 1+131.59	0.00	1,920.10	1,920.10	0.00
Turnout at Sta. 0+948.40 Right	42.00	74.00	32.00	0.00
Turnout at Sta. 1+003.95 Left	18.00	109.00	91.00	0.00
Turnout at Sta. 1+051.48 Left	13.00	187.00	174.00	0.00
Sub Total	250.70	2,438.40	2,217.10	29.40
* 12% Shrinkage Factor Applied to Fill				
Round About Station to Station	**Cut (m^3)**	*** Fill (m^3)**	**Borrow (m^3)**	**(m^3)**
0+000.000 - 0+087.980	4.10	1,802.90	1,798.80	0.00
Sub Total	4.10	1,802.90	1,798.80	0.00
* 12% Shrinkage Factor Applied to Fill				
N21 "B" Station to Station	**Cut (m^3)**	*** Fill (m^3)**	**Borrow (m^3)**	**(m^3)**
1+171.597 - 1+246.72	155.70	175.00	19.30	0.00
1+246.72 - 1+552.52	1,119.90	576.00	0.00	543.90
Turnout at Sta. 1+248.67 Right	32.00	18.00	0.00	14.00
Turnout at Sta. 1+553.48 Left	14.00	19.00	5.00	0.00
Sub Total	1,321.60	788.00	24.30	557.90
* 12% Shrinkage Factor Applied to Fill				
Parking Lot Station to Station	**Cut (m3)**	*** Fill (m^3)**	**Borrow (m^3)**	**(m^3)**
0+000.000 - 0+189.218	829.00	5,228.00	4,399.00	0.00
Sub Total	829.00	5,228.00	4,399.00	0.00
* 12% Shrinkage Factor Applied to Fill				
Grand Total	**50,434.70**	**88,899.10**	**52,514.30**	**14,049.90**

** total borrow needed for project = 38,464.40

ITEM 61903-1211 - 12.0 m TURNOUT, 5 UNIT CATTLE GUARD WITH TYPE II GATE

STATION	LOCATION	SIZE (W x L) *	REMARKS
N21(3A)			
0+809.600	Centerline	N/A	Install 5 Unit Cattleguard at E.O.P.
TOTAL 1			

CONTROL: N21(3A) SPUR A

BM No.	STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
576	0+043.876	34.037	619823.311	287940.154	1832.408	REBAR
577	0+244.183	34.821	619824.742	287739.851	1833.151	REBAR
578	0+396.698	32.462	619830.566	287592.100	1833.658	REBAR
579	0+565.298	25.670	619859.074	287429.047	1832.813	REBAR
580	0+721.233	22.208	619892.841	287276.773	1834.736	REBAR
581	0+807.913	26.825	619917.965	287193.685	1836.199	REBAR

ITEM 61901-0100 FENCING WOVEN WIRE

STATION	LOCATION	LENGTH(m)	REMARKS
0+030.480 - 0+806.528	Right	790.72	B.O.P. to E.O.P.
0+128.00	Right	-9.38	1-4.90 m Turnout w/ Cattleguard and gate
0+228.00	Right	-21.00	1-4.90 m Turnout w/ Cattleguard and no gate
0+538.00	Right	-9.38	1-4.90 m Turnout w/ Cattleguard and no gate
0+720.00	Right	-21.00	1-4.90 m Turnout w/ Cattleguard and no gate
0+768.00	Right	-21.00	1-4.90 m Turnout w/ Cattleguard and no gate
	SUB-TOTAL:	708.96	
0+806.528	Centerline	29.99	Tie back to existing fence
SUB-TOTAL		738.95	
0+030.480 - 0+819.916	Left	798.50	B.O.P. to E.O.P. Tie into existing fence
0+128.00	Left	-21.00	1-7.00 m Turnout w/ Cattleguard and no gate
0+228.00	Left	-21.00	1-7.00 m Turnout w/ Cattleguard and no gate
0+362.00	Left	-21.00	1-7.00 m Turnout w/ Cattleguard and no gate
0+428.00	Left	-21.00	1-7.00 m Turnout w/ Cattleguard and no gate
	SUB-TOTAL:	714.50	
0+819.916	Centerline	34.30	Tie back to existing fence
SUB-TOTAL:		1,463.30	
		29.27	2% added to account for terrain slope
GRAND-TOTAL		1429.19	

ITEM 61903-0710 - 7.0 m TURNOUT, 3 UNIT CATTLE GUARD WITH TYPE II GATE

STATION	LOCATION	SIZE (W x L) *	REMARKS
N6330			
1+618.750	Center Lir	3 unit Cattlguard	Center Line with Type II Gate

ITEM 61903-1010 - 9.0 m TURNOUT, 5 UNIT CATTLE GUARD WITH TYPE II GATE

STATION	LOCATION	SIZE (W x L) *	REMARKS
N6330			
1+598.500	Left	9.0m x 31.5m	Construct Turnout off Main Line with Type II Gate
TOTAL 1			

ITEM 61903-0310 4.5 m WIDE TURNOUT WITH TYPE II GATE N6331(1-2)

SCHOOL SPUR N6331(1-2) - SPUR "C"			With 2 Unit Cattleguard & Type II Gate
STATION	LOCATION	SIZE (W x L) *	REMARKS
0+620.0	Left	4.5 m x 22.86 m	Reconstruct Turnout to Residential
0+830.0	Left	4.5 m x 22.86 m	Reconstruct Turnout to Residential
0+910.0	Left	4.5 m x 22.86 m	Reconstruct Turnout to Residential

ITEM 61902-2600 4.5 m WIDE TURNOUT WITH TYPE II GATE

SCHOOL SPUR N6331(1-2) - SPUR "B"			Type II Gate Only
1+248.0	Right	4.5 m x 22.86 m	Reconstruct Turnout to Residential

ITEM 61903-0310 4.5 m TURNOUT, 2 UNIT CATTLEGUARD W/ TYPE II GATE

N6330			
STATION	LOCATION	SIZE (W x L) *	REMARKS
1+395.000	Right	4.5 m x 9.90 m	Construct new Turnout With Type II Gate
TOTAL . . . 1			
N6331			
34+050.000	Right	4.5 m x 9.90 m	Construct new Turnout With Type II Gate
34+150.000	Right	4.5 m x 9.90 m	Construct new Turnout With Type II Gate
TOTAL . . . 3			
SCHOOL SPUR N21(3A)			
0+538.000	Right	4.5 m x 9.90 m	Construct new Turnout With Type II Gate
GRAND TOTAL . . . 4 Req,d			

ITEM 61903-0311 4.5 m TURNOUT, 2- UNIT CATTLEGUARD: WITHOUT GATE

SCHOOL SPUR N21(3A)			
STATION	LOCATION	SIZE (W x L) *	REMARKS
0+132.000	Right	4.5 m x 9.90 m	Construct new Turnout without Gate
TOTAL . . . 1			

ITEM 60701-1000 REMOVE, CLEAN & STOCKPILE CULVERT

SCHOOL SPUR N21(3A)			
STATION	LOCATION	LENGTH (m)	REMARKS
0+064.00	centerline	12.52	1- 610 m CSPC
0+513.00	centerline	15.09	1- 610 m CSPC
TOTAL:		27.61	

ESTIMATED PCC CURB AND GUTTER

STATION TO STATION	CONCRETE CURB (m)	ASPHALT CURB (m)	PCC CURB & GUTTER (m)	ROLL CURB (m)	TRUCK APRON (m^2)	REMARKS:
	0.00	0.00	0.00	85.10	470.60	Roundabout, around dome
				129.50	0.00	Roundabout Islands
0+948.00 to 1+250.00	0.00	0.00	302.00			N6331(1-2), Right side Spur C
1+250.00 to 1+552.00	0.00	0.00	315.00	0.00	0.00	N6331(1-2), Right side Spur C
0+951.00 to 1+047.00	0.00	0.00	63.00	0.00	0.00	N6331(1-2), Left side Spur C
1+085.00 to 1+150.00	0.00	0.00	125.00	0.00	0.00	N6331(1-2), Left side Spur C
0+782.00 to 1+529.00	0.00	0.00	416.00	0.00	0.00	N6331(1-2), Left side Spur C
1+537.40 to 1+552.50	0.00	0.00	26.00	0.00	0.00	N6331(1-2) / Spur B, left side
1+160.00 to 1+528.50	0.00	0.00	383.50	0.00	0.00	Spur Road / N6331(1-1), left
Varies	0.00	0.00	478.60	0.00	0.00	Parking Lot Chapter House
36+790.0 to 37+000.00	0.00	210	0.00	0.00	0.00	Guardrail curb. N6331(2)right side
TOTAL:	0.00	210	2,109	214.60	470.60	

ITEM 63308-2000: OBJECT MARKERS, SQUARE TUBE, TYPE "2"

STATION	LOCATION	REQUIRED
0+030.00	Left & Right	2
0+160.00	Left & Right	2
0+290.00	Left & Right	2
0+512.00	Left & Right	2
N21(3A) SPUR"A" TOTAL:		8

N6331(2)2&4 UTILITIES

EXISTING STATION	EXISTING LOCATION	TYPE OF POLE
33+927.022	12.1 Rt.	Electrical
33+931.779	9.8 Lt.	Electrical
33+971.084	12.8 Rt.	Television
34+190.025	13.0 Rt.	Television
34+267.955	15.0 Rt.	Television
34+324.401	6.0 Lt.	Television
34+434.217	11.7 Rt.	Television
34+489.951	20.7 Rt.	Television
	15.0 Lt.	Television
34+680.160	9.5 Rt.	Television
34+982.200	3.7 Lt.	Television
35+140.620	10.9 Lt.	Television
35+799.983	8.5 Lt.	Electrical
35+845.183	8.5 Lt.	Television
36+308.042	8.3 Rt.	Electrical
36+318.200	10.8 Lt.	Electrical
36+353.133	11.7 Lt.	Electrical
36+560.297	12.9 Lt.	Television
36+564.208	11.5 Lt.	Electrical
36+886.658	19.5 Lt.	Electrical

*THE UTILITY POLES LISTED FOR RELOCATION ARE BASED ON NRODOT OBSERVATIONS. THE UTLIITY OWNER MAY MODIFY/ REVISED THIS LIST BASED ON THEIR REQUIRMENTS. UTILITY POLE RELOCATION BY OTHERS.

ITEM 61903-0711- 7.0 m TURNOUT, 3 UNIT CATTLEGUARD WITHOUT GATE

N6331			
N6331 SEE ATTACH TURNOUT (TOTAL 23)			
SCHOOL SPUR N21(3A)			
STATION	LOCATION	SIZE (W x L) *	REMARKS
0+132.000	Left	7.0 m x 9.90 m	Construct new Turnout without Gate
0+228.00	Left	7.0 m x 9.90 m	Construct new Turnout without Gate
0+228.00	Right	7.0 m x 9.90 m	Construct new Turnout without Gate
0+362.00	Left	7.0 m x 9.90 m	Construct new Turnout without 711mm S x 508 R CSPA
0+428.00	Left	7.0 m x 9.90 m	Construct new Turnout without 711mm S x 508 R CSPA
0+725.00	Right	7.0 m x 9.90 m	Construct new Turnout without 711mm S x 508 R CSPA
0+770.00	Right	7.0 m x 9.90 m	Construct new Turnout Without Gate
SCHOOL SPUR N6331(1-2) - SPUR "C"			
1+005.000	Left	7.0 m x 22.86m	Construct new Turnout to Market without Gate
1+050.000	Left	7.0 m x 22.86m	Construct new Turnout to Market without Gate
TOTAL . . . 9 Req,d			

* Length of turnout is to inside of cattleguard and does not include cattleguard, aggregate surfacing beyond the cattleguard, or additional tie-in length required.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

UTILITIES, TURNOUT AND QUANTITY TABLE

DRAWN BY: NRDOT	DATE: 8/7/2015
DESIGNED BY: NRDOT	DATE: 8/7/2015
REVISED: 11/3/2017	BY: Design 2
SHEET SIZE: Full Size (24x36) Plot Sheet	

Sht_7 N21(3)_Quantity Tables 071715.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	8	96
			N6331	N6331(2)2&4		

ITEM 63309-0020 DELINEATORS, TYPE 1b, SQUARE TUBE

STATION	LOCATION	QTY	STATION	LOCATION	QTY
N6331(2) STATIONING			N6331(2) STATIONING		
33+928.389	Rt.	1	36+290.621	Rt.	1
PC 34+035.389	Rt.	1	PT 36+313.000	Rt.	1
34+091.582	Rt.	1	36+339.500	Rt.	1
34+147.775	Rt.	1	PC 36+381.173	Rt.	1
PT 34+203.968	Rt.	1	36+410.119	Rt.	1
34+318.000	Rt.	1	36+439.064	Rt.	1
34+470.968	Rt.	1	PT 36+468.010	Rt.	1
34+790.968	Rt.	1	36+520.010	Rt.	1
34+507.049	Lt.	1	PC 36+574.499	Lt.	1
34+668.000	Lt.	1	36+602.284	Lt.	1
34+741.049	Lt.	1	PT 36+630.069	Lt.	1
PC 34+793.049	Lt.	1	36+688.069	Lt.	1
34+819.080	Lt.	1	36+756.521	Lt.	1
34+847.500	Lt.	1	PC 36+827.521	Lt.	1
34+871.141	Lt.	1	36+864.996	Lt.	1
34+897.172	Lt.	1	36+902.471	Lt.	1
34+923.202	Lt.	1	PT 36+939.947	Lt.	1
34+949.233	Lt.	1	37+010.947	Lt.	1
34+971.000	Lt.	1	37+116.947	Lt.	1
PT 35+001.294	Lt.	1	37+238.333	Lt.	1
35+053.294	Lt.	1	37+316.333	Lt.	1
35+296.500	Lt.	1	PC 37+368.333	Lt.	1
PC 35+391.209	Lt.	1	37+388.824	Lt.	1
35+433.861	Lt.	1	PT 37+409.315	Lt.	1
35+476.513	Lt.	1	37+461.315	Lt.	1
35+522.500	Lt.	1	PC 37+473.445	Rt.	1
35+561.817	Lt.	1	37+496.237	Rt.	1
35+604.469	Lt.	1	37+519.030	Rt.	1
35+647.121	Lt.	1	37+541.822	Rt.	1
35+689.773	Lt.	1	PT 37+564.614	Rt.	1
PT 35+732.423	Lt.	1	N6330 STATIONING		
35+817.923	Lt.	1	PC 1+034.735	Lt.	1
35+945.923	Lt.	1	1+051.852	Lt.	1
35+819.692	Rt.	1	1+069.969	Lt.	1
35+939.692	Lt.	1	1+086.086	Lt.	1
35+999.692	Rt.	1	1+103.203	Lt.	1
PC 36+039.692	Rt.	1	1+120.320	Lt.	1
36+058.994	Rt.	1	PT 1+137.436	Lt.	1
36+097.599	Rt.	1	1+173.436	Lt.	1
36+116.901	Rt.	1	1+235.000	Lt.	1
36+136.203	Rt.	1	1+322.990	Lt.	1
36+155.505	Rt.	1	PC 1+374.989	Lt.	1
36+174.808	Rt.	1	1+402.500	Lt.	1
36+194.110	Rt.	1	1+422.081	Lt.	1
36+213.412	Rt.	1	1+445.627	Lt.	1
36+232.714	Rt.	1	1+469.173	Lt.	1
36+252.016	Rt.	1	PT 1+492.719	Lt.	1
36+271.319	Rt.	1	1+544.719	Lt.	1
			1+620.000	Lt.	1
				SUBTOTAL	48
SUBTOTAL		48		TOTAL	96

ITEM 63308-2000 OBJECT MARKERS, TYPE 2

CULVERT STATION	LOCATION	QTY
N6330(1) STATIONING		
1+423.000	Rt. & Lt.	2
N6331(2) STATIONING		
34+331.000	Rt. & Lt.	2
35+135.000	Rt. & Lt.	2
35+315.000	Rt. & Lt.	2
36+110.000	Rt. & Lt.	2
36+520.000	Rt. & Lt.	2
36+560.000	Rt. & Lt.	2
36+602.000	Rt. & Lt.	2
36+680.000	Rt. & Lt.	2
36+780.000	Rt. & Lt.	2
37+101.000	Rt. & Lt.	2
37+290.000	Rt. & Lt.	2
37+537.640	Rt. & Lt.	2
	TOTAL	26

ITEM 20304-1000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

STATION	LOCATION	REMARKS
N6331(2) STATIONING		
33+920.000	℄	Remove Existing 4-Unit Cattleguard And Back Fill Void
35+915.000	Lt.	Remove 2-152 mm Concrete Filled Bollards
35+950.700	Rt.	Remove Concrete Block in Channel
36+110.000	Lt.	Remove Existing Cattle Guard On Turnout
36+160.000	Rt.	Remove Existing Bridge & Sign
36+798.000	Lt.	Remove Existing Man Hole to Natural Ground
37+566.000	℄	Remove Existing Cattle Guard
CHAPTER HOUSE PARKING LOT		
0+005 to 0+050;	38 m Rt.	Remove existing masonry wall
0+013 to 0+067;	55 m Rt.	Existing masonry wall closer to Chapter House will remain inplace
Chapter House Propose Parking Lot		Existing Power Poles to be Remove and Relocate by NTUA.
0+140 to 0+185	10m Rt	Rmoval of 42m existing sidewalk front side of Chapter House

ITEM 63308-3000 OBJECT MARKERS, TYPE 3

N6330(1) STATION	LOCATION	QTY
1+093.000	Rt	1
1+094.500	Lt	1
1+115.100	Rt	1
1+115.400	Lt	1
	TOTAL	4

ITEM 61701-5000 GUARDRAIL SYSTEM SGR-04b, TYPE PDE 02 SKT-350 END TREATMENT

STATION TO STATION	LOCATION	LENGTH (m)	REMARKS
N6330(1) STATIONING			
1+021.895 to 1+088.471	Rt.	66.576	On Curve
1+021.895 to 1+090.493	Lt.	68.598	On Curve
1+119.809 to 1+153.340	Lt.	33.531	On Curve
1+119.907 to 1+154.533	Rt.	34.626	On Curve
1+275.178 to 1+371.859	Lt.	96.681	
	TOTAL	300.012	
N6331(2) STATIONING			
35+870.000 to 35+991.920	Rt.	121.920	
36+157.370 to 36+260.077	Rt.	102.707	On Curve
36+551.000 to 36+643.330	Rt.	92.330	On Curve
36+730.000 to 37+001.710	Rt.	271.71	On Curve. With Curbing
37+356.550 to 37+530.853	Rt.	174.303	On Curve
37+542.686 to 37+558.050	Rt.	15.364	On Curve
37+509.691 to 37+529.103	Lt.	19.412	On Curve
37+541.683 to 37+558.050	Lt.	16.367	On Curve
	TOTAL	814.113	
	GRAND TOTAL:	1,114.125	

ITEM 63401-1520 PAVEMENT MARKINGS, TYPE "H", SOLID WHITE 102 mm WIDE

STATION TO STATION	LOCATION	DESCRIPTION	LENGTH(m)
N6330(1) STATIONING			
1+004.800 to 1+617.530	Rt.	Solid White	612.73
		SUB-TOTAL:	612.73
1+004.800 to 1+617.530	Lt.	Solid White	612.73
Minus (1) 4.50 m T.O. @ 20.67 m		Solid White	-20.67
Minus (1) 9.00 m T.O. @ 37.17 m		Solid White	-37.17
		SUB-TOTAL:	554.89
N6331(2) STATIONING			
33+920.000 to 37+560.530	Rt.	Solid White	3,640.53
Minus (3) 4.50 m T.O. @ 20.67 m		Solid White	-62.01
Minus (4) 7.00 m T.O. @ 35.17 m		Solid White	-140.68
Minus 36.57 m @ N6330		Solid White	-36.57
		SUB-TOTAL:	3,401.27
33+901.882 to 37+560.053	Lt.	Solid White	3,640.53
Minus (7) 4.50 m T.O. @ 20.67 m		Solid White	-144.69
Minus (1) 6.39 m T.O. @ 22.56 m		Solid White	-22.56
Minus (14) 7.00 m T.O. @ 35.17 m		Solid White	-492.38
		SUB-TOTAL:	2,980.90
		GRAND-TOTAL:	7,549.79

ITEM 63405-3260 PAVEMENT MARKINGS, "STOP BAR", TYPE "H", SOLID WHITE

STATION	LOCATION	DESCRIPTION	QUANTITY (EA.)
N6330(1) STATIONING			
1+012.000	Rt.	Stop Bar	1
1+595.000	On Turnout	Stop Bar	1
N6331 STATIONING			
35+909.000	On Turnout	Stop Bar	1
36+579.000	On Turnout	Stop Bar	1
36+696.000	On Turnout	Stop Bar	1
		TOTAL	5

ITEM 61801-0000 PRECAST CONCRETE JERSEY BARRIER

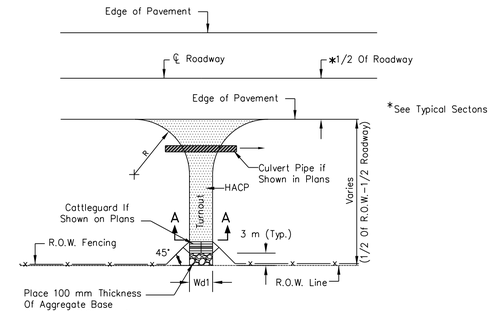
STATION TO STATION	LOCATION	CONCRETE WALL BARRIER (m)	TRANSITON SECTION (Each)
N6330(1) STATIONING			
1+088.287 to 1+091.392	Rt.		3.048
1+091.392 to 1+116.671	Rt.	24.384	
1+116.671 to 1+119.829	Rt.		3.048
1+090.428 to 1+093.374	Lt.		3.048
1+093.374 to 1+116.929	Lt.	24.384	
1+116.929 to 1+119.874	Lt.		3.048
N6331(2) STATIONING			
37+530.829 to 37+533.791	Rt.		3.048
37+533.791 to 37+539.718	Rt.	6.096	
37+539.718 to 37+542.695	Rt.		3.048
37+529.105 to 37+532.226	Lt.		3.048
37+532.226 to 37+538.507	Lt.	6.096	
37+538.507 to 37+541.640	Lt.		3.048
	SUBTOTAL	60.960	24.384
	TOTAL	85.344	

ITEM 63401-1510 PAVEMENT MARKINGS, TYPE "H", DOUBLE SOLID YELLOW 102 mm WIDE EACH STRIP

STATION TO STATION	LOCATION	DESCRIPTION	LENGTH(m)
N6330(1) STATIONS			
1+012.000 to 1+617.530	Lt. & Rt.	Double Yellow	606
N6331(2) STATIONS			
33+920.000 to 37+560.530	Lt. & Rt.	Double Yellow	3,641
		TOTAL	4247

ITEM No. 61901-1000 -- N6330(1), N6331(2) FENCE 5 STRAND BARBED WIRE and WOVEN

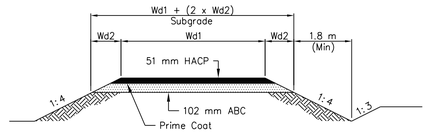
N6330(1) STATION TO STATI	LOCATION	61901-1000 Fence Barbed	61901-0100 Fence Woven	61921-1010 Removal
1+023.000 to 1+087.415	Right		60	
1+023.000 to 1+094.075	Left		85	
1+118.385 to 1+615.750	Right	510		
1+118.775 to 1+615.750	Left	505		
	SUB TOTAL:	1,015	145	
N6331(2) STATION TO STATION				
33+920.000 to 37+564.614	Right		3,605	
33+920.000 to 37+564.614	Left		3,625	
33+920.000 to 33+961.000	Right			53
34+455.000 to 34+500.000	Left			51
35+857.000 to 36+049.000	Left			192
36+204.000 to 36+272.000	Left			65
36+765.450 to 36+913.85	Left			144
	SUB TOTAL:		7,230	505
N21(3A) STATION TO STATION				
0+030.480 To 0+782.400	Right	0	670	
0+030.480 To 0+782.400	Left	0	668	
0+782.404	Centerline		47	
* 3% added Terrain Slope = 45.00			45	
	SUB TOTAL:	0	1,430	
N6331(2-1) STATION TO STATION				
1+920.000 To 1+552.000	Right	25	670	
1+920.000 To 1+552.000	Left	25	668	
0+620.000	Turnout	7.8		
0+830.000	Turnout	7.8		
0+910.000	Turnout	7.8		
	SUB TOTAL:	73.4	1,338	
	GRAND TOTAL:	1,088	10,143	505



TYPE "A" TURNOUT

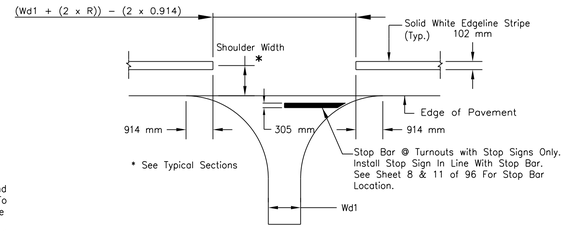
Wd1	Cattleguard	Radius (R)
4.50m	4900mm	9.00m
7.00m	7190mm	15.00m
9.00m	94800mm	15.00m
11.50m	11770mm	15.00m
14.00m	14060mm	15.00m

Note: In The Event the Turnout Cattle Guard is Located Within the Turnout Radii, So That the Asphalt/Gravel/Dirt Width is Narrower on the Back Side of the Cattle Guard Than on the Front Side, the Asphalt/Gravel/Dirt Width on the Back Side Shall be Widened to Match the Width on the Front Side and Tapered Back to the Standard Roadway/Driveway Width in 5 Meters. This Work Shall be Included in the Earthwork, Gravel, Asphalt, etc. Bid Items as Appropriate.



Wd2 = (HACP + ABC Thickness in mm) x 4 / 1000

TYPICAL TURNOUT SECTION A-A



TYPICAL PAVEMENT MARKING @ TURNOUT

TURNOUT EXTENSION NOTE:

The Turnouts Listed for N6330 & N6331 Will Require Earthwork And Grading Outside The Road Right-Of-Way. This Work Is Necessary To Obtain Acceptable Turnout Grades of ±8.0% Maximum Or To Create Smooth Tie-ins To Existing Turnouts. The Specific Length Of Extensions Required To Meet Acceptable Grades Shall Be Determined By the COR/COTR The Width Of Extensions Shall Match The New Driveway Width Given On The Plans. The Cost Of The Extensions Shall Be Incidental To Earthwork Bid Items. Earthwork for construction of all turnouts shall be meansured for inclusion in the final earthwork calculations under the earthwork bid items. Specified Aggregate, Asphalt, Concrete, Or Other Pavement Related Structural Material Will Be Measured And Paid Under The Appropriate Bid Items.

Turnout Lists

N6330 STATIONING
Sta. 1+395.000 Lt.
Sta. 1+598.500 Lt.

N6331 STATIONING
Sta. 34+135.000 Lt.
Sta. 35+075.000 Lt.
Sta. 35+510.000 Lt.
Sta. 36+110.000 Lt.
Sta. 36+586.000 Lt.
Sta. 37+065.000 Rt.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

ESTIMATED QUANTITY
TABLES &
TURNOUT DETAILS

DRAWN BY: NRDOT	DATE: 10/2/2013
DESIGNED BY: NRDOT	DATE: 10/2/2013
REVISED: 6/8/2015	BY: Design 2
Sht_8 N6331-Quantity Tables_061517.dgn	

Sht_8 N6331-Quantity Tables_061517.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	9	96
			N6331	N6331(2)2&4		

ESTIMATED DRAINAGE STRUCTURE QUANTITIES

STATION	ha	STRUCTURE DESCRIPTION *	SKEW NO.	25101-2000 Placed Riprap, Class 2 m³	25110-2000 Grouted Riprap, Class 2 m³	25112-2000 Wire Enclosed Riprap, Class 2 m³	60201-0810 610 mm CSPC-1.63 mm Thickness 67.7 mm x 12.7 mm Corrugation m	60201-0910 762 mm CSPC-1.63 mm Thickness 67.7 mm x 12.7 mm Corrugation m	60201-1010 914 mm CSPC-1.63 mm Thickness 67.7 mm x 12.7 mm Corrugation m	60201-1210 1219 mm CSPC-1.63mm Thickness 68 mm x 13 mm Corrugation m	60202-0510 711 mm x 508 mm CSPA-1.63mm Thickness 67.7 mm x 12.7 mm Corrugation m	60202-0610 889 mm x 610 mm CSPA-1.63mm Thickness 67.7 mm x 12.7 mm Corrugation m	60224-1900 2.438 m Span x 1.820 m Rise Quadruple Barrel Concrete Box Culvert m	60210-0810 End Section For 610 mm CSPC * 1.63 mm Thickness Ea.	60210-0910 End Section For 762 mm CSPC * 2.01 mm Thickness Ea.	60210-1010 End Section For 914 mm CSPC * 2.01 mm Thickness Ea.	60210-1210 End Section For 1219 mm CSPC * 2.77 mm Thickness Ea.	60211-0910 End Section For 711 mm x 508 mm CSPA * 1.63 mm Thickness Ea.	60211-1010 End Section For 889 mm x 610 mm CSPA * 2.01 mm Thickness Ea.
PROJECT N6330(1)																			
1+104.668	9700	2.439 m Span x 1.829 m Rise Quadruple Barrel Concrete Box Culvert											17.07						
1+395.000 Lt.	0.4	1-711 mm x 508 mm x 10.37 m CSPA	N/A								10.37							2	
1+423.000	8.0	1-711 mm x 508 mm x 16.47 m CSPA	110°		8.1	21.0					16.47							1	
PROJECT N6331(2)		SUB TOTAL			8.1	21.0					26.84		17.07					3	
33+987.000 Lt.	74.1	3-711 mm x 508 mm x 9.76 m CSPA	N/A	19.4							29.28							6	
34+135.000 Lt.	76.7	3-711 mm x 508 mm x 14.64 m CSPA	N/A	19.4							43.92							6	
34+244.000 Lt.	78.7	3-711 mm x 508 mm x 15.25 m CSPA	N/A	19.4							45.75							6	
34+305.000 Rt.	0.9	1-711 mm x 508 mm x 14.64 m CSPA	N/A								14.64							2	
34+331.000	81.0	2-762 mm x 34.747 m CSPC	45°	24.50		38.5		69.49							2				
34+453.000 Lt.	1.2	1-711 mm x 508 mm x 15.86 m CSPA	N/A								15.86							2	
34+525.000 Lt.	2.0	1-610 mm x 8.54 m CSPC	N/A				8.54							2					
34+557.000 Lt.	2.7	1-610 mm x 8.54 m CSPC	N/A				8.54							2					
34+600.000 Rt.	0.6	1-711 mm x 508 mm x 9.15 m CSPA	N/A								9.15							2	
34+661.000 Lt.	3.4	1-610 mm x 9.15 m CSPC	N/A				9.15							2					
34+722.000 Lt.	3.9	1-711 mm x 508 mm x 15.86 m CSPA	N/A								15.86							2	
34+751.000 Rt.	0.8	1-711 mm x 508 mm x 15.86 m CSPA	N/A								15.86							2	
34+835.000 Lt.	4.5	1-711 mm x 508 mm x 15.86 m CSPA	N/A								15.86							2	
34+930.000 Rt.	1.2	1-711 mm x 508 mm x 16.47 m CSPA	N/A								16.47							2	
34+983.000 Lt.	5.7	1-610 mm x 15.86 m CSPC	N/A				15.86							2					
35+036.000 Rt.	1.5	1-711 mm x 508 mm x 20.13 m CSPA	N/A								20.13							2	
35+075.000 Lt.	6.5	1-711 mm x 508 mm x 17.69 m CSPA	N/A								17.69							2	
35+135.000	7.0	1-711 mm x 508 mm x 27.468 m CSPA	45°	5.5	8.1						27.468							1	
35+315.000	1.5	1-610 mm x 40.843 m CSPC	40°	4.7			40.843							1					
35+510.000 Lt.	0.8	1-610 mm x 14.64 m CSPC	N/A				14.64							2					
35+540.000	0.2	1-610 mm x 21.946 m CSPC	60°				21.946							1					
36+080.000 Rt.	0.7	1-711 mm x 508 mm x 18.91 m CSPA	N/A								18.91							2	
36+231.485	3.5	2-914 mm x 22.77m Existing CSPC	90°													2			
36+520.000	7.4	1-762 mm x 26.213 m CSPC	90°	6.7				26.213							1				
36+560.000	28.0	1-914 mm x 20.726 m CSPC	90°						20.726							1			
36+602.000	1.1	1-889 mm x 610 mm x 18.898 m CSPA	90°									18.898							1
36+680.000	2.3	1-711 mm x 508 mm x 23.165 m CSPA	90°	7.1							23.165							1	
36+780.000	13.0	1-914 mm x 26.213 m CSPC	90°	6.2					26.213							1			
36+795.000	2.3	1-711 mm x 508 mm x 19.99 m CSPA	N/A								19.99							2	
37+035.000 Lt.	1.1	1-711 mm x 508 mm x 19.99 m CSPA	N/A								19.99							2	
37+101.000	15.0	1-914 mm x 23.774 CSPC	90°	5.9	9.4				23.774							1			
37+290.000	31.0	1-889 mm x 610 mm x 28.042 m CSPA	50°	7.0								28.042							1
37+537.640	376.0	3-1219 m x 23.164 mm CSPC	50°		98.0					69.492							3		
** All Pipe & End Sections shall be Aluminized		SUB TOTAL		125.8	123.6	59.5	119.519	95.707	70.713	69.492	369.993	46.940		12	3	5	3	44	2
PROJECT N6331(2) CHAPTER PARKING LOT																			
0+090.000 Rt.	1.0	1-711 mm x 508 mm x 62.179 m CSPA	150°								62.179							1	
		SUB TOTAL									62.179							1	

* Install End Section on Inlet Side, Except @ Turnout Locations Where End Sections Will Be Installed at Both Ends. Details on Sheet 23 of 96.

60701-1000 REMOVE, CLEAN & STOCKPILE EXISTING CULVERTS

LOCATION	SIZE
N6331(2) STATIONING	
34+344.540	914 mm x 12.3 m
36+779.356	914 mm x 10.0 m
37+100.000	610 mm x 12.1 m
37+301.870	914 mm x 6.5 m
37+537.685	2-1.828 m x 12.4 m
TOTAL	65.7 m

ITEM 61601-1000 CONCRETE SLOPE PAVING

LOCATION	(m³)	REMARKS
N6330(1) STATIONING		
1+093.944 to 1+115.28	13.0	Slope Paving at Box Culverts
TOTAL	13.0	

ITEM 20410-2000 FURROW DITCHES

STATION	LOCATION	LENGTH(m)
N6330(1) STATIONING		
1+615	Rt.	23
N6331(2) STATIONING		
35+690	Rt.	34
	TOTAL	57

ITEM 20443-1000 EARTHEN DIKE/BERM TYPE "A"

CULVERT STATION	LOCATION	APPROX. LENGTH(m)
N6330(1) STATIONING		
1+423.000	Rt.	10
N6331(2) STATIONING		
34+331.000	Lt.	10
35+135.000	Rt.	10
35+315.000	Lt.	10
	TOTAL	40

Note: Skew Ditch Blocks As Directed By The COR/COTR

ITEM 62901-1100 EROSION CONTROL MAT TYPE IV

STATIONS	LOCATION	QUANTITY(m²)
N6331(2) STATIONING		
35+780 to 35+855	Lt.	240
36+180 to 36+256	Rt.	460
36+300 to 36+350	Lt.	180
36+540 to 36+660	Rt.	680
37+420 to 37+465.72	Rt.	650
	TOTAL	2210

N6331(2)

ITEM 25302-1000: GABIONS, CLASS 2 ---- 0.914mm x 0.914mm x Length Of Baskets

Station: reference from roadway centerline.	Size of Basket	Layer	Volume (m³)	Remark:
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 1a	137.2	Gabion retaining wall first row at ground level.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 1b	137.2	Gabion retaining wall first row at ground level.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 1c	137.2	Gabion retaining wall first row at ground level.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 2a	45.7	Gabion retaining wall second row.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 2b	45.7	Gabion retaining wall second row.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 2c	45.7	Gabion retaining wall second row.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 3a	45.7	Gabion retaining wall third row.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 3b	45.7	Gabion retaining wall third row.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 4a	45.7	Gabion retaining wall fourth row.
37+420.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 4b	45.7	Gabion retaining wall fourth row.
37+420.00 - 37+427.32	1.0m high x 1.0m x 1.83 long	Row 5a	22.0	Gabion retaining wall fifth row.
37+451.00 - 37+465.72	1.0m high x 1.0m x 1.83 long	Row 5b	22.0	Gabion retaining wall fifth row.
37+420.00 - 37+426.40	1.0m high x 1.0m x 1.83 long	Row 6-Top	3.2	Gabion retaining wall of top row.
		subtotal:	778.8	
36+540.00 - 36+660.70	1.0m high x 1.0m x 1.83m lon	Row 1	66.0	Gabion retaining wall first row at ground level.
36+539.09 - 36+660.70	1.0m high x 1.0m x 1.83m lon	Row 2-mid section	66.0	Gabion retaining wall second row
36+538.17 - 36+558.29	1.0m high x 1.0m x 1.83m lon	Row 2-mid section	11.0	Gabion retaining wall third row.
36+561.95 - 36+600.35	1.0m high x 1.0m x 1.83m lon	Row 2-mid section	21.0	Gabion retaining wall third row.
36+604.01 - 36+620.47	1.0m high x 1.0m x 1.83m lon	Row 2-mid section	9.0	Gabion retaining wall third row.
		subtotal:	173.0	
	Gabions, Class 2;	GRAND TOTAL:	951.8	

ITEM 25305-1000: REVET MATTRESS CLASS 2

Station to Station	Size	Layer	Length	Volume (m3)	Remark:
37+420.00 - 37+465.72	0.305m high x 1.0m x 4.00m long	bottom	45.72	56.8	Rock Revet Mattress placed below ground.
36+540.00 - 36+660.00	0.305m high x 1.0m x 3.66m long	bottom	121	121.00	Rock Revet Mattress placed below ground.
		Revet mattress; Total:		177.8	

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

DRAINAGE STRUCTURE QUANTITIES TABLES

DRAWN BY: NRDOT DATE: 8/7/2015
DESIGNED BY: NRDOT DATE: 8/7/2015
REVISED: 10/25/2017 BY: Design 2

Sht_9 N6331Drainage Structures and Quantity Tables_073115.dgn

SUPERELEVATION GRADE TABULATIONS

Design Speed N6330(1): 50 km/h Normal Crown Slope: 2.000%
Design Speed N6331(1–2): 60 km/h Maximum Superelevation: 4.000%

C1 Degree : 13°58'16" Radius : 125.000 m
Full Super Rate : Normal Crown Design Speed N6330(1): 50 km/h

C2 Degree : 6°59'08" Radius : 250.000 m
Tangent Runout Back : 11.333 Tangent Runout Ahead : 11.333
Runoff Length Back : 17.000 Runoff Length ahead : 17.000
Transition Length Back : 28.333 Transition Length ahead : 28.333
Full Super Rate : 3.000% Design Speed N6330(1): 50 km/h

Transition Station	Station	%e Left	%e Right
Normal Crown	1+352.266	−2.000%	−2.000%
0% Super	1+363.599	0.000%	−2.000%
Reverse Crown	1+374.933	2.000%	−2.000%
PC 2	1+374.989	2.010%	−2.010%
Full Super	1+380.599	3.000%	−3.000%
Full Super	1+487.109	3.000%	−3.000%
PT 2	1+492.719	2.010%	−2.010%
Reverse Crown	1+492.776	2.000%	−2.000%
0% Super	1+504.109	0.000%	−2.000%
Normal Crown	1+515.443	−2.000%	−2.000%

C3 Degree : 1°44'47" Radius : 1000.000 m
Tangent Runout Back : 12.000 Tangent Runout Ahead : 12.000
Runoff Length Back : 12.000 Runoff Length ahead : 12.000
Transition Length Back : 24.000 Transition Length ahead : 24.000
Full Super Rate : RC Design Speed N6331(2): 60 km/h

Transition Station	Station	%e Left	%e Right
Normal Crown	34+015.349	−2.000%	−2.000%
0% Super	34+027.349	−2.000%	0.000%
PC 3	34+035.389	−2.000%	1.340%
Reverse Crown	34+039.349	−2.000%	2.000%
Reverse Crown	34+200.007	−2.000%	2.000%
PT 3	34+203.967	−2.000%	1.340%
0% Super	34+212.007	−2.000%	0.000%
Normal Crown	34+224.007	−2.000%	−2.000%

C4 Degree : 6°59'08" Radius : 250.000 m
Tangent Runout Back : 12.222 Tangent Runout Ahead : 12.222
Runoff Length Back : 22.000 Runoff Length ahead : 22.000
Transition Length Back : 34.222 Transition Length ahead : 34.222
Full Super Rate : 3.600%

Transition Station	Station	%e Left	%e Right
Normal Crown	34+766.087	−2.000%	−2.000%
Reverse Crown	34+778.309	0.000%	−2.000%
0% Super	34+790.531	2.000%	−2.000%
PC 4	34+793.049	2.412%	−2.412%
Full Super	34+800.309	3.600%	−3.600%
Full Super	34+994.034	3.600%	−3.600%
PT 4	35+001.294	2.412%	−2.412%
Reverse Crown	35+003.812	2.000%	−2.000%
0% Super	35+016.034	0.000%	−2.000%
Normal Crown	35+028.257	−2.000%	−2.000%

C5 Degree : 2°41'12" Radius : 650.000 m
Tangent Runout Back : 12.500 Tangent Runout Ahead : 12.500
Runoff Length Back : 15.000 Runoff Length ahead : 15.000
Transition Length Back : 27.500 Transition Length ahead : 27.500
Full Super Rate : 2.400%

Transition Station	Station	%e Left	%e Right
Normal Crown	35+368.659	−2.000%	−2.000%
0% Super	35+381.159	0.000%	−2.000%
PC 5	35+391.209	1.608%	−2.000%
Reverse Crown	35+393.659	2.000%	−2.000%
Full Super	35+396.159	2.400%	−2.400%
Full Super	35+727.473	2.400%	−2.400%
Reverse Crown	35+729.973	2.000%	−2.000%
PT 5	35+732.423	1.608%	−2.000%
0% Super	35+742.473	0.000%	−2.000%
Normal Crown	35+754.973	−2.000%	−2.000%

C6 Degree : 11°31'38" Radius : 151.500 m
Tangent Runout Back : 12.030 Tangent Runout Ahead : 12.030
Runoff Length Back : 24.000 Runoff Length ahead : 24.000
Transition Length Back : 36.030 Transition Length ahead : 36.030
Full Super Rate : 3.990%

Transition Station	Station	%e Left	%e Right
Normal Crown	36+011.582	−2.000%	−2.000%
0% Super	36+023.612	−2.000%	0.000%
Reverse Crown	36+035.642	−2.000%	2.000%
PC 6	36+039.692	−2.673%	2.673%
Full Super	36+047.612	−3.990%	3.990%
Full Super	36+302.003	−3.990%	3.990%
PT 6	36+309.923	−2.673%	2.673%
Reverse Crown	36+313.973	−2.000%	2.000%
0% Super	36+326.003	−2.000%	0.000%
Normal Crown	36+338.033	−2.000%	−2.000%

C7 Degree : 6°59'08" Radius : 250.000 m
Tangent Runout Back : 12.222 Tangent Runout Ahead : 12.222
Runoff Length Back : 22.000 Runoff Length ahead : 22.000
Transition Length Back : 34.222 Transition Length ahead : 34.222
Full Super Rate : 3.600%

Transition Station	Station	%e Left	%e Right
Normal Crown	36+354.210	−2.000%	−2.000%
0% Super	36+366.433	−2.000%	0.000%
Reverse Crown	36+378.655	−2.000%	2.000%
PC 7	36+381.173	−2.412%	2.412%
Full Super	36+388.433	−3.600%	3.600%
Full Super	36+460.750	−3.600%	3.600%
PT 7	36+468.010	−2.412%	2.412%
Reverse Crown	36+470.528	−2.000%	2.000%
0% Super	36+482.750	−2.000%	0.000%
Normal Crown	36+494.972	−2.000%	−2.000%

C8 Degree : 5°49'17" Radius : 300.000 m
Tangent Runout Back : 12.121 Tangent Runout Ahead : 12.121
Runoff Length Back : 20.000 Runoff Length ahead : 20.000
Transition Length Back : 32.121 Transition Length ahead : 32.121
Full Super Rate : 3.300%

Transition Station	Station	%e Left	%e Right
Normal Crown	36+548.978	−2.000%	−2.000%
0% Super	36+561.099	0.000%	−2.000%
Reverse Crown	36+573.220	2.000%	−2.000%
PC 8	36+574.499	2.211%	−2.211%
Full Super	36+581.099	3.300%	−3.300%
Full Super	36+623.469	3.300%	−3.300%
PT 8	36+630.069	2.211%	−2.211%
Reverse Crown	36+631.348	2.000%	−2.000%
0% Super	36+643.469	0.000%	−2.000%
Normal Crown	36+655.590	−2.000%	−2.000%

C9 Degree : 3°52'51" Radius : 450.000 m
Tangent Runout Back : 12.632 Tangent Runout Ahead : 12.632
Runoff Length Back : 18.000 Runoff Length ahead : 18.000
Transition Length Back : 30.632 Transition Length ahead : 30.632
Full Super Rate : 2.850%

Transition Station	Station	%e Left	%e Right
Normal Crown	36+802.830	−2.000%	−2.000%
0% Super	36+815.461	0.000%	−2.000%
PC 9	36+827.521	1.910%	−2.000%
Reverse Crown	36+828.093	2.000%	−2.000%
Full Super	36+833.461	2.850%	−2.850%
Full Super	36+934.007	2.850%	−2.850%
Reverse Crown	36+939.375	2.000%	−2.000%
PT 9	36+939.947	1.910%	−2.000%
0% Super	36+952.007	0.000%	−2.000%
Normal Crown	36+964.639	−2.000%	−2.000%

C10 Degree : 6°59'08" Radius : 250.000 m
Tangent Runout Back : 12.222 Tangent Runout Ahead : 12.222
Runoff Length Back : 22.000 Runoff Length ahead : 22.000
Transition Length Back : 34.222 Transition Length ahead : 34.222
Full Super Rate : 3.600%

Transition Station	Station	%e Left	%e Right
Normal Crown	37+341.371	−2.000%	−2.000%
0% Super	37+353.593	0.000%	−2.000%
Reverse Crown	37+365.815	2.000%	−2.000%
PC 10	37+368.333	2.412%	−2.412%
Full Super	37+375.593	3.600%	−3.600%
Full Super	37+402.055	3.600%	−3.600%
PT 10	37+409.315	2.412%	−2.412%
Reverse Crown	37+411.833	2.000%	−2.000%
0% Super	37+424.055	0.000%	−2.000%
Normal Crown	37+436.277	−2.000%	−2.000%

C11 Degree : 10°06'08" Radius : 172.870 m

Full Super Rate : Normal Crown

SUPERELEVATION TABLE: N21(3A) SPUR A

	Section1 Centerline–LEOP Type: Linear		Super Control Line	Section1 Centerline–REOP Type: Linear	
CURVE	STATION	CROSS SLOPE	POINT TYPE	STATION	CROSS SLOPE
	0+005.100	−2.00%	Normal Crown	0+005.100	−2.00%
	0+257.861	−2.00%	Normal Crown	0+257.861	−2.00%
	0+269.679	0.00%	Zero Cross Slope		
C1	0+281.497	2.00%	Reverse Crown	0+281.497	−2.00%
	0+282.679	2.20%	Full Super	0+282.679	−2.20%
	0+481.211	2.20%	Full Super	0+481.211	−2.20%
	0+482.393	2.00%	Reverse Crown	0+482.393	−2.00%
	0+494.211	0.00%	Zero Cross Slope		
	0+506.029	−2.00%	Normal Crown	0+506.029	−2.00%
	0+829.620	−2.00%	Normal Crown	0+829.620	−2.00%

ALIGNMENT DATA

ALIGN POINT	STATION	BEARING	NORTHING	EASTING
N6330(1)				
BOP	1+005.100	N71°42'48"E	622315.949	288699.543
PC C1	1+034.735	N71°42'48"E	622326.848	288732.524
PI C1	1+089.183	S61°12'44"E	622343.932	288784.222
PT C1	1+137.436	S61°12'44"E	622317.712	288831.941
PC C2	1+374.989	S61°12'44"E	622203.314	289040.135
PI C2	1+434.967	S34°13'50"E	622174.431	289092.700
PT C2	1+492.719	S34°13'50"E	622124.843	289126.439
EOP	1+620.000	S34°13'50"E	622019.610	289198.037
N6331(2)				
BOP	33+885.542	N10°44'29"E	619795.952	287981.942
PC C3	34+035.389	N10°44'29"E	619909.319	288003.448
PI C3	34+119.878	N01°04'57"E	619992.328	288019.195
PT C3	34+203.967	N01°04'57"E	620076.802	288020.791
PC C4	34+793.049	N01°04'57"E	620665.779	288031.921
PI C4	34+903.642	N48°48'32"E	620776.352	288034.011
PT C4	35+001.294	N48°48'32"E	620849.185	288117.234
PC C5	35+391.209	N48°48'32"E	621105.971	288410.651
PI C5	35+565.845	N78°53'10"E	621220.982	288542.068
PT C5	35+732.423	N78°53'10"E	621254.645	288713.429
PC C6	36+039.692	N78°53'10"E	621313.874	289014.935
PI C6	36+227.443	N23°18'45"W	621350.065	289199.165
PT C6	36+309.923	N23°18'45"W	621522.488	289124.863
PC C7	36+381.173	N23°18'45"W	621587.921	289096.666
PI C7	36+425.033	N43°12'51"W	621628.201	289079.309
PT C7	36+468.010	N43°12'51"W	621660.166	289049.276
PC C8	36+574.499	N43°12'51"W	621737.776	288976.360
PI C8	36+602.364	N32°36'04"W	621758.083	288957.280
PT C8	36+630.069	N32°36'04"W	621781.558	288942.267
PC C9	36+827.521	N32°36'04"W	621947.900	288835.882
PI C9	36+884.028	N18°17'12"W	621995.504	288805.437
PT C9	36+939.947	N18°17'12"W	622049.157	288787.707
PC C10	37+368.333	N18°17'12"W	622455.909	288653.291
PI C10	37+388.870	N08°53'39"W	622475.409	288646.847
PT C10	37+409.315	N08°53'39"W	622495.699	288643.672
PC C11	37+473.445	N08°53'39"W	622559.058	288633.757
PI C11	37+520.117	N39°06'40"W	622605.168	288626.541
PT C11	37+564.614	N39°06'40"W	622641.382	288597.100
EOP	37+567.373	N39°06'40"W	622643.522	288595.359

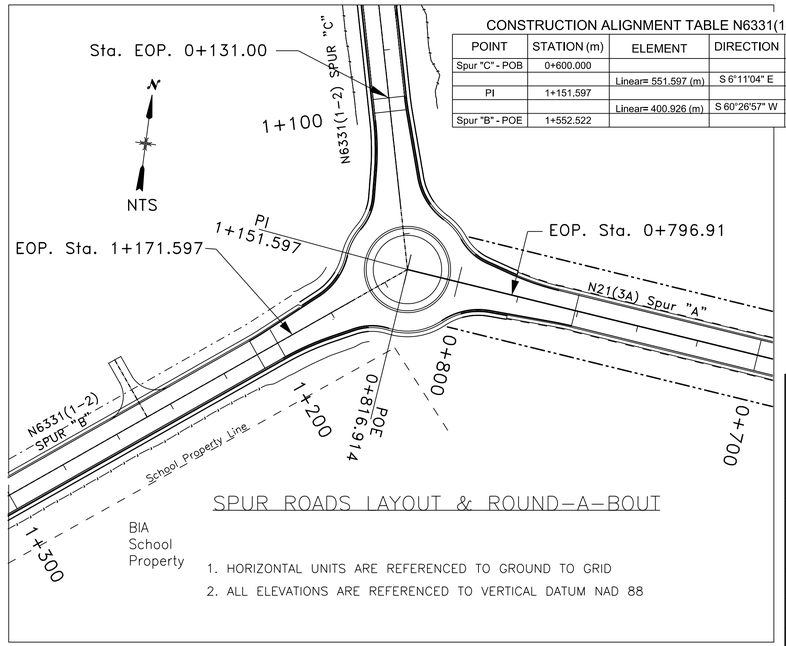
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	10	96
			N6331	N6331(1–2)(2)2&4		
			N21(3A)	N21(3A)2&4		

CONTROL POINTS

NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
GPS9	620950.616	288217.500	1810.637	BM–RB
GPS10	621043.507	288334.709	1800.808	BM–RB
GPS11	621169.413	288458.672	1791.320	BM–RB
GPS12	621231.745	288594.846	1784.112	BM–RB
GPS13	621279.588	288762.487	1774.562	BM–AC–PCH
GPS14	621312.099	288927.774	1760.970	BM–RB
GPS15	621339.799	289047.089	1757.049	BM–RB
GPS16	621480.745	289122.740	1752.001	BM–RB
GPS17	621623.527	289051.068	1750.778	BM–RB
GPS18	621717.776	288977.675	1746.409	BM–AC–PCH
GPS19	621870.362	288864.283	1746.558	BM–RB
GPS20	621992.703	288796.670	1750.358	BM–RB
GPS22	622319.174	288733.396	1744.492	BM–RB
GPS23	622466.334	288639.339	1744.045	BM–RB
GPS24	622663.491	288621.342	1738.575	BM–BC
GPS25	622257.226	288986.600	1753.500	BM–RB
GPS26	622034.957	289206.115	1772.043	BM–RB
GPS562	617629.669	287617.582	1863.208	BM–RB
GPS563	617779.984	287633.770	1861.734	BM–RB
GPS577	619813.804	287734.637	1833.981	BM–RB
GPS578	619819.680	287586.788	1834.516	BM–RB
GPS579	619848.174	287423.794	1833.426	BM–RB
GPS580	619881.896	287271.482	1835.605	BM–RB
GPS581	619907.095	287188.403	1837.071	BM–RB
GPS719	619812.409	287934.898	1832.884	BM–RB
GPSCP1	622169.632	288841.127	1744.488	CP–BC
GPSKIA	621000.043	286935.433	1829.628	RB–AC
GPSPP15	619707.286	286936.115	1845.919	PP–RB–DRTB
GPSPP145	618454.491	288016.574	1843.277	PP–RB
GPSPP146	618819.816	287429.560	1843.239	PP–RB
GPSPP151	619517.746	287646.001	1837.031	PP–RB
TREE	620932.976	288172.830	1814.801	RCRB
YDOG	619536.976	287962.289	1835.532	RB–AC

NOTE: All controls were measured and adjusted (site calibration) to best fit a project plane at scale of 1.00000000

NAD83 AZC STATE PLANE GROUND
SCALE FACTOR = 0.999692819



CONSTRUCTION ALIGNMENT TABLE N6331(1-2) SPUR "C" & "B"

POINT	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
Spur "C" - POB	0+600.000			620431.566	287113.343
		Linear= 551.597 (m)	S 6°11'04" E		
PI	1+151.597			619883.180	287172.766
		Linear= 400.926 (m)	S 60°26'57" W		
Spur "B" - POE	1+552.522			619685.444	286823.993

SPUR ROADS LAYOUT & ROUND–A–BOUT

1. HORIZONTAL UNITS ARE REFERENCED TO GROUND TO GRID
2. ALL ELEVATIONS ARE REFERENCED TO VERTICAL DATUM NAD 88

N21(3A) ALIGNMENT TABLE

	STATION	NORTHING	EASTING
-			
Element:	Linear		
BOP	0+004.858	619785.434	287979.947
PC	0+409.883	619798.963	287570.287
Tangent		Direction:	N88°06'31"W
Tangent		Length:	409.883
	STATION	NORTHING	EASTING
Circular			
PC	0+409.883	619,798.963	287570.287
PI	0+472.328	619,801.024	287590.09
CC		620,398.625	287,590.090
PT	0+534.326	619,815.893	287447.227
Radius:		599.989	
Delta:		153°01"	Right
DEG		254°38"	
Length:		124.443	
Tangent:		62.445	
Chord:		124.22	
Middle Ord		3.223	
External:		3.241	
Tangent		88°06'31"	W
Radial		153'29"	E
Chord		82°10'00"	W
Radial		13°46'30"	E
Tangent		76°13'30"	W
	STATION	NORTHING	EASTING
Linear			
PT	0+534.326	619,815.893	287447.227
POE	0+816.914	619,883.180	287172.766
Tangent		N76°13'30"W	
Tangent		Length:	282.589
EOP	0+796.914		

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

SUPERELEVATION, ALIGNMENT DATA & CONTROL POINT DATA

DRAWN BY: NRDOT DATE: 6/20/2016
DESIGNED BY: NRDOT DATE: 6/20/2016
REVISED: 11/18/2017 BY: Design 2
Sht_10 Project ALIGN–Superelevation Data_062016.dgn

Sht_10 Project ALIGN–Superelevation Data_062016.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	11	96
			N6331	N6331(2)2&4		
			N21(3A)	N21(3A)2&4		

N6330(1)
ITEM 21102–2000 ROADWAY OBLITERATION – METHOD 2

STATION TO STATION			LENGTH:	LOCATION	AREA (m²)	REMARKS:
1+175.00	to	1+275.00	100	Right	800	Existing dirt road
1+403.00	to	1+525.00	122	Left	976	Existing dirt road
				TOTAL:	1,776	

ITEM 15714–0000 STRAW MULCHING; 62510–1000 SEEDING, DRY METHOD

STATION TO STATION			LENGTH:	LOCATION	AREA (m²)	REMARKS:
1+175.00	to	1+275.00	100	Right	548.6	Existing roadbed
1+403.00	to	1+525.00	122	Left	669.292	Existing roadbed
				TOTAL:	1,218	
				TOTAL:	0.122	ha

N6331(2)
ITEM 21102–2000 ROADWAY OBLITERATION – METHOD 2

STATION TO STATION			LENGTH:	LOCATION	AREA (m²)	REMARKS:
33+920.00	to	34+190.00	270	Left	2160	Existing dirt road
34+845.00	to	34+925.00	80	Right	640	Existing dirt road
36+945.00	to	37+060.00	115	Right	920	Existing dirt road
37+072.00	to	37+205.00	133	Right	1064	Existing dirt road
37+233.00	to	37+316.00	83	Right	664	Existing dirt road
				TOTAL:	5,448	

ITEM 15714–0000 STRAW MULCHING; 62510–1000 SEEDING, DRY METHOD

STATION TO STATION			LENGTH:	LOCATION	AREA (m²)	REMARKS:
33+920.00	to	34+190.00	270	Left	1481.22	Existing roadbed
34+845.00	to	34+925.00	80	Right	438.88	Existing roadbed
36+945.00	to	37+060.00	115	Right	630.89	Existing roadbed
37+072.00	to	37+205.00	133	Right	729.638	Existing roadbed
37+233.00	to	37+316.00	83	Right	455.338	Existing roadbed
				TOTAL:	3,736	
				TOTAL:	0.374	ha

N21(3A) SPUR "A" – EXISTING UTILITY CROSSING

STATION	DESCIPTION	LOCATION	ELEVATION	SKEW NO.	OWNER	REMARKS
0+000.000 – 0+081.25	Existing Waterline	20.00 m Left			NTUA	Protect in Place
0+005.620	Power Pole	24.00 m Right			NTUA	
0+035.200	Power Pole	24.00 m Right	1838.300	99	NTUA	to be raised by owner
0+038.150	Existing Overhead Power Line	Centerline	1838.300	99	NTUA	to be raised by owner
0+039.551	Existing Overhead Power Line	Centerline	1838.300	99	NTUA	to be raised by owner
0+049.200	Existing Overhead Power Line	Centerline	1838.300	90	NTUA	to be raised by owner
0+051.155	Existing Waterline	18.00 m Left			NTUA	Protect in Place
0+081.155	Existing Waterline	18.09 m Left			NTUA	Protect in Place
0+083.007	Existing Waterline	Centerline			NTUA	Waterline to be in–casing by Owner
0+081.340	Existing Water Meter	18.09 m Left			NTUA	Protect in Place
0+081.155 – 0+134.17	Existing Waterline	Varies			NTUA	Protect in Place
0+081.340 – 0+131.48	Existing Waterline	8.09 m to 19.40 m			NTUA	Protect in Place
0+130.500	Existing Sewer Line	Centerline			NTUA	Remove & Relocate by Other
0+131.142	Existing Sewer Line	Centerline			NTUA	Protect in Place
0+131.483	Existing Water Meter	19.40 m			NTUA	Protect in Place
0+134.170	Existing Water Meter	31.00 m Left			NTUA	Protect in Place
0+134.510	Existing Sewer Manhole	23.48 m Left			NTUA	Protect in Place
0+134.51 – 0+500.000	Existing Sewer Line	Varies Left			NTUA	Protect in Place
0+138.000	Existing Sewer Manhole	Left			NTUA	Protect in Place
0+138.000 – 0+471.00	Existing Sewer Line	36.00 m Left			NTUA	Protect in Place
0+255.042	Existing Sewer Manhole	20.79 m Right			NTUA	Protect in Place
0+277.800	Existing Overhead Power Line	Centerline	1836.800	108	NTUA	to be raised by owner
0+280.550	Existing Overhead Power Line	Centerline	1836.800	108	NTUA	to be raised by owner
0+305.000	Existing Power Pole	29.31 m Right			NTUA	Protect in Place
0+415.200	Existing Overhead Power Line	22.00 m Right	1836.200	125	NTUA	Bottom Powerline Elevation 1836.20
0+415.383	Existing Overhead Power Line	Centerline	1836.200	125	NTUA	Bottom Powerline Elevation 1836.20
0+434.100	Existing Overhead Power Line	Centerline	1836.200	125	NTUA	Bottom Powerline Elevation 1836.20
0+475.000 – 0+561.00	Existing Sewer Line	Varies Left			NTUA	Protect in Place
0+475.000	Existing Sewer Manhole	41.00 m Left			NTUA	Remove & Relocate by Other
0+482.100	Existing Power Pole	15.00 m Right			NTUA	Protect in Place
0+487.191	Existing Power Pole	16.98 m Right			NTUA	Protect in Place
0+513.100	Existing Overhead Power Line	Centerline	1838.100	148	NTUA	Bottom Powerline Elevation 1838.10
0+513.777	Existing Overhead Power Line	Centerline	1838.100	148	NTUA	Bottom Powerline Elevation 1838.10
0+541.099	Existing Power Pole	17.00 m Left			NTUA	Protect in Place
0+544.000	Existing Power Pole	18.00 m Left			NTUA	Protect in Place
0+560.013	Existing Sewer Manhole	13.46 m Left			NTUA	Remove & Relocate by Other
0+561.100 – 0+785.00	Existing Sewer Line	17.00 m Left			NTUA	Remove & Relocate by Other
0+561.100	Existing Sewer Manhole	13.00 m Left			NTUA	Remove & Relocate by Other
0+560.013 – 0+778.37	Existing Sewer Line	Varies Left			NTUA	Remove & Relocate by Other
0+574.379	Existing Sewer Manhole	15.59 m Left			NTUA	Remove & Relocate by Other
0+778.379	Existing Sewer Manhole	17.61 m Left			NTUA	Remove & Relocate by Other
0+785.000	Existing Sewerline	Centerline			NTUA	Remove & Relocate by Other
0+787.413	Existing Waterline	Centerline			NTUA	To be abandoned
0+779.000	Existing Sewer Manhole	17.00 m Left			NTUA	Remove & Relocate by Other
0+793.640	New Waterline	Centerline			NTUA	Waterline To be Encased by Owner

N21(3A) ITEM: 63405–3260 PAVEMENT MARKINGS, TYPE "H" STOP BAR

STATION	LOCATION	QUANTITY	DESCRIPTION
0+051	Left.	1.00	BOP C/L
0+781.0	Right.	1.00	EOP C/L
	TOTAL:	2	

N21(3A)
63401–1510 PAVEMENT MARKINGS, TYPE "H" DOUBLE SOLID YELLOW

STATION TO STATION			LOCATION	LENGTH (m)
SCHOOL SPUR				
00+006.023	to	00+760.893	DOUBLE CENTERLINE	701.00
			TOTAL:	701.00

N21(3A)
63401–1520 PAVEMENT MARKINGS, TYPE "H" SOLID WHITE

STATION TO STATION			LOCATION	LENGTH (m)
00+006.023	to	00+796.914	Rt. SHOULDER	792.10
Minus 2 – 4.5 m T/O @ Rt. (No. x 9.99 m)			Rt.	–41.46
Minus 3 – 7.0 m T/O @ Rt. : (No. x 9.99 m)			Rt.	–107.91
			SUBTOTAL:	642.73
00+006.023	to	00+796.914	Lt. SHOULDER	792.10
Minus 4 – 7.0 m T/O @ Lt. (No. x 9.99 m)			Lt.	–143.88
Chapter House Parking Stalls				980.00
			SUBTOTAL:	1,628.22
			TOTAL:	2,270.95

ITEM 63309–0030 & 63309–0040; DELINEATORS, 51mm x 51mm SQUARE STEEL TUBE

STATION	LOCATION	Type "1a"	Type "1b"	Project
0+409.883	Lt. & Rt.	1	0	N21(3A)
0+450.000	Lt. & Rt.	1	0	N21(3A)
0+490.000	Lt. & Rt.	1	0	N21(3A)
0+534.326	Lt. & Rt.	1	0	N21(3A)
	TOTAL:	4	0	

TURNOUT LOCATIONS W/ CATTLEGUARDS & GATES

STATION	LOCATION	TURNOUT SIZE	CattleGuard 2–UNIT	CattleGuard 3–UNIT	CattleGuard 5–UNIT	TYPE II GATE (EA)	TYPE III GATE (EA)	REMARKS
N6330(1) STATIONING								
1+395.000	Lt.	4.5m x 36.4m	1			1		Curve to Fit Existing Driveway.
1+598.500	Lt.	9.0m x 31.5m			1	1		Construct Turnout Off Main Turnout (See Sht 9), Temporary Easement
1+618.750	C/L	Rdwy. Align.		1		1		Temporary Easement
N6331(2) STATIONING			1	1	1	3		
33+866.000	Rt.	7.0m x 18.2m						Robert&Adiane Manygoats Constructed under N21(3)–Mobile Hm"/R/W
33+987.000	Lt.	7.0m x 25.2m		1			1	Ray/Etheleen Johnson & Lee/Sally H. Johnson
34+050.000	Rt.	4.5m x 18.2m	1			1		Juanita Whitehair/Anita Joe"/= R/W
34+135.000	Lt.	7.0m x 25.2m		1			1	Curtis Curley/Agnes Redshirt
34+150.000	Rt.	4.5m x 18.2m	1			1		Randy/Modesta Belle Bigman
34+225.000	Rt.	7.0m x 25.2m		1			1	Melvin Franklin
34+250.000	Rt.	4.5m x 25.2m	1				1	Eldon Jon Franklin
34+244.000	Lt.	7.0m x 18.2m		1			1	Keith June/Christine C. Coleman
34+305.000	Rt.	7.0m x 18.2m		1			1	Robert D./Lora M. Bennett
34+361.000	Lt.	7.0m x 19.6m		1			1	Robert Goatson/Harry Bennett @ 75'Skew
34+450.000	Rt.	4.5m x 18.2m	1				1	Tony Sr./Lorinda Bennett"/= R/W
34+525.000	Lt.	4.5m x 18.2m	1				1	Henry Lee Tso
34+540.000	Rt.	4.5m x 18.2m	1				1	Edison Dean Bennett
34+557.000	Lt.	4.5m x 18.2m	1				1	Anthony Tso
34+600.000	Rt.	4.5m x 18.2m	1				1	Pearlene Shaw
34+661.000	Lt.	4.5m x 18.2m	1				1	Mary Butler
34+722.000	Lt.	7.0m x 18.2m		1			1	George G./Kathleen Bennett
34+751.000	Rt.	7.0m x 18.2m		1			1	Lillie Blackhair
34+835.000	Lt.	7.0m x 18.2m		1			1	MaCarty Yazzie/Joe Freeman
34+925.000	Lt.	4.5m x 18.2m	1				1	Delbert/Juleana Begay
34+930.000	Rt.	7.0m x 18.2m		1			1	Earl Martin
35+983.000	Lt.	7.0m x 18.2m		1			1	Carletta Anderson
35+036.000	Rt.	7.0m x 18.2m		1			1	David Quinn/Patty J. Aquero
35+075.000	Lt.	7.0m x 34.8m		1			1	Micheal D. Anderson
35+134.000	Lt.	4.5m x 18.2m	1				1	Alice Sloan
35+510.000	Lt.	7.0m x 20.2m		1			1	Mary Bigman
35+915.000	Lt.	6.39m x 10.2m		1			1	Chapter House Access
35+992.000	Lt.	7.0m x 10.2m		1			1	Bee Hogan Property
36+080.000	Rt.	7.0m x 18.2m		1			1	
36+110.000	Lt.	7.0m x 17.2m		1			1	
36+306.000	Rt.	4.5m x 18.2m	1				1	
36+586.000	Lt.	7.0m x 38.4m		1			1	Bee Hogan Property
36+706.000	Lt.	7.0m x 18.2m		1			1	
36+795.000	Lt.	7.0m x 18.2m		1			1	
37+035.000	Lt.	7.0m x 18.2m		1			1	
37+065.000	Rt.	4.5m x 450.2m	1				1	
37+125.000	Lt.	4.5m x 18.2m	1				1	
37+315.500	Lt.	7.0m x 18.2m		1			1	
37+563.750	C/L	Rdwy. Align.			1			E.O.P.
		SUB–TOTAL	14	23	1	2	35	
		GRAND TOTAL	15	24	2	5	35	

N6331(2)2&4
EXISTING UTILITY CROSSINGS

EXISTING LOCATION	DESCRIPTION	SKEW	REMARKS
33+929.650	Overhead Telephone Line	102°	To Be Raised By Owner
33+948.820	Overhead Cable TV Line	30°	To Be Raised By Owner
34+158.310	Water Line	94°	To Be Abandoned
34+197.710	Overhead Cable TV Line	121°	Protect in Place
34+313.420	Overhead Electrical Line	68°	To Be Raised By Owner
34+325.650	Overhead Cable TV Line	78°	To Be Raised By Owner
34+361.740	Overhead Cable TV Line	9°	To Be Raised By Owner
34+395.075	Existing Waterline	9°	To Be Abandoned
34+543.000	Overhead Cable TV Line	85°	To Be Raised By Owner
34+665.903	Waterline Crossing C/L	90°	To be Abandoned
34+668.916	Waterline Crossing C/L	90°	New Waterline with 305mm Encased by Owner
34+686.030	Overhead Cable TV Line	122°	To Be Raised By Owner
34+967.564	Water Line	67°	To Be Encased By Owner
34+939.540	Overhead Electrical Line	67°	To Be Raised By Owner
34+981.900	Overhead Cable TV Line	93°	Protect in Place
34+983.900	Overhead Cable TV Line		5m Left to be relocated by Owner
35+029.040	Sanitary Sewer Line	146°	To Be Encased By Owner
35+139.965	Overhead Cable TV Line	93°	Protect in Place
35+803.850	Overhead Electrical Line	67°	Protect in Place
35+821.430	Overhead Electrical Line	108°	Protect in Place
35+845.770	Overhead Cable TV Line	94°	Protect in Place
36+298.550	Water Line	101°	To Be Encased By Owner
36+305.035	Overhead Electrical Line	71°	Protect in Place
36+552.560	Overhead Cable TV Line	121°	To Be Raised By Owner
36+556.640	Overhead Electrical Line	123°	Protect in Place
36+606.540	Water Line	91°	To Be Encased By Owner
36+798.480 – 9.5 Lt.	Manhole	N/A	To Be Adjusted to New Grade
36+805.080	Sanitary Sewer Line	55°	To Be Encased By Owner
36+860.350 – 8.9 Lt.	Water Valve	N/A	To Be Adjusted To New Grade
36+873.865 – 6.2 Lt.	Sewer Cleanout	N/A	To Be Relocated By Owner
36+889.165 – 4.5 Lt.	Sewer Cleanout	N/A	To Be Relocated By Owner
34+217 to 34+504 Lt.	Overhead Cable TV Line	N/A	Parallel Line Within R.O.W. To Be Relocated By Owner
34+365 to 34+568 Lt.	Water Line	N/A	Parallel Line Within R.O.W. To Be Relocated By Owner
36+304 to 36+355 Lt.	Overhead Electrical Line	N/A	Parallel Line Within R.O.W. To Be Relocated By Owner
36+733 Lt. to 36+827 Rt.	Sanitary Sewer Line	N/A	Parallel Line Within R.O.W. Protect in Place
36+742 to 37+097 Lt.	Water Line	N/A	Parallel Line Within R.O.W. To Be Relocated By Owner
36+858 to 36+887 Lt.	Overhead Electrical Line	N/A	Parallel Line Within R.O.W. To Be Relocated By Owner

*Remarks Related to Work by Others is Work to be Required by BIA. Actual Work Required/Performed by Utility Owner May Vary.

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

UTILITIES & QUANTITIES TABLES

DRAWN BY: NRDOT	DATE: 8/4/2015
DESIGNED BY: NRDOT	DATE: 8/4/2015
REVISED: 11/7/2017	BY: Design 2
Sht_11 N6331–Quantity Tables_073115.dgn	

Sht_11 N6331–Quantity Tables_073115.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	12	96

Sta 1+093.000 Rt.
Sta 1+094.500 Lt.
Sta 1+115.100 Rt.
Sta 1+115.400 Lt.
Install Object Marker, Type III

Sta 1+093.374 to 1+116.929 Lt. Install 24.384 m of Concrete Wall Barrier With 2-Concrete Transition Sections

Sta 1+021.895 to 1+090.493 Lt. Install 68.576 m of New Guardrail Including Guardrail Transition & 1-Terminal Section Type SKT-350

Sta 1+119.690 to 1+153.340 Lt. Install 34.290 m of New Guardrail Including Guardrail Transition & 1-Terminal Section Type SKT-350

Sta 1+325 to 1+345 Construct Cut to Fill Transition with Wire Enclosed Riprap
Sta 1+345 to 1+390 Lt. &
Sta 1+425 to 1+560 Lt. Construct Wire Enclosed Riprap Lined Ditch

Sta 1+120 to 1+135 Lt. Construct Wire Enclosed Riprap Cut to Fill Transition. Sta 1+135 to 1+140 Lt. Constuct Wire Enclosed Riprap Toe of Fill Protection. Sta 1+140 to 1+240 Lt. Construct Placed Riprap Toe of Fill Protection

Sta 1+104.668 Centerline 8 Barrels CBC. See Sheet 41 of 96 for plan & profile Detail.

See Sheet 62 for Toe of Slope Protector Place Raprip Detail.

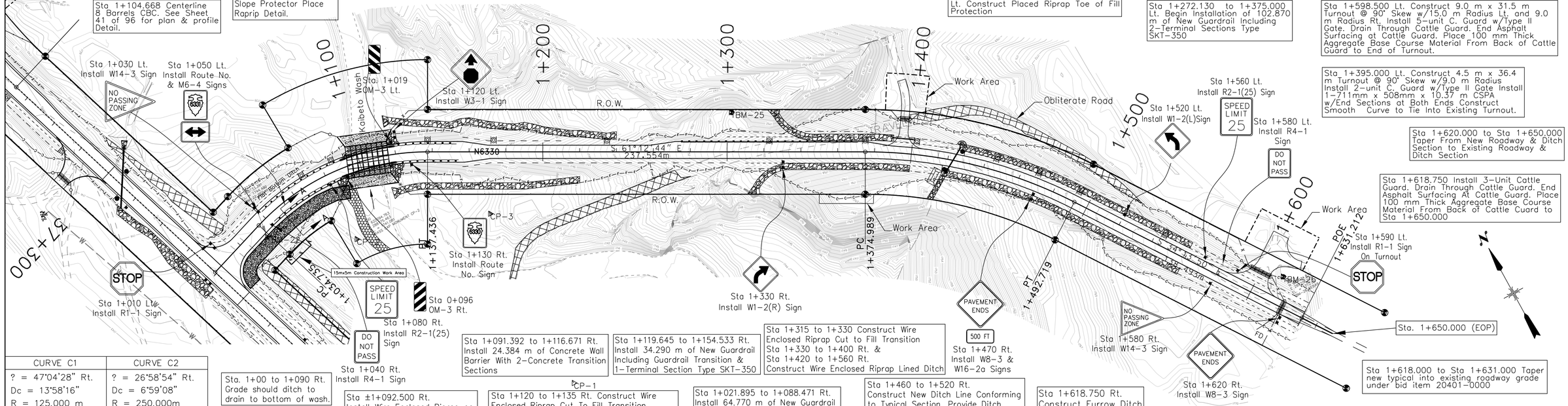
Sta 1+272.130 to 1+375.000 Lt. Begin Installation of 102.870 m of New Guardrail Including 2-Terminal Sections Type SKT-350

Sta 1+598.500 Lt. Construct 9.0 m x 31.5 m Turnout @ 90° Skew w/15.0 m Radius Lt. and 9.0 m Radius Rt. Install 5-unit C. Guard w/Type II Gate. Drain Through Cattle Guard. End Asphalt Surfacing at Cattle Guard. Place 100 mm Thick Aggregate Base Course Material From Back of Cattle Guard to End of Turnout.

Sta 1+395.000 Lt. Construct 4.5 m x 36.4 m Turnout @ 90° Skew w/9.0 m Radius Install 2-unit C. Guard w/Type II Gate Install 1-711mm x 508mm x 10.37 m CSPA w/End Sections at Both Ends Construct Smooth Curve to Tie Into Existing Turnout.

Sta 1+620.000 to Sta 1+650.000 Taper From New Roadway & Ditch Section to Existing Roadway & Ditch Section

Sta 1+618.750 Install 3-Unit Cattle Guard. Drain Through Cattle Guard. End Asphalt Surfacing At Cattle Guard. Place 100 mm Thick Aggregate Base Course Material From Back of Cattle Cuard to Sta 1+650.000



CURVE C1	CURVE C2
? = 47°04'28" Rt.	? = 26°58'54" Rt.
Dc = 13°58'16"	Dc = 6°59'08"
R = 125.000 m	R = 250.000m
T = 54.448 m	T = 59.977 m
L = 102.700 m	L = 117.730 m
e = NC	e = 3.000%
PI	PI
STA = 1+089.183	STA = 1+434.967
N = 622343.932	N = 622174.431
E = 288784.222	E = 289092.700

Sta. 1+00 to 1+090 Rt. Grade should ditch to drain to bottom of wash.

Install Placed Riprap on Southeast Corner of N6330/N6331 Intersection. And extend riprap to wingwall No. 1 See Sheet 62 For Details.

Sta ±1+092.500 Rt. Install Wire Enclosed Riprap on Southwest Channel Bank From End of Wingwall to R.O.W. Line See Sheet 49 For Details

Sta. 1+00 to 1+090 Rt. Grade should ditch to drain to bottom of wash.

Sta 1+091.392 to 1+116.671 Rt. Install 24.384 m of Concrete Wall Barrier With 2-Concrete Transition Sections

Sta 1+120 to 1+135 Rt. Construct Wire Enclosed Riprap Cut To Fill Transition
Sta 1+135 to 1+140 Rt.
Construct Wire Enclosed Riprap Lined Ditch.
Sta 1+140 to 1+220 Rt. Construct Placed Riprap Lined Ditch. See Special Ditch Details In Profile View and On Sheet 64

Sta 1+119.645 to 1+154.533 Rt. Install 34.290 m of New Guardrail Including Guardrail Transition & 1-Terminal Section Type SKT-350

Sta 1+021.895 to 1+088.471 Rt. Install 64.770 m of New Guardrail Including Guardrail Transition & 1-Terminal Section Type SKT-350

Sta 1+315 to 1+330 Construct Wire Enclosed Riprap Cut to Fill Transition
Sta 1+330 to 1+400 Rt. &
Sta 1+420 to 1+560 Rt.
Construct Wire Enclosed Riprap Lined Ditch

Sta 1+460 to 1+520 Rt. Construct New Ditch Line Conforming to Typical Section. Provide Ditch Backslopes of 1:6 or Flatter.

Sta 1+618.750 Rt. Construct Furrow Ditch

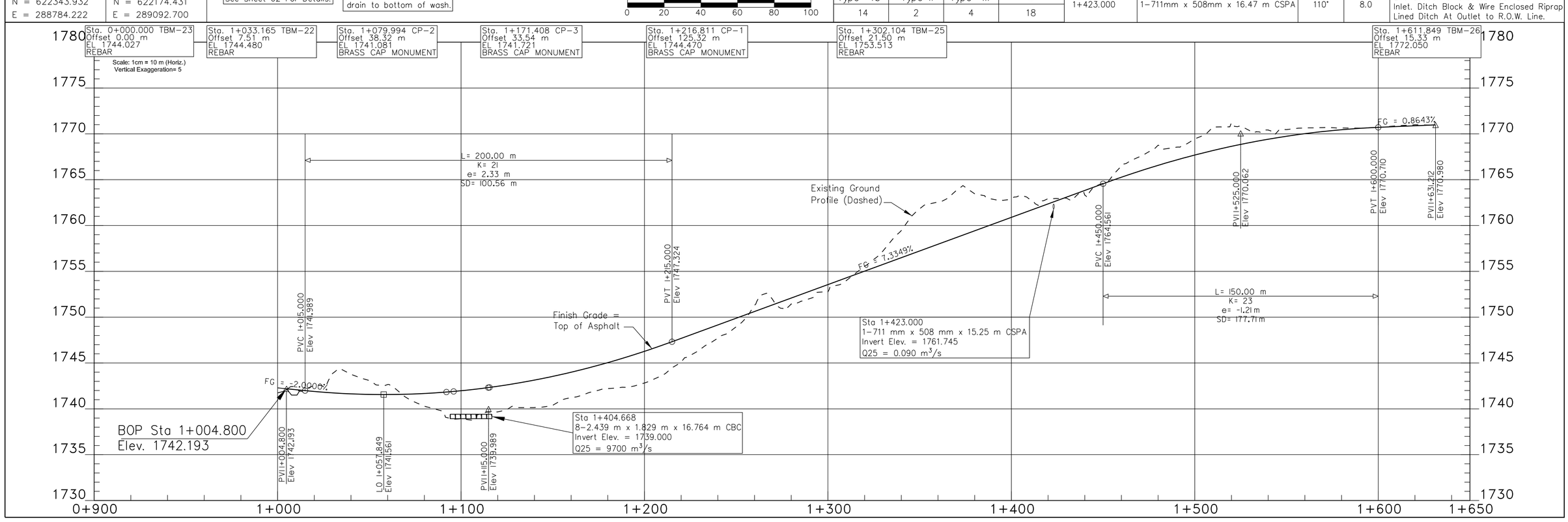
Sta 1+618.000 to Sta 1+631.000 Taper new typical into existing roadway grade under bid item 20401-0000

SCALE: Meters
0 20 40 60 80 100

DELINEATORS	OBJECT MARKERS		RIGHT OF-WAY MONUMENTS
Type "1b"	Type II	Type "III"	
14	2	4	18

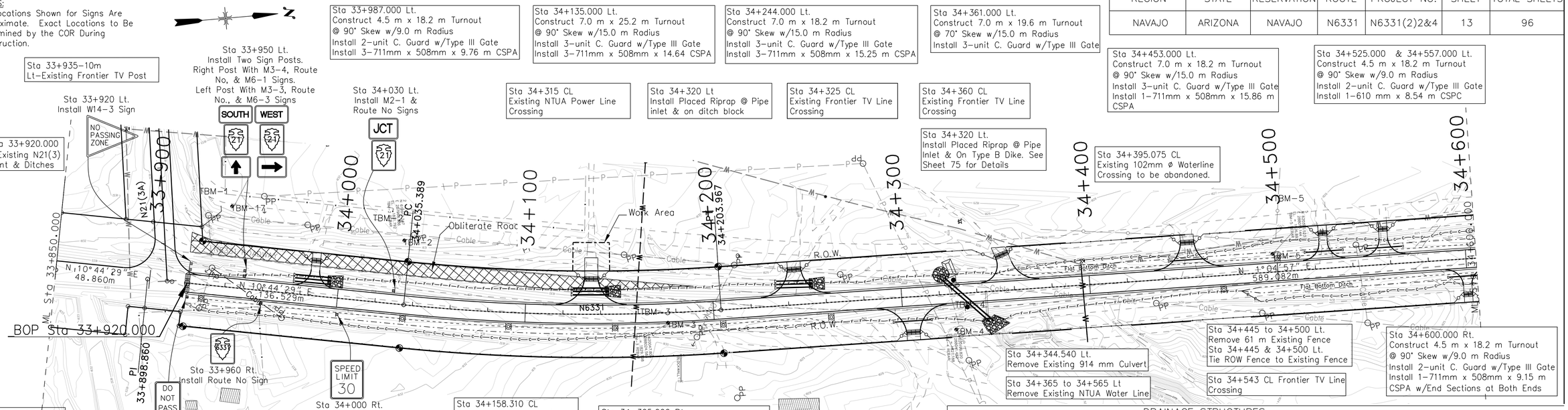
DRAINAGE STRUCTURES

Station	Structure	Skew No.	D.A. (ha)	Remarks
1+104.668	8-2.439 m x 1.829 m x 16.764 m CBC	97°	9700	See Sheet 41-44 for Details
1+395.000 Lt.	1-711mm x 508mm x 10.37 m CSPA	N/A	0.4	Under Turnout. End Sections Both Ends.
1+423.000	1-711mm x 508mm x 16.47 m CSPA	110°	8.0	End Section & Grouted Rock Berm @ Inlet. Ditch Block & Wire Enclosed Riprap Lined Ditch At Outlet to R.O.W. Line.



REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	13	96

NOTES:
1. Locations Shown for Signs Are Approximate. Exact Locations to Be Determined by the COR During Construction.

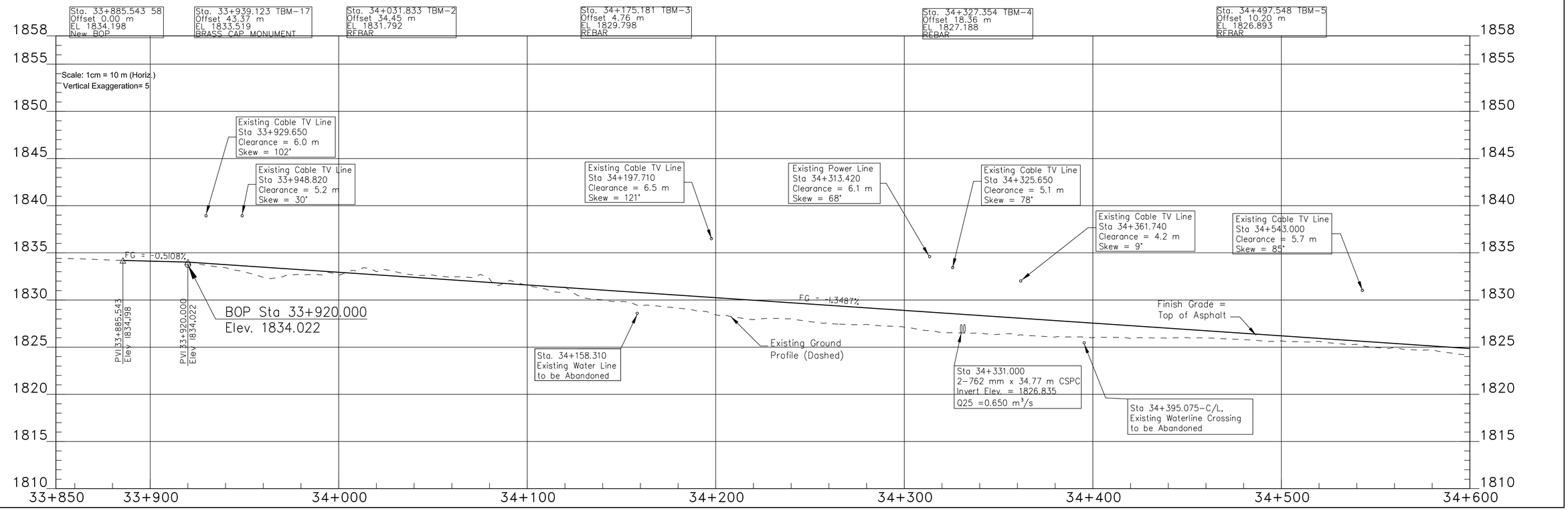


CURVE C3
? = 9°39'32" Lt.
Dc = 1°44'47"
R = 1000.000 m
T = 84.489 m
L = 168.579 m
e = RC
PI
STA = 34+119.878
N = 619992.328
E = 288019.195

DELINEATORS	OBJECT MARKERS		RIGHT OF–WAY MONUMENTS
Type "1b"	Type II	Type "1a"	
7	2	0	6

DRAINAGE STRUCTURES

Station	Structure	Skew No.	D.A. (ha)	Remarks
33+987.000 Lt.	3–711mm x 508mm x 9.76 m CSPA	N/A	74.1	Under Turnout. End Sections Both Ends. Placed Riprap @ Outlet.
34+135.000 Lt.	3–711mm x 508mm x 14.64 m CSPA	N/A	76.7	Under Turnout. End Sections Both Ends. Placed Riprap @ Outlet.
34+244.000 Lt.	3–711mm x 508mm x 15.25 m CSPA	N/A	78.7	Under Turnout. End Sections Both Ends. Placed Riprap @ Outlet.
34+305.000 Rt.	1–711mm x 508mm x 14.64 m CSPA	N/A	0.9	Under Turnout. End Sections Both Ends
34+331.000	2–762 mm x 34.747 m CSPC	45°	81.0	End Section, Ditch Block, And Placed Riprap at Inlet. WER Stilling Basin at Outlet.
34+453.000 Lt.	1–711mm x 508mm x 15.86 m CSPA	N/A	1.2	Under Turnout. End Sections Both Ends
34+525.000 Lt.	1–610 mm x 8.54 m CSPC	N/A	2.0	Under Turnout. End Sections Both Ends
34+557.000 Lt.	1–610 mm x 8.54 m CSPC	N/A	2.7	Under Turnout. End Sections Both Ends
34+600.000 Rt.	1–711mm x 508mm x 9.15 m CSPA	N/A	0.6	Under Turnout. End Sections Both Ends



REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	14	96

Sta 34+722.000 Lt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-711mm x 508mm x 15.86 m
CSPA w/End Sections at Both Ends

Sta 34+835.000 Lt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-711mm x 508mm x 15.86 m
CSPA w/End Sections at Both Ends

Sta 34+983.000 Lt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-610 mm x 15.86 m CSPC
w/End Sections at Both Ends

Sta 35+075.000 Lt.
Construct 7.0 m x 34.8 m Turnout @ 90° Skew
w/15.0 m Radius. Install 3-unit C. Guard
w/Type III Gate. Install 1-711mm x 508mm x
17.69 m CSPA. w/End Sections at Both Ends.
Construct Smooth Curve to Tie Into Existing
Turnout.

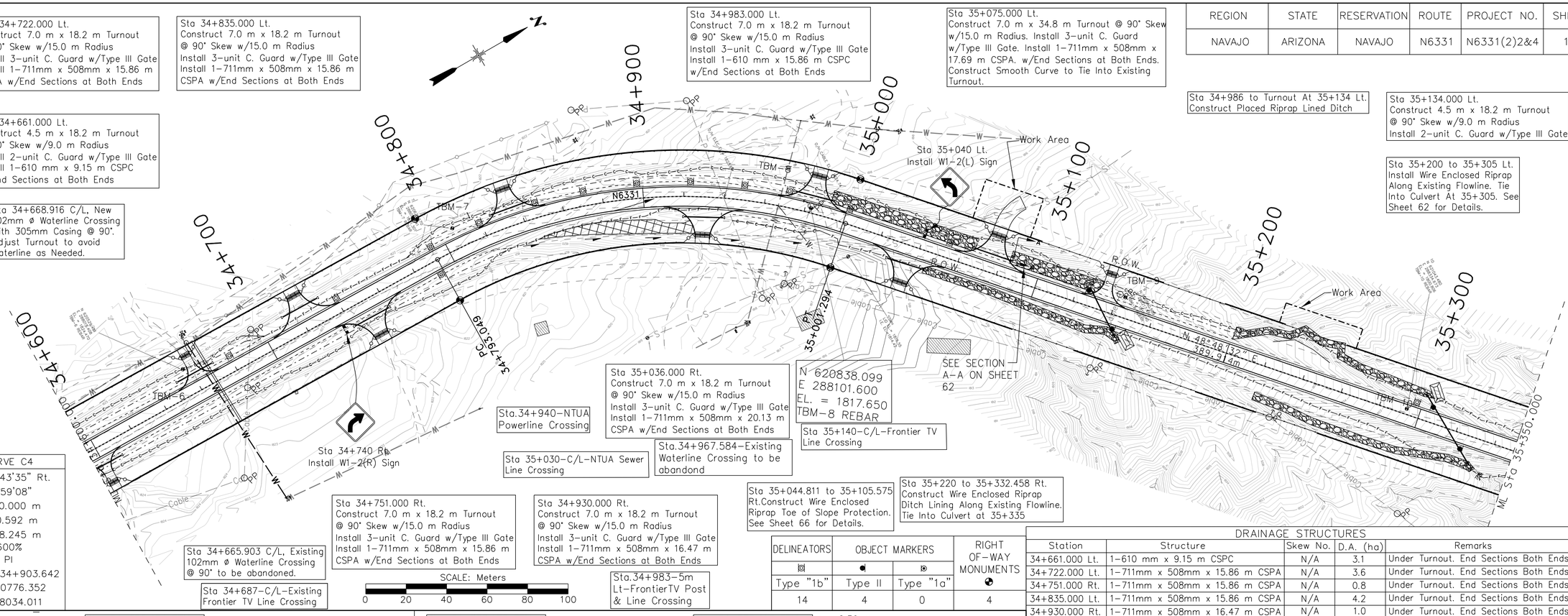
Sta 34+986 to Turnout At 35+134 Lt.
Construct Placed Riprap Lined Ditch

Sta 35+134.000 Lt.
Construct 4.5 m x 18.2 m Turnout
@ 90° Skew w/9.0 m Radius
Install 2-unit C. Guard w/Type III Gate

Sta 35+200 to 35+305 Lt.
Install Wire Enclosed Riprap
Along Existing Flowline. Tie
Into Culvert At 35+305. See
Sheet 62 for Details.

Sta 34+661.000 Lt.
Construct 4.5 m x 18.2 m Turnout
@ 90° Skew w/9.0 m Radius
Install 2-unit C. Guard w/Type III Gate
Install 1-610 mm x 9.15 m CSPC
w/End Sections at Both Ends

Sta 34+668.916 C/L, New
102mm ø Waterline Crossing
With 305mm Casing @ 90°.
Adjust Turnout to avoid
Waterline as Needed.



Sta.34+940-NTUA
Powerline Crossing

Sta 35+036.000 Rt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-711mm x 508mm x 20.13 m
CSPA w/End Sections at Both Ends

Sta 35+140-C/L-Frontier TV
Line Crossing

Sta 35+030-C/L-NTUA Sewer
Line Crossing

Sta.34+967.584-Existing
Waterline Crossing to be
abandond

Sta 35+044.811 to 35+105.575
Rt.Construct Wire Enclosed
Riprap Toe of Slope Protection.
See Sheet 66 for Details.

Sta 35+220 to 35+332.458 Rt.
Construct Wire Enclosed Riprap
Ditch Lining Along Existing Flowline.
Tie Into Culvert at 35+335

CURVE C4
? = 47°43'35" Rt.
Dc = 6°59'08"
R = 250.000 m
T = 110.592 m
L = 208.245 m
e = 3.600%
PI
STA = 34+903.642
N = 620776.352
E = 288034.011

Sta 34+751.000 Rt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-711mm x 508mm x 15.86 m
CSPA w/End Sections at Both Ends

Sta 34+930.000 Rt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-711mm x 508mm x 16.47 m
CSPA w/End Sections at Both Ends

Sta 34+665.903 C/L, Existing
102mm ø Waterline Crossing
@ 90° to be abandoned.

Sta 34+687-C/L-Existing
Frontier TV Line Crossing

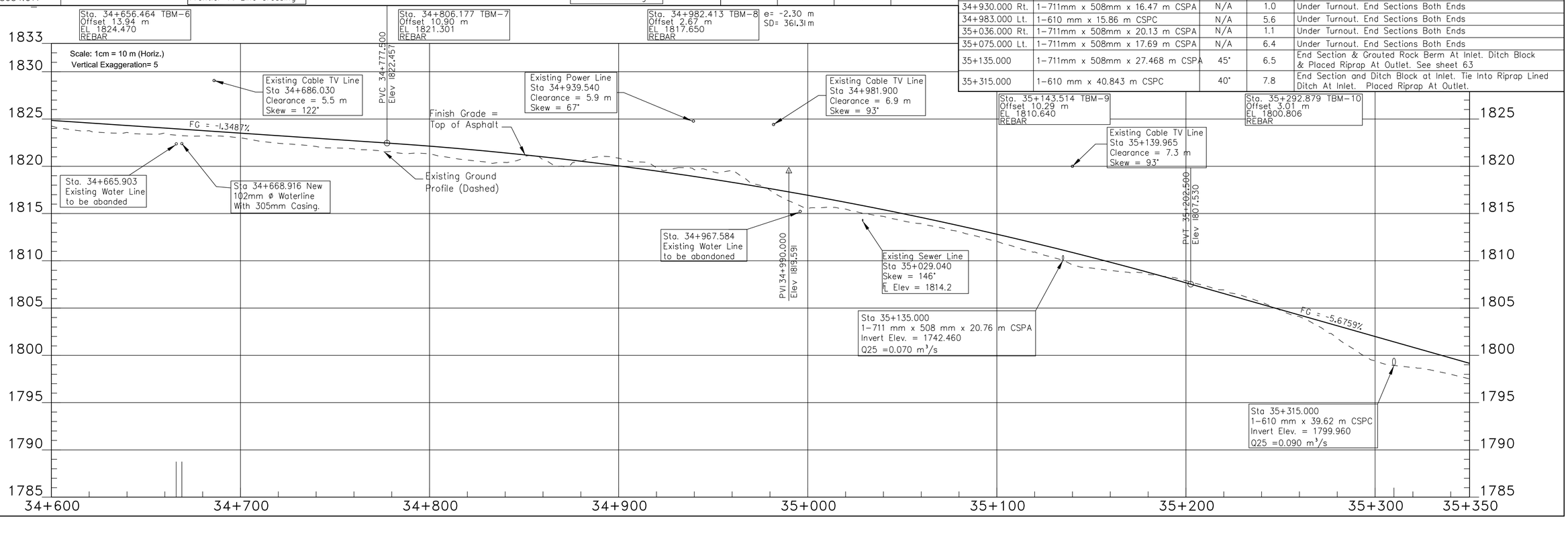
SCALE: Meters
0 20 40 60 80 100

Sta.34+983-5m
Lt-FrontierTV Post
& Line Crossing

DELINEATORS	OBJECT MARKERS		RIGHT OF-WAY MONUMENTS
Type "1b"	Type II	Type "1a"	
14	4	0	4

DRAINAGE STRUCTURES

Station	Structure	Skew No.	D.A. (ha)	Remarks
34+661.000 Lt.	1-610 mm x 9.15 m CSPC	N/A	3.1	Under Turnout. End Sections Both Ends
34+722.000 Lt.	1-711mm x 508mm x 15.86 m CSPA	N/A	3.6	Under Turnout. End Sections Both Ends
34+751.000 Rt.	1-711mm x 508mm x 15.86 m CSPA	N/A	0.8	Under Turnout. End Sections Both Ends
34+835.000 Lt.	1-711mm x 508mm x 15.86 m CSPA	N/A	4.2	Under Turnout. End Sections Both Ends
34+930.000 Rt.	1-711mm x 508mm x 16.47 m CSPA	N/A	1.0	Under Turnout. End Sections Both Ends
34+983.000 Lt.	1-610 mm x 15.86 m CSPC	N/A	5.6	Under Turnout. End Sections Both Ends
35+036.000 Rt.	1-711mm x 508mm x 20.13 m CSPA	N/A	1.1	Under Turnout. End Sections Both Ends
35+075.000 Lt.	1-711mm x 508mm x 17.69 m CSPA	N/A	6.4	Under Turnout. End Sections Both Ends
35+135.000	1-711mm x 508mm x 27.468 m CSPA	45°	6.5	End Section & Grouted Rock Berm At Inlet. Ditch Block & Placed Riprap At Outlet. See sheet 63
35+315.000	1-610 mm x 40.843 m CSPC	40°	7.8	End Section and Ditch Block at Inlet. Tie Into Riprap Lined Ditch At Inlet. Placed Riprap At Outlet.



REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	15	96

Sta 35+350 to 35+620 Lt.
Construct Wire Enclosed Riprap Toe of Fill Protection and Ditch Lining

Sta 35+510.000 Lt.
Construct 7.0 m x 20.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-610 mm x 14.64 m CSPC

Sta 35+620 to 35+640 Lt.
Construct Cut to Fill Transition

Sta 35+885 to Sta 35+905 Lt.
Existing Retaining Wall Just Beyond R.O.W. DO NOT DISTURB. Keep Heavy Equipment A Minimum Of 5 meters Away From Wall. Contractor To Pothole For Possible Wall Tie-Backs. If Tie-Backs Are Found, Contact The COR For Possible Modifications To Ditch Cross Section.

Sta 35+915.000 Lt.
Construct 6.390 m x 10.2 m Turnout
@ 87° Skew w/9.0 m Radius
Remove Existing Culverts.
Install 3-Unit C. Guard place concrete bottom with placed riprap at both ends.
Remove 2-152 mm Concrete Filled Bollards. Protect Existing Gate Posts.
Remove & Replace Existing Stop Sign.

Sta 35+780 to 35+855 Lt.
Install Erosion Control Mat Type IV

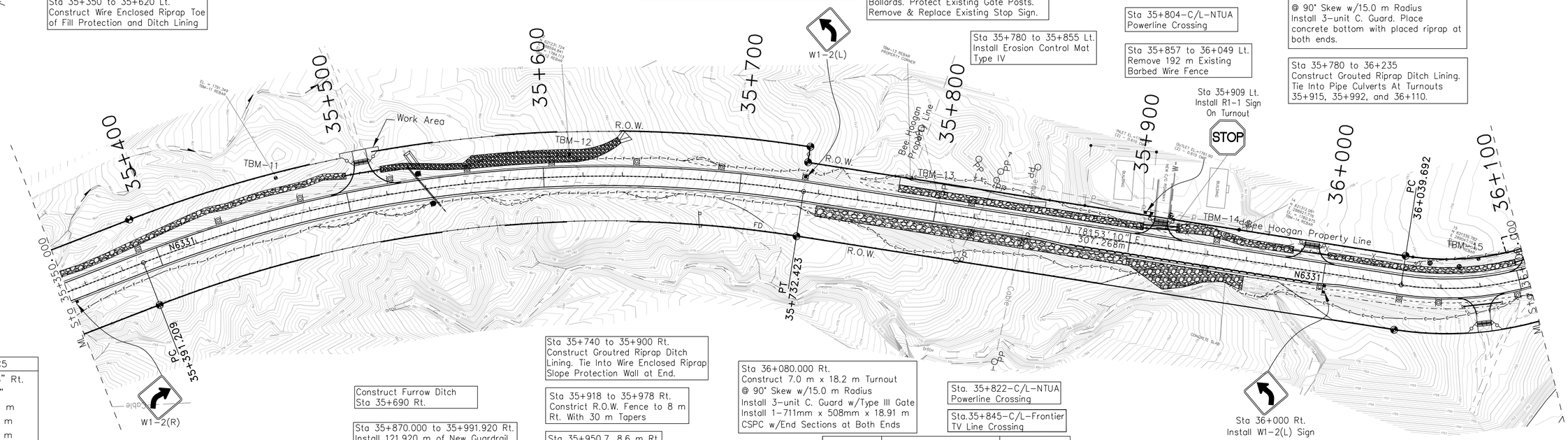
Sta 35+919, 16.4 m Lt.
Protect Fire Hydrant

Sta 35+804-C/L-NTUA
Powerline Crossing

Sta 35+857 to 36+049 Lt.
Remove 192 m Existing Barbed Wire Fence

Sta 35+992.000 Lt.
Construct 7.0 m x 10.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard. Place concrete bottom with placed riprap at both ends.

Sta 35+780 to 36+235
Construct Grouted Riprap Ditch Lining. Tie Into Pipe Culverts At Turnouts 35+915, 35+992, and 36+110.



Construct Furrow Ditch
Sta 35+690 Rt.

Sta 35+740 to 35+900 Rt.
Construct Groutred Riprap Ditch Lining. Tie Into Wire Enclosed Riprap Slope Protection Wall at End.

Sta 35+918 to 35+978 Rt.
Constrict R.O.W. Fence to 8 m Rt. With 30 m Tapers

Sta 35+950.7, 8.6 m Rt.
Remove Concrete Block From Channel Bank

Sta 35+870.000 to 35+991.920 Rt.
Install 121.920 m of New Guardrail Including 2-Terminal Sections Type SKT-350.

Sta 35+900 to 35+960 Rt.
Construct Wire Enclosed Riprap Slope Protection on Channel Bank. See Sheet 50 For Details.

Sta 36+080.000 Rt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-711mm x 508mm x 18.91 m CSPC w/End Sections at Both Ends

Sta. 35+822-C/L-NTUA
Powerline Crossing

Sta.35+845-C/L-Frontier TV Line Crossing

CURVE C5
? = 30°04'38" Rt.
Dc = 2°41'12"
R = 650.000 m
T = 174.636 m
L = 341.215 m
e = 2.400%
PI
STA = 35+565.845
N = 621220.982
E = 288542.068

DELINEATORS	OBJECT MARKERS		RIGHT OF-WAY MONUMENTS
▣	●	⊙	◒
Type "1b"	Type II	Type "1a"	
15	2	0	7

DRAINAGE STRUCTURES

Station	Structure	Skew No.	D.A. (ha)	Remarks
35+510.000 Lt.	1-610 mm x 14.64 m CSPC	N/A	0.8	Under Turnout. End Sections Both Ends
35+540.000	1-610 mm x 21.946 m CSPC	60°	0.7	Install New Ditch Block on Inlet Side
36+080.000 Rt.	1-711mm x 508mm x 18.91 m CSPA	N/A	0.7	Under Turnout. End Sections Both Ends

Sta. 35+292.879 TBM-10
Offset 3.01 m
EL 1800.806
REBAR

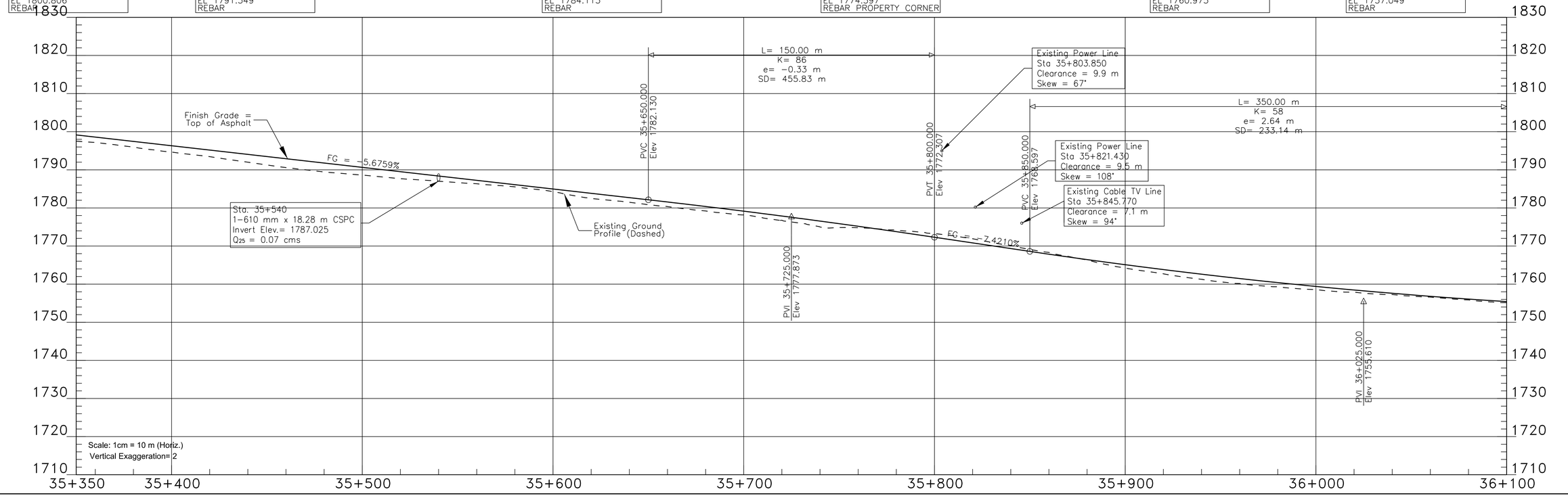
Sta. 35+466.911 TBM-11
Offset 20.62 m
EL 1791.349
REBAR

Sta. 35+613.069 TBM-12
Offset 11.49 m
EL 1784.113
REBAR

Sta. 35+785.357 TBM-13
Offset 15.00 m
EL 1774.597
REBAR PROPERTY CORNER

Sta. 35+953.824 TBM-14
Offset 15.05 m
EL 1760.975
REBAR

Sta. 36+080.543 TBM-15
Offset 14.26 m
EL 1757.049
REBAR



REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	16	96

Sta 36+110.000 Lt.
Construct 7.0 m x 17.2 m Turnout
@ 90° Skew w/9.0 m Radius
Install New 3-unit C. Guard w/Type III Gate Remove Existing Cattle Guard. Place concrete bottom with placed riprap at both sides.

Sta 36+204 to 36+272 Lt.
Remove 65 m Existing Barbed Wire Fence

Sta 36+231.485
Install End Sections At Inlets of Existing 914 mm Culverts. Tie Grouted Riprap Into End Sections.

Sta 36+300 to 36+355-10m Lt.
Existing Frontier TV Line

Sta 36+300 to 36+350 Lt.
Install Erosion Control Mat Type IV on Ditch Backslope

Sta 36+298-C/L-NTUA Water Line Crossing

Sta 36+305-C/L-NTUA Power Line Crossing

Sta 36+555-C/L-Frontier TV Line Crossing

Sta 36+586.000 Lt.
Construct 7.0 m x 38.4 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Remove Existing Culverts. Construct Smooth Asphalt & Aggrgate Base Transition to Existing Road.

Sta 36+800-10m Lt-NTUA Sewer Manhole

Sta 36+805-NTUA Sewer Line Crossing

Sta 36+779.356
Remove Existing 914 mm Culvert

Sta 36+795.000 Lt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type II Gate
Install 1-711mm x 508mm x 19.99 m CSPA w/End Sections at Both Ends

Sta 36+557-C/L-NTUA Power Line Crossing

Sta 36+776 to 36+883 Lt.
Remove 135 m Existing Fence
Sta 36+776 Tie R.O.W. Fence to Existing Fence

Sta 36+160 Rt.
Remove Existing Bridge and Sign

Sta 36+157.370 to 36+260.077 Rt.
Install 102.870 m of New Guardrail Including 2-Terminal Sections Type SKT-350

Sta 36+231.485
2 Existing 914 mm Culverts to be remove Clean and Reset

Sta 36+180 to 36+260 Rt.
Construct Wire Enclosed Slope Channel Bank Protection See Sheet 50 For Details.

Sta 36+195 to 36+256 Rt.
Constrict R.O.W. Fence to 11 m Rt. With 30 m Tapers

Sta 36+510 Lt.
Install W1-2(R) Sign

Sta 36+579 Lt.
Install R1-1 Sign

Sta 36+785 Lt.
Install R1-1 Sign

Sta 36+730.000 to 37+001.710 Rt.
Install 270.510 m of New Guardrail Including 2-Terminal Sections Type SKT-350. Sta 36+790 to 37+000 Construct Asphalt Curb Behind Guardrail.
See Sheet 68 to 74 For Details.

Sta 36+786.57 Rt. Construct Concrete Spillway for Guardrail.
See Sheet 74 For Details.

Sta 36+817-12m Rt-NTUA Sewer Manhole

CURVE C6	CURVE C7	CURVE C8
? = 102°11'55" Lt.	? = 19°54'06" Lt.	? = 10°36'47" Rt.
Dc = 11°31'38"	Dc = 6°59'08"	Dc = 5°49'17"
R = 151.500 m	R = 250.000 m	R = 300.000 m
T = 187.751 m	T = 43.860 m	T = 27.864 m
L = 270.231 m	L = 86.837 m	L = 55.570 m
e = 3.990%	e = 3.600%	e = 3.300%
PI	PI	PI
STA = 36+227.443	STA = 36+425.033	STA = 36+602.364
N = 621350.065	N = 621628.201	N = 621758.083
E = 289199.165	E = 289079.309	E = 288957.280

SCALE: Meters
0 20 40 60 80 100

Sta 36+306.000 Rt.
Construct 4.5 m x 18.2 m Turnout
@ 90° Skew w/9.0 m Radius
Install 2-unit C. Guard w/Type III Gate

Sta 36+606.540 Centerline 102mm ø Waterline with 305mm casing to remain in-place.

Sta 36+551.000 to 36+643.330 Rt.
Install 91.440 m of New Guardrail Including 2-Terminal Sections Type SKT-350.

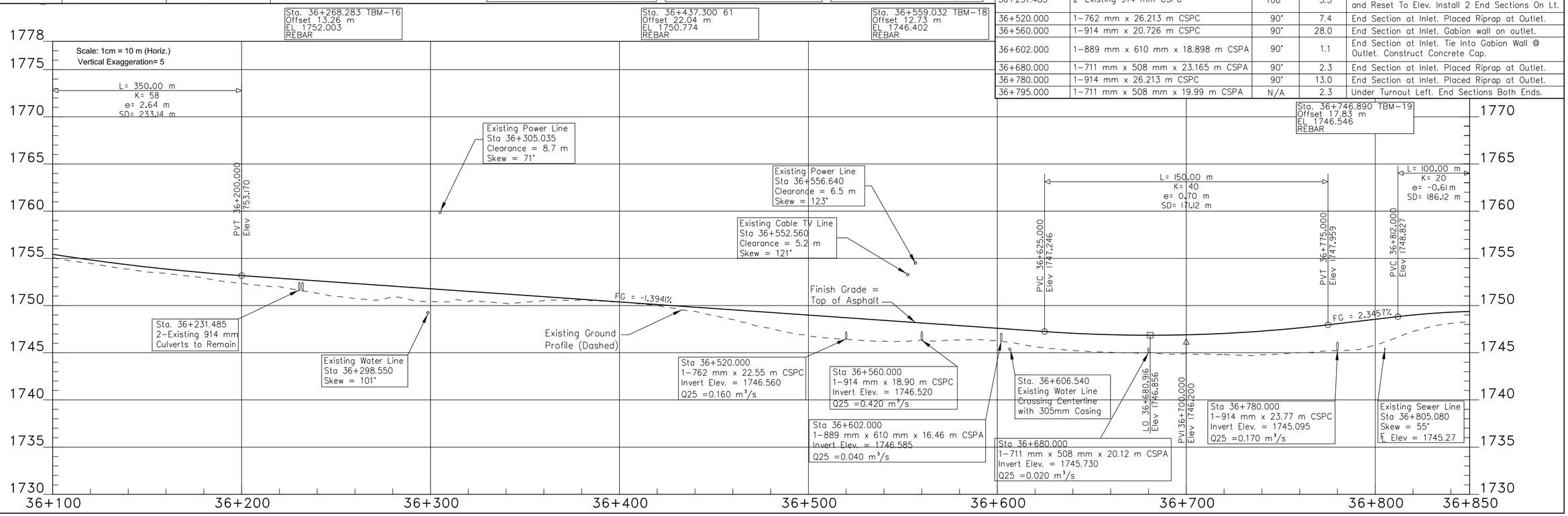
Sta 36+565 to 36+640 Rt.
Constrict R.O.W. Fence to 9 m Rt. With 30 m Tapers

Sta 36+540 to 36+660 Rt.
Install Wire Enclosed Riprap and Gabions. See Sheet 51 For Details.
Install Erosion Control Mat Type IV.

DELINEATORS	OBJECT MARKERS		RIGHT OF-WAY MONUMENTS
Type "1b"	Type II	Type "1a"	
20	12	0	14

DRAINAGE STRUCTURES

Station	Structure	Skew No.	D.A. (ha)	Remarks
36+231.485	2-Existing 914 mm CSPC	100°	3.5	Existing 2-914mm X 22.77 CSPC. Remove, Clean and Reset To Elev. Install 2 End Sections On Lt.
36+520.000	1-762 mm x 26.213 m CSPC	90°	7.4	End Section at Inlet. Placed Riprap at Outlet.
36+560.000	1-914 mm x 20.726 m CSPC	90°	28.0	End Section at Inlet. Gabion wall on outlet.
36+602.000	1-889 mm x 610 mm x 18.898 m CSPA	90°	1.1	End Section at Inlet. Tie Into Gabion Wall @ Outlet. Construct Concrete Cap.
36+680.000	1-711 mm x 508 mm x 23.165 m CSPA	90°	2.3	End Section at Inlet. Placed Riprap at Outlet.
36+780.000	1-914 mm x 26.213 m CSPC	90°	13.0	End Section at Inlet. Placed Riprap at Outlet.
36+795.000	1-711 mm x 508 mm x 19.99 m CSPA	N/A	2.3	Under Turnout Left. End Sections Both Ends.



REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	17	96

Chapter Boundary

Sta 37+035.000 Lt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/9.0 m Radius
Install 3-unit C. Guard w/Type III Gate
Install 1-711mm x 508mm x 19.99 m
CSPA w/End Sections at Both Ends

Sta 37+101 Lt.
Grade Two Existing Drainage Channels to Drain to New Culvert. Line New Channels With Placed Riprap to R.O.W. Line.

Sta 37+125.000 Lt.
Construct 4.5 m x 18.2 m Turnout
@ 90° Skew w/9.0 m Radius
Install 2-unit C. Guard w/Type III Gate

Sta 37+215 to 37+283 Lt.
Construct Placed Riprap Ditch Lining. Tie Into Culvert at End.

Sta 37+509.691 to 37+529.285 Lt.
Install 19.050 m of New Guardrail Including Guardrail Transition & 1-Terminal Section Type SKT-350.

Sta 37+100
Remove Existing 610mm Culvert

Sta 37+315.500 Lt.
Construct 7.0 m x 18.2 m Turnout
@ 90° Skew w/15.0 m Radius
Install 3-unit C. Guard w/Type III Gate

Sta 36+740 to 37+090-Lt-Existing
NTUA Water Line w/in R/W

Sta 37+280 Lt.
Install Route No.
& M6-1 Signs

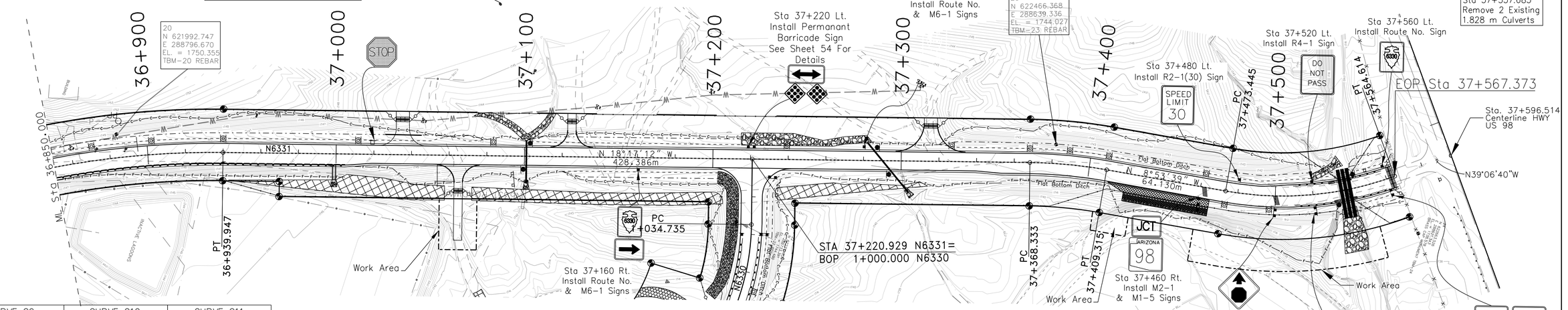
Sta 37+529.105 to 37+541.640 Lt.
Install 6.096 m of Concrete Jersey Barrier With 2-Concrete Transition Sections

Sta 37+520 Lt.
Construct Wire Enclosed Cut To Fill Transition

Sta 37+541.456 to 37+561.050 Lt.
Install 19.050 m of New Guardrail Including Guardrail Transition & 1-Terminal Section Type SKT-350.

Sta 37+563 Lt.
Remove Metal Sign Frame

Sta 37+537.685
Remove 2 Existing 1.828 m Culverts



CURVE C9	CURVE C10	CURVE C11
? = 14°18'52" Rt.	? = 9°23'33" Rt.	? = 30°13'01" Lt.
Dc = 3°52'51"	Dc = 6°59'08"	Dc = 10°06'08"
R = 450.000 m	R = 250.000 m	R = 172.870 m
T = 56.507 m	T = 20.537 m	T = 46.671 m
L = 112.426 m	L = 40.982 m	L = 91.169 m
e = 2.850%	e = 3.600%	e = NC
PI	PI	PI
STA = 36+884.028	STA = 37+388.870	STA = 37+520.117
N = 621995.504	N = 622475.409	N = 622605.168
E = 288805.437	E = 288646.847	E = 288626.541

Sta 36+855.110 & 36+969.975 Rt.
Tie R.O.W. Fence to Existing Chain Link Fence

Sta 37+065.0000 Rt.
Construct 4.5 m x 40.2 m Turnout
@ 90° Skew w/9.0 m Radius
Install 2-unit C. Guard w/Type III Gate

SCALE: Meters
0 20 40 60 80 100

Sta 37+000.000 Rt.
Construct Concrete Spillway For Guardrail. See Sheet 74 For Details.

Sta 37+462, 37+500 & 37+538 Rt.
Construct Rumble Strips. See Sheet 81 For Details.

Sta 37+301.870
Remove Existing 914mm Culvert

Sta 37+356.550 to 37+530.999 Rt.
Install 175.26 m of New Guardrail Including Guardrail Transition & 1-Terminal Section Type SKT-350

Sta 37+420 to 37+465.72 Rt.
Construct Gabion Wall on Channel Bank. See Sheet 64 For Details. Install Erosion Control Mat Type IV. See Sheet 54 and 55.

Sta 37+410 to 37+531 Rt.
Constrict R.O.W. Fence to 10 m Rt. With 30 m Taper on South End of Constriction

Sta 37+530.829 to 37+542.695 Rt.
Install 6.096 m of Concrete Jersey Barrier With 2-Concrete Transition Sections

Sta 37+542.515 to 37+561.050 Rt.
Install 19.050 m of New Guardrail Including Guardrail Transition & 1-Terminal Section Type SKT-350.

Sta 37+566 Remove Existing Cattle Guard. Sta 37+563.750 Install New 5-Unit Cattle Guard. Grade Cattle Guard to Drain To The East. Sta 37+567.373 Saw Cut Existing Asphalt Pavement. Taper Roadway Width to Match Existing Width at EOP. Match New Asphalt to Existing.

Sta 37+560 Rt., Install Two Sign Posts. Right Post With M3-2, M1-5, & M6-1 Signs. Left Post With M3-4, M1-5., & M6-1 Signs

Sta. 36+884.976 TBM-20
Offset 12.64 m
EL 1750.355
REBAR

Sta. 37+037.588 CP-1
Offset 88.56 m
EL 1744.470
BRASS CAP MONUMENT

Sta. 37+133.340 CP-3
Offset 124.84 m
EL 1741.721
BRASS CAP MONUMENT

Sta. 37+176.991 CP-2
Offset 65.44 m
EL 1741.081
BRASS CAP MONUMENT

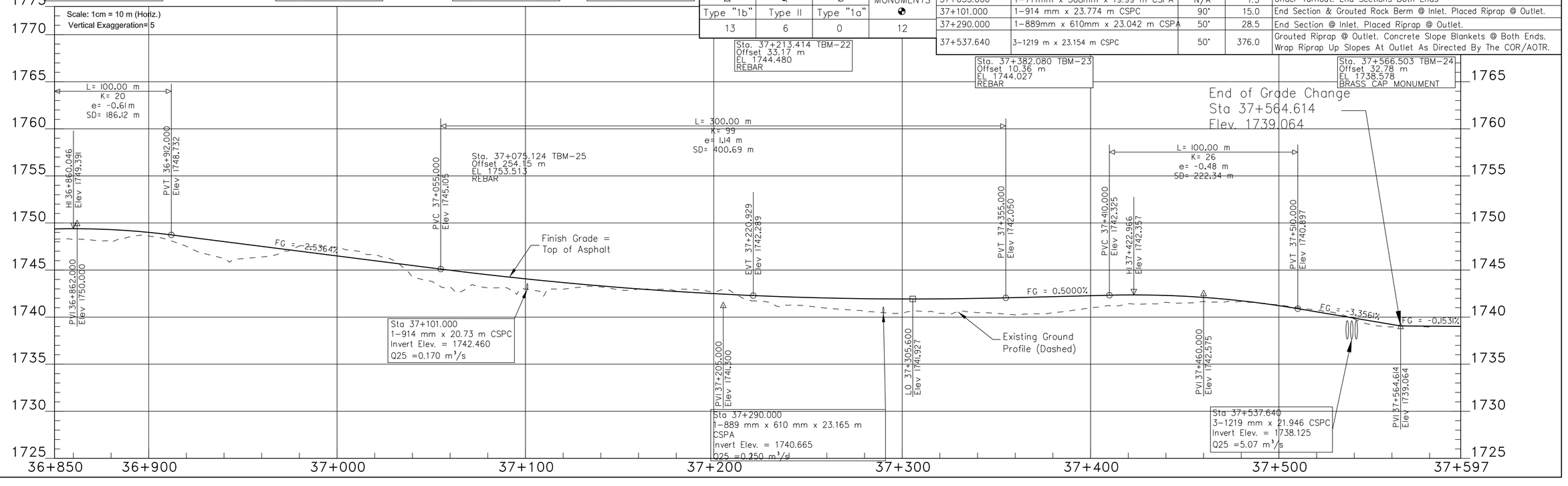
DELINEATORS	OBJECT MARKERS		RIGHT OF-WAY MONUMENTS
Type "1b"	Type II	Type "1a"	
13	6	0	12

Sta. 37+213.414 TBM-22
Offset 33.17 m
EL 1744.480
REBAR

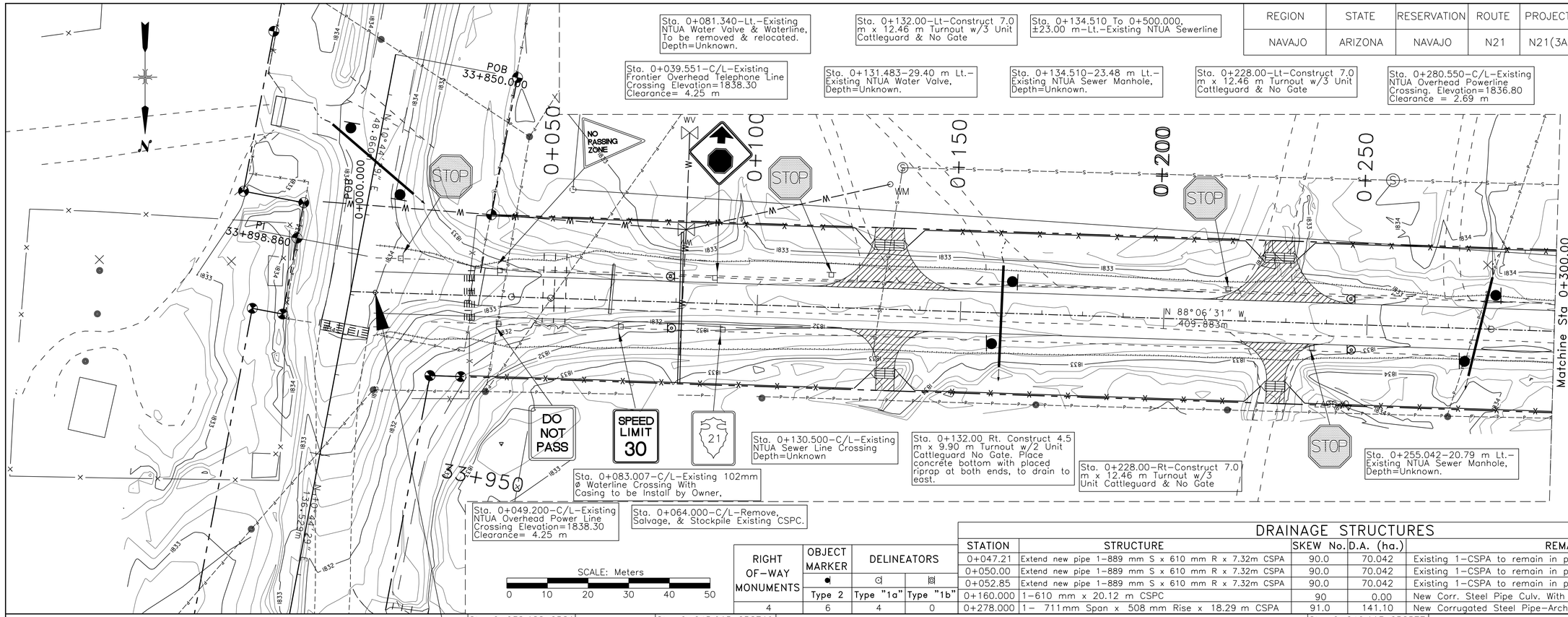
Sta. 37+382.080 TBM-23
Offset 10.36 m
EL 1744.027
REBAR

Sta. 37+566.503 TBM-24
Offset 32.78 m
EL 1738.578
BRASS CAP MONUMENT

DRAINAGE STRUCTURES				
Station	Structure	Skew No.	D.A. (Ha.)	Remarks
37+035.000	1-711mm x 508mm x 19.99 m CSPA	N/A	1.3	Under Turnout. End Sections Both Ends
37+101.000	1-914 mm x 23.774 m CSPC	90°	15.0	End Section & Grouted Rock Berm @ Inlet. Placed Riprap @ Outlet.
37+290.000	1-889mm x 610mm x 23.042 m CSPA	50°	28.5	End Section @ Inlet. Placed Riprap @ Outlet.
37+537.640	3-1219 m x 23.154 m CSPC	50°	376.0	Grouted Riprap @ Outlet. Concrete Slope Blankets @ Both Ends. Wrap Riprap Up Slopes At Outlet As Directed By The COR/AOTR.



REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	18	96



RIGHT OF-WAY MONUMENTS	OBJECT MARKER	DELINEATORS	
Type 2	Type "1a"	Type "1b"	
4	6	4	0

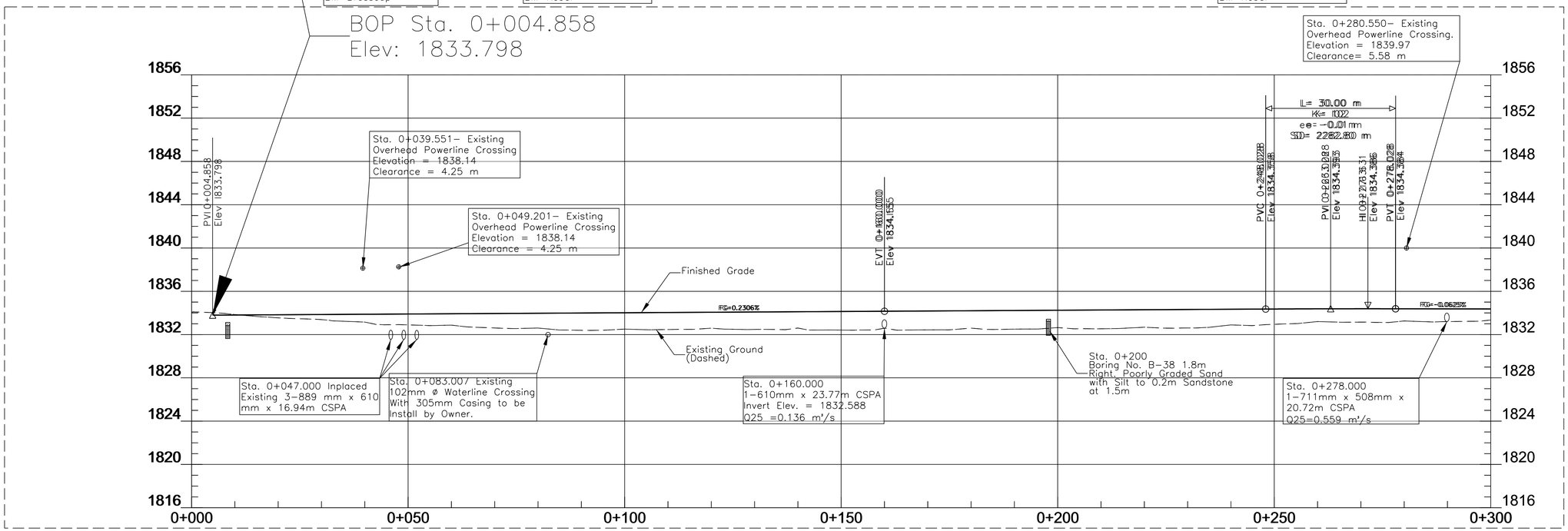
DRAINAGE STRUCTURES

STATION	STRUCTURE	SKEW No.	D.A. (ha.)	REMARKS
0+047.21	Extend new pipe 1–889 mm S x 610 mm R x 7.32m CSPA	90.0	70.042	Existing 1–CSPA to remain in place
0+050.00	Extend new pipe 1–889 mm S x 610 mm R x 7.32m CSPA	90.0	70.042	Existing 1–CSPA to remain in place
0+052.85	Extend new pipe 1–889 mm S x 610 mm R x 7.32m CSPA	90.0	70.042	Existing 1–CSPA to remain in place
0+160.000	1–610 mm x 20.12 m CSPC	90	0.00	New Corr. Steel Pipe Culv. With End Section
0+278.000	1– 711mm Span x 508 mm Rise x 18.29 m CSPA	91.0	141.10	New Corrugated Steel Pipe–Arch With End Section

Sta. 0+038.188 GPS1
Offset 36.21 m
EL 1833.485
BM–Brasscap

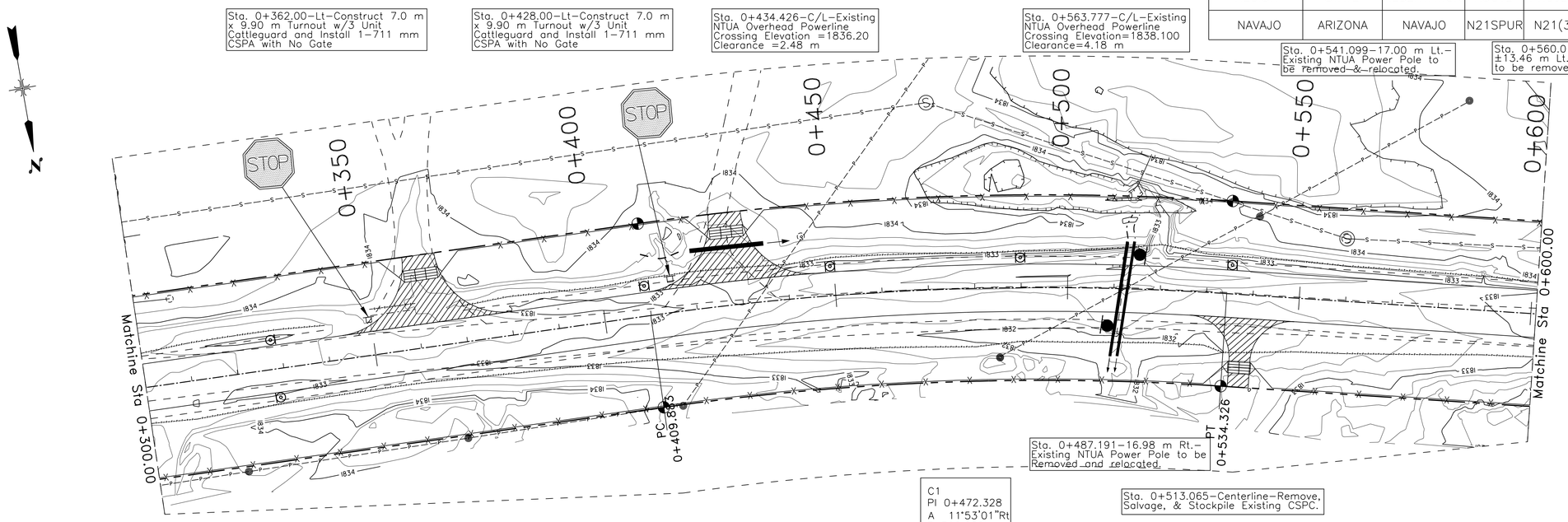
Sta. 0+045.915 GPS719
Offset 25.47 m
EL 1832.884
BM–Rebar

Sta. 0+246.113 GPS577
Offset 20.26 m
EL 1833.981
BM–Rebar



E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\REV N21 Plan-Profile Sheets\Sht_18 Sch Spur PLP18.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21SPUR	N21(3A)2&4	19	96



C1
PI 0+472.328
A 11°53'01"Rt
R 599.989
L 124.443
T 62.445
E 3.241
N 619801.024
E 287507.876

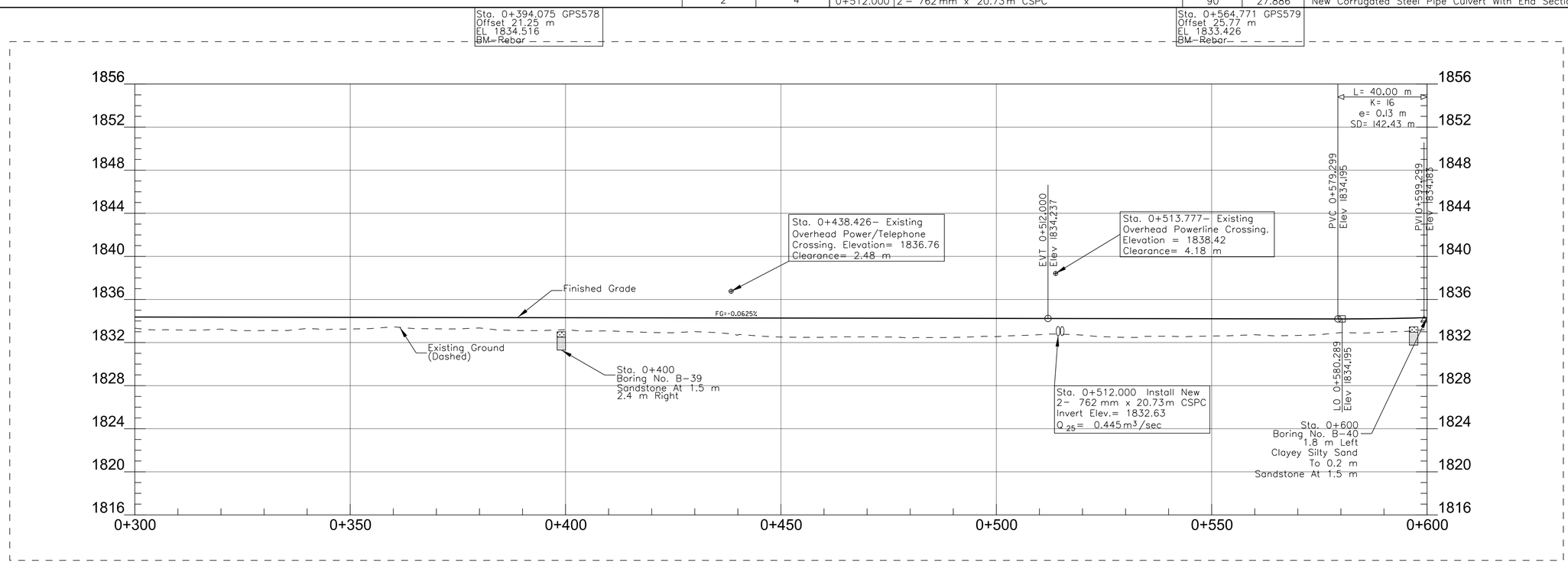
RIGHT OF–WAY MONUMENTS	OBJECT MARKER
4	Type 2

SCALE: Meters
0 10 20 30 40 50

DELINEATORS	
TYPE "1a"	TYPE "1b"
⊙	⊙
2	4

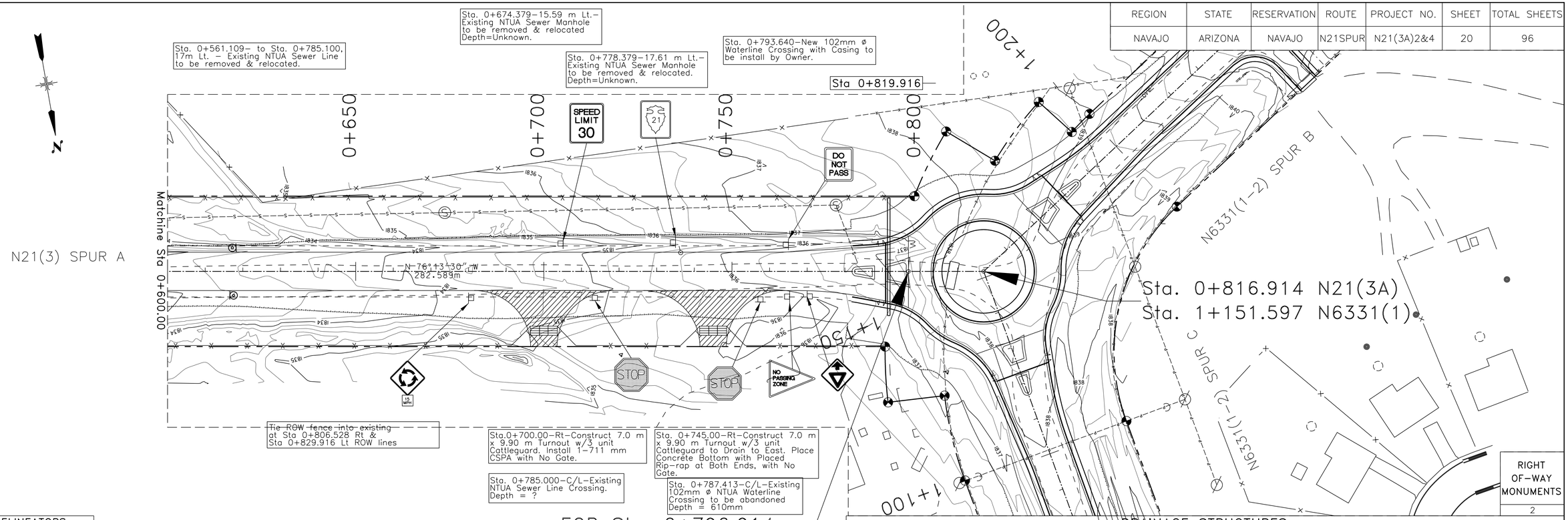
DRAINAGE STRUCTURES

STATION	STRUCTURE	SKEW No.	D.A. (ha.)	REMARKS
0+362.000	1–711 mm S x 508 mm R x 11.59 m CSPA	0	N/A	New CSPA with End Sections Under Turnout Lt.
0+428.000	1–711 mm S x 508 mm R x 11.59 m CSPA	0	N/A	New CSPA with End Sections Under Turnout Lt.
0+512.000	2 – 762 mm x 20.73m CSPC	90	27.886	New Corrugated Steel Pipe Culvert With End Section At Inlet



E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\REV N21 Plan–Profile Sheets\Sht_19 Sch Spur PLP19.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21SPUR	N21(3A)2&4	20	96



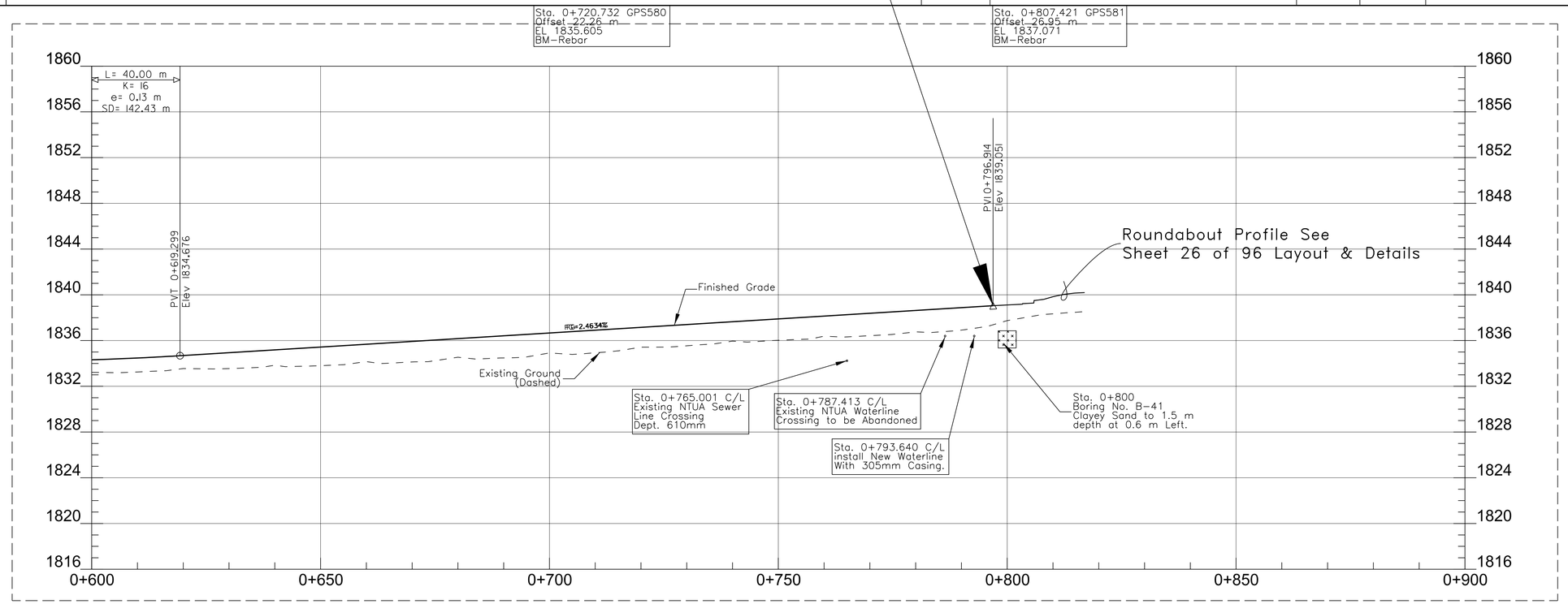
RIGHT OF–WAY MONUMENTS: 2

DELINEATORS	
TYPE "1a"	TYPE "1b"
⊙	⊡
6	0

SCALE: Meters
0 10 20 30 40 50

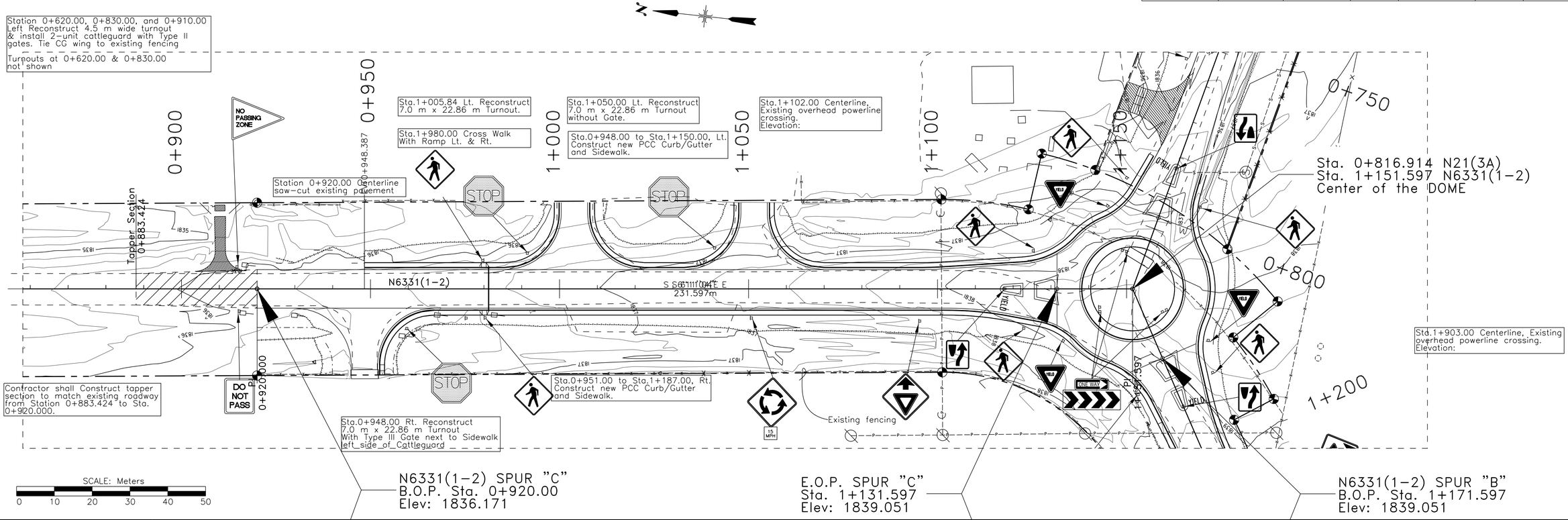
DRAINAGE STRUCTURES

STATION	STRUCTURE	SKEW No.	D.A. (ha.)	REMARKS
0+725.000	1–711 mm S x 508 mm R x 11.59 m CSPA	0		New CSPA with End Section Under Turnout Rt.



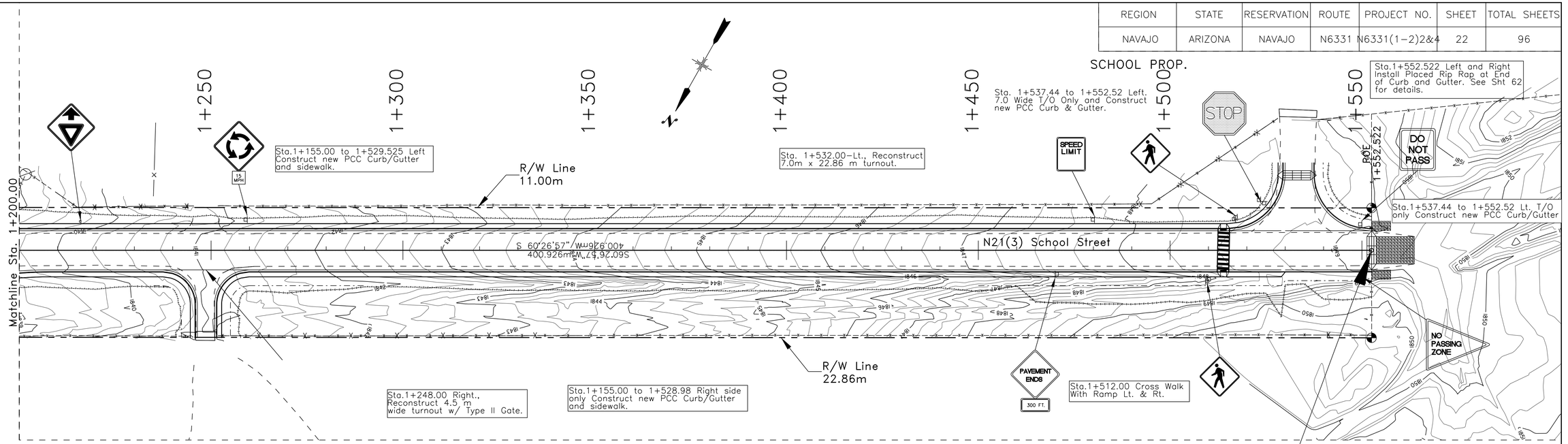
E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\REV N21 Plan–Profile Sheets\Sht_20 Sch Spur PLP20.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(1-2)	21	96



E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\REV N21 Plan-Profile Sheets\Snt_21 REV N6331(1-2) Sch Street SPUR C PLP 110817.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(1-2)2&4	22	96

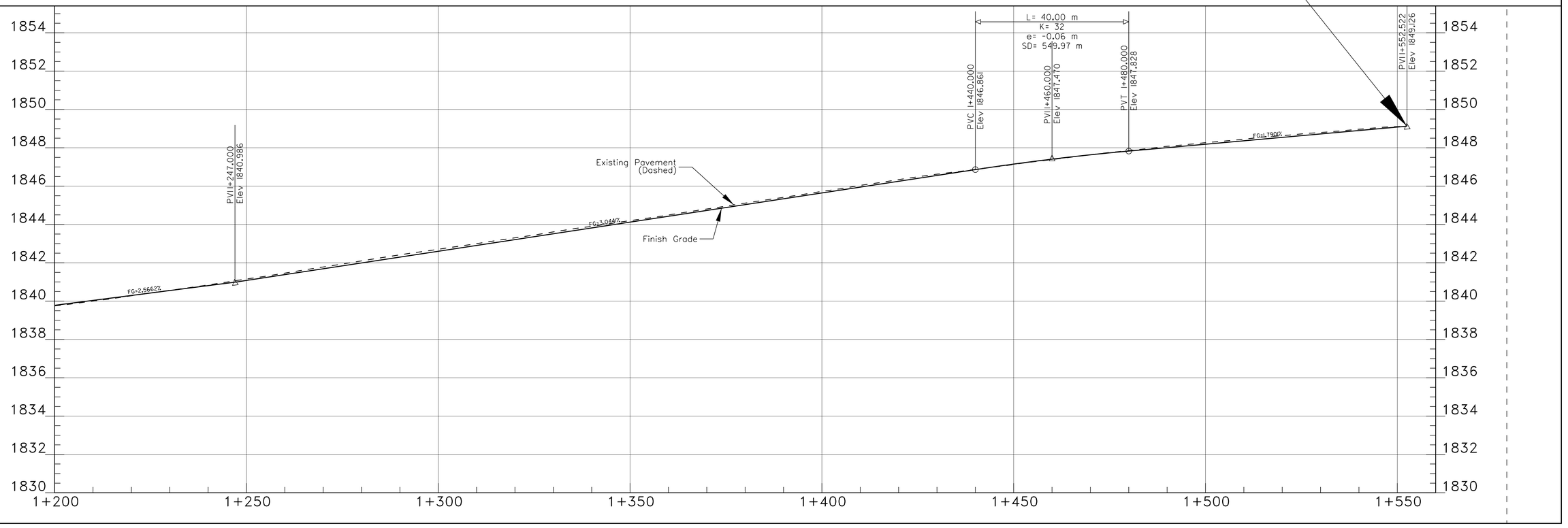


SCALE: Meters
0 10 20 30 40 50

N6331(1-2)SPUR "B"
E.O.P. Sta. 1+552.552
Elev: 1849.126

Sta.1+552.522 Install 4-Unit cattleguard without gate. Install new 50 m of barbed-wire fencing and tie-in to existing fencing.

Sta.1+552.522 to 1+592.522 Construct 40 m gravel transition to existing roadway as shown and/or as directed by COTR. The width of the transition shall match the existing graded road and taper from the new road width. Grade to drain the transition ditches from new ditch flow lines.

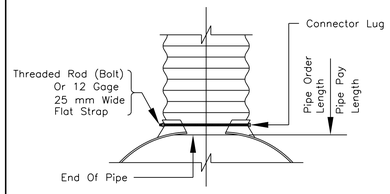


F:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\REV N21 Plan-Profile Sheets\Sht_22 REV N21 Spur Rd. Sch Street PLP 103117.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21 SPUR	N21(3A)2&4	23	96

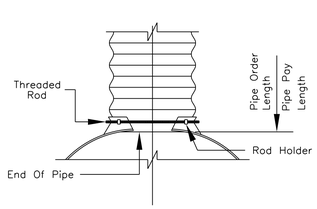
ESTIMATED STRUCTURES QUANTITIES

ITEM NO.		60201 −0810	60201 −0910	60202 −0510	60202 −0610	60210 −0810	60210 −0910	60211 −0910
		610 mm CSPC−2.01 mm Thickness 68 mm x 13 mm Corrugation	762 mm CSPC−2.01 mm Thickness 68 mm x 13 mm Corrugation	711 mm Span x 508 mm Rise CSPA−3.5 mm Thickness 68 mm x 13 mm Corrugation	889 mm Span x 610 mm Rise CSPA−3.5 mm Thickness 68 mm x 13 mm Corrugation	End Section For 610 mm CSPC 2.01 mm Thickness	End Section For 762 mm CSPC 2.01 mm Thickness	End Section For 711 mm x 508 mm CSPA 2.01 mm Thickness
STATION	STRUCTURE DESCRIPTION **	SKEW NO.	m^3	m	m	m	m	Ea.	Ea.	Ea.
	N21(3A)2&4 SPUR "A"									
0+047.21	1−889 mm S x 610 mm R x 7.32 m CSPA (extension)	90					7.32			
0+050.00	1−889 mm S x 610 mm R x 7.32 m CSPA (extension)	90					7.32			
0+052.85	1−889 mm S x 610 mm R x 7.32 m CSPA (extension)	90					7.32			
0+160.000	1−610 mm x 23.77 m CSPC	91		23.77				1		
0+278.000	1−711 mm S x 508 mm R x 20.72 m CSPA	90				20.72				1
0+362.000	1−711 mm S x 508 mm R x 11.59 m CSPA	N/A				11.59				2
0+428.000	1−711 mm S x 508 mm R x 11.59 m CSPA	N/A				11.59				2
0+512.000	2−762 mm x 25.60 m CSPC	92			51.60				2	
0+725.000	1−711 mm S x 508 mm R x 11.59 m CSPA	N/A				11.59				2
** All Drainage Pipes and End Sections shall be Aluminized		TOTAL:		23.77	51.60	55.49	21.96	1	2	7



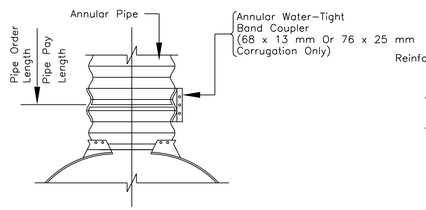
TYPE NO. 1

For sizes 305mm to 610mm round and 432 x 330mm to 711 x 508mm Arch pipes



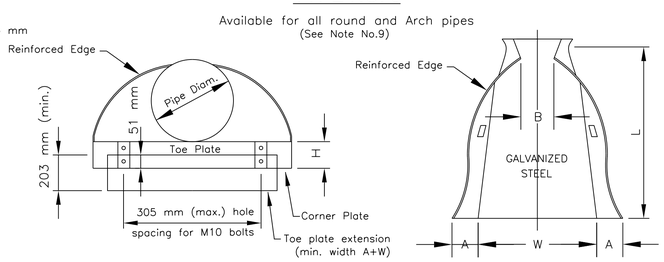
TYPE NO. 2

For sizes 762mm and Larger round and 889 x 610mm and Larger Arch pipes



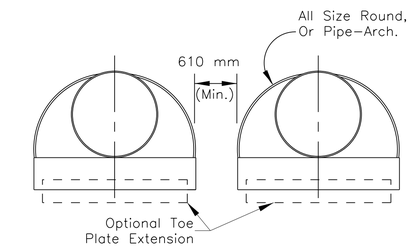
TYPE NO. 3

Available for all round and Arch pipes



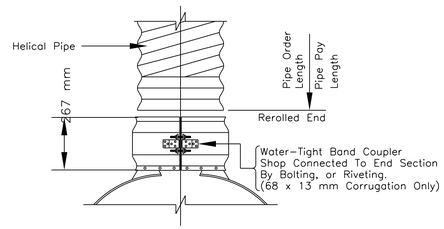
ELEVATION

PLAN



MULTIPLE INSTALLATION SPACING

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



TYPE NO. 5

Available for all round and Arch pipes
(See Note No.9)

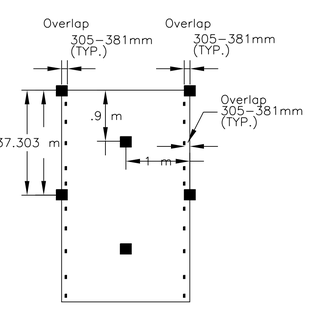
GENERAL NOTES

1. For Multiple Installation Of All Types, A Minimum Of A 610mm Spacing Measured Along The Horizontal Between Flared End Sections At Their Widest Cross Section Shall Be Used.
2. All Three (3) Piece Bodies To Have 2.77mm Thickness Sides And 3.5mm 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 9.53mm ø Galvanized Rivets Or Bolts.
3. End Sections For Steel Pipe−Arches: For The 1956mm x 1321mm And 2108mm X 1448mm Sizes, Reinforced Edge To Be Supplemented By 51mm x 51mm x 6.35mm Galvanized Angles. The Angles To Be Attached By 9.53mm Dia. Galvanized Nuts And Bolts. Angle Reinforcement Will Be Placed Under The Center Panel Seams.
4. End Sections For Steel Circular Pipes: For 1524mm Thru 2134mm Sizes, Reinforced Edge To Be Supplemented With Galvanized Stiffener Angles. The Angles Will Be 51mm x 51mm x 6.35mm For 1524mm Thru 1829mm, And 64mm x 64mm x 6.35mm For 1981mm And 2134mm. The Angles To Be Attached By 9.53mm 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 610mm Pipe Only.
7. Type No. 2 Steel End Section: Connect End Section With Threaded Rod With Rod Holder, For 762mm And 914mm Round Pipe; And 432mm x 330mm Thru 1448mm x 965mm CSPA.
8. Type No. 3 Steel End Section: The Connection Includes 305mm Of The Pipe Length As A Connector Section For Pipe Arch Sizes 1626mm x 1092mm Thru 2108mm x 1448mm And Round Pipe Sizes 1067mm Thru 2134mm. Gages Of Connector Section Shall Be The Same As The End Sections As Mentioned Above. The Connector Section Will Be Attached To The End Section By 9.5mm Galvanized Rivets Or Bolts On Approximately 152mm Centers.
9. Helically Corrugated Pipe: For Type No. 5 And Type No. 3 The Dimple Band Or Corrugated Pipe Connector Section Shall Be Attached To The End Section By 9.5mm Galvanized Steel Rivets Or Bolts Spaced At Approximately 152mm Centers.
10. Type No. 1, Type No. 2, And Type No. 3 Connections May Be Used With Welded Seams Helically Corrugated Pipe With Re−Rolled Ends. Re−Rolled Ends Shall Include A Minimum Of Two (2) Annular Corrugations Of The Same Size As The Pipe Corrugations.

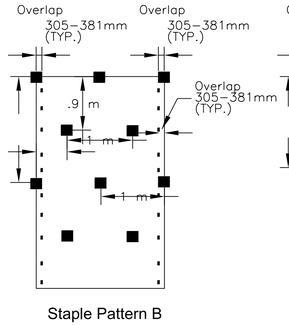
RECP STAPLE TABLE

Slope Ht. (m)	Staple Pattern		
91			
84	C		
76			
69			
61	B	C	C
53			
46			
38			
30	A		
23		B	
15			B
8			
	1:3	1:2	1:1

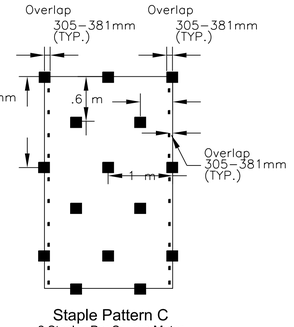
Grade



Staple Pattern A
0.8 Staples Per Square Meter



Staple Pattern B
1.3 Staples Per Square Meter

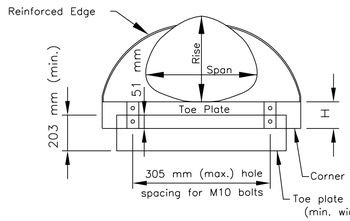


Staple Pattern C
2 Staples Per Square Meter

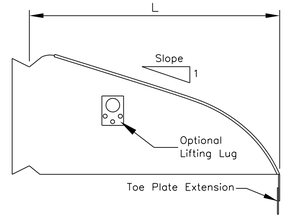
RECP STAPLE DETAILS
SEE SHEET 53 FOR ADDITIONAL REQUIREMENTS

STAPLE NOTES

1. To Determine The Staple Pattern To Use For Erosion Blankets/Mats Refer To The Rolled Erosion Control Products (RECP) Staple Table. Choose Staple Pattern A, B Or C Based On The Grade And Slope Height.
2. Begin Stapling At Top Of Slope.
3. Staple Overlap Areas With Staggered Pattern With Staples.
4. Staple Patterns Shown Are For 2.44 m Wide Blankets.
5. Follow All The Manufacturer's Recommendations For Installing Blankets & Staples.



ELEVATION



TYPICAL CROSS SECTION

NOTE: PIPE BEDDING AND BACKFILL MATERIAL SHALL BE TESTED FOR RESISTIVITY AT EACH PIPE LOCATION AND SOURCE PER SECTION 153. THE MINIMUM ACCEPTABLE RESISTIVITY TO BE PER SECTION 704 OF THE SUPPLEMENTAL SPECIFICATIONS.

ROUND PIPE END SECTION

Pipe Diam (mm)	Thick ness (mm)	DIMEMSIONS A (25 mm±)	B (Max.)	H (mm)	F (mm)	L (38 mm±)	W (51 mm±)	Approx. Slope	BODY
610	1.6	254	330	152	1168	1041	1219	2 1/2	1 Pc
762	2	311	318	203	1397	1229	1448	2 1/2	2 Pc
914	2	368	305	229	1778	1524	1829	2 1/2	2 Pc
1067	2.8	432	279	267	2082	1753	2134	2 1/2	2 Pc
1219	2.8	470	737	305	2235	2007	2286	2 1/4	3 Pc
1372	2.8	470	762	305	2540	2134	2591	2	3 Pc
1524	2.8 / 3.5	457	914	305	2845	2235	2896	1 3/4	3 Pc
1676	2.8 / 3.5	457	914	305	2997	2210	3048	1 1/2	3 Pc
1829	2.8 / 3.5	457	1118	305	3048	2248	3048	1 1/3	3 Pc
1981	2.8 / 3.5	457	168	305	3302	2223	3505	1 1/4	4 Pc
2134	2.8 / 3.5	457	1219	305	3454	2223	3658	1 1/6	4 Pc

ARCH PIPE END SECTION

SPAN* *68 mm x 13 mm	RISE *76 mm x 25 mm	Thick ness (mm)	DIMEMSIONS A (25 mm±)	B (Max.)	H (25 mm±)	F (mm)	L (38 mm±)	W (51 mm±)	Approx. Slope	BODY
711 x 508		1.6	203	406	152	711	813	1219	2 1/2	1 Pc
889 x 610		2.0	254	406	152	863	991	1524	2 1/2	1 Pc
1067 x 737		2.0	305	305	191	1016	168	1905	2 1/2	2 Pc
1245 x 838		2.8	343	508	229	1168	1346	2134	2 1/2	2 Pc
1448 x 965		2.8	470	660	305	1473	1575	2286	2 1/4	3 Pc
1626 x 1092		2.8	457	737	305	1854	1753	2591	2 1/4	3 Pc
1803 x 1194		2.8 / 3.5	470	914	305	2540	1956	2896	2 1/4	3 Pc
	1854 x 1397	2.8	457	914	305	3149	1956	3200	2.0	3 Pc
	2057 x 1499	2.8	457	991	305	3454	1956	3505	2.0	3 Pc
	2210 x 1600	2.8	457	991	305	3454	1956	3505	2.00	3 Pc

* CORRUGATION DIMENSION

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

DRAINAGE STRUCTURE DETAILS & STRUCTURE QTY. TABLE FOR N21(3A)

DRAWN BY: NRDOT	DATE: 6/19/2015
DESIGNED BY: NRDOT	DATE: 6/19/2015
REVISED: 11/9/2017	BY: Gerald.Hood

Sht_23 Drainage Structure Details and Structure Qty. Table for N21(3A)_062916.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	24	96
			N6331	N6331(1-2)2&4		

N6331(2-1) SPUR B
63401-1511 PAVEMENT MARKINGS, TYPE "H" SOLID YELLOW 102mm wide

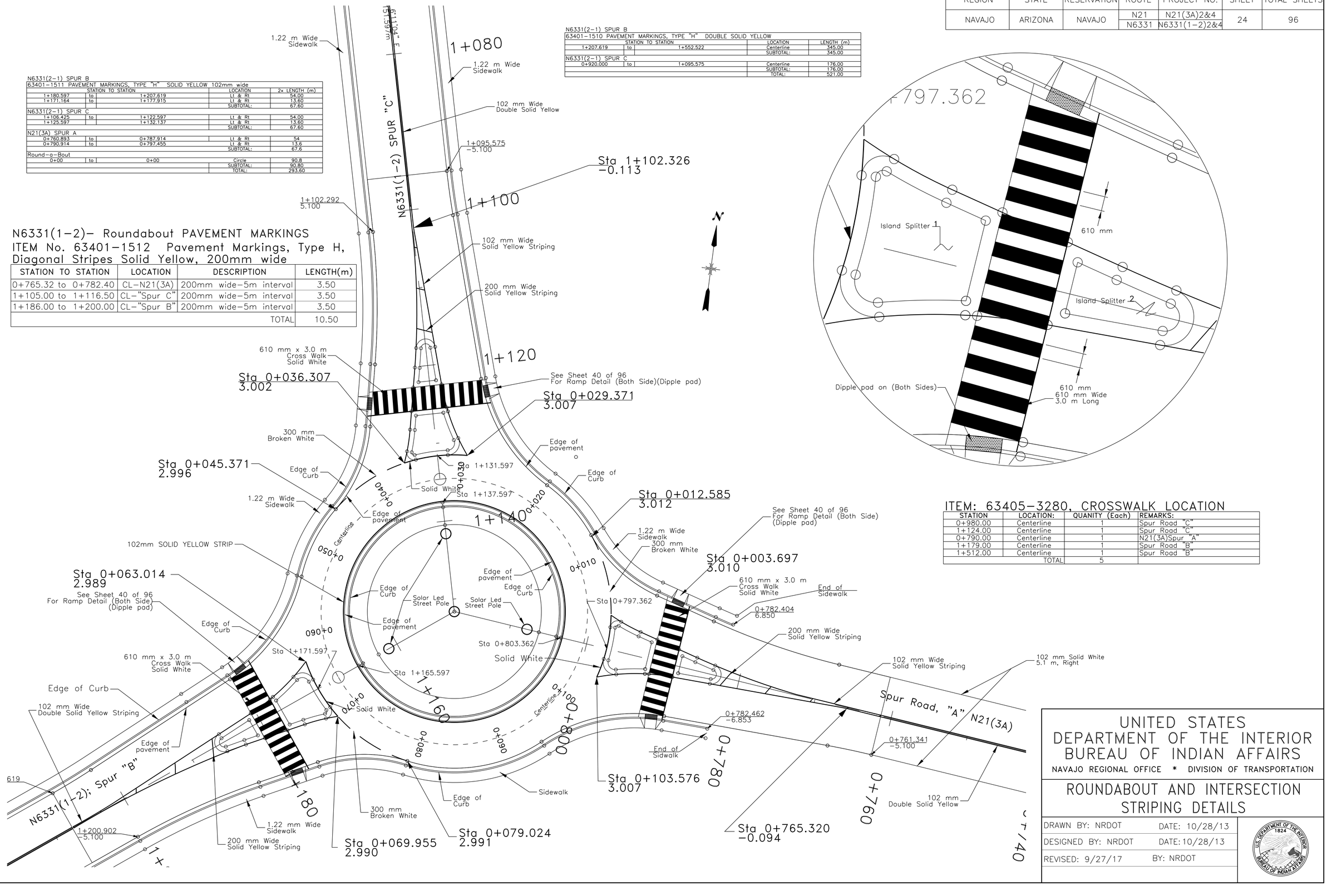
STATION TO STATION			LOCATION	2x LENGTH (m)
1+180.597	to	1+207.619	Lt & Rt	54.00
1+171.164	to	1+177.915	Lt & Rt	13.60
			SUBTOTAL:	67.60
N6331(2-1) SPUR C				
1+106.425	to	1+122.597	Lt & Rt	54.00
1+125.597	to	1+132.137	Lt & Rt	13.60
			SUBTOTAL:	67.60
N21(3A) SPUR A				
0+760.893	to	0+787.914	Lt & Rt	54
0+790.914	to	0+797.455	Lt & Rt	13.6
			SUBTOTAL:	67.6
Round-a-Bout				
0+00	to	0+00	Circle	90.8
			SUBTOTAL:	90.80
			TOTAL:	293.60

N6331(2-1) SPUR B
63401-1510 PAVEMENT MARKINGS, TYPE "H" DOUBLE SOLID YELLOW

STATION TO STATION			LOCATION	LENGTH (m)
1+207.619	to	1+552.522	Centerline	345.00
			SUBTOTAL:	345.00
N6331(2-1) SPUR C				
0+920.000	to	1+095.575	Centerline	176.00
			SUBTOTAL:	176.00
			TOTAL:	521.00

N6331(1-2)- Roundabout PAVEMENT MARKINGS
ITEM No. 63401-1512 Pavement Markings, Type H, Diagonal Stripes Solid Yellow, 200mm wide

STATION TO STATION	LOCATION	DESCRIPTION	LENGTH(m)
0+765.32 to 0+782.40	CL-N21(3A)	200mm wide-5m interval	3.50
1+105.00 to 1+116.50	CL-"Spur C"	200mm wide-5m interval	3.50
1+186.00 to 1+200.00	CL-"Spur B"	200mm wide-5m interval	3.50
		TOTAL	10.50



ITEM: 63405-3280, CROSSWALK LOCATION

STATION	LOCATION:	QUANITY (Each)	REMARKS:
0+980.00	Centerline	1	Spur Road "C"
1+124.00	Centerline	1	Spur Road "C"
0+790.00	Centerline	1	N21(3A)Spur "A"
1+179.00	Centerline	1	Spur Road "B"
1+512.00	Centerline	1	Spur Road "B"
TOTAL		5	

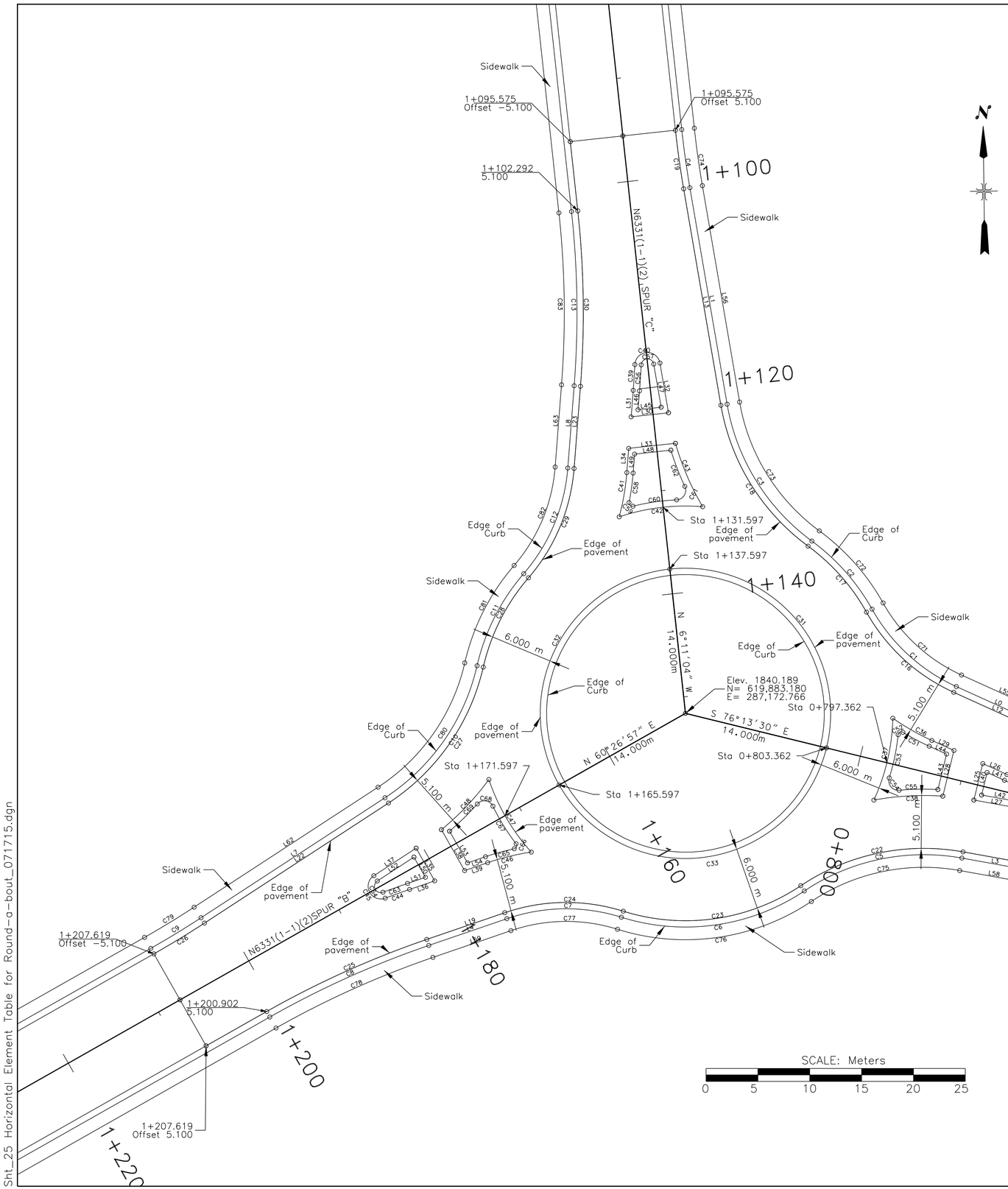
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

ROUNDABOUT AND INTERSECTION STRIPING DETAILS

DRAWN BY: NRDOT	DATE: 10/28/13
DESIGNED BY: NRDOT	DATE: 10/28/13
REVISED: 9/27/17	BY: NRDOT

Sht_24_Round-a-bout_Intersection_Striping_Details_71715.dgn 06152016\Sht_24_Round-a-bout_Intersection_Striping_Details_71715.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	25	96
			N6331	N6331(1-2)2&4		



Horizontal Element Tabling

Line Table

Mark	Length	Direction
L0	7.953	N 65°36'19"W
L1	21.185	N 9°45'39"W
L2	95.575	N 6°11'04"W
L3	5.699	N 79°48'05"W
L4	7.953	S 7°04'07"W
L5	351.621	S 60°26'57"W
L6	344.904	N 60°26'57"E
L7	21.185	N 56°52'22"E
L8	7.953	N 4°26'07"E
L9	102.292	N 6°11'04"W
L10	278.389	N 89°48'54"W
L11	282.556	N 76°13'30"W
L12	7.953	N 65°36'19"W
L13	21.185	N 9°45'39"W
L14	95.575	N 6°11'04"W
L15	278.389	N 89°48'54"W
L16	1.217	N 76°15'53"W
L17	275.839	N 76°13'30"W
L18	21.185	N 79°48'05"W
L19	7.953	S 7°04'07"W
L20	351.621	S 60°26'57"W
L21	344.904	N 60°26'57"E
L22	21.185	N 56°52'22"E
L23	7.953	N 4°26'07"E
L24	102.292	N 6°11'04"W
L25	3.625	N 1°46'30"E
L26	2.558	S 65°36'19"E
L27	4.866	N 79°48'05"W
L28	4.532	N 1°46'30"E
L29	2.343	N 65°36'19"W
L30	3.625	S 83°48'56"W
L31	2.558	N 4°26'07"E
L32	4.866	S 9°45'39"E
L33	4.532	S 83°48'56"W
L34	2.343	S 4°26'07"W
L35	3.625	S 29°33'03"E
L36	2.558	S 7°04'07"W
L37	4.866	N 56°52'22"E
L38	4.532	S 29°33'03"E
L39	2.343	N 7°04'07"E
L40	2.241	N 1°46'30"E
L41	1.823	S 65°36'19"E
L42	4.216	N 79°48'05"W
L43	3.517	N 1°46'30"E
L44	1.836	N 65°36'19"W
L45	2.241	S 83°48'56"W
L46	1.823	N 4°26'07"E
L47	4.216	S 9°45'39"E
L48	3.517	S 83°48'56"W
L49	1.836	S 4°26'07"W
L50	2.241	S 29°33'03"E
L51	1.823	S 7°04'07"W
L52	4.216	N 56°52'22"E
L53	3.517	S 29°33'03"E
L54	1.836	N 7°04'07"E
L55	7.953	N 65°36'19"W
L56	21.185	N 9°45'39"W
L57	95.575	N 6°11'04"W
L58	5.699	N 79°48'05"W
L59	7.953	S 7°04'07"W
L60	351.621	S 60°26'57"W
L61	344.904	N 60°26'57"E
L62	21.185	N 56°52'22"E
L63	7.953	N 4°26'07"E
L64	102.292	N 6°11'04"W

Curve Table

Mark	Radius	Arc Length	Chord Length	Tangent Length	Middle Ordinate	External Distance	Chord Direction
C0	90.830	2.429	2.429	1.214	0.008	0.008	N 66°22'17"W
C1	17.678	11.228	11.041	5.811	0.884	0.931	N 47°24'33"W
C2	20.610	8.824	8.757	4.481	0.470	0.481	N 41°28'44"W
C3	20.726	15.911	15.523	8.371	1.508	1.626	N 31°45'10"W
C4	90.830	5.670	5.669	2.836	0.044	0.044	N 7°58'21"W
C5	20.726	15.911	15.523	8.371	1.508	1.626	S 78°12'24"W
C6	20.610	18.434	17.826	9.885	2.027	2.248	S 81°50'16"W
C7	17.678	11.228	11.041	5.811	0.884	0.931	S 89°15'53"W
C8	90.830	16.835	16.811	8.442	0.390	0.391	S 65°45'32"W
C9	90.830	5.670	5.669	2.836	0.044	0.044	N 58°39'39"E
C10	20.726	15.911	15.523	8.371	1.508	1.626	N 34°52'50"E
C11	20.610	10.050	9.951	5.127	0.610	0.628	N 26°51'29"E
C12	17.678	11.228	11.041	5.811	0.884	0.931	N 22°37'53"E
C13	90.830	16.835	16.811	8.442	0.390	0.391	N 0°52'28"W
C14	868.090	205.902	205.420	103.437	6.098	6.141	N 8°01'12"W
C15	91.440	16.948	16.924	8.498	0.392	0.394	N 7°54'55"W
C16	18.288	11.616	11.422	6.011	0.915	0.963	N 47°24'33"W
C17	20.000	8.563	8.498	4.348	0.457	0.467	N 41°28'44"W
C18	21.336	16.379	15.980	8.617	1.553	1.674	N 31°45'10"W
C19	91.440	5.708	5.707	2.855	0.045	0.045	N 7°58'21"W
C20	878.290	207.105	206.626	104.035	6.097	6.140	N 8°03'35"W
C21	91.440	5.708	5.707	2.855	0.045	0.045	N 7°00'47"W
C22	21.336	16.379	15.980	8.617	1.553	1.674	S 78°12'24"W
C23	20.000	17.888	17.298	9.592	2.181	2.181	S 81°50'16"W
C24	18.288	11.616	11.422	6.011	0.915	0.963	S 89°15'53"W
C25	91.440	16.948	16.924	8.498	0.392	0.394	S 65°45'32"W
C26	91.440	5.708	5.707	2.855	0.045	0.045	N 58°39'39"E
C27	21.336	16.379	15.980	8.617	1.553	1.674	N 34°52'50"E
C28	20.000	9.753	9.656	4.975	0.592	0.610	N 26°51'29"E
C29	18.288	11.616	11.422	6.011	0.915	0.963	N 22°37'53"E
C30	91.440	16.948	16.924	8.498	0.392	0.394	N 0°52'28"W
C31	14.000	26.868	22.931	19.979	5.966	10.396	N 41°12'17"W
C32	14.000	27.701	23.398	21.299	6.310	11.489	S 27°07'56"W
C33	14.000	33.396	26.022	35.247	8.832	23.925	N 82°06'43"E
C34	96.540	2.497	2.497	1.249	0.008	0.008	S 66°20'47"E
C35	1.220	3.562	2.425	10.951	1.085	9.798	S 16°33'21"W
C36	23.388	4.340	4.334	2.176	0.101	0.101	N 60°17'22"W
C37	20.000	8.162	8.105	4.139	0.415	0.424	S 13°01'28"W
C38	26.436	6.674	6.656	3.355	0.210	0.212	N 86°43'48"E
C39	96.540	2.497	2.497	1.249	0.008	0.008	N 3°41'39"E
C40	1.220	3.562	2.425	10.951	1.085	9.798	N 86°35'47"E
C41	23.388	4.340	4.334	2.176	0.101	0.101	S 9°45'04"W
C42	20.000	8.162	8.105	4.139	0.415	0.424	N 83°03'54"E
C43	26.436	6.674	6.656	3.355	0.210	0.212	N 23°13'46"W
C44	96.540	2.497	2.497	1.249	0.008	0.008	S 70°19'40"W
C45	1.220	3.562	2.425	10.951	1.085	9.798	N 26°46'13"W
C46	23.388	4.340	4.334	2.176	0.101	0.101	N 76°23'04"E
C47	20.000	8.162	8.105	4.139	0.415	0.424	N 30°18'06"W
C48	26.436	6.674	6.656	3.355	0.210	0.212	S 43°24'15"W
C49	97.150	2.513	2.513	1.256	0.008	0.008	S 66°20'47"E
C50	0.610	1.781	1.212	5.475	0.542	4.899	S 16°33'21"W
C51	23.998	2.871	2.870	1.437	0.043	0.043	N 62°10'39"W
C52	0.305	0.615	0.516	0.484	0.142	0.267	S 63°29'34"W
C53	20.610	4.264	4.257	2.140	0.110	0.111	S 11°39'45"W
C54	0.914	1.797	1.521	1.372	0.407	0.735	S 38°44'16"E
C55	27.046	3.747	3.744	1.876	0.065	0.065	N 88°54'12"E
C56	97.150	2.513	2.513	1.256	0.008	0.008	N 3°41'39"E
C57	0.610	1.781	1.212	5.475	0.542	4.899	N 86°35'47"E
C58	23.998	2.871	2.870	1.437	0.043	0.043	S 7°51'47"W
C59	0.305	0.615	0.516	0.484	0.142	0.267	S 46°28'00"E
C60	20.610	4.264	4.257	2.140	0.110	0.111	N 8°42'11"E
C61	0.914	1.797	1.521	1.372	0.407	0.735	N 31°18'10"E
C62	27.046	3.747	3.744	1.876	0.065	0.065	N 2°03'22"W
C63	97.150	2.513	2.513	1.256	0.008	0.008	S 70°19'40"W
C64	0.610	1.781	1.212	5.475	0.542	4.899	N 26°46'13"W
C65	23.998	2.871	2.870	1.437	0.043	0.043	N 74°29'48"E
C66	0.305	0.615	0.516	0.484	0.142	0.267	N 20°10'01"E
C67	20.610	4.264	4.257	2.140	0.110	0.111	N 31°39'48"W
C68	0.914	1.797	1.521	1.372	0.407	0.735	N 82°03'50"W
C69	27.046	3.747	3.744	1.876	0.065	0.065	S 45°34'38"W
C70	89.610	2.396	2.396	1.198	0.008	0.008	N 66°22'17"W
C71	16.458	10.454	10.279	5.410	0.823	0.866	N 47°24'33"W
C72	21.830	9.347	9.276	4.746	0.498	0.510	N 41°28'44"W
C73	19.506	14.974	14.609	7.878	1.419	1.531	N 31°45'10"W
C74	89.610	5.593	5.592	2.798	0.044	0.044	N 7°58'21"W
C75	19.506	14.974	14.609	7.878	1.419	1.531	S 78°12'24"W
C76	21.830	19.525	18.881	10.470	2.147	2.381	S 81°50'16"W
C77	16.458	10.454	10.279	5.410	0.823	0.866	S 89°15'53"W
C78	89.610	16.609	16.585	8.328	0.385	0.386	S 65°45'32"W
C79	89.610	5.593	5.592	2.798	0.044	0.044	N 58°39'39"E
C80	19.506	14.974	14.609	7.878	1.419	1.531	N 34°52'50"E
C81	21.830	10.645	10.540	5.430	0.646	0.665	N 26°51'29"E
C82	16.458	10.454	10.279	5.410	0.823	0.866	N 22°37'53"E
C83	89.610	16.609	16.585	8.328	0.385	0.386	N 0°52'28"W

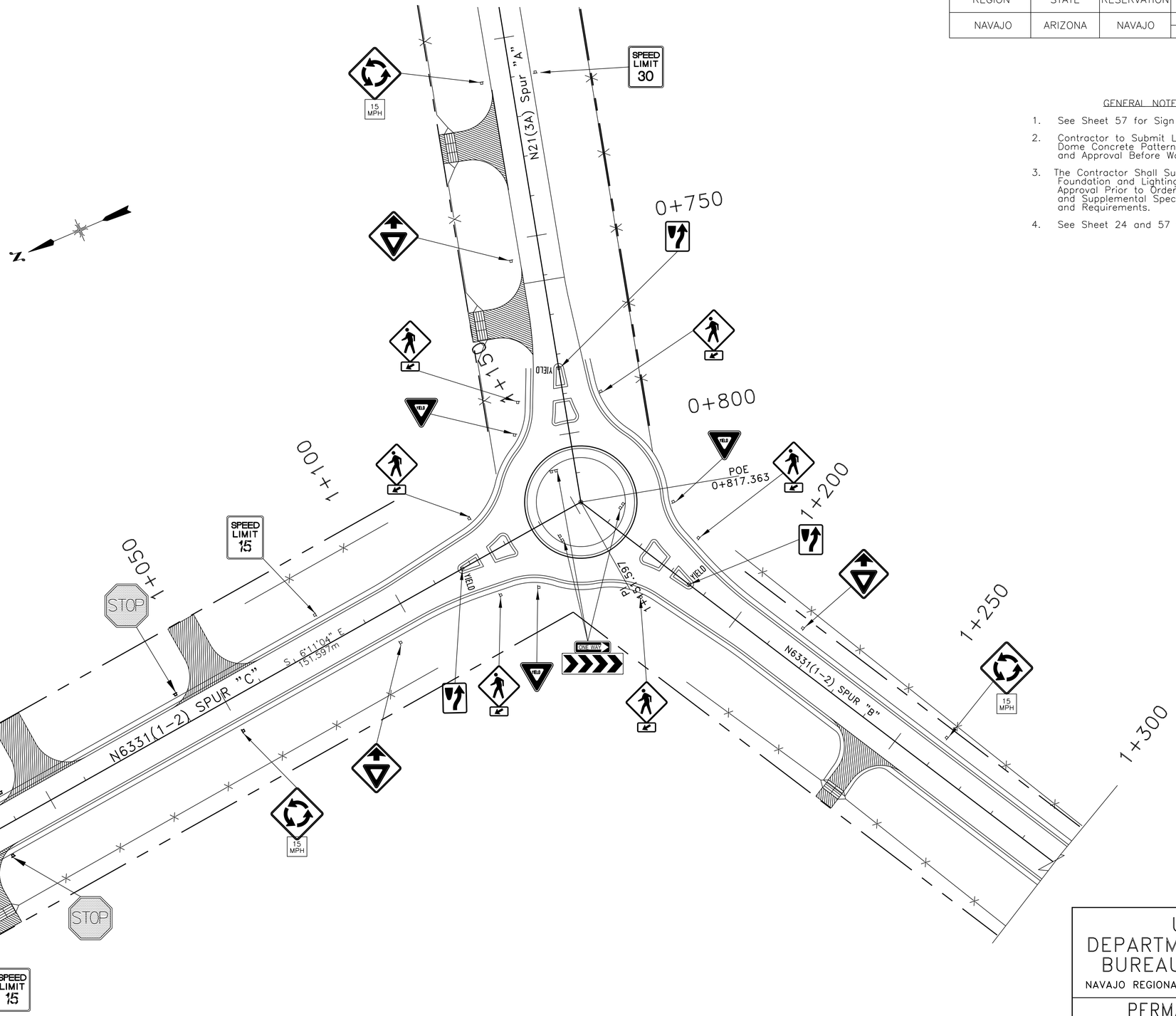
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

HORIZONTAL ELEMENT TABLE FOR ROUND-ABOUT

DRAWN BY: NRDOT	DATE: 7/17/2015
DESIGNED BY: NRDOT	DATE: 7/17/2015
REVISED: 11/7/2017	BY: Design 2

Snt_25 Horizontal Element Table for Round-a-bout_071715.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)	26	96
			N6331	N6331(1-2)		



GENERAL NOTES

1. See Sheet 57 for Sign Location.
2. Contractor to Submit Landscape Sample of Round-a-bout Dome Concrete Pattern with Color, to COR/COTR for Review and Approval Before Work on Dome Commences.
3. The Contractor Shall Submit Solar Led Designs With Foundation and Lighting to the COR/COTR for Review and Approval Prior to Ordering Materials. See Sheet 29 and Supplemental Specifications Section 636 for Details and Requirements.
4. See Sheet 24 and 57 for Striping Details and Cross Walks.

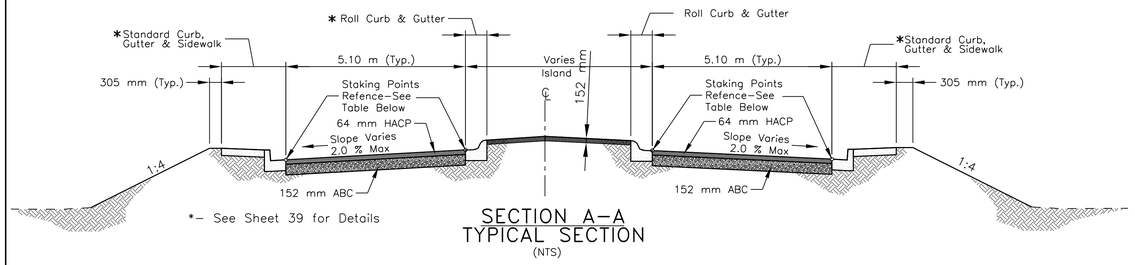
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PERMANENT SIGN LOCATION FOR ROUND-ABOUT

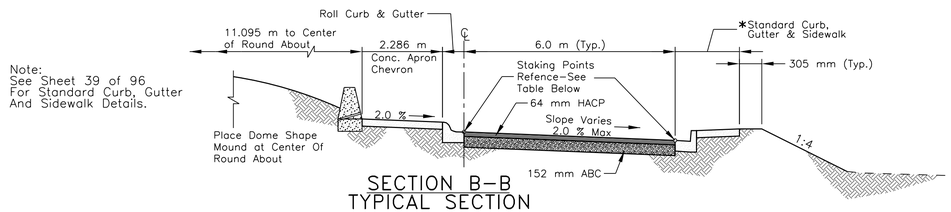
DRAWN BY: NRDOT	DATE: 7/17/2015
DESIGNED BY: NRDOT	DATE: 7/17/2015
REVISED: 9/27/2017	BY: Design 2

Sht_26 Signs Detail For Round-a-bout Detail071715.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	27	96
			N6331	N6331(1-2)2&4		



SECTION A–A TYPICAL SECTION
(NTS)



SECTION B–B TYPICAL SECTION
(NTS)

STAKING POINT TABLE

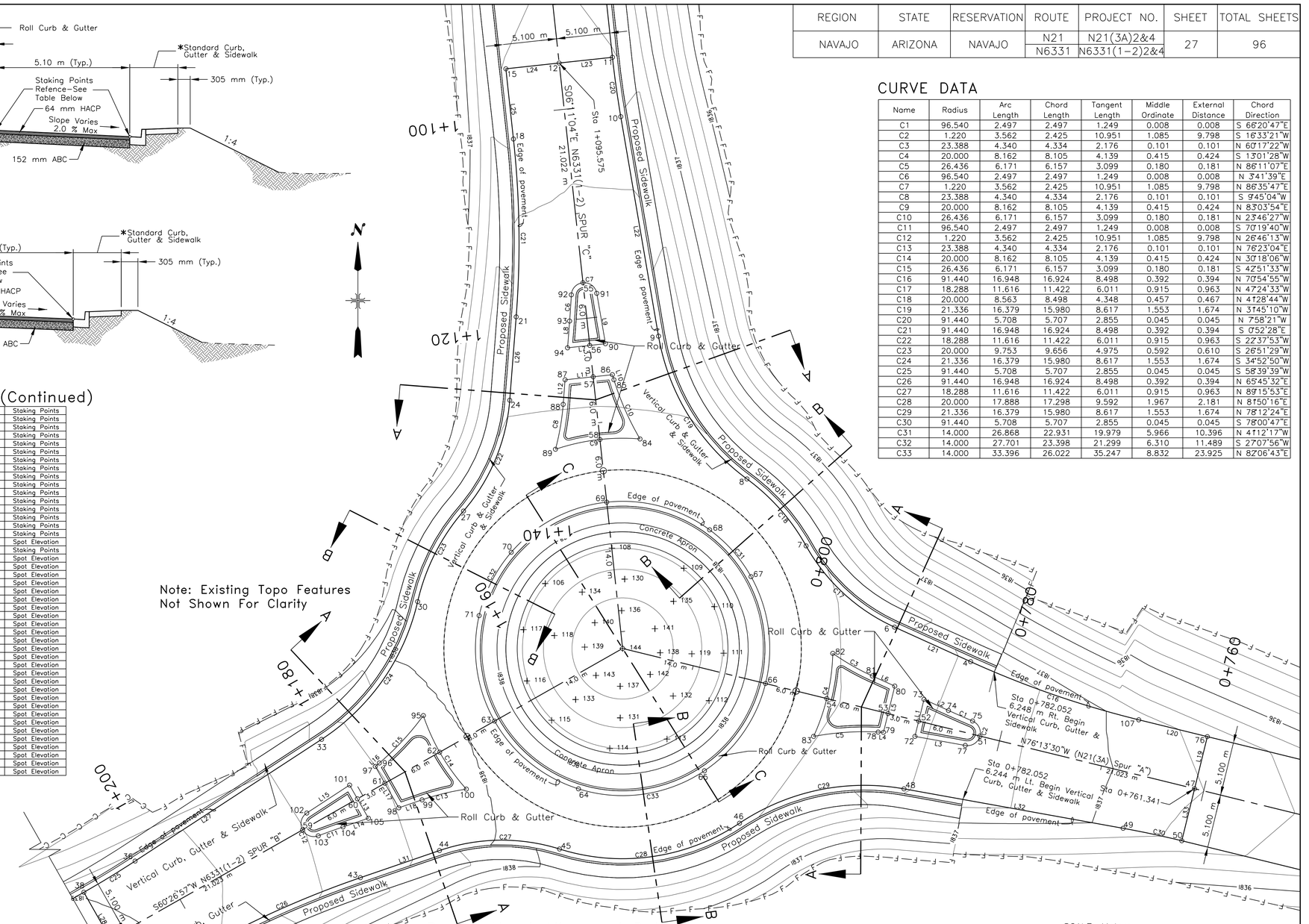
Name	Northing	Easting	Elevation	Description
4	619,881.927	287,205.873	1,838.699	Staking Points
6	619,885.211	287,198.631	1,838.871	Staking Points
7	619,892.941	287,190.222	1,839.047	Staking Points
8	619,899.308	287,184.593	1,839.051	Staking Points
9	619,912.896	287,176.184	1,838.992	Staking Points
10	619,933.774	287,172.592	1,838.618	Staking Points
11	619,939.425	287,171.801	1,838.463	Staking Points
12	619,938.876	287,166.731	1,838.560	Staking Points
15	619,938.326	287,161.660	1,838.458	Staking Points
18	619,931.649	287,162.384	1,838.554	Staking Points
21	619,914.727	287,162.642	1,838.941	Staking Points
24	619,906.798	287,162.027	1,839.030	Staking Points
27	619,896.256	287,157.632	1,839.052	Staking Points
30	619,887.641	287,153.270	1,839.051	Staking Points
33	619,874.532	287,144.131	1,839.180	Staking Points
36	619,862.955	287,126.390	1,839.676	Staking Points
38	619,859.987	287,121.516	1,839.871	Staking Points
40	619,855.550	287,124.031	1,839.975	Staking Points
41	619,851.113	287,126.547	1,839.873	Staking Points
42	619,854.426	287,132.390	1,839.701	Staking Points
43	619,861.375	287,147.821	1,839.253	Staking Points
44	619,863.955	287,155.344	1,839.131	Staking Points
45	619,864.101	287,166.765	1,839.051	Staking Points
46	619,866.557	287,183.887	1,839.046	Staking Points
47	619,869.841	287,227.176	1,838.130	Staking Points
48	619,869.823	287,199.530	1,838.766	Staking Points
49	619,866.072	287,220.380	1,838.212	Staking Points
50	619,864.887	287,225.962	1,838.028	Staking Points
51	619,874.846	287,206.759	1,838.668	Staking Points
52	619,876.275	287,200.932	1,838.821	Staking Points
53	619,876.989	287,198.018	1,838.898	Staking Points
54	619,878.418	287,192.191	1,839.051	Staking Points
55	619,917.976	287,168.995	1,838.847	Staking Points
56	619,912.011	287,169.642	1,838.928	Staking Points
57	619,909.029	287,169.965	1,838.969	Staking Points
58	619,903.063	287,170.611	1,839.051	Staking Points
59	619,865.918	287,142.319	1,839.436	Staking Points
60	619,868.877	287,147.538	1,839.282	Staking Points
61	619,870.357	287,150.148	1,839.205	Staking Points
62	619,873.316	287,155.367	1,839.051	Staking Points
63	619,876.275	287,160.587	1,839.171	Staking Points
64	619,869.825	287,168.565	1,839.171	Staking Points
65	619,871.544	287,180.551	1,839.171	Staking Points
66	619,879.846	287,186.363	1,839.171	Staking Points
67	619,890.013	287,184.985	1,839.171	Staking Points
68	619,894.469	287,181.045	1,839.171	Staking Points
69	619,897.098	287,171.258	1,839.171	Staking Points
70	619,892.333	287,162.172	1,839.171	Staking Points
71	619,886.303	287,159.118	1,839.171	Staking Points
72	619,874.817	287,200.574	1,838.810	Staking Points
73	619,878.338	287,201.438	1,838.809	Staking Points
74	619,877.282	287,203.767	1,838.748	Staking Points
75	619,876.280	287,206.054	1,838.687	Staking Points
76	619,874.794	287,228.391	1,838.028	Staking Points
77	619,873.956	287,205.363	1,838.690	Staking Points
78	619,875.227	287,197.077	1,838.892	Staking Points
79	619,875.202	287,197.580	1,838.881	Staking Points
80	619,879.599	287,198.658	1,838.879	Staking Points
81	619,880.567	287,196.524	1,838.932	Staking Points
82	619,882.714	287,192.760	1,839.021	Staking Points
83	619,874.818	287,190.934	1,839.018	Staking Points
84	619,903.111	287,174.424	1,839.058	Staking Points
85	619,908.745	287,171.942	1,838.989	Staking Points
86	619,909.227	287,171.794	1,838.984	Staking Points
87	619,908.739	287,167.293	1,838.988	Staking Points
88	619,906.403	287,167.112	1,839.014	Staking Points
89	619,902.132	287,166.378	1,839.061	Staking Points

STAKING POINT TABLE (Continued)

90	619,912.173	287,171.133	1,838.944	Staking Points
91	619,916.968	287,170.309	1,838.877	Staking Points
92	619,916.824	287,167.888	1,838.871	Staking Points
93	619,914.332	287,167.727	1,838.909	Staking Points
94	619,911.782	287,167.529	1,838.946	Staking Points
95	619,876.797	287,153.812	1,839.068	Staking Points
96	619,872.284	287,149.624	1,839.175	Staking Points
97	619,871.957	287,149.240	1,839.186	Staking Points
98	619,868.019	287,151.473	1,839.183	Staking Points
99	619,868.779	287,153.689	1,839.133	Staking Points
100	619,869.799	287,157.901	1,839.074	Staking Points
101	619,870.182	287,146.798	1,839.257	Staking Points
102	619,867.523	287,142.723	1,839.378	Staking Points
103	619,865.358	287,143.816	1,839.385	Staking Points
104	619,866.199	287,146.167	1,839.319	Staking Points
105	619,867.029	287,148.586	1,839.255	Staking Points
106	619,889.356	287,165.413	1,839.571	Spot Elevation
107	619,876.393	287,221.867	1,838.202	Staking Points
108	619,892.729	287,171.755	1,839.572	Spot Elevation
109	619,890.812	287,178.588	1,839.572	Spot Elevation
110	619,887.163	287,181.505	1,839.571	Spot Elevation
111	619,882.731	287,182.390	1,839.570	Spot Elevation
112	619,878.212	287,180.985	1,839.571	Spot Elevation
113	619,874.562	287,176.995	1,839.572	Spot Elevation
114	619,873.658	287,171.545	1,839.572	Spot Elevation
115	619,876.349	287,166.015	1,839.571	Spot Elevation
116	619,880.092	287,163.672	1,839.572	Spot Elevation
117	619,884.967	287,163.334	1,839.572	Spot Elevation
118	619,884.409	287,166.280	1,839.867	Spot Elevation
119	619,882.673	287,179.346	1,839.867	Spot Elevation
130	619,889.779	287,172.965	1,839.867	Spot Elevation
131	619,876.580	287,172.539	1,839.867	Spot Elevation
132	619,878.657	287,177.578	1,839.867	Spot Elevation
133	619,878.322	287,168.299	1,839.868	Spot Elevation
134	619,888.547	287,168.918	1,839.867	Spot Elevation
135	619,887.663	287,177.611	1,839.867	Spot Elevation
136	619,886.779	287,172.676	1,840.085	Spot Elevation
137	619,879.585	287,172.531	1,840.085	Spot Elevation
138	619,882.776	287,176.347	1,840.085	Spot Elevation
139	619,883.312	287,169.164	1,840.085	Spot Elevation
140	619,885.629	287,170.122	1,840.085	Spot Elevation
141	619,885.061	287,175.840	1,840.085	Spot Elevation
142	619,880.711	287,175.392	1,840.085	Spot Elevation
143	619,880.616	287,170.232	1,840.085	Spot Elevation
144	619,883.180	287,172.766	1,840.189	Spot Elevation

CURVE DATA

Name	Radius	Arc Length	Chord Length	Tangent Length	Middle Ordinate	External Distance	Chord Direction
C1	96.540	2.497	2.497	1.249	0.008	0.008	S 66°20'47"E
C2	1.220	3.562	2.425	10.951	1.085	9.798	S 16°33'21"W
C3	23.388	4.340	4.334	2.176	0.101	0.101	N 60°17'22"W
C4	20.000	8.162	8.105	4.139	0.415	0.424	S 13°01'28"W
C5	26.436	6.171	6.157	3.099	0.180	0.181	N 86°11'07"E
C6	96.540	2.497	2.497	1.249	0.008	0.008	N 3°41'39"E
C7	1.220	3.562	2.425	10.951	1.085	9.798	N 86°35'47"E
C8	23.388	4.340	4.334	2.176	0.101	0.101	S 9°45'04"W
C9	20.000	8.162	8.105	4.139	0.415	0.424	N 83°03'54"E
C10	26.436	6.171	6.157	3.099	0.180	0.181	N 23°46'27"W
C11	96.540	2.497	2.497	1.249	0.008	0.008	S 70°19'40"W
C12	1.220	3.562	2.425	10.951	1.085	9.798	N 26°46'13"W
C13	23.388	4.340	4.334	2.176	0.101	0.101	N 76°23'04"E
C14	20.000	8.162	8.105	4.139	0.415	0.424	N 30°18'06"W
C15	26.436	6.171	6.157	3.099	0.180	0.181	S 42°51'33"W
C16	91.440	16.948	16.924	8.498	0.392	0.394	N 70°54'55"W
C17	18.288	11.616	11.422	6.011	0.915	0.963	N 47°24'33"W
C18	20.000	8.563	8.498	4.348	0.457	0.467	N 41°28'44"W
C19	21.336	16.379	15.980	8.617	1.553	1.674	N 31°45'10"W
C20	91.440	5.708	5.707	2.855	0.045	0.045	N 7°58'21"W
C21	91.440	16.948	16.924	8.498	0.392	0.394	S 0°52'28"E
C22	18.288	11.616	11.422	6.011	0.915	0.963	S 22°37'53"W
C23	20.000	9.753	9.656	4.975	0.592	0.610	S 26°51'29"W
C24	21.336	16.379	15.980	8.617	1.553	1.674	S 34°52'50"W
C25	91.440	5.708	5.707	2.855	0.045	0.045	S 58°39'39"W
C26	91.440	16.948	16.924	8.498	0.392	0.394	N 65°45'32"E
C27	18.288	11.616	11.422	6.011	0.915	0.963	N 89°15'53"E
C28	20.000	17.888	17.298	9.592	1.967	2.181	N 8°50'16"E
C29	21.336	16.379	15.980	8.617	1.553	1.674	N 78°12'24"E
C30	91.440	5.708	5.707	2.855	0.045	0.045	S 78°00'47"E
C31	14.000	26.868	22.931	19.979	5.966	10.396	N 41°12'17"W
C32	14.000	27.701	23.398	21.299	6.310	11.489	S 27°07'56"W
C33	14.000	33.396	26.022	35.247	8.832	23.925	N 82°06'43"E



LINE TABLE

Name	Length (m)	Direction
L1	3.625	N 13°46'30"E
L2	2.558	S 65°36'19"E
L3	4.866	N 79°48'05"W
L4	0.504	S 87°07'40"E
L5	4.527	N 13°46'30"E
L6	2.343	N 65°36'19"W
L7	3.625	S 83°48'56"W
L8	2.558	N 4°26'07"E
L9	4.866	S 9°45'39"E
L10	0.504	N 17°05'14"W
L11	4.527	S 83°48'56"W
L12	2.343	S 4°26'07"W
L13	3.625	S 29°33'03"E
L14	2.558	S 7°04'07"W
L15	4.866	N 56°52'22"E
L16	0.504	S 49°32'46"W
L17	4.527	S 29°33'03"E
L18	2.343	N 7°04'07"E
L19	5.100	N 13°46'40"E
L20	6.717	N 76°13'30"W
L21	7.953	N 65°36'19"W
L22	21.185	N 9°45'39"W
L23	5.100	S 83°48'48"W
L24	5.100	S 83°49'04"W
L25	6.717	S 6°11'04"E
L26	7.953	S 4°26'07"W
L27	21.185	S 56°52'22"W
L28	5.100	S 29°32'48"E
L29	5.100	S 29°33'19"E
L30	6.717	N 60°26'57"E
L31	7.953	N 7°04'07"E
L32	21.185	S 79°48'05"E
L33	5.100	N 13°46'20"E

Round–About Alignment Data

POINT	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
PC	0+00.000			619,879.132	287,189.277
PI	0+24.260	CURVE DATA		619,902.694	287,195.053
		Delta = 109°57'34"Lt.			
		Deg. = 102°43'41"			
		R = 17.000 (m)			
		L = 32.626 (m)			
		T = 24.260 (m)			
		e = 12.624 (m)			
PCC	0+32.626			619,900.081	287,170.934
PI	0+58.489	CURVE DATA		619,897.295	287,145.221
		Delta = 113°22'00"Lt.			
		Deg. = 102°43'41"			
		R = 17.000 (m)			
		L = 33.637 (m)			
		T = 25.864 (m)			
		e = 13.950 (m)			
PCC	0+66.262			619,874.795	287,157.977
PI	1+09.062	CURVE DATA		619,837.563	287,179.086
		Delta = 136°40'26"Lt.			
		Deg. = 102°43'41"			
		R = 17.000 (m)			
		L = 40.552 (m)			
		T = 42.800 (m)			
		e = 29.052 (m)			
PT	1+06.814	619879.132	287189.277		

SCALE: Meters
0 4 8 12 16 20

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N21(3A) ROUND–ABOUT GRADING PLAN

DRAWN BY: NRDOT DATE: 7/17/2015

DESIGNED BY: NRDOT DATE: 7/17/2015

REVISED: 11/17/2017 BY: Design 2

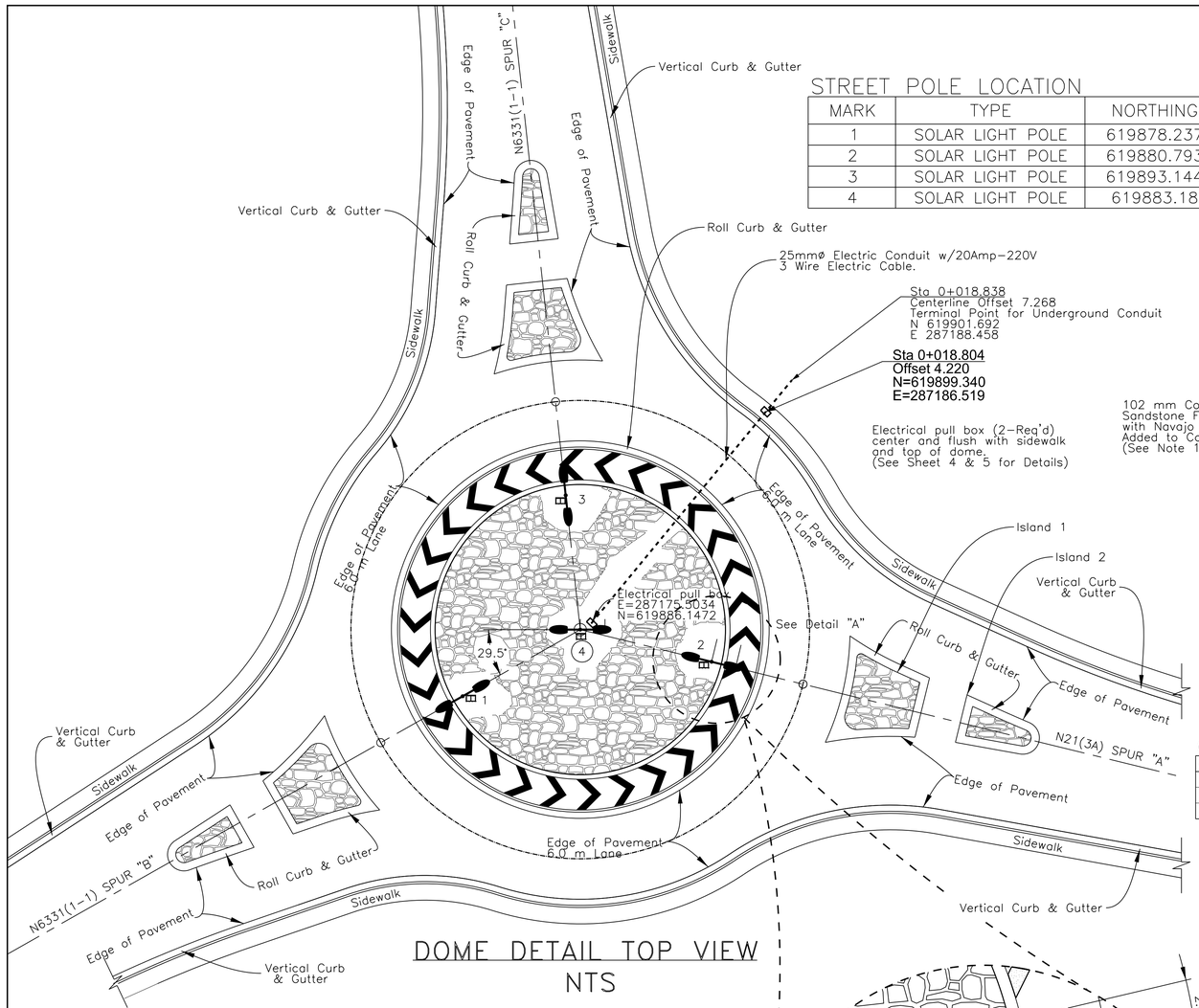
Sht_27 N21(3A) Rnd Abt Grading Plan 071715.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	28	96
			N6331	N6331(1-2)2&4		

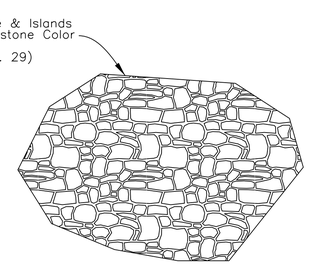
NOTE: Refer sheets 4, 27 & 39 for additional details and notes.

STREET POLE LOCATION

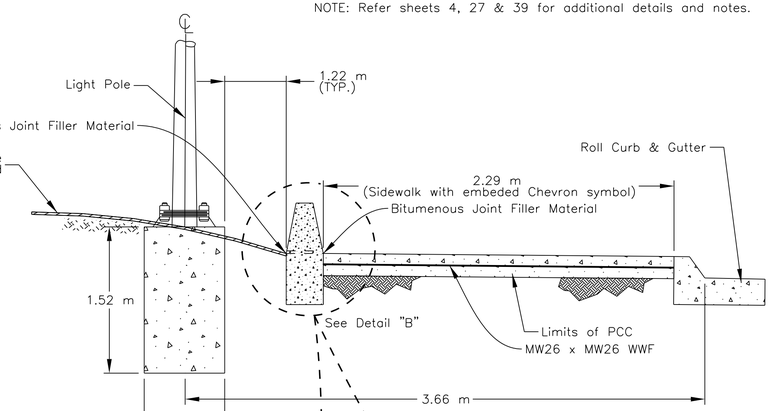
MARK	TYPE	NORTHING	EASTING
1	SOLAR LIGHT POLE	619878.237	287164.047
2	SOLAR LIGHT POLE	619880.793	287182.500
3	SOLAR LIGHT POLE	619893.144	287171.686
4	SOLAR LIGHT POLE	619883.180	287172.766



DOME DETAIL TOP VIEW
NTS



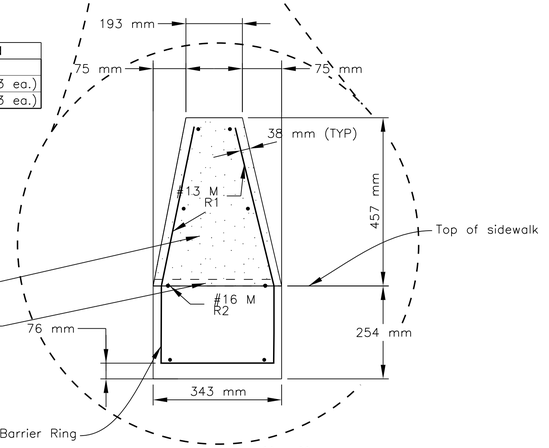
DOME SLAB PATTERN
NTS



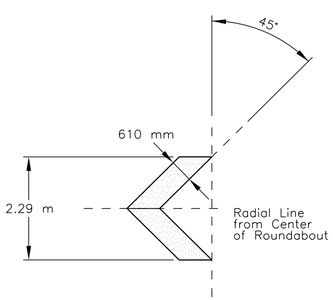
SECTION A-A
NTS

60101-0000 MINOR CONCRETE, Class A(AE)

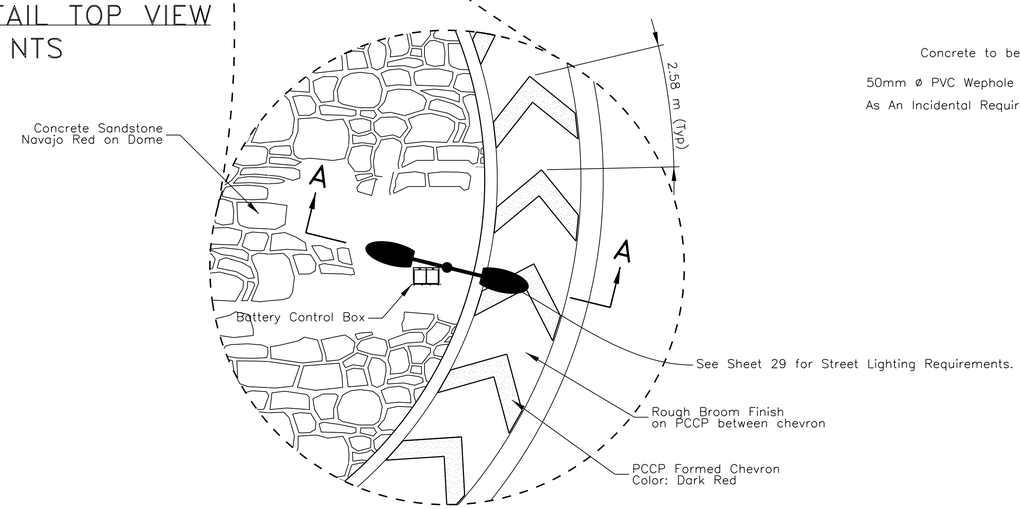
AREA (m^2)	RADIUS (m)	LENGTH (m)	THICKNESS (mm)	VOLUME (m^3)	DESCRIPTION
0.210	11.095	69.712	Solid Yellow	14.64	Concrete barrier
22.50	–	–	152	10.26	Splitter Island-1 (3 ea.)
7.40	–	–	152	3.37	Splitter Island-2 (3 ea.)
			TOTAL:	28.27	



DETAIL "B"
NTS



CHEVRON DETAIL
NTS



DETAIL "A"
LIGHT POLE LOCATION (TYPICAL)
NTS

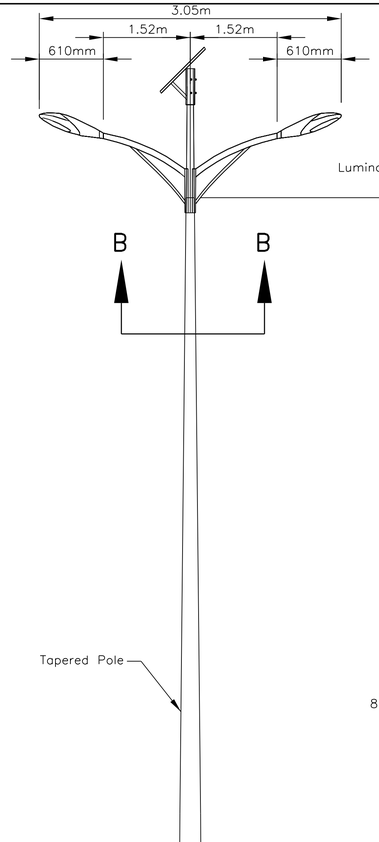
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

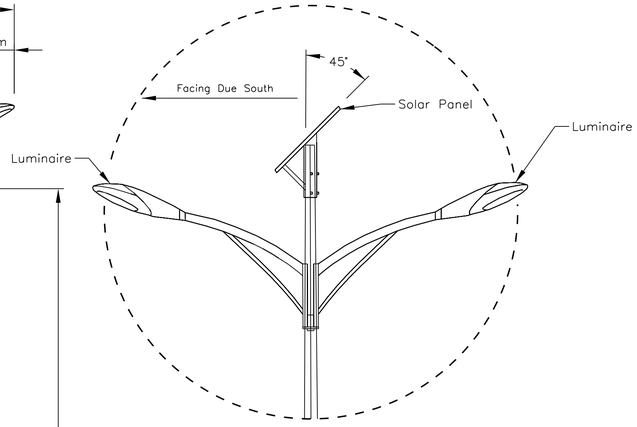
ROUNDABOUT DOME DETAIL & SOLAR LIGHT POLE LOCATIONS

DRAWN BY: NRDOT	DATE: 7/24/2015
DESIGNED BY: NRDOT	DATE: 7/24/2015
REVISED: 11/9/2017	BY: Design 2

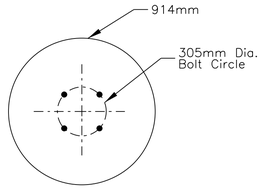
Sht_28 Round-a-bout Dome Detail and Solar Light Pole Loc._072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	29	96
			N6331	N6331(1-2)2&4		

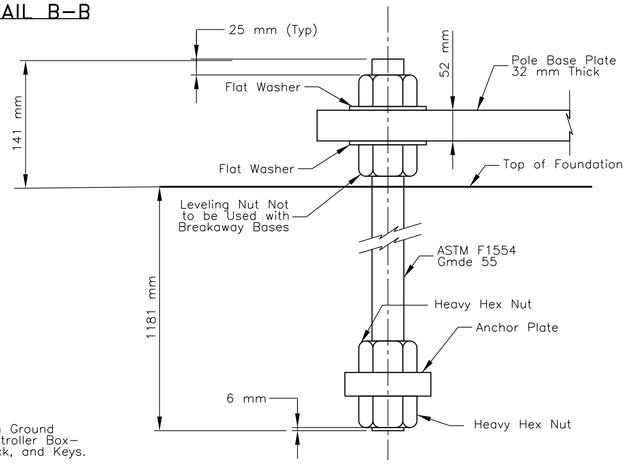




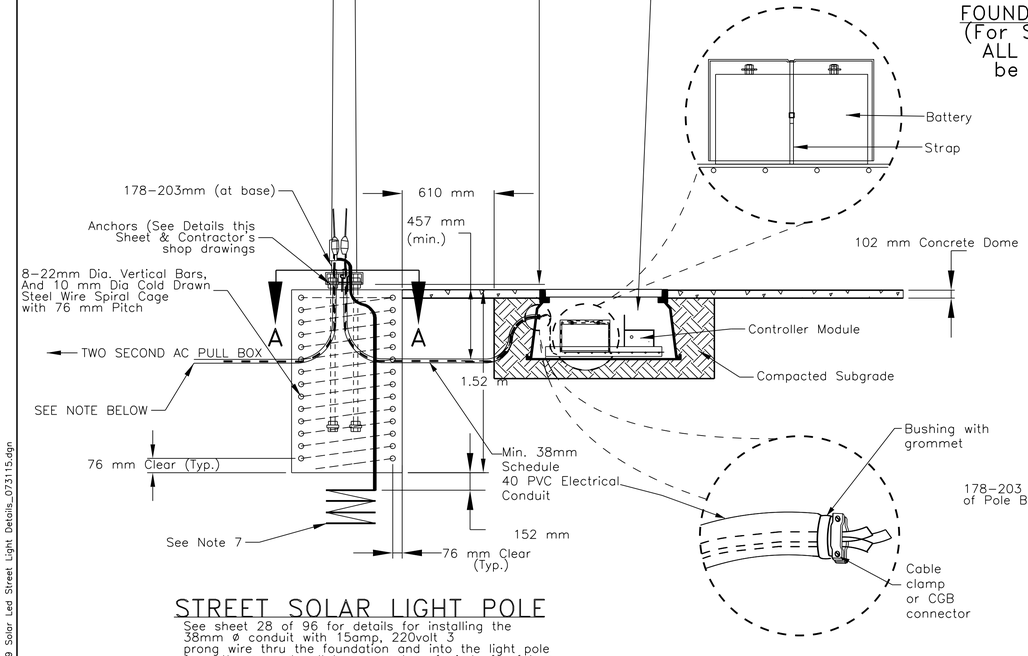
DETAIL B-B



DETAIL A-A

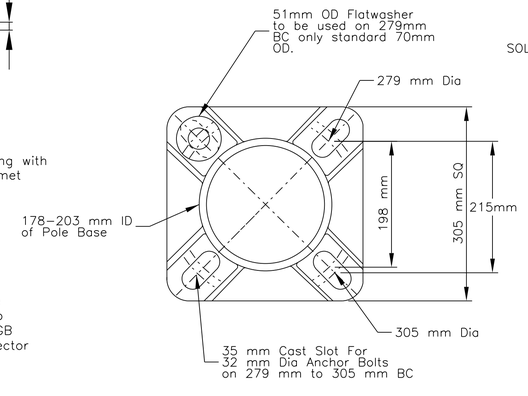


FOUNDATION ANCHOR BOLT DETAIL
(For Standard Base Applications)
ALL Anchor Components Shall
be Galvanize per ASTM 153



STREET SOLAR LIGHT POLE

See sheet 28 of 96 for details for installing the 38mm ø conduit with 15amp, 220volt 3 prong wire thru the foundation and into the light pole from the second pull box a center of circle for future AC power



GENERAL NOTES AND SOLAR LIGHTING TECHNICAL SPECIFICATIONS

1. All workmanship and materials shallconform to the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03) by manufacturer complying with ISO 2001 (2008).
2. For additional installation procedures, see Section 636- Signal, Lighting, and Electrical Systems of the FP-03. The overall solar light system must be capable of withstanding winds speeds of up to 112km/hr (70mph) with gust factor of 1.3.
3. The locations of Solar Led Street lights shown on the plan are approximate. All lighting units shall be installed with the mast arm perpendicular to the Roundabout circle on which they are located.
4. The Contractor shall verify all pole locations with the COR/COTR prior to any construction activity.
5. Type "T" tapered Pole 8.0m in lenght. Anchor bolts shall be 32mm x 1181mm x 102mm, with two hex nuts and two flat washers per bolt.
6. Unstable soil may require deeper foundation.
7. A 7.62m coil of No. 4 AWG bare copper conductor shall be installed before the concrete is poured and connected to pole grounding screw in the hand hole.
8. The foundation hole shall be augured and Class "A(AE)" (20.68 MPa) concrete poured against undisturbed compacted earth. There may be sandstone 914mm below the ground surface which may require rock drilling procedures.
9. The Contractor shall submit (for review and approval) his detailed solar lighting system, meeting the requirements herein and elsewhere in the contract to the NRDOT P&D Branch Chief through the COR/COTR. The submission shall include all the materials proposed including but not limited to foundations, poles, mast arms, lighting fixtures, solar panels, batteries, battery box, control system, anchoring, installation and maintenance procedures, materials certifications, etc) for the system that meet or exceed the requirements.

Solar Light TECHNICAL SPECIFICATIONS:

a. Operating voltage shall be 24 v. DC.
b. Operating temperature -40° F ~ 125° F.
c. Special control system requiredto preventover-charging and over-discharging.
d. Power consumption of the 552 SMD/LED system is 24v / 1.6A / 65W
e. Generally, approximately 5 hours of strong direct sunshine must enable a full charge.
f. Illumination time shall be 12 hours or more, generally dusk to dawn.
g. The system must maintain up to 5 days reserve power to allow for successive cloudy weather and days without sunshine.
h. Several successive cloudy or alternating overcast days should not affect illumination time.

LAMP UNITS (LIGHT HEADS)

a. Must besuppliedwith two lamp units.
b. Each lamp unit must be fitted with 552 Cree$_m$ SMD/LED's or equivalent.
c. All SMD/LED's are white at approximate 6000k color temperature. Amber or white/amber or other LED color temperatures.
d. Each LED must have a light output of greater than 8000 mcd and approximate 6 Lux (Lumens per squaremeter).
e. Each LED must be rated at 3v dc and 15mA.
f. Each SMD must have a light output of 6 Lumens and a wider light spread with total of 3300 or greater Lumens for each LED lamp.
g. Standard system must have automatic dusk to dawn operation.
h. Each 552 SMD/LED lamp unitmust provide approximate 4500 Lux (Lumens per square meter) or approx. 358 Candela.
i. Using a 20' (6 meter) pole, average light pattern for each lamp unit shall provide approximately 40 Lux (Lumens per square meter) or 3.7 fc/ftc.
j. Using a 26' (8 meter) pole, average light pattern for each lamp unit shall provide approximately 30 Lux (Lumens per square metre) or 2.7 fc/ftc.
k. Other SMD/LED quantities within the lamp are available by special order.
l. Polarity protected circuitry.
m. SMD/LED lifemust be rated for up to 100,000 hours or equal to about 22 years.
n. System must have removable LED circuit boards with easy plug-in connections.
o. Fixtures shall attach and detach to and from the arm which in turn attaches/detaches to the pole.
p. Silver/gray & white color finish of system pole, arms, and fixtures.
q. The lamp head shall be cobra style and is approximately 813mm x 356mm (at widest) x 203mm (at highest) L x W x D. Other styles may be proposed by the contractor at no additional cost to the government.

SOLAR PANEL:

a. Built with highlyefficient polycrystalline solar panel.
b. Must have aluminum frame with anti-aging and encapsulated.
c. Must have low reflecting tempered glass.
d. Wattageoutput of solar panel shall a minimum of 280 Watts.
e. Solar panels may be supplied in a dual format (2 x 140w = 280w) but single panel is preferred.
f. 140w solarpanel dimensions are approximate 1143mm x 1016mm x 51mm (LxWxD).
g. Typical solar panel life must be a minimum of 15 years subject to environmental factors.
h. The size of the solar panel must be based on the amount of SMD/LED's within the lamp head to insure the required wattage and power of the system is provided.
i. The dimensions of the solar panel can vary and is subject to the wattage and format supplied.

MASTARM:

a. Galvanized steel arm to accommodate each of the two lamp units (light heads).
b. Arms must be able to Attach and detach toand fromthe street light pole. No welding of parts to the pole allowed.
c. Silver/gray color finish.

POST / POLE & Foundation:

a. Standard grade galvanized steel pole with base unit to enable secure installation. Pole shall be fabricated from structural steel meeting the ASTM A53, Grade B requirements. The galvanizing shall be in accordance with ASTM A123. Aluminum pole is allowed provided it meets the requirements of General Note 2 above.
b. Pole shall have a square or round flat base (welded flat plate sized to carry the design loading) with pre-drilled holes for installation.
c. The square base of the pole is approximately 320mm x 320mm. Actual size depends on the supplier.
d. Anchor bolts will be embedded into the concrete foundation as shown on the plans and sized to carry the expected loading.
e. Wind load rating for pole is 110 MPH with a 1.3 gust factor.
f. A template for setting the anchor bolts into new, wet concrete is recommended.
g. The depth, size, ground wire, and reinforcing steel of the foundation is per the details on the plans.
h. The 4 pre-drilled holes on each template are approx. 20mm diameter.
i. The top of the pole has an outside diameter of approximately 76mm and tapers outwards towards the base.
j. Silver/gray color finish.
k. The pole diameter will vary depending upon the height. A 8m (26') pole has a diameter of approx. 178 - 203mm (7-8") at its base decreasing down to approx. 75mm (3") at the top.

CHARGE CONTROLLER/TIMER (PROGRAMMABLE CONTROL MODULE):

a. This system shall include a programmable control module which regulates and manages the solar panel power, battery power, and illumination timer.
b. The compact control module has LED indicators to display status as well as input connections for solar panel, batteries, and output connections for the lamp with push button programming.
c. The Controller shall:
1. Accept and control the GEL, AGM, and sealed lead acid type (VRLA) batteries.
2. Low voltage disconnect regulated by state of charge or voltage.
3. Detects daytime and night time conditions via the solar panel.
4. Automatic adaption to ambient temperature conditions.
5. Safety features for short circuit and reverse polarity protection of battery and lamp inputs.
6. Automatic voltage recognition (12v or 24v).
7. Float voltage for 12v system is 13 .7v dc and for 24v system is 27.4v dc.
8. Low voltage disconnect for 12v system is 11.4 ~ 11.9v dc or for 24v system is 22.8 ~ 23.8v dc.
9. Reconnect voltage for 12v system is 12.8v dc or for 24v system is 25.6v dc.
10. Dimensions approx. 11 cm x 10 cm x 4 cm (4" x 4" x 1.5") LxWxD.
11. Ambient temperature range -40 deg C ~ +50 deg C (-40 deg F ~ +122 deg F).
12. Protection rating I.P.22
13. Programmable lock-out feature for optional use to prevent accidental or unauthorized tampering.
14. User programmable illumination time for up to 1 to 12 hours or dusk-to-dawn setting.
15. Default setting shall be dusk to dawn.
16. User must be able to set the control module to run from dusk and then shut off after a certain amount of hours.
17. Control module shall be mounted inside the battery box.

BATTERY & CONTROLLER BOX:

a. Galvanized steel in ground battery and control module box with lockable lid that will accommodate the rechargeable batteries and control module. The Contractor may propose an alternate above ground box mounted to the pole at least 2.4m above the base with welded anchor plates or pre-drilled holes to enable secure installation on the pole.
b. Silver/gray color finish.
c. Battery box will fit two 12 volt 200 Amp/Hour or 220 Amp/Hour batteries and the controller mounted above on a rack.
d. Connection wiring between the battery box, solar panel and lamp units shall be included.

BATTERY CAPACITY:

a. 24v DC systems use two 12v sealed lead acid, AGM or GEL type rechargeable batteries.
b. Battery capacity is subject to the specification of the system.
c. Battery capacity is from 200 Amp/Hr to 220 Amp/Hr each battery.
d. Battery dimensions vary subject to battery capacity. Battery weight will vary subject to battery capacity.
e. Typical battery life is approximately 3-5 years subject to environmental factors.

Note: if this lighting system is not in operation for several months, the battery may discharge naturally on its own. By allowing a battery to deep discharge it may cause irreversible damage as the battery may then lose the ability to recharge or hold a full charge. Periodic charging is recommended when this system is not being used or when the solar panel is disconnected.

10. The Contractor shall provide a cast brick (25x102x102mm) of the Navajo Red Sandstone concrete mix to the COR/COTR for reviw and approval before use on the project.

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

SOLAR LED STREET LIGHT DETAILS

DRAWN BY: NRDOT	DATE: 7/17/15
DESIGNED BY: NRDOT	DATE: 7/1715
REVISED: 9/27/17	BY: DESIGN 2

Sht_29 Solar Led Street Light Details_073115.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	30	96
			N6331	N6331(1-2)2&4		

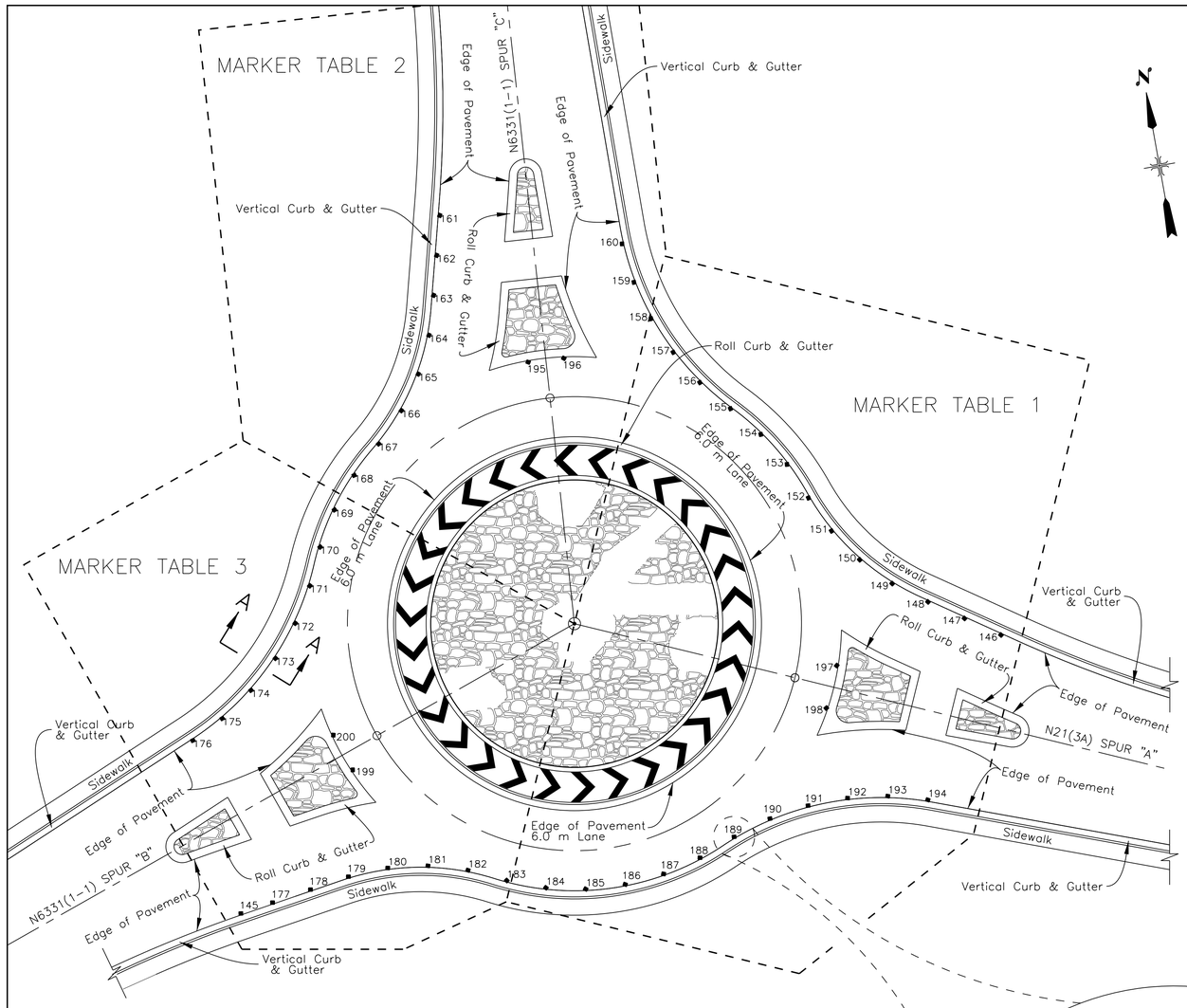


TABLE 1 SOLAR LED MARKER PAVEMENT LIGHT LOCATIONS

Point	Station	Offset	Angle°	Northing	Easting	Qty. Each	Description
146	7+85.695	6.784	17°	619882.335	287204.702	1	LEDS shall face on-coming traffic
147	7+88.644	7.337	17°	619883.574	287201.97	1	LEDS shall face on-coming traffic
148	7+91.592	7.889	17°	619884.813	287199.238	1	LEDS shall face on-coming traffic
149	7+94.522	8.584	13°	619886.186	287196.558	1	LEDS shall face on-coming traffic
150	7+97.308	9.737	13°	619887.968	287194.126	1	LEDS shall face on-coming traffic
151	7+99.869	11.329	13°	619890.124	287192.018	1	LEDS shall face on-coming traffic
152	8+02.135	13.317	13°	619892.595	287190.291	1	LEDS shall face on-coming traffic
153	8+04.298	15.374	31°	619895.108	287188.68	1	LEDS shall face on-coming traffic
154	8+06.737	17.087	31°	619897.352	287186.719	1	LEDS shall face on-coming traffic
155	8+09.405	18.417	31°	619899.279	287184.444	1	LEDS shall face on-coming traffic
156	8+12.095	19.775	16°	619901.238	287182.154	1	LEDS shall face on-coming traffic
157	8+14.569	21.496	16°	619903.499	287180.162	1	LEDS shall face on-coming traffic
158	8+16.776	23.547	16°	619906.017	287178.507	1	LEDS shall face on-coming traffic
184	8+14.283	-19.713	30°	619863.407	287170.628	1	LEDS shall face on-coming traffic
185	8+11.366	-19.098	30°	619863.31	287173.607	1	LEDS shall face on-coming traffic
186	8+08.574	-18.055	30°	619863.658	287176.567	1	LEDS shall face on-coming traffic
187	8+05.970	-16.606	30°	619864.446	287179.441	1	LEDS shall face on-coming traffic
188	8+03.611	-14.784	30°	619865.654	287182.166	1	LEDS shall face on-coming traffic
189	8+01.504	-12.658	26°	619867.217	287184.719	1	LEDS shall face on-coming traffic
190	7+99.220	-10.693	26°	619868.582	287187.405	1	LEDS shall face on-coming traffic
191	7+96.683	-9.067	26°	619869.556	287190.256	1	LEDS shall face on-coming traffic
192	7+93.943	-7.813	26°	619870.122	287193.216	1	LEDS shall face on-coming traffic
193	7+91.054	-6.955	26°	619870.267	287196.226	1	LEDS shall face on-coming traffic
194	7+88.074	-6.511	26°	619869.989	287199.226	1	LEDS shall face on-coming traffic
197	7+97.093	1.631	31°	619880.045	287192.405	1	LEDS shall face on-coming traffic
198	7+97.094	-1.646	31°	619876.862	287191.623	1	LEDS shall face on-coming traffic
					TOTAL:	26	

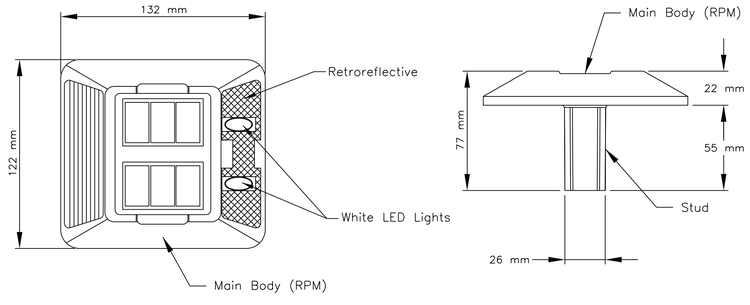
TABLE 2 SOLAR LED MARKER PAVEMENT LIGHT LOCATIONS

Point	Station	Offset	Angle°	Northing	Easting	Qty.	Description
159	11+26.664	-7.183	16°	619908.742	287177.22	1	LEDS shall face on-coming traffic
160	11+23.706	-6.606	16°	619911.62	287176.329	1	LEDS shall face on-coming traffic
161	11+20.114	6.734	17°	619913.754	287162.679	1	LEDS shall face on-coming traffic
162	11+23.063	7.287	17°	619910.763	287162.447	1	LEDS shall face on-coming traffic
163	11+26.011	7.84	17°	619907.772	287162.215	1	LEDS shall face on-coming traffic
164	11+28.947	8.504	13°	619904.781	287161.871	1	LEDS shall face on-coming traffic
165	11+31.750	9.615	13°	619901.875	287161.068	1	LEDS shall face on-coming traffic
166	11+34.334	11.169	13°	619899.139	287159.802	1	LEDS shall face on-coming traffic
167	11+36.629	13.125	13°	619896.647	287158.105	1	LEDS shall face on-coming traffic
168	11+38.775	15.204	29°	619894.289	287156.27	1	LEDS shall face on-coming traffic
195	11+31.754	1.334	31°	619902.764	287169.302	1	LEDS shall face on-coming traffic
196	11+31.755	-1.349	31°	619903.052	287171.969	1	LEDS shall face on-coming traffic
					TOTAL:	12	

TABLE 3 SOLAR LED MARKER PAVEMENT LIGHT LOCATIONS

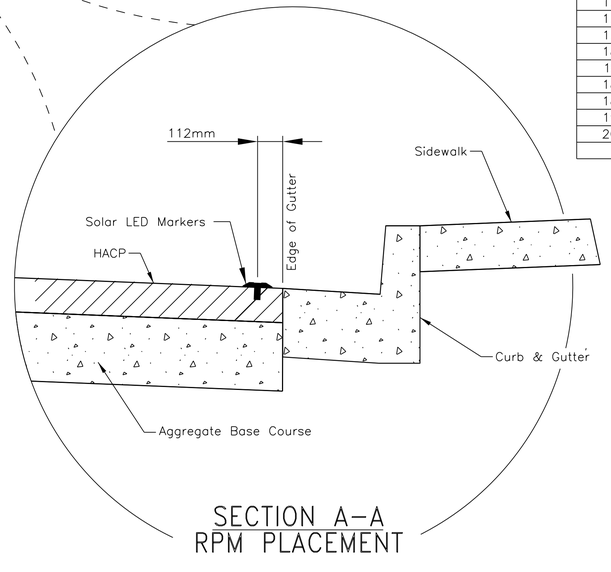
Point	Station	Offset	Angle°	Northing	Easting	Qty. Each	Description
169	11+63.029	16.274	29°	619891.699	287154.795	1	LEDS shall face on-coming traffic
170	11+65.332	14.383	29°	619888.918	287153.723	1	LEDS shall face on-coming traffic
171	11+67.436	12.244	21°	619886.019	287152.948	1	LEDS shall face on-coming traffic
172	11+69.774	10.343	21°	619883.212	287151.852	1	LEDS shall face on-coming traffic
173	11+72.356	8.789	21°	619880.587	287150.373	1	LEDS shall face on-coming traffic
174	11+75.129	7.611	21°	619878.195	287148.541	1	LEDS shall face on-coming traffic
175	11+78.041	6.834	21°	619876.083	287146.391	1	LEDS shall face on-coming traffic
176	11+80.764	6.488	21°	619874.438	287144.193	1	LEDS shall face on-coming traffic
145	11+84.030	-6.556	16°	619861.481	287147.785	1	LEDS shall face on-coming traffic
177	11+81.563	-7.019	16°	619862.295	287150.159	1	LEDS shall face on-coming traffic
178	11+78.615	-7.571	16°	619863.268	287152.997	1	LEDS shall face on-coming traffic
179	11+75.664	-8.133	10°	619864.234	287155.84	1	LEDS shall face on-coming traffic
180	11+72.782	-9.018	10°	619864.886	287158.784	1	LEDS shall face on-coming traffic
181	11+70.083	-10.361	10°	619865.049	287161.794	1	LEDS shall face on-coming traffic
182	11+67.640	-12.128	10°	619864.717	287164.791	1	LEDS shall face on-coming traffic
183	11+65.491	-14.23	30°	619863.949	287167.697	1	LEDS shall face on-coming traffic
199	11+71.440	-1.334	31°	619872.233	287156.162	1	LEDS shall face on-coming traffic
200	11+71.416	1.646	31°	619874.837	287154.712	1	LEDS shall face on-coming traffic
					TOTAL:	18	

PLAN VIEW-ROUND-A-BOUT SOLAR LED LIGHTING LAYOUT



MS 200 SINGLE SIDE-SOLAR LED MARKERS RAISED PAVEMENT MARKER (RPM)

See Sheet 31 for installation notes and specification requirements.



SECTION A-A RPM PLACEMENT

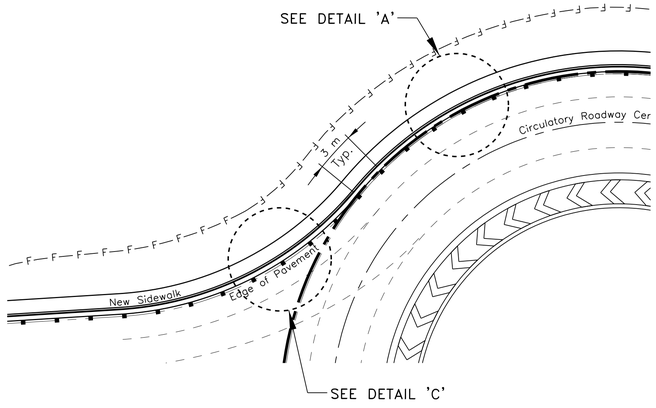
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

ROUND-ABOUT & SOLAR RPM LIGHT DETAIL LOCATIONS

DRAWN BY: NRDOT	DATE: 10/22/2015
DESIGNED BY: NRDOT	DATE: 10/22/2015
REVISED: 11/18/2017	BY: Design 2

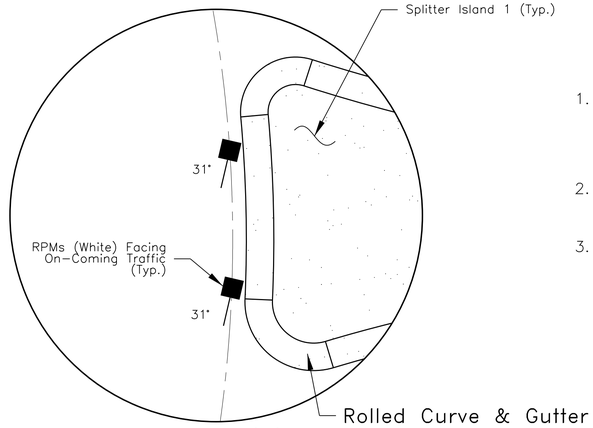
Sht_30 Round-a-bout Solar Led Light Locations Revised 102215.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	31	96
			N6331	N6331(1-2)2&4		



PARTIAL PLAN VIEW ROUND-ABOUT

SEE FULL LAYOUT ON SHT. 30 OF 96



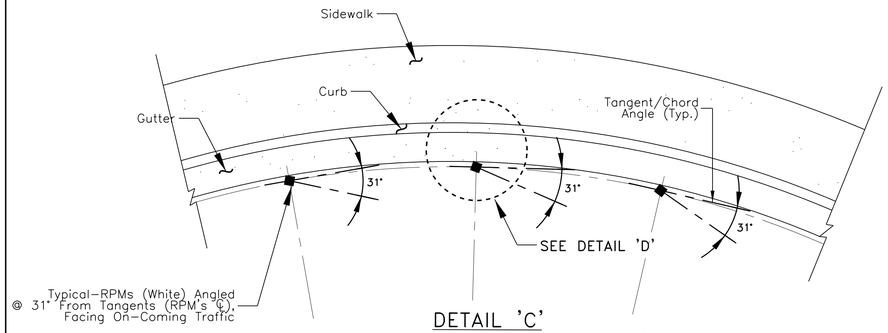
DETAIL 'C'

DIRECTION (AIM) OF RPM/LED (22°) @ SPLITTER ISLANDS (Typ.)

SEE FULL LAYOUT ON SHT. 30 OF 96

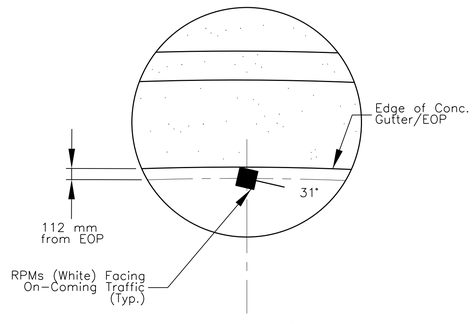
INSTALLATION REQUIREMENTS

1. REFLECTOR ORIENTATION:
   PLACE THE REFLECTOR MARKERS AT TANGENT/CHORD ANGLE PER TABLE ON SHEET 30 OF 96 FACING TRAFFIC ON THE OUTER EDGE OF THE CIRCLE AS SHOWN TO INSURE THE PROPER VISIBILITY OF EDGE OF PAVEMENT LINE BY ON-COMING VEHICLES.
2. LOCATIONS:
   SEE SHEET 30 OF 96 AND THIS SHEET FOR LOCATIONS, PLACEMENT AND SPACING OF THE REFLECTOR MARKERS.
3. INSTALLATION:
   A.) DIG OUT WITH 30-32 mm ø DRILL TIP, IN DEPTH 60-65 mm VERTICALLY (PICTURE NO. 2).
   B.) THOROUGHLY CLEAN OUT THE HOLE BEFORE APPLYING THE ADHESIVE (PICTURE NO. 3). SEE SECTION 718.23 OF THE SUPPLEMENTAL SPECIFICATIONS ON THE TYPE OF ADHESIVE TO USE IN THE HOLE.
   C.) SET THE SHAFT ALL THE WAY INTO THE HOLE TO INSURE THE REFLECTOR WILL SIT FLUSH WITH THE SURFACE OF THE ROAD PRIOR TO EPOXY PLACEMENT.
   D.) PUT ENOUGH EPOXY RESIN (ADHESIVE BOND) IN THE HOLE FOR COMPLETE SHAFT ADHESION, THEN SET THE SHAFT ALL THE WAY INTO THE HOLE FLUSH WITH THE PAVEMENT.
   E.) SLIGHTLY TURN THE REFLECTOR TO INSURE COMPLETE COVERAGE OF EPOXY RESIN ON THE TIP AND SHAFT AND TO INSURE THE PROPER TANGENT/CHORD ANGLE IS SET.
4. CHECK REFLECTORS AFTER SETUP.
   A.) KEEP THE ROAD CLEAN DURING AND AFTER INSTALLATION UNTIL EACH REFLECTOR IS COMPLETELY SET.
   B.) REFER AND COMPLY WITH THE EPOXY RESIN MANUFACTURER PROCEDURES OF USE DURING INSTALLATION AT ALL TIMES.



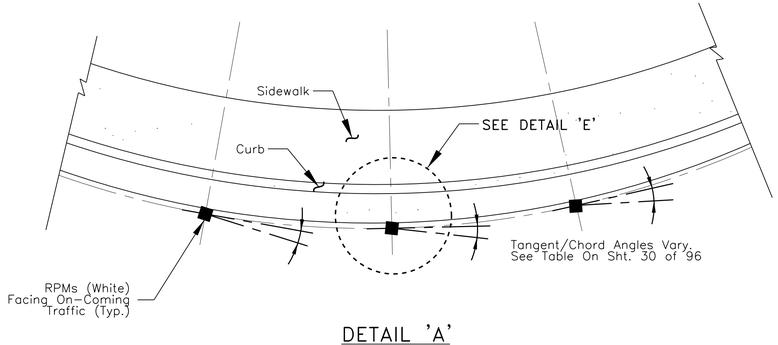
DETAIL 'C'

DIRECTION (AIM) OF RPM/LEDs (31°) AT INSIDE OF CURVE (TYP.)



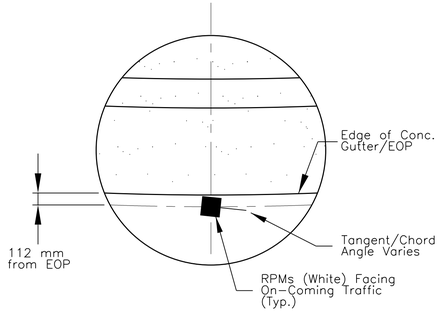
DETAIL 'D'

DIRECTION (AIM) OF RPM/LED (31°)



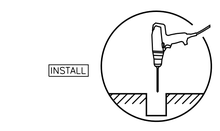
DETAIL 'A'

DIRECTION (AIM) OF RPM/LEDs (Varies) AT OUTSIDE OF CURVE (TYP.)

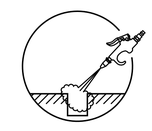


DETAIL 'E'

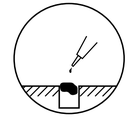
DIRECTION (AIM) OF RPM/LED (Varies)



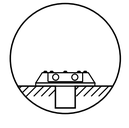
1. Dig Out A Hole (30-32 mmø, 60-65 mm depth)



2. Clean Hole Before Installation.



3. Put Adhesive Bone Into The Hole.



4. Solay Reflector Placed Down Flush.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N21(3A)/N6331(1-2) ROUNDABOUT RPM SOLAR LED LIGHTING DETAILS

DRAWN BY: NRDOT	DATE: 9/21/2015
DESIGNED BY: NRDOT	DATE: 9/21/2015
REVISED: 11/9/2017	BY: Design 2

Sht_31 Round-a-bout Solor Led Lighting Details 92115.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	32	96

Utility Table

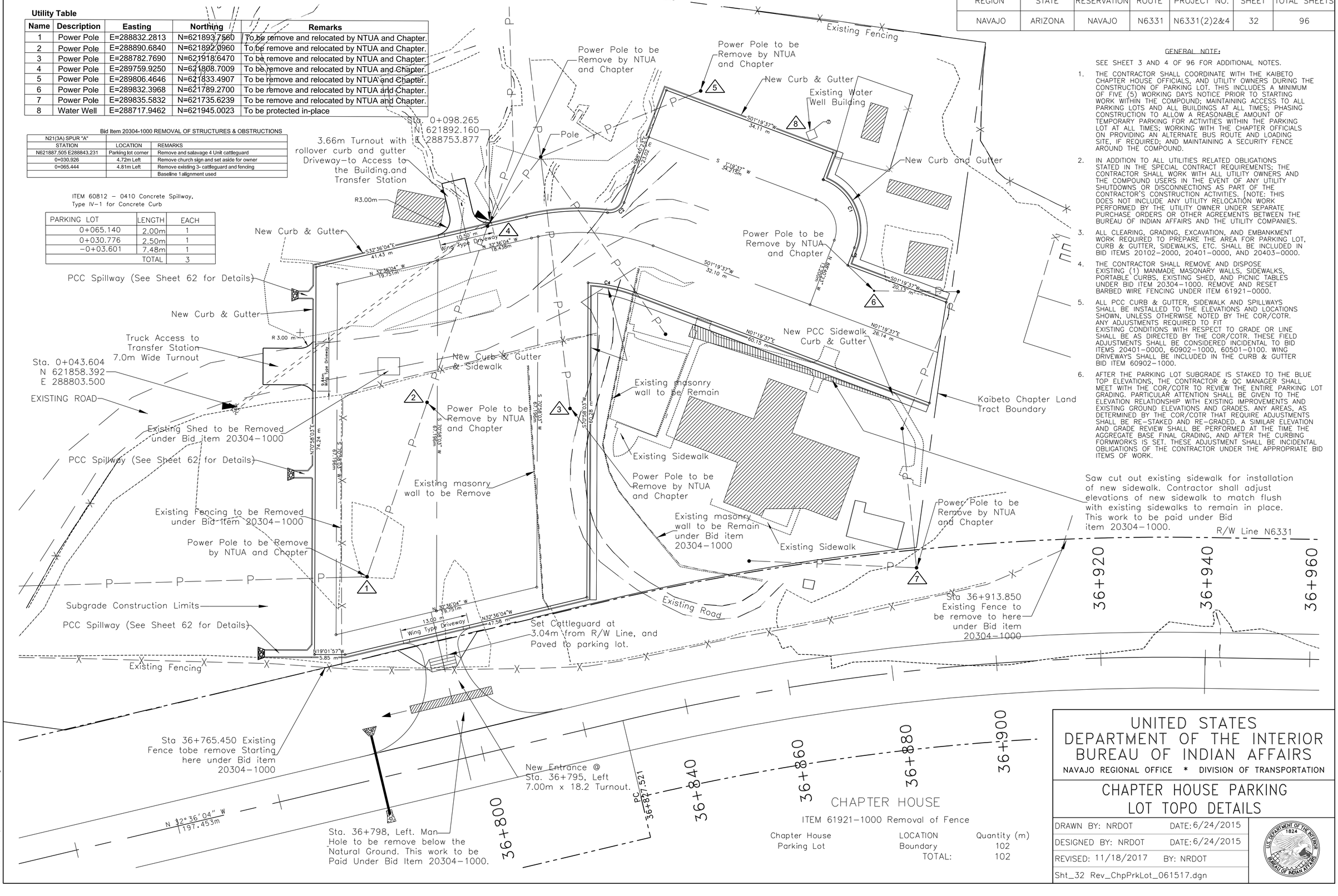
Name	Description	Easting	Northing	Remarks
1	Power Pole	E=288832.2813	N=621893.7560	To be remove and relocated by NTUA and Chapter.
2	Power Pole	E=288890.6840	N=621892.0960	To be remove and relocated by NTUA and Chapter.
3	Power Pole	E=288782.7690	N=621918.6470	To be remove and relocated by NTUA and Chapter.
4	Power Pole	E=289759.9250	N=621808.7009	To be remove and relocated by NTUA and Chapter.
5	Power Pole	E=289806.4646	N=621833.4907	To be remove and relocated by NTUA and Chapter.
6	Power Pole	E=289832.3968	N=621789.2700	To be remove and relocated by NTUA and Chapter.
7	Power Pole	E=289835.5832	N=621735.6239	To be remove and relocated by NTUA and Chapter.
8	Water Well	E=288717.9462	N=621945.0023	To be protected in-place

Bid Item 20304-1000 REMOVAL OF STRUCTURES & OBSTRUCTIONS

N21(3A) SPUR "A"		
STATION	LOCATION	REMARKS
N621887.505 E288843.231	Parking lot corner	Remove and salavage 4 Unit cattleguard
0+030.926	4.72m Left	Remove church sign and set aside for owner
0+065.444	4.81m Left	Remove existing 3- cattleguard and fencing
		Baseline 1 alignment used

ITEM 60812 – 0410 Concrete Spillway, Type IV-1 for Concrete Curb

PARKING LOT	LENGTH	EACH
0+065.140	2.00m	1
0+030.776	2.50m	1
−0+03.601	7.48m	1
	TOTAL	3



ITEM 61921–1000 Removal of Fence

	LOCATION	Quantity (m)
Chapter House Parking Lot	Boundary	102
	TOTAL:	102

GENERAL NOTE:

SEE SHEET 3 AND 4 OF 96 FOR ADDITIONAL NOTES.

1. THE CONTRACTOR SHALL COORDINATE WITH THE KAIBETO CHAPTER HOUSE OFFICIALS, AND UTILITY OWNERS DURING THE CONSTRUCTION OF PARKING LOT. THIS INCLUDES A MINIMUM OF FIVE (5) WORKING DAYS NOTICE PRIOR TO STARTING WORK WITHIN THE COMPOUND; MAINTAINING ACCESS TO ALL PARKING LOTS AND ALL BUILDINGS AT ALL TIMES; PHASING CONSTRUCTION TO ALLOW A REASONABLE AMOUNT OF TEMPORARY PARKING FOR ACTIVITIES WITHIN THE PARKING LOT AT ALL TIMES; WORKING WITH THE CHAPTER OFFICIALS ON PROVIDING AN ALTERNATE BUS ROUTE AND LOADING SITE, IF REQUIRED; AND MAINTAINING A SECURITY FENCE AROUND THE COMPOUND.
2. IN ADDITION TO ALL UTILITIES RELATED OBLIGATIONS STATED IN THE SPECIAL CONTRACT REQUIREMENTS; THE CONTRACTOR SHALL WORK WITH ALL UTILITY OWNERS AND THE COMPOUND USERS IN THE EVENT OF ANY UTILITY SHUTDOWNS OR DISCONNECTIONS AS PART OF THE CONTRACTOR'S CONSTRUCTION ACTIVITIES. [NOTE: THIS DOES NOT INCLUDE ANY UTILITY RELOCATION WORK PERFORMED BY THE UTILITY OWNER UNDER SEPARATE PURCHASE ORDERS OR OTHER AGREEMENTS BETWEEN THE BUREAU OF INDIAN AFFAIRS AND THE UTILITY COMPANIES.
3. ALL CLEARING, GRADING, EXCAVATION, AND EMBANKMENT WORK REQUIRED TO PREPARE THE AREA FOR PARKING LOT, CURB & GUTTER, SIDEWALKS, ETC. SHALL BE INCLUDED IN BID ITEMS 20102–2000, 20401–0000, AND 20403–0000.
4. THE CONTRACTOR SHALL REMOVE AND DISPOSE EXISTING (1) MANMADE MASONARY WALLS, SIDEWALKS, PORTABLE CURBS, EXISTING SHED, AND PICNIC TABLES UNDER BID ITEM 20304–1000. REMOVE AND RESET BARBED WIRE FENCING UNDER ITEM 61921–0000.
5. ALL PCC CURB & GUTTER, SIDEWALK AND SPILLWAYS SHALL BE INSTALLED TO THE ELEVATIONS AND LOCATIONS SHOWN, UNLESS OTHERWISE NOTED BY THE COR/COTR. ANY ADJUSTMENTS REQUIRED TO FIT EXISTING CONDITIONS WITH RESPECT TO GRADE OR LINE SHALL BE AS DIRECTED BY THE COR/COTR. THESE FIELD ADJUSTMENTS SHALL BE CONSIDERED INCIDENTAL TO BID ITEMS 20401–0000, 60902–1000, 60501–0100. WING DRIVEWAYS SHALL BE INCLUDED IN THE CURB & GUTTER BID ITEM 60902–1000.
6. AFTER THE PARKING LOT SUBGRADE IS STAKED TO THE BLUE TOP ELEVATIONS, THE CONTRACTOR & QC MANAGER SHALL MEET WITH THE COR/COTR TO REVIEW THE ENTIRE PARKING LOT GRADING. PARTICULAR ATTENTION SHALL BE GIVEN TO THE ELEVATION RELATIONSHIP WITH EXISTING IMPROVEMENTS AND EXISTING GROUND ELEVATIONS AND GRADES. ANY AREAS, AS DETERMINED BY THE COR/COTR THAT REQUIRE ADJUSTMENTS SHALL BE RE–STAKED AND RE–GRADED. A SIMILAR ELEVATION AND GRADE REVIEW SHALL BE PERFORMED AT THE TIME THE AGGREGATE BASE FINAL GRADING, AND AFTER THE CURBING FORMWORKS IS SET. THESE ADJUSTMENT SHALL BE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR UNDER THE APPROPRIATE BID ITEMS OF WORK.

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

CHAPTER HOUSE PARKING LOT TOPO DETAILS

DRAWN BY: NRDOT	DATE: 6/24/2015
DESIGNED BY: NRDOT	DATE: 6/24/2015
REVISED: 11/18/2017	BY: NRDOT
Sht_32 Rev_ChpPrkLot_061517.dgn	

Sht_32 Rev_ChpPrkLot_061517.dgn

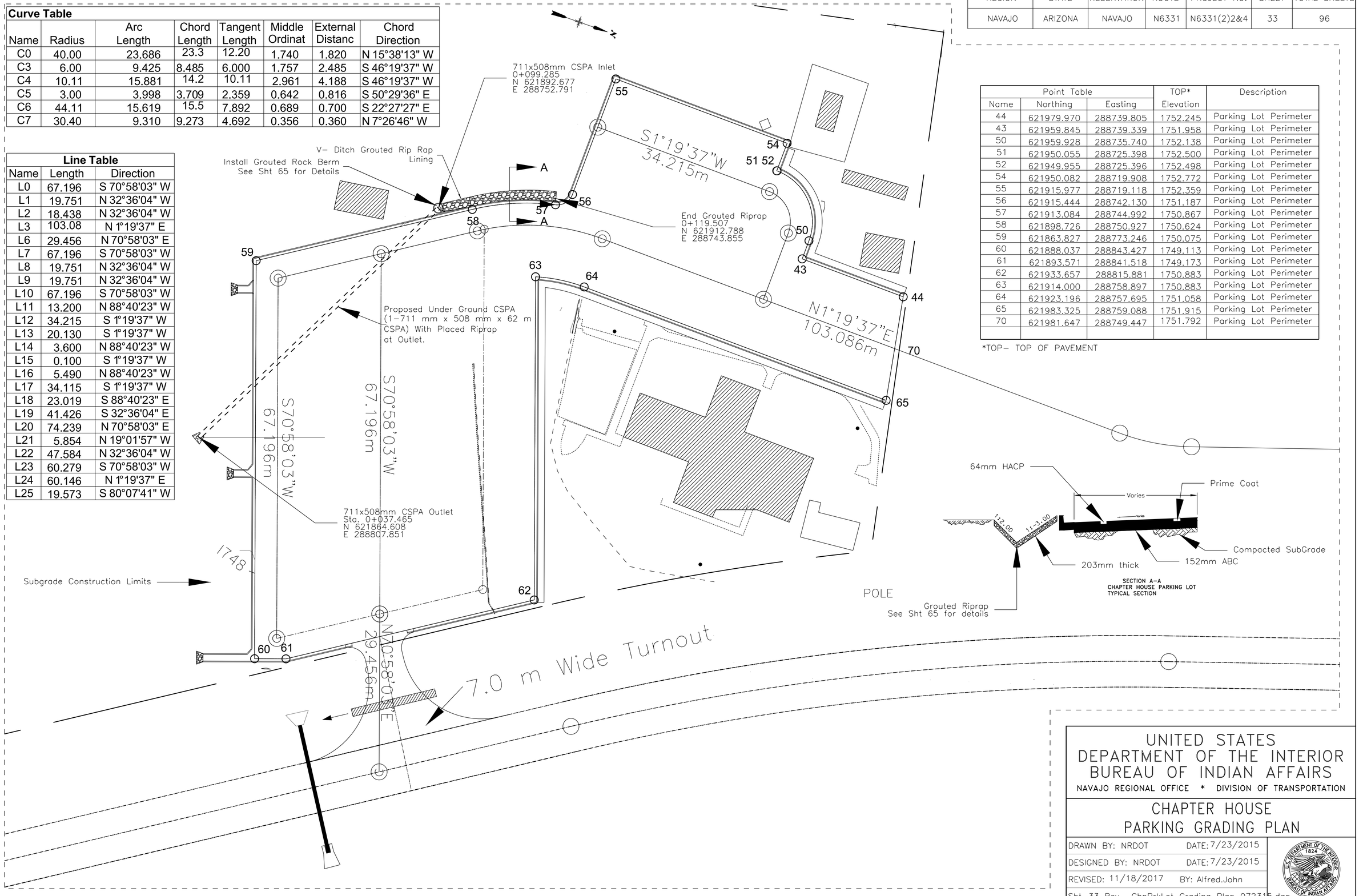
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	33	96

Curve Table

Name	Radius	Arc Length	Chord Length	Tangent Length	Middle Ordinat	External Distanc	Chord Direction
C0	40.00	23.686	23.3	12.20	1.740	1.820	N 15°38'13" W
C3	6.00	9.425	8.485	6.000	1.757	2.485	S 46°19'37" W
C4	10.11	15.881	14.2	10.11	2.961	4.188	S 46°19'37" W
C5	3.00	3.998	3.709	2.359	0.642	0.816	S 50°29'36" E
C6	44.11	15.619	15.5	7.892	0.689	0.700	S 22°27'27" E
C7	30.40	9.310	9.273	4.692	0.356	0.360	N 7°26'46" W

Line Table

Name	Length	Direction
L0	67.196	S 70°58'03" W
L1	19.751	N 32°36'04" W
L2	18.438	N 32°36'04" W
L3	103.08	N 1°19'37" E
L6	29.456	N 70°58'03" E
L7	67.196	S 70°58'03" W
L8	19.751	N 32°36'04" W
L9	19.751	N 32°36'04" W
L10	67.196	S 70°58'03" W
L11	13.200	N 88°40'23" W
L12	34.215	S 1°19'37" W
L13	20.130	S 1°19'37" W
L14	3.600	N 88°40'23" W
L15	0.100	S 1°19'37" W
L16	5.490	N 88°40'23" W
L17	34.115	S 1°19'37" W
L18	23.019	S 88°40'23" E
L19	41.426	S 32°36'04" E
L20	74.239	N 70°58'03" E
L21	5.854	N 19°01'57" W
L22	47.584	N 32°36'04" W
L23	60.279	S 70°58'03" W
L24	60.146	N 1°19'37" E
L25	19.573	S 80°07'41" W



Point Table			TOP*	Description
Name	Northing	Easting	Elevation	
44	621979.970	288739.805	1752.245	Parking Lot Perimeter
43	621959.845	288739.339	1751.958	Parking Lot Perimeter
50	621959.928	288735.740	1752.138	Parking Lot Perimeter
51	621950.055	288725.398	1752.500	Parking Lot Perimeter
52	621949.955	288725.396	1752.498	Parking Lot Perimeter
54	621950.082	288719.908	1752.772	Parking Lot Perimeter
55	621915.977	288719.118	1752.359	Parking Lot Perimeter
56	621915.444	288742.130	1751.187	Parking Lot Perimeter
57	621913.084	288744.992	1750.867	Parking Lot Perimeter
58	621898.726	288750.927	1750.624	Parking Lot Perimeter
59	621863.827	288773.246	1750.075	Parking Lot Perimeter
60	621888.037	288843.427	1749.113	Parking Lot Perimeter
61	621893.571	288841.518	1749.173	Parking Lot Perimeter
62	621933.657	288815.881	1750.883	Parking Lot Perimeter
63	621914.000	288758.897	1750.883	Parking Lot Perimeter
64	621923.196	288757.695	1751.058	Parking Lot Perimeter
65	621983.325	288759.088	1751.915	Parking Lot Perimeter
70	621981.647	288749.447	1751.792	Parking Lot Perimeter

*TOP– TOP OF PAVEMENT

SECTION A–A
CHAPTER HOUSE PARKING LOT
TYPICAL SECTION

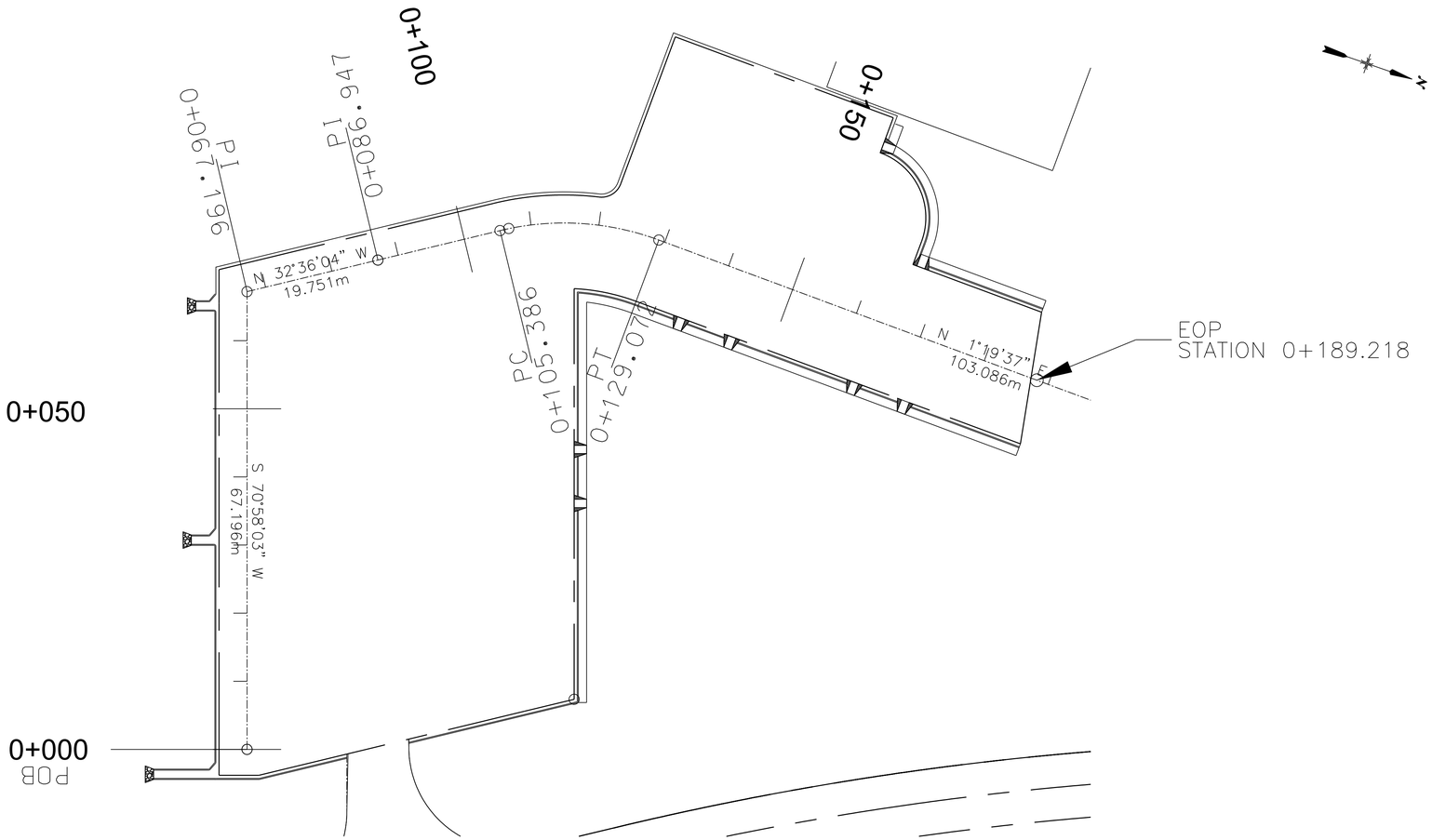
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CHAPTER HOUSE PARKING GRADING PLAN

DRAWN BY: NRDOT	DATE: 7/23/2015
DESIGNED BY: NRDOT	DATE: 7/23/2015
REVISED: 11/18/2017	BY: Alfred.John
Sht_33 Rev_ ChpPrkLot Grading Plan 072315.dgn	

Sht_33 Rev_ ChpPrkLot Grading Plan 072315.dgn

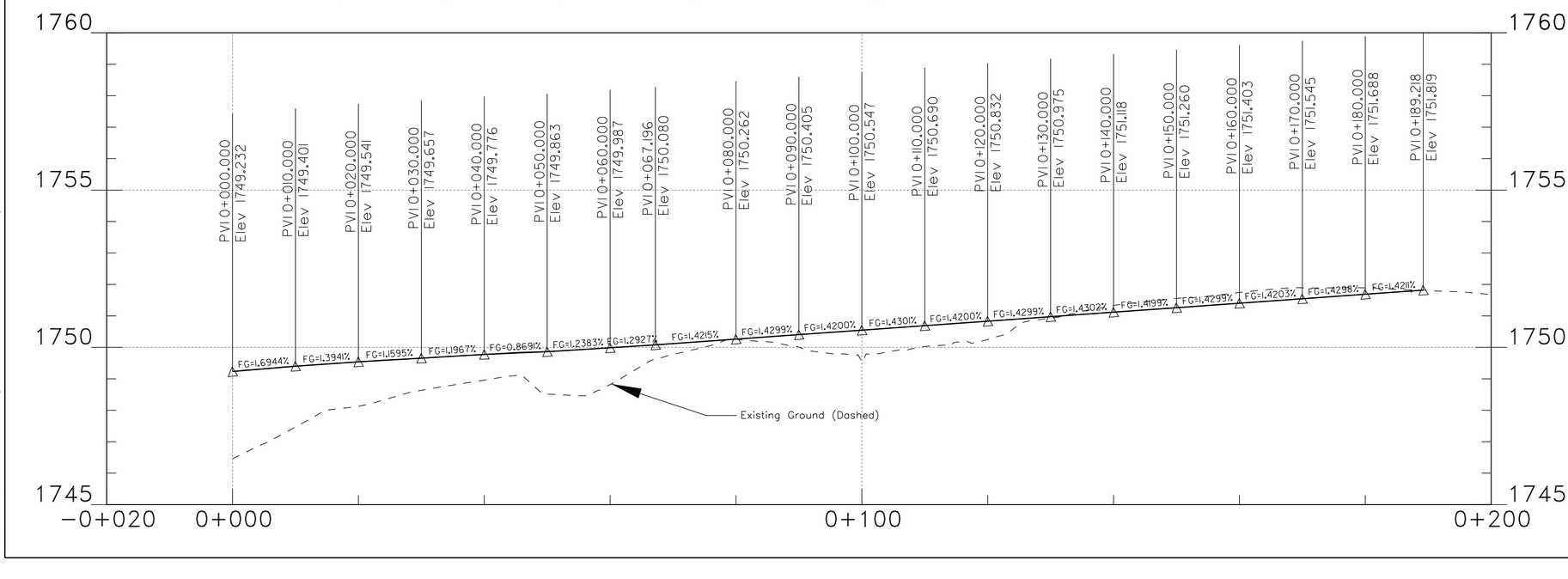
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)	34	96



Porject: Kaibeto Chapter Parking Lot

Horizontal Alignment: Baseline 1

		STATION	NORTHIN	EASTING
Element: Linear				
	POB	0+000.000	621890.680	288838.488
	PI	0+067.196	621868.768	288774.965
Tangent Direction:		S 70^58'03" W		
Tangent Length:		67.196		
Element: Linear				
	PI	0+067.196	621868.768	288774.965
	PI	0+086.947	621885.407	288764.324
Tangent Direction:		N 32^36'04" W		
Tangent Length:		19.751		
Element: Linear				
	PI	0+086.947	621885.407	288764.324
	PC	0+105.386	621900.940	288754.389
Tangent Direction:		N 32^36'04" W		
Tangent Length:		18.438		
Element: Circular				
	PC	0+105.386	621900.940	288754.389
	PI	0+117.587	621911.219	288747.815
	CC		621922.49	288788.087
	PT	0+129.072	621923.418	288748.098
Radius:		40.00		
Delta:		33^55'42"	Right	
Degree of Curvature(Arc):		43^39'34"		
Length:		23.686		
Tangent:		12.202		
Chord:		23.342		
Middle Ordinate:		1.74		
External:		1.82		
Tangent Direction:		N 32^36'04" W		
Radial Direction:		N 57^23'56" E		
Chord Direction:		N 15^38'13" W		
Radial Direction:		S 88^40'23" E		
Tangent Direction:		N 1^19'37" E		
Element: Linear				
	PT	0+129.072	621923.418	288748.098
	PI	0+189.218	621983.548	288749.491
Tangent Direction:		N 1^19'37" E		
Tangent Length:		103.086		



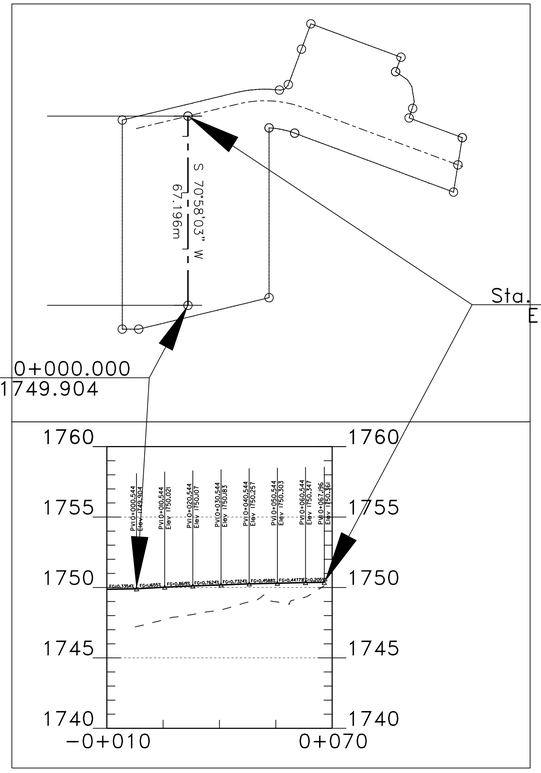
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CHAPTER HOUSE PARKING LOT PLAN AND PROFILE

DRAWN BY: NRDOT	DATE: 7/23/2015
DESIGNED BY: NRDOT	DATE: 7/23/2015
REVISED: 9/28/2017	BY: Design 2

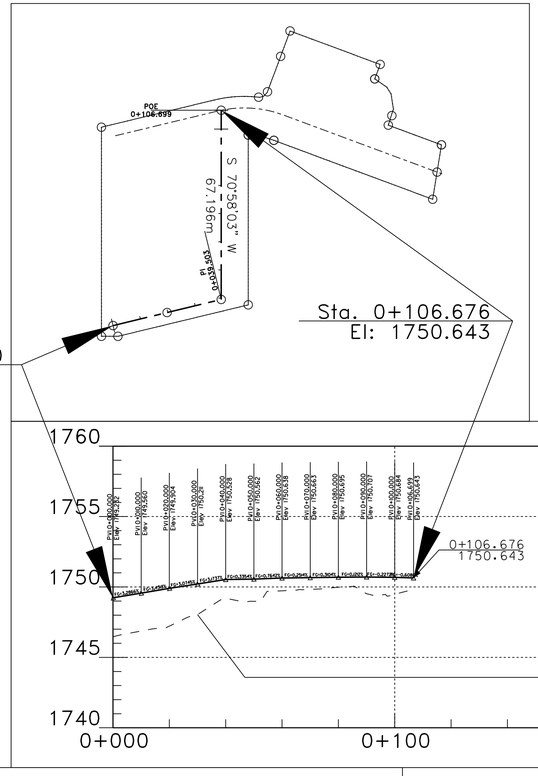
Sht_34 Chapter House Parking Lot Plan and Profile 072315.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	35	96



Project Name: N6330-N6331 FINAL GROUND 1-08-10
Description: FINAL ROW ALIGNMENT
Horizontal Alignment : Baseline 2
Description:
Style: Design Centerline

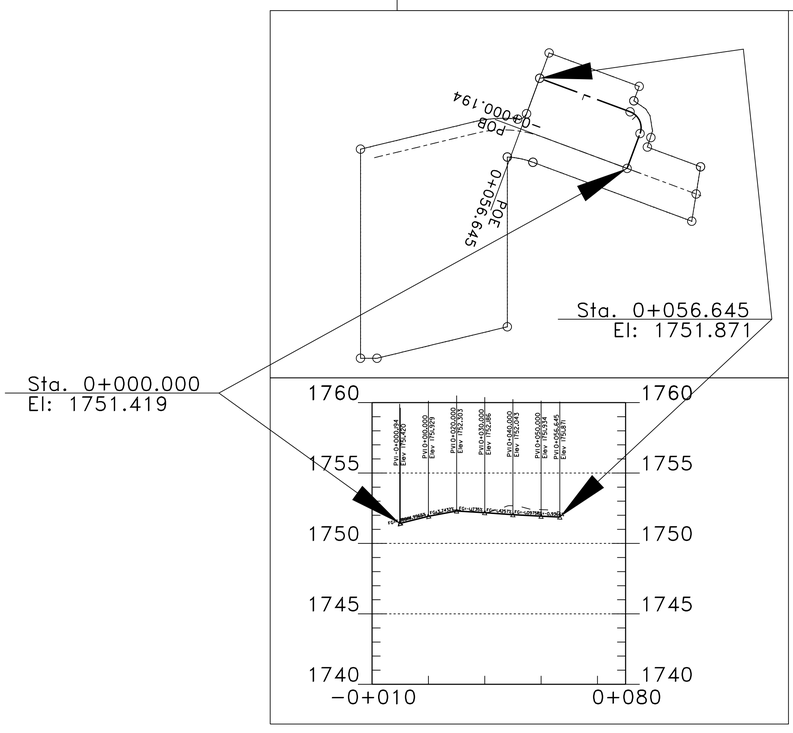
	STATION	NORTHING	EASTING
Element:	Linear		
POB	0+000.000	N 621907.320	E 288827.846
POE	0+067.196	N 621885.407	E 288764.324
Tangent Direction:	S 70°58'03" W		
Tangent Length:	67.196		



Project Name: N6330-N6331 FINAL GROUND 1-08-10
Description: FINAL ROW ALIGNMENT
Horizontal Alignment Name: Baseline 3
Style: Design Centerline

	STATION	NORTHING	EASTING
Element: Linear			
POB	0+000.000	N 621890.680	E 288838.488
	0+019.751	N 621907.320	E 288827.846
Tangent Direction:	N 32°36'04" W		
Tangent Length:	19.751		
Element: Linear			
PI	0+019.751	N 621907.320	E 288827.846
PI	0+039.503	N 621923.959	E 288817.205
Tangent Direction:	N 32°36'04" W		
Tangent Length:	19.751		
Element: Linear			
PI	0+039.503	N 621923.959	E 288817.205
POE	0+106.699	N 621902.046	E 288753.682
Tangent Direction:	S 70°58'03" W		
Tangent Length:	67.196		

Existing Ground (Dashed)



Project Name: N6330-N6331 FINAL GROUND 1-08-10
Description: FINAL ROW ALIGNMENT
Horizontal Alignment Name: Baseline 4
Style: Design Centerline

	STATION	NORTHING	EASTING
Element: Linear			
POB	-0+000.19	N 621955.514	E 288748.841
PC	0+013.006	N 621955.819	E 288735.645
Tangent Direction:	N 88°40'23" W		
Tangent Length:	13.200		
Element: Circular			
PC	0+013.006	N 621955.819	E 288735.645
PI	0+019.006	N 621955.958	E 288729.646
CC		N 621949.821	E 288735.506
PT	0+022.431	N 621949.960	E 288729.507
Radius:	6.000		
Delta:	90°00'00" Left		
Degree of Curvature(Arc):	291°03'45"		
Length:	9.425		
Tangent:	6.000		
Chord:	8.485		
Middle Ordinate:	1.757		
External:	2.485		
Tangent Direction:	N 88°40'23" W		
Radial Direction:	N 1°19'37" E		
Chord Direction:	S 46°19'37" W		
Radial Direction:	N 88°40'23" W		
Tangent Direction:	S 1°19'37" W		
Element: Linear			
PT	0+022.431	N 621949.960	E 288729.507
POE	0+056.645	N 621915.755	E 288728.715
Tangent Direction:	S 1°19'37" W		
Tangent Length:	34.215		

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

CHAPTER PARKING
BASE LINE PLAN & PROFILE DETAILS

DRAWN BY: NRDOT	DATE: 7/23/2015
DESIGNED BY: NRDOT	DATE: 7/23/2015
REVISED: 7/23/2017	BY: Design.Riley

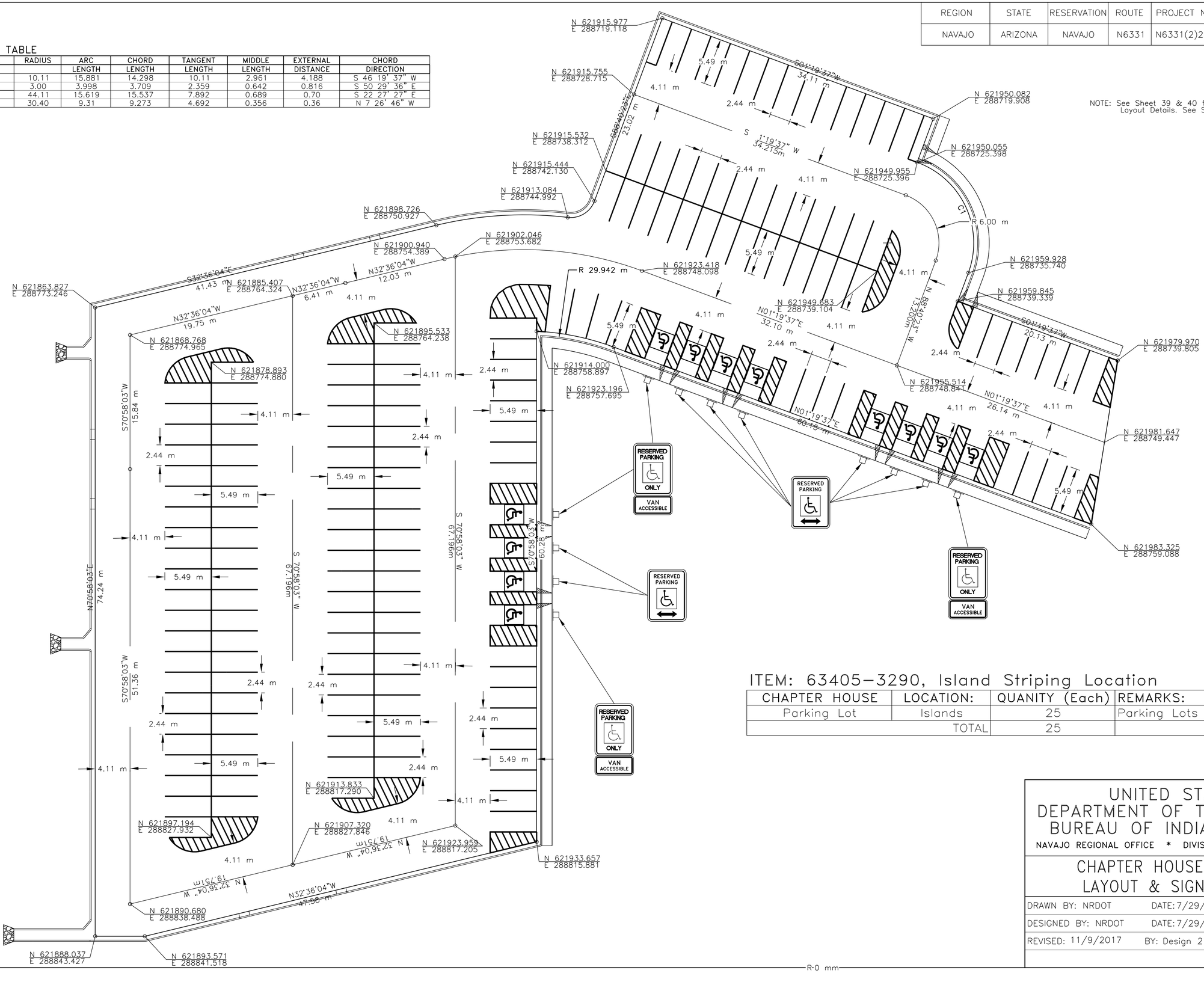
Sht_35 Chapter Parking Base Line Profiles Details 072315.dgn

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_35 Chapter Parking Base Line Profiles Details 072315.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	36	96

CURVE TABLE

NAME	RADIUS	ARC LENGTH	CHORD LENGTH	TANGENT LENGTH	MIDDLE LENGTH	EXTERNAL DISTANCE	CHORD DIRECTION
C1	10.11	15.881	14.298	10.11	2.961	4.188	S 46 19' 37" W
C2	3.00	3.998	3.709	2.359	0.642	0.816	S 50 29' 36" E
C3	44.11	15.619	15.537	7.892	0.689	0.70	S 22 27' 27" E
C4	30.40	9.31	9.273	4.692	0.356	0.36	N 7 26' 46" W



NOTE: See Sheet 39 & 40 for Striping Layout Details. See Sheet 74 for Spillway Details.

ITEM: 63405-3290, Island Striping Location

CHAPTER HOUSE	LOCATION:	QUANITY (Each)	REMARKS:
Parking Lot	Islands	25	Parking Lots Island
	TOTAL	25	

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

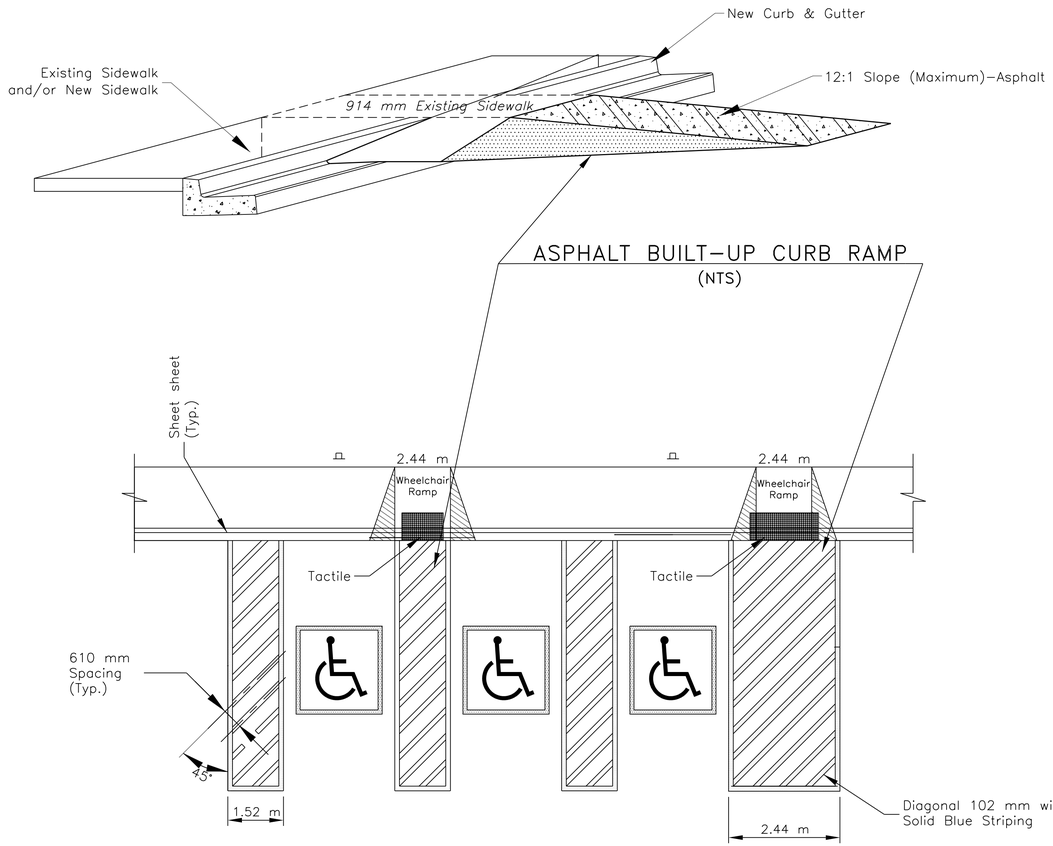
CHAPTER HOUSE STRIPING
LAYOUT & SIGN DETAILS

DRAWN BY: NRDOT	DATE: 7/29/2015
DESIGNED BY: NRDOT	DATE: 7/29/2015
REVISED: 11/9/2017	BY: Design 2

Sht_36 Chapter House Striping Layout & Signs Details071715.dgn

R-0 mm

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	37	96



ASPHALT BUILT–UP CURB RAMP
(NTS)

GENERAL NOTES

1. SEE SHEET 39 FOR ADDITIONAL NOTES AND SHEET 40 FOR CURB RAMP TACTILE PAD INSTALLATION.
2. INSTALL HANDICAP WHEELCHAIR RAMP ALONG THE PCC CURB, GUTTER AND SIDEWALK AT ALL DIAGONAL STRIP LOCATIONS. THIS WORK SHALL BE IINCLUDED IN THE UNIT PRICE BID FOR BID ITEM 61505 – 1000.

ITEM No. 61505–1000:HANDICAP RAMP, CONCRETE (with Tactile Pad)

STATION	LOCATION	EACH	REMARKS
N6331(1–2) SPUR C			
0+980.000	Centerline	2	Pedestrian Crosswalk
0+998.500	Lt.	1	Wheel Chair Ramp
1+012.400	Lt.	1	Wheel Chair Ramp
1+040.500	Lt.	1	Wheel Chair Ramp
0+957.400	Rt.	1	Wheel Chair Ramp
1+059.200	Lt.	1	Wheel Chair Ramp
1+124.000	Lt.	2	Pedestrian Crosswalk @ Round–a–bout
N6331(1–2) Spur B			
1+179.000	Centerline	2	Pedestrian Crosswalk
1+243.000	Rt.	1	Pedestrian Crosswalk @ Round–a–bout
1+252.000	Rt.	1	Wheel Chair Ramps
1+512.000	Centerline	2	Pedestrian Crosswalk
N21(3A) Spur A			
0+790.000	Centerline	2	Pedestrian Crosswalk @ Round–a–bout
Chapter Parking Lot			
0+129.375	32.65 m Rt.	1	New Handicap Access Ramp on South Parking Lot.
1+132.137	40.09 m Rt.	1	New Handicap Access Ramp on South Parking Lot.
0+136.172	9.60 m Rt.	1	New Handicap Access Ramp Adjacent to Chapter House.
0+144.061	11.36 m Rt.	1	New Handicap Access Ramp Adjacent to Chapter House.
0+155.076	24.44 m Lt.	1	New Access Ramp on West Parking Lot.
0+163.253	9.60 m Rt.	1	New Handicap Access Ramp Adjacent to Chapter House.
0+165.286	11.44 m Lt.	1	New Access Ramp on West Parking Lot.
0+171.251	9.60 m Rt.	1	New Handicap Access Ramp Adjacent to Chapter House.
TOTAL WHEEL CHAIR RAMPS:		25	

TYPICAL HANDICAP PARKING DETAIL (AT NEW PCC SIDEWALKS)
(NTS)

NOTE: HANDICAP RAMPS AND PADS TO BE LOCATED AS SHOWN ON THE PARKING LOT DRAWINGS.

SEE SHEET 39 FOR HANDICAP RAMP CONCRETE DETAILS, AND SHEET 40 FOR CURB RAMP TACTILE DETAILS.



TYPICAL HANDICAP
PARKING SYMBOL DETAIL
(NTS)

ITEM No. 63405–3250: PAVEMENT MARKINGS, TYPE "H", HANDICAP SYMBOL

LOCATION	HANDICAP STALL
SEE SHEET 36 FOR DETAIL	12





HANDICAP PARKING LOT SIGN DETAILS

REQUIRED: "RESERVED PARKING ONLY" (R7–8c)
"RESERVED PARKING" With ARROWS (R7–8)
* "VAN ACCESSIBLE" (R7–8b)

63405–3300 PAVEMENT MARKINGS: Type "H", SOLID BLUE

STATION TO STATION	LOCATION	DESCRIPTION	LENGTH (m)
0+030.60 to 0+049.800	48.0m, right	Handicapped stalls	119.70
0+130.47 to 0+148.758	9.6m, right	Handicapped stalls	113.65
0+158.47 to 0+176.472	9.6m, right	Handicapped stalls	113.65
		TOTAL:	347.00

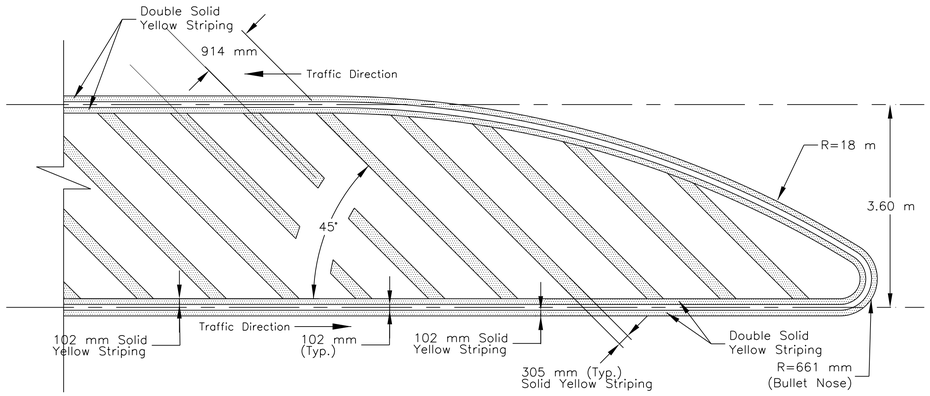
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

HANDICAP STRIPING, SIGN, & ASPHALT RAMP DETAILS

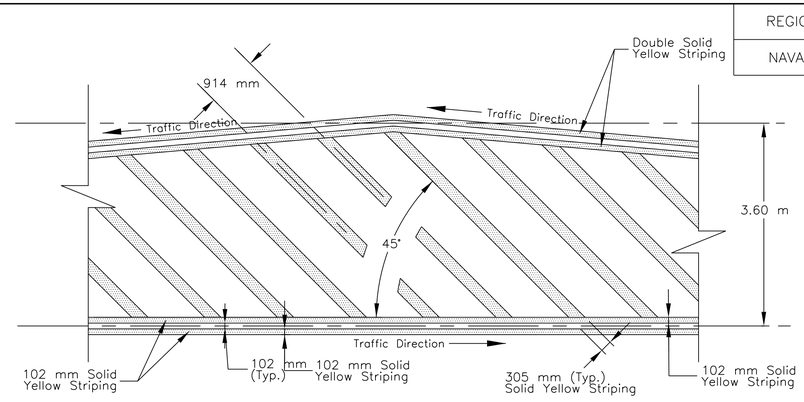
DRAWN BY: NRDOT	DATE: 5/2014
DESIGNED BY: NRDOT	DATE: 6/2005
REVISED: 6/28/17	BY: Design 2

Sht_37_Handicap Striping, Signs and Asphalt Ramp Details 072115.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	38	96



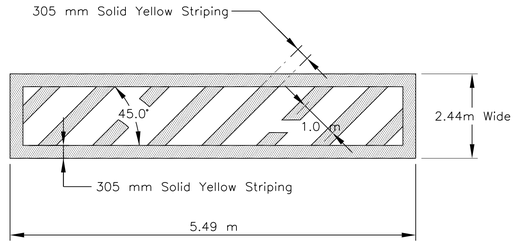
DETAIL "A"
ITEM NO. 63405-3290: PAVEMENT MARKING, TYPE "H"
"DIAGONAL STRIPING", SOLID YELLOW



DETAIL "B"
ITEM NO. 63405-3290: PAVEMENT MARKING, TYPE "H"
"DIAGONAL STRIPING", SOLID YELLOW

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) ALONG WITH ALL SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. ALL CONCRETE TO BE CLASS A(AE) WITH CLASS 1 FINISH. CHAMFER ALL EXPOSED EDGES AS SHOWN. ALL CONCRETE SHALL CONFORM TO SECTION 601 "MINOR CONCRETE STRUCTURES" OF THE FP-03.
3. ANY UNSUITABLE MATERIAL ENCOUNTERED DURING THE FOOTING EXCAVATIONS SHALL BE REMOVED AS DIRECTED BY THE ENGINEER AND REPLACED WITH STRUCTURAL BACKFILL MATERIAL CONFORMING TO AASTHO A-2-4 SOIL CLASSIFICATION OR BETTER AND SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF STRUCTURES.
4. IN NO CASE SHALL ANY BACKFILL BE PLACED UNTIL THE CONCRETE HAS ATTAINED A COMPRESSIVE STRENGTH OF 17.24 mPa. ALL CONCRETE SHALL BE 20.68 mPa STRENGTH IN 28 DAYS.
5. ALL STONE FOR RIP-RAP TO BE CLASS (1) MEETING THE GRADING REQUIREMENTS OF TABLE 705-1; SECTION 251-"RIP-RAP" OF THE FP-03.
6. ALL EXCAVATIONS AND BACKFILL OPERATIONS SHALL BE DONE TO NEAT LINES IN ACCORDANCE WITH SECTION 209 OF THE FP-03, AND THE DETAILS SHOWN. THIS WORK SHALL BE INCIDENTAL TO INSTALLATION OF RIP-RAP AND SPILLWAYS.
8. THE CONTRACTOR WILL BE REQUIRED TO MAKE ANY NECESSARY ADJUSTMENTS IN THE FIELD TO MATCH EXISTING FIELD CONDITIONS. THESE FIELD ADJUSTMENTS ARE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
9. SEE SHEET 39 & 40 FOR WHEEL CHAIR CURB RAMP DETAILS.

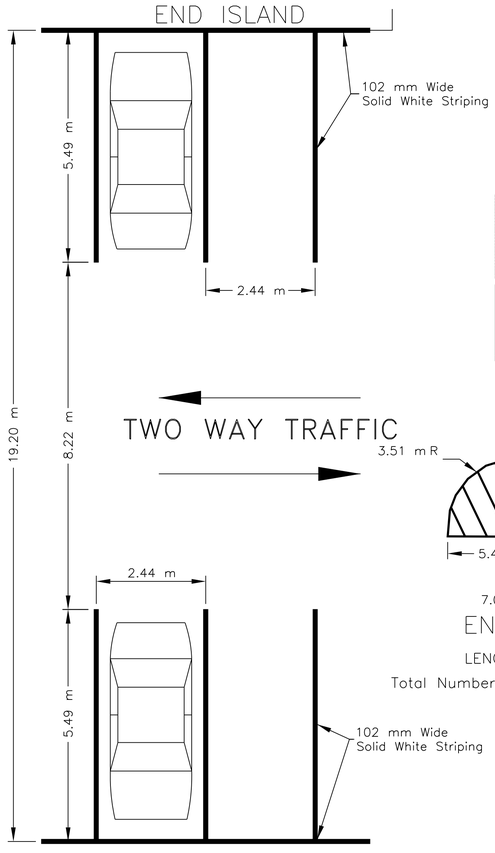


Total Number of Islands= 4

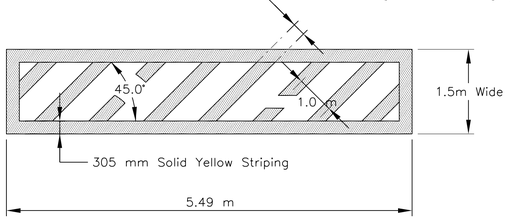
Total Length of Striping per one Island= 27.6m

63405-3290 PAVEMENT MARKINGS: Type "H", SOLID YELLOW

STATION	LOCATION	DESCRIPTION	LENGTH (m)
0+007.800	45m, right	Chapter House diagonal Island	24.30
0+007.800	9.4m, right	Chapter House diagonal Island	49.36
0+012.40	28.6m, right	Chapter House diagonal Island	49.36
0+063.80	9.6m, right	Chapter House diagonal Island	49.36
0+095.55	5.4m, right	Chapter House diagonal Island	49.36
0+113.39	5.0m, right	Chapter House diagonal Island	44.91
0+121.07	27m, left	Chapter House diagonal Island	24.29
0+155.07	26m, left	Chapter House diagonal Island	24.29
0+155.07	9.6m, left	Chapter House diagonal Island	42.03
0+168.22	8.0m, left	Chapter House diagonal Island	24.50
0+187.62	9.6m, left	Chapter House diagonal Island	24.29
0+189.22	7m, right	Chapter House diagonal Island	24.29
		TOTAL:	430.34



PARKING LOT LAYOUT DETAILS
(Scale 1:15)

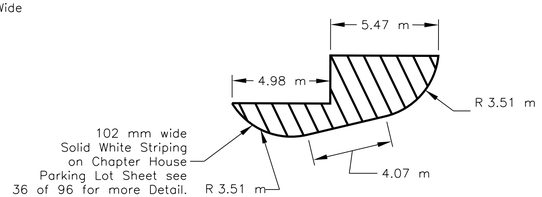


Total Number of Islands= 11

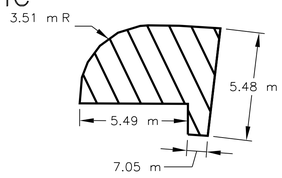
Total Length of Striping per one Island= 21.5m

Pavement Markings, Type "H", Handicap Island Striping, Solid Blue 305mm wide

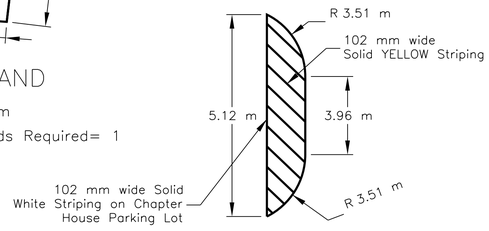
STATION	LOCATION	DESCRIPTION	STRIPING LENGTH (m)
0+175.631	Rt	2.4m wide Island	27.6
0+131.751	Rt	2.4m wide Island	27.6
0+078.683	Rt	2.4m wide Island	27.6
0+061.923	Rt	2.4m wide Island	27.6
0+066.343	Rt	1.5m wide Island	21.5
0+070.303	Rt	1.5m wide Island	21.5
0+074.263	Rt	1.5m wide Island	21.5
0+136.171	Rt	1.5m wide Island	21.5
0+140.131	Rt	1.5m wide Island	21.5
0+144.019	Rt	1.5m wide Island	21.5
0+148.051	Rt	1.5m wide Island	21.5
0+159.331	Rt	1.5m wide Island	21.5
0+163.291	Rt	1.5m wide Island	21.5
0+167.251	Rt	1.5m wide Island	21.5
0+171.211	Rt	1.5m wide Island	21.5
		TOTAL:	346.9



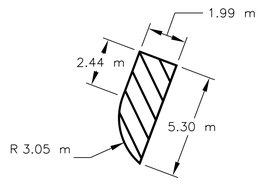
END ISLAND
Total Length of Striping per one Island= 49.4 m
Total Number of Islands Required= 4



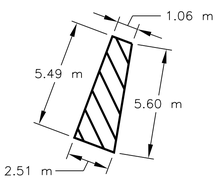
END ISLAND
LENGTH 45.0m
Total Number of Islands Required= 1



END ISLAND
Total Length of Striping per one Island= 42.0m
Total Number of Islands Required= 1



END ISLAND
Total Length of Striping per one Island= 24.5m
Total Number of Islands Required= 1



END ISLAND
Total Length of Striping per one Island= 24.3m
Total Number of Islands Required= 3

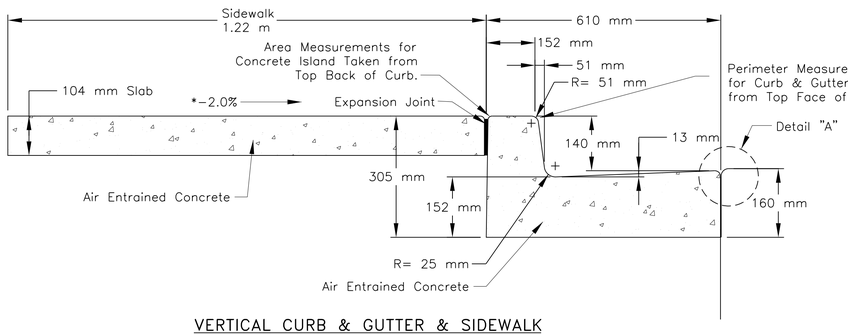
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CHAPTER HOUSE PARKING LOT STRIPING DETAILS

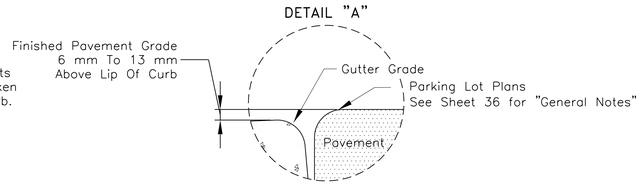
DRAWN BY: NRDOT	DATE: 12/2/2013
DESIGNED BY: NRDOT	DATE: 12/2/2013
REVISED: 6/26/2015	BY: Design 2
Sht_38_Chapter Parking Lot DIA_STRIPING DETAILS072015.dgn	

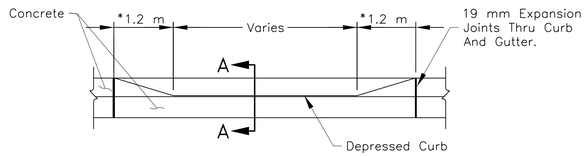
Sht_38_Chapter Parking Lot DIA_STRIPING DETAILS072015.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	39	96
			N6331	N6331(1-2)2&4		
			N21(3A)	N21(3A)2&4		



VERTICAL CURB & GUTTER & SIDEWALK

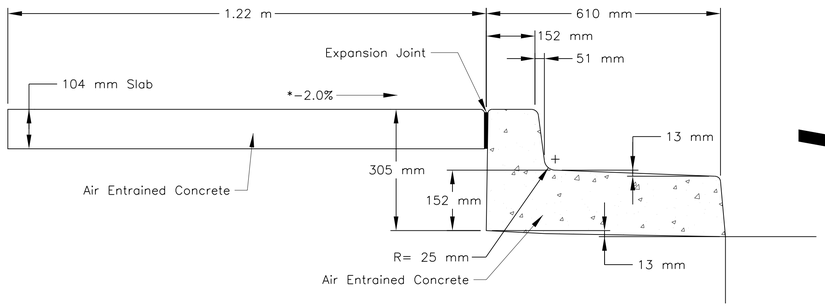




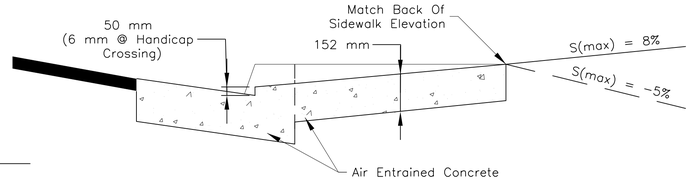
WING-TYPE DRIVEWAY

*2.0 METER @ HANDICAP ACCESS AREAS

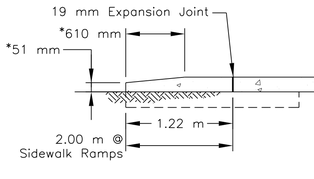
*UNLESS SHOWN OTHERWISE ON DRAWINGS



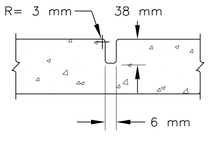
OUT SLOPE GUTTER



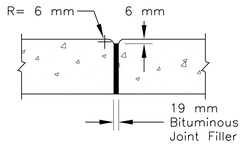
SECTION A-A



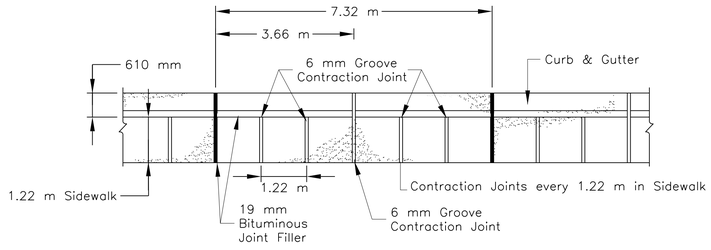
CURB TERMINAL SECTION
(Unless Noted Otherwise On Plans)



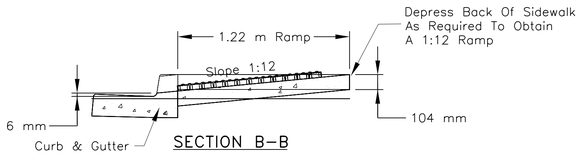
CONTRACTION JOINT



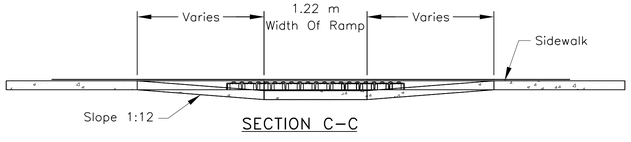
EXPANSION JOINT



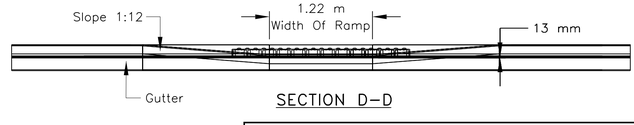
CURB GUTTER & SIDEWALK JOINT DETAIL



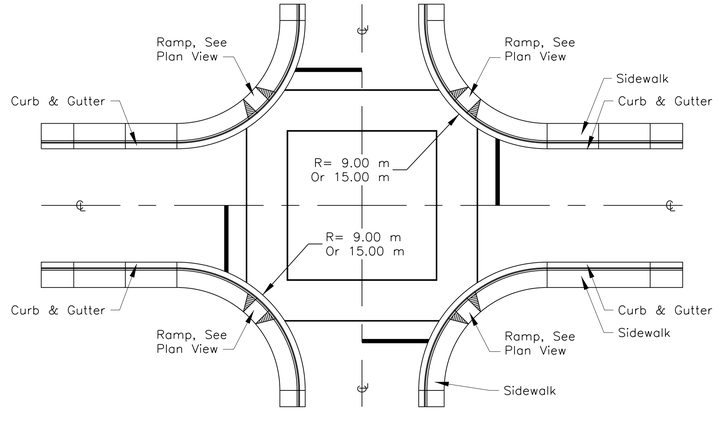
SECTION B-B



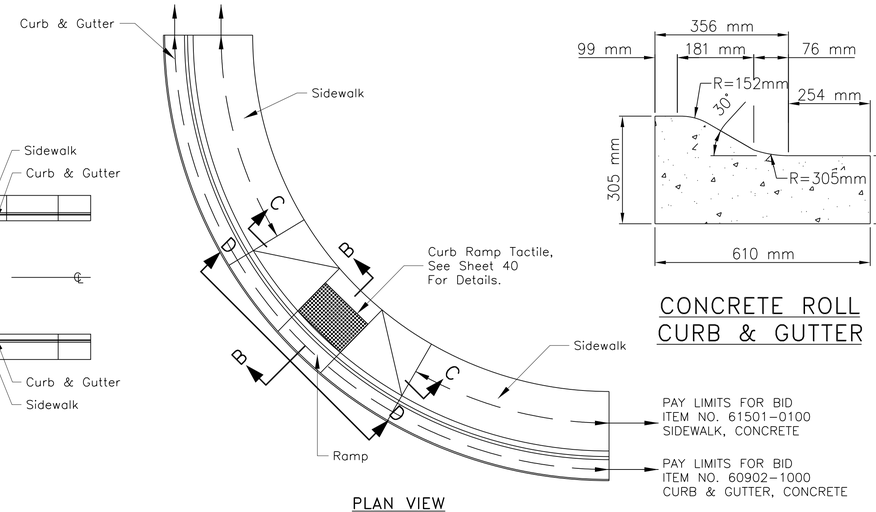
SECTION C-C



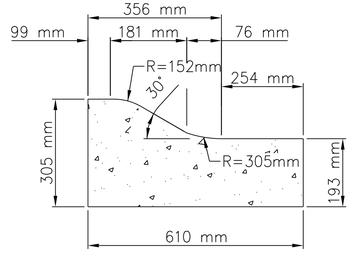
SECTION D-D



TYPICAL HANDICAP RAMP - TYPE I
(@ Street Intersection)



PLAN VIEW



CONCRETE ROLL
CURB & GUTTER

* WHERE CURB TAPERS ARE NEEDED (AS PER COR) TO MATCH SIDEWALKS AND/OR ARE RELATED TO A SIDEWALK RAMP, THE LENGTH OF THE TAPER SHALL BE 2m LONG AND THE TOE OF THE TAPER TO BE FLUSH WITH THE MATCHING SURFACE.

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS FP-03 ALONG WITH ALL SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. ALL CONCRETE TO BE AIR ENTRAINED WITH A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa IN 28 DAYS. ALL CONCRETE SHALL CONFORM TO SECTION 601 "MINOR CONCRETE STRUCTURES" OF THE FP-03.
3. IN NO CASE SHALL ANY BACK FILLING OR PAVING BE ALLOWED UNTIL THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 17.2 MPa.
4. ALL SUBGRADE SOILS IN AREAS WHERE CONCRETE CURB, GUTTER, VALLEY GUTTER, AND SIDEWALK IS BEING PLACED SHALL BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99, METHOD (C). ANY UNSUITABLE SUBGRADE MATERIALS ENCOUNTERED SHALL BE REMOVED AND REPLACED WITH SELECT BACK FILL MATERIAL CONFORMING TO AASHTO (A-2-4) OR BETTER, AS DIRECTED BY THE COR/COTR UNDER BID ITEM 20403-0000.
5. ALL PCC CONCRETE, DEPRESSED CURBS, AND GUTTER FILLET AREAS CONSTRUCTION SHALL BE CONSIDERED INCIDENTAL TO ITEMS 60902-1000 AND 61501-0100.
6. ALL PRE FORM JOINT FILLER SHALL BE IN ACCORDANCE WITH SECTION 712.01(b), BITUMINOUS TYPE OF THE FP-03. THE CONTRACTOR SHALL SUBMIT A PROPOSAL ON THE TYPE OF FILLER AND METHOD OF INSTALLATION TO BE USED FOR REVIEW AND APPROVAL BY THE COR/COTR PRIOR TO INSTALLATION. THIS MATERIAL AND THE INSTALLATION THEREOF SHALL BE CONSIDERED INCIDENTAL TO ITEMS 60902-1000 AND 61501-0100.
7. THE CONTRACTOR WILL BE REQUIRED TO MAKE ANY AND ALL NECESSARY FIELD ADJUSTMENTS IN LOCATION OR LENGTHS TO MATCH FIELD CONDITIONS AS DIRECTED BY THE COR/COTR. THIS WORK SHALL BE INCIDENTAL TO COMPLETION OF THE PROJECT AND NO ADDITIONAL PAYMENT WILL BE MADE.
8. SURFACE TEXTURE OF WHEELCHAIR RAMP, SURFACES NOT COVERED BY TACTILE SHALL BE OBTAINED BY HEAVY BROOMING (TEXTURE DEPTH, 2 mm), TRANSVERSE TO THE SLOPES OF THE RAMP. THIS WORK SHALL BE INCIDENTAL TO ITEM 61505-1000.
9. THE CONTRACTOR WILL BE REQUIRED TO MAKE ANY AND ALL NECESSARY FIELD ADJUSTMENTS TO MATCH FIELD CONDITIONS AS DIRECTED BY THE COR/COTR AFTER THE CURB AND VALLEY GUTTERS ARE FORMED AND PRIOR TO PLACING, THE CONTRACTOR SHALL NOTIFY THE COR/COTR AND ALLOW TIME FOR THE COR/COTR TO CHECK DRAINAGE. IF POSITIVE DRAINAGE IS NOT FOUND, ELEVATIONS SHALL BE ADJUSTED TO ENSURE DRAINAGE AROUND CURB RETURNS AND ALONG CURBS AND VALLEY GUTTERS. THIS WORK SHALL BE INCIDENTAL TO COMPLETION OF THE PROJECT AND NO ADDITIONAL PAYMENT WILL BE MADE.
10. RADII MEASUREMENTS SHOWN TO FACE OF GUTTER AT SIDEWALK AND END ISLANDS.
11. ALL CURB RAMPS SHALL MEET CURRENT AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS, INCLUDING PROVIDING A DETECTABLE WARNING SURFACE TACTILE COMFORMING WITH THE ADA ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES (ADAAG). THIS WORK SHALL BE INCIDENTAL TO ITEM 61505-1000 SEE SHEET 40 FOR DETAILS.

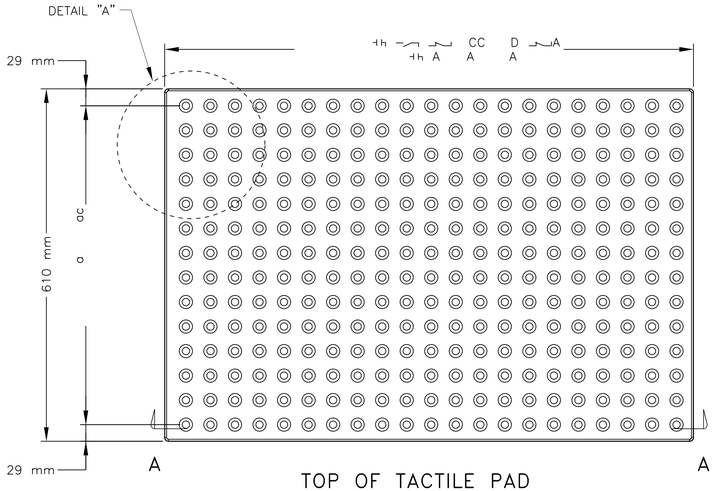
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE CURB, GUTTER AND SIDWALK DETAILS

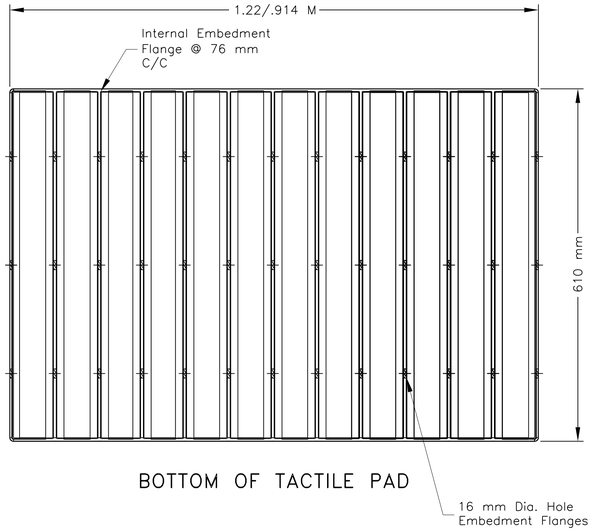
DRAWN BY: NRDOT	DATE: 5/24/2013
DESIGNED BY: NRDOT	DATE: 5/24/2013
REVISED: 8/30/2015	BY: Peter Hodzie
Sht_39_Concrete Curb,Gutter and Sidewalk Details072015.dgn	

Sht_39_Concrete Curb,Gutter and Sidewalk Details072015.dgn

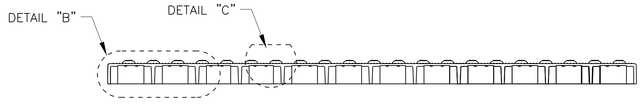
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(1-2)2&4	40	96
			N21(3A)	N21(3A)2&4		



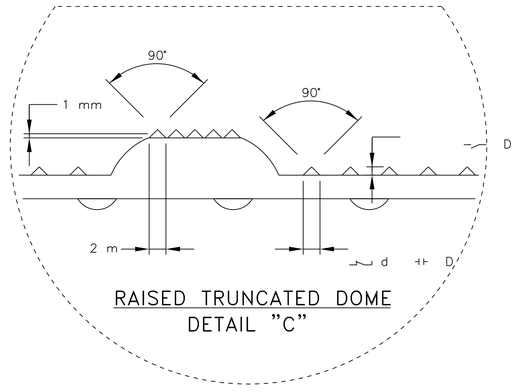
TOP OF TACTILE PAD



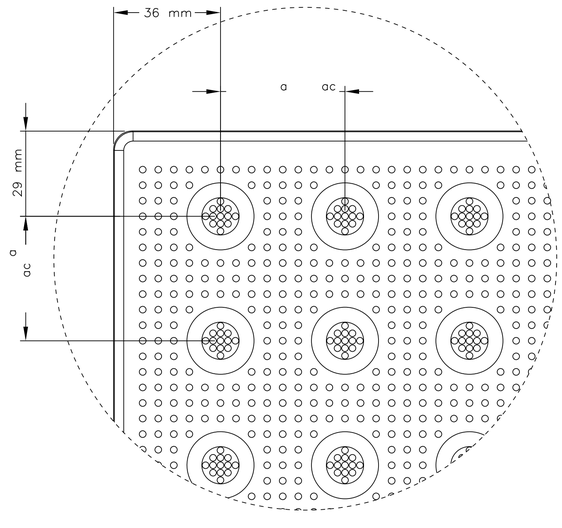
BOTTOM OF TACTILE PAD



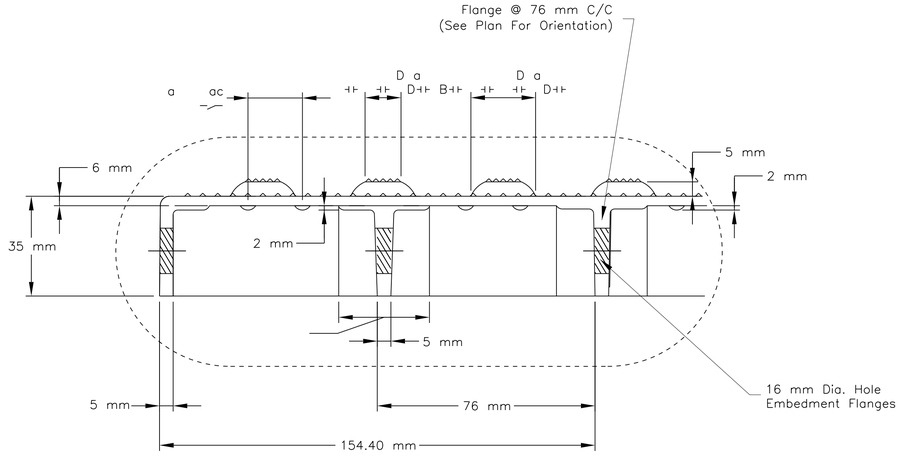
SECTION A-A



RAISED TRUNCATED DOME
DETAIL "C"



RAISED TRUNCATED DOME
PLAN VIEW
DETAIL "A"



SIDE VIEW
DETAIL "B"

GENERAL NOTES

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

2. THE CONTRACTOR SHALL INSTALL YELLOW COLORED CAST-IN-PLACE COMPOSITE TACTILE, AS FOLLOWS:

   a. THE CONCRETE SHALL BE POURED AND FINISHED LEVEL, TRUE AND SMOOTH TO THE REQUIRED DIMENSIONS PRIOR TO THE PLACEMENT OF THE TACTILE UNIT.

   b. PLACE THE TACTILE UNIT 152 – 203mm FROM THE CURB LINE. WORKING IN A GRID PATTERN, TAMP THE TACTILE UNIT INTO THE WET CONCRETE USING A RUBBER MALLET AND A CLEAN SCRAP PIECE OF WOOD. CONTINUE THIS PROCESS UNTIL ALL OF THE AIR HAS BEEN RELEASED, AND THE TACTILE UNIT SURFACE IS FLUSH WITH THE SURROUNDING AREA.

   c. FOLLOWING THE PLACEMENT, THE TACTILE PAD ELEVATION SHOULD BE CHECKED TO THE ADJACENT SURFACE WITH A STRAIGHT EDGE. ANY REQUIRED ADJUSTMENTS MUST BE MADE PRIOR TO THE TIME WHEN THE CONCRETE BEGINS TO SET.

   d. DURING AND AFTER THE TACTILE UNIT INSTALLATION, AS WELL AS THE CONCRETE CURING STAGE, NO WALKING OR EXTERNAL FORCES BE PLACED ON THE TACTILE UNIT. THE AREA MUST BE PROTECTED FROM PEDESTRIAN TRAFF IC UNTIL CONCRETE IS CURED.

3. THE COST OF SUPPLYING ALL MATERIALS AND INSTALLATION OF THE TACTILE UNIT SHALL BE INCLUDED IN THE UNIT PRICE BID UNDER ITEM 61505-1000.

4. THE CONTRACTOR SHALL BE REQUIRED TO MAKE ANY NECESSARY FIELD ADJUSTMENTS TO MATCH IN-PLACED SIDEWALK, CURB AND GUTTER ACTUAL CONDITIONS. THESE FIELD ADJUSTMENTS ARE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.

N6331(1-2) – CROSSWALK LOCATION

STATION	LOCATION:	QUANITY	REMARKS:
0+980.00	Centerline	1	Spur Road "C"
1+124.00	Centerline	1	Spur Road "C"
0+790.00	Centerline	1	N21(3A)Spur "A"
1+179.00	Centerline	1	Spur Road "B"
1+512.00	Centerline	1	Spur Road "B"
	TOTAL:	5	

See Sheet 37 for location of Ramps

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

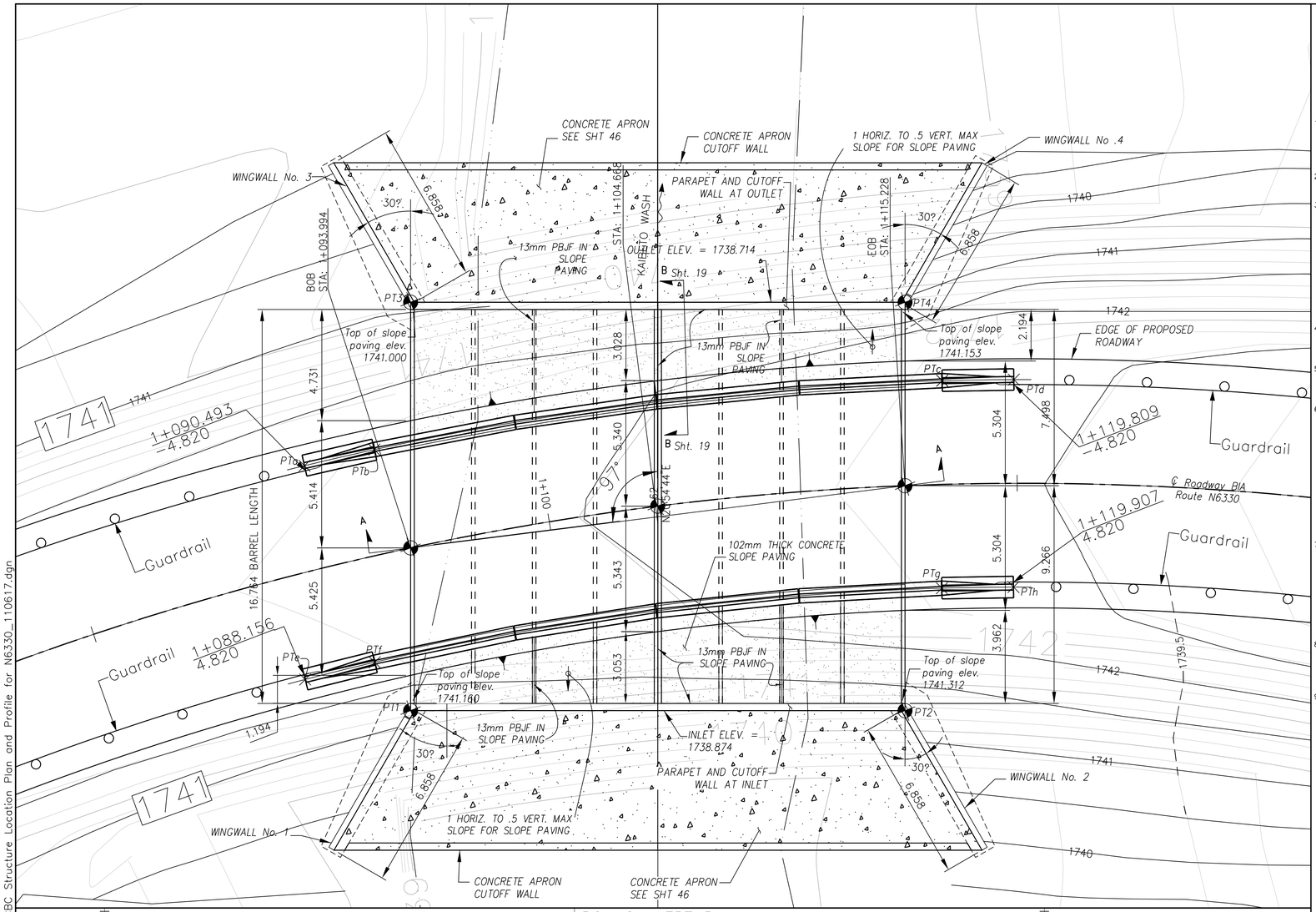
EMBEDMENT PANEL CURB RAMP TACTILE PAD DETAILS

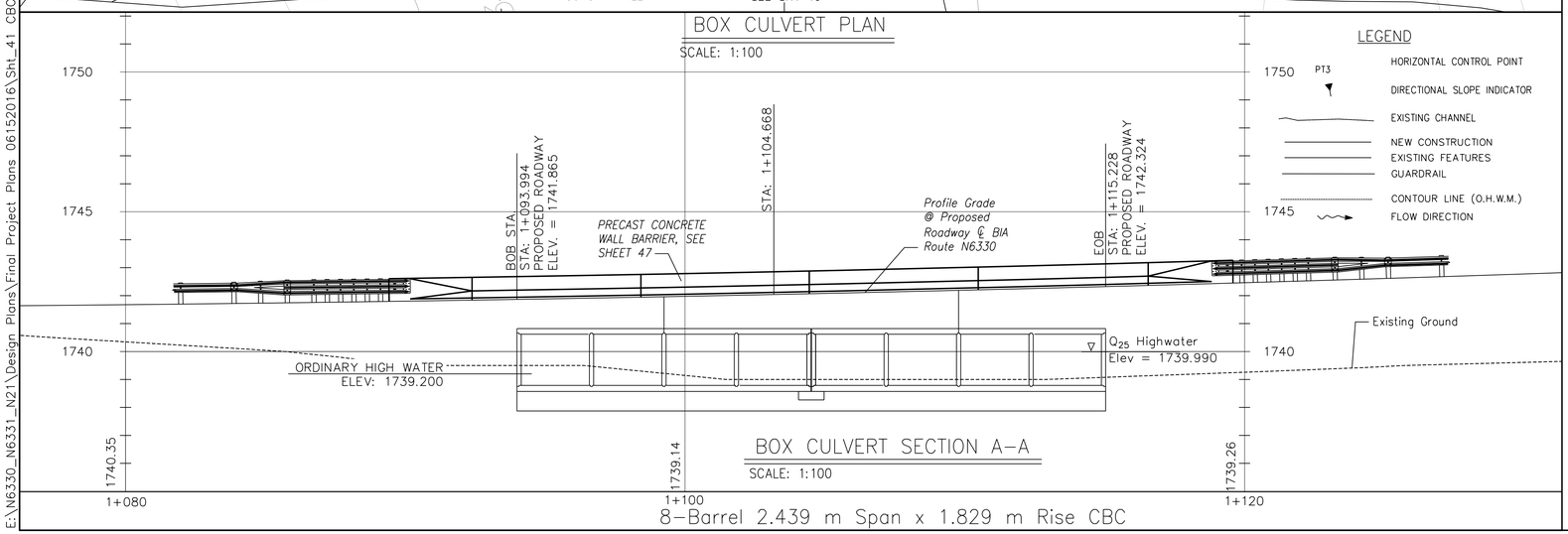
DRAWN BY: NRDOT	DATE: 5/7/2014
DESIGNED BY: NRDOT	DATE: 5/7/2014
REVISED: 2/10/2015	BY: Design 2

Sht_40_Embedment Panel Curb Ramp Tactile Details062915.dgn

Sht_40_Embedment Panel Curb Ramp Tactile Details062915.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330 N6331	N6330(1)1,2&4 N6331(2)2&4	41	96





8-Barrel 2.439 m Span x 1.829 m Rise CBC

N O T E S

1) SPECIFICATIONS: DESIGN:AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES, SEVENTEENTH EDITION, 2002 AND SUBSEQUENT INTERIM SPECIFICITION, CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-03, AND ALL SUBSEQUENT REVISIONS.

2) UNITS: ALL DIMENSIONS ARE IN SI (METRIC) UNITS.

3) CONCRETE: CAST IN PLACE CONCRETE SHALL BE CLASS A(AE) WITH A 28 DAY MINIMUM STRENGTH OF 20.7 MPa. THE AIR CONTENT FOR CLASS A(AE) CONCRETE SHALL NOT BE LESS THAN SPECIFIED IN THE FP-03. CHAMFER EXPOSED CORNERS OF ALL CONCRETE 20 mm UNLESS OTHERWISE SHOWN. ALL CONCRETE SHALL CONTAIN TYPE II PORTLAND CEMENT. THE TIME LIMITS SPECIFIED IN THE FP-03 SHALL APPLY. IF THE CONCRETE CANNOT BE DISCHARGED WITHIN THE SPECIFIED LIMIT, AN ALTERNATE METHOD OF DELIVERY, SUCH AS DRY BATCHING SHALL BE USED OR A SITE BATCHING PLANT CONFORMING TO THE SPECIFICATIONS SHALL BE USED. ALL EXPANSION JOINTS SHALL BE CONSIDERED INCIDENTAL.

4) SEE SHEETS 87-96 FOR ALTERNATE PRECAST BOX DETAILS FOR ALTERNATE BID ITEM 60224-1901.

5) FINISHING CONCRETE SURFACES: ALL SURFACE CONCRETE SHALL BE GIVEN A CLASS 1 ORDINARY FINISH.

6) REINFORCED CONCRETE: ALL REINFORCING STEEL SHALL CONFORM TO AASHTO M 31M, GRADE 420 UNLESS A DIFFERENT GRADE IS SPECIFIED. THE MINIMUM COVER OF ANY REINFORCING STEEL SHALL BE 50mm UNLESS OTHERWISE SPECIFIED. DIMENSIONS SHOWN REFER TO THE CENTERLINE OR BARS UNLESS NOTED OTHERWISE. LENGTHS OF REINFORCING STEEL BARS SHOWN INCLUDE REQUIRED SPLICE LENGTHS FOR SPLICES SHOWN. ANY ADDITIONAL SPLICES NOT SHOWN IN THE PLANS SHALL BE REQUESTED FOR APPROVAL BY THE CONTRACTOR AND SHALL NOT BE UTILIZED UNTIL WRITTEN APPROVAL IS GRANTED BY THE CONTRACTING OFFICER (CO). ADDITIONAL REINFORCING STEEL QUANTITIES REQUIRED FOR ADDITIONAL SPLICES NOT SHOWN IN THE PLANS SHALL NOT BE PAID FOR.

7) REMOVAL OF EXISTING STRUCTURE AND OBSTRUCTIONS: THE CONTRACTOR SHALL STOCKPILE SALVAGEABLE MATERIALS DETERMINED BY THE COR WITHIN THE PROJECT LIMITS FOR REMOVAL. ALL OTHER MATERIALS SHALL BE REMOVED FROM THE PROJECT SITE IN ACCORDANCE WITH THE SPECIFICATIONS. REMOVE EXISTING BRIDGE N310 FOUNDATIONS AND SUPERSTRUCTURE WITHIN THE, ONE (1)m BELOW THE FINAL FLOW LINE ELEVATION at Sta. 36+157.000 (RIGHT) ON N6331(2); AND DISPOSE OF IN ACCORDANCE WITH SEC. 203.

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

9) CONCRETE BOX CULVERT: PAYMENT FOR CONCRETE BOX CULVERT SHALL BE MADE UNDER BID ITEM 60224-1900 UNLESS THE CONTRACTOR CHOOSES TO BID ON THE PRE-CAST ALTERNATE UNDER BID ITEM 60224-1901. THE COST OF WINGWALLS AND REINFORCING STEEL IN THE BOX CULVERTS AND WINGWALLS IS INCIDENTAL TO BOTH BID ITEMS 60224-1900 & 1901.

10) FOUNDATION FILL THE CONCRETE BOX CULVERT AND WINGWALLS SHALL BE PLACED ON A MINIMUM of 610mm OF FOUNDATION FILL(UNDER BID ITEM 20802-0000). FOUNDATION FILL SHALL COMPLY WITH SECTION 208 OF FP-03. FOUNDATION FILL FOR THE BOX CULVERT SHALL EXTEND TO THE EDGE OF CULVERT. FOUNDATION FILL FOR THE WINGWALLS SHALL EXTEND 450mm BEYOND THE EDGES OF THE WINGWALLS FOOTING. EXCAVATED MATERIALS MAY BE USED AS UNCLASSIFIED BORROW PROVIDED SUCH MATERIAL MEETS THE REQUIREMENTS OF THE SPECIFICATIONS.

11) CONCRETE APRONS PAYMENT FOR CONCRETE APRONS SHALL BE INCLUDED IN BID ITEM NUMBER 60224-1901. FOUNDATION PREPARATION FOR THE CONCRETE APRON AND WINGWALLS SHALL COMPLY WITH SECTION 209 OF FP-03.

12) CONCRETE SLOPE PAVING: SHALL BE 102mm THICK MINIMUM AND REINFORCED WITH 152 X 152 -MW26 X MW26 WELDED WIRE FABRIC (WWF) THAT IS CENTERED IN THE SLOPE PAVING. WELDED FABRIC SHALL BE FURNISHED IN MATS. ROLLS OF WWF ARE NOT PERMITTED. PAYMENT FOR CONCRETE SLOPE PAVING SHALL BE MADE UNDER BID ITEM NUMBER 61601-1000. WELDED WIRE BABRIC IS INCIDENTAL TO THIS BID ITEM.

13) CONCRETE WALL BARRIERS: FABRICATE (PRE-CAST) OR CAST IN PLACE. CONTRACTOR SHALL SUBMIT HIS PROPOSED WALL BARRIER (JERSEY BARRIER) DESIGN AND LAYOUT TO THE COR/COTR FOR REVIEW AND APPROVAL PRIOR TO ORDERING MATERIAL. SEE TYPICAL BARRIER ON SHEET 47 FOR DESIGN LAYOUT. THE CONTRACTOR IS FREE TO SUBMIT OTHER DESIGNS FOR APPROVAL AND SHALL INCLUDE DESIGN OF LIFTING ANCHORS, ANY ADDITIONAL REINFORCING STEEL NECESSARY TO SUIT LIFTING AND HANDLING OF THE PRECAST BARRIERS AND WALL BARRIERS CONNECTIONS.

14) CONCRETE WALL BARRIERS ON ROUTE N6330 ABOVE THE CONCRETE BOX CULVERT SHALL BE PLACED ON CHORDS TO AN ARC HAVING RADII OF 129.413m AND 120.587m

15) PAYMENT FOR CONCRETE WALL BARRIERS AND CAST-IN-PLACE CONCRETE TRANSITIONS FROM WALL BARRIER TO THRIE BEAM GUARDRAIL SHALL BE PAID BY THE LINEAR METER UNDER BID ITEM 61801-0000. THE COST OF ALL REINFORCING STEEL, INSERTS AND CONNECTIONS ASSOCIATED WITH THESE ITEM ARE CONSIDERED INCIDENTAL.

a. SEE SHT 44 FOR CAST IN PLACE CONCRETE BOX CULVERT DETAILS. (SEE SHEETS 89-96 FOR PRECAST BOX DETAILS)

b. SEE SHEET 45 FOR CAST IN PLACE WINGWALL DETAILS. (SEE SHEETS 94 FOR PRECAST WINGWALL DETAILS)

c. SEE SHT 47 FOR CONCRETE WALL BARRIER TRANSITION TO THRIE BEAM.

d. SEE SHT 68-74 FOR GUARDRAIL DETAILS.

POINT TABLE					
POINT No.	NORTHING	EASTING	ELEVATION	STATION	OFFSET
PT1	622325.196	288788.559		1+092.467	6.763 Rt.
PT2	622317.685	288808.217		1+114.812	9.563 Rt.
PT3	622341.426	288794.760		1+096.008	10.238 Lt.
PT4	622333.914	288814.418		1+115.524	7.797 Lt.
PTa	622336.541	288788.059	1741.726	1+090.430	4.413Lt.
PTb	622336.121	288791.077	1741.773	1+093.374	4.413 Lt.
PTc	622330.235	288814.705	1742.293	1+116.929	4.413 Lt.
PTd	622329.189	288817.569	1742.376	1+119.872	4.413 Lt.
PTe	622328.033	288784.840	1741.694	1+088.232	4.413 Rt.
PTf	622327.665	288787.866	1741.741	1+091.392	4.413 Rt.
PTg	622321.991	288811.541	1742.286	1+116.671	4.413 Rt.
PTh	622320.949	288814.405	1742.375	1+119.831	4.413 Rt.

HYDRAULIC DATA

WATERWAY KAIBETO WASH
DRAINAGE AREA 97.3 km²
25 YEAR FLOW RATE 60 m³/s
HW ELEV. 1739.99
VELOCITY 1.0 m/s
MAX SCOUR DEPTH 0.05 m
FREEBOARD 710 mm

500 YEAR FLOW RATE 200 m³/s
HW ELEV. 1742.34
VELOCITY 1.0 m/s
MAX SCOUR DEPTH 0.20 m
FREEBOARD -1.64 m

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

CBC STRUCTURE LOCATION PLAN & PROFILE

DRAWN BY: WHPacific DATE: 7/20/2015
DESIGNED BY: NRDOT DATE: 7/20/2015
REVISED: 11/14/2017 BY: Design 2

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_41 CBC Structure Location Plan and Profile for N6330_110617.dgn

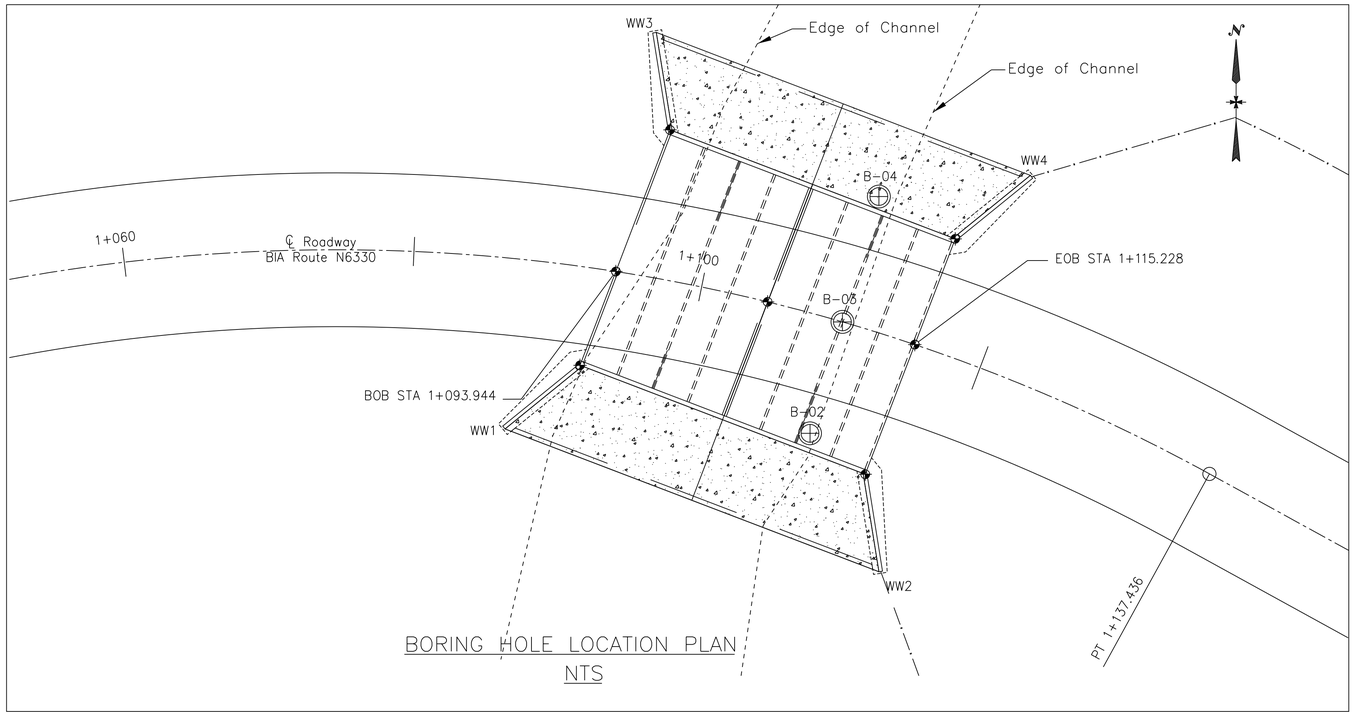
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	42	96

NOTE:
INFORMATION CONTAINED IN THE BORING LOGS ON THIS SHEET IS MADE AVAILABLE TO PROSPECTIVE BIDDERS FOR INFORMATIONAL PURPOSES ONLY. THIS INFORMATION WAS DEVELOPED AS ACCURATELY AS POSSIBLE BY THE METHODS USED. THE GOVERNMENT ACCEPTS NO RESPONSIBILITY FOR ANY CONDITIONS ENCOUNTERED WHICH MAY BE AT VARIANCE FROM THE INFORMATION CONTAINED HEREIN.

BORE HOLE LOCATION		
B-02	STA 1+110	8 m Rt.
B-03	STA 1+110	℄
B-04	STA 1+110	9 m Lt.

LEGEND

⊕ BORE HOLE LOCATION



BORING HOLE LOCATION PLAN
NTS

LOG OF BORING NO. B-02 Page 1 of 2

CLIENT: ASCG, Inc.
SITE: Kaibeto, Arizona
PROJECT: N310 Kaibeto

Boring Location: STA 1+110, R 8 meters

GRAPHIC LOG	DESCRIPTION	DEPTH, m.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, m.	SAMPLES SPT - N BLOWS / 0.3m.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT kN/m3	TESTS UNCONFINED STRENGTH, kPa
	Approx. Surface Elev.: 1740 m									
	POORLY GRADED SAND with silt and gravel; brown, very dense		SP SM	1	SS	0.41	68/.28	6		
	1.2 1738.8	1								
	SILTY SAND; white, very dense (Weathered Sandstone)		SM	2	SS	0.03	50/.03	3		
		2								
			SM	3	SS	0.03	50/.03	12		
	3.8 1736.2	3								
	SILTY SAND; white to light brown, very dense (Weathered Sandstone)		SM	4	SS	0.03	50/.08	11		
		4								
			SM	5	SS	0.05	50/.13	22		
		5								
			SM	6	SS	0.08	50/.08	20		
	8.4 1731.6	6								
	SILTY SAND; red brown, very dense (Weathered Sandstone)									
	Continued Next Page	7								
		8								
		9								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, m
WL ▽ 5.2 WD ▼
WL ▽ ▽
WL

Terracon

BORING STARTED 05-08-07
BORING COMPLETED 05-08-07
RIG CME-75 FOREMAN MD
APPROVED KJS JOB # 66045049D

BORSHEET_89 66045049.GPJ TERRACON.GDT 07/24/07

LOG OF BORING NO. B-02 Page 2 of 2

CLIENT: ASCG, Inc.
SITE: Kaibeto, Arizona
PROJECT: N310 Kaibeto

GRAPHIC LOG	DESCRIPTION	DEPTH, m.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, m.	SAMPLES SPT - N BLOWS / 0.3m.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT kN/m3	TESTS UNCONFINED STRENGTH, kPa
	SILTY SAND; red brown, very dense (Weathered Sandstone)		SM	7	SS	0.05	50/.05	15		
	9.9 1730.1	10								
	SILTY SAND; white to light brown, very dense (Weathered Sandstone)		SM	8	SS	0.08	50/.08	24		
	11.1 1728.9	11								
	Boring Terminated at 36.5 Feet.									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, m
WL ▽ 5.2 WD ▼
WL ▽ ▽
WL

Terracon

BORING STARTED 05-08-07
BORING COMPLETED 05-08-07
RIG CME-75 FOREMAN MD
APPROVED KJS JOB # 66045049D

BORSHEET_89 66045049.GPJ TERRACON.GDT 07/24/07

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

BORING HOLE LOCATION PLAN AND BORING LOGS

Designed by:	Terracon
Drawn by:	Terracon Date: 5/08/2007
Revised by:	NRDOT Date: 7/06/2015
File Name:	Sht_40 Rev_N6330-N310 Boring Logs

Sht_42 Boring Hole Location Plan and Boring Logs 072015.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	43	96

LOG OF BORING NO. B-03

Page 1 of 2

CLIENT: ASCG, Inc.

SITE: Kaibeto, Arizona

PROJECT: N310 Kaibeto

Boring Location: STA 1+110, centerline

Approx. Surface Elev.: 1740 m

GRAPHIC LOG	DESCRIPTION	DEPTH, m.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, m.	SAMPLES SPT - N BLOWS / 0.3m.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT kN/m3	TESTS UNCONFINED STRENGTH, kPa
	POORLY GRADED SAND with silt and gravel; brown, medium dense to very dense	0	SP SM	1	SS	0.46	12	7		
	2 1738	1								
	SILTY SAND; white, very dense (Weathered Sandstone)	2	SP SM	2	SS	0.08	50/.1	5		
	▽	3	SM	3	SS	0.05	50/.05	10		
	5.3 1734.7	4	SM	4	SS	0.05	50/.05	21		
	SILTY SAND; light brown, very dense (Weathered Sandstone)	5	SM	5	SS	0.08	50/.08	21		
	8.4 1731.6	6	SM	6	SS	0.05	50/.05	21		
	SILTY SAND; white, very dense (Weathered Sandstone)	7								
	Continued Next Page	8								
		9								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, m			
WL ▽	4.6	WD ▽	
WL ▽		▽	
WL			

Terracon

BORING STARTED	05-08-07		
BORING COMPLETED	05-08-07		
RIG	CME-75	FOREMAN	MD
APPROVED	KJS	JOB #	660450490

BOREHOLE_99 660450490.GPJ TERRACON.GDT 07/24/07

LOG OF BORING NO. B-03

Page 2 of 2

CLIENT: ASCG, Inc.

SITE: Kaibeto, Arizona

PROJECT: N310 Kaibeto

GRAPHIC LOG	DESCRIPTION	DEPTH, m.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, m.	SAMPLES SPT - N BLOWS / 0.3m.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT kN/m3	TESTS UNCONFINED STRENGTH, kPa
	SILTY SAND; white, very dense (Weathered Sandstone)	9	SM	7	SS	0.03	50/.03	20		
	9.9 1730.1	10								
	SILTY SAND; red brown, very dense (Weathered Sandstone)	11	SM	8	SS	0.03	50/.03	12		
	11.1 1728.9									
	Boring Terminated at 36.5 Feet.									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, m			
WL ▽	4.6	WD ▽	
WL ▽		▽	
WL			

Terracon

BORING STARTED	05-08-07		
BORING COMPLETED	05-08-07		
RIG	CME-75	FOREMAN	MD
APPROVED	KJS	JOB #	660450490

BOREHOLE_99 660450490.GPJ TERRACON.GDT 07/24/07

LOG OF BORING NO. B-04

Page 1 of 2

CLIENT: ASCG, Inc.

SITE: Kaibeto, Arizona

PROJECT: N310 Kaibeto

Boring Location: STA 1+110, L 9 meters

Approx. Surface Elev.: 1740 m

GRAPHIC LOG	DESCRIPTION	DEPTH, m.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, m.	SAMPLES SPT - N BLOWS / 0.3m.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT kN/m3	TESTS UNCONFINED STRENGTH, kPa
	POORLY GRADED SAND with silt and gravel; brown, medium dense to very dense	0	SP SM	1	SS	0.41	15	5		
	2 1738	1								
	SILTY SAND; white, very dense (Weathered Sandstone)	2	SP SM	2	SS	0.03	50/.03	5		
	▽	3	SM	3	SS	0.08	50/.08	7		
		4	SM	4	SS	0.05	50/.05	16		
	5.3 1734.7	5								
	SILTY SAND; white to red, very dense (Weathered Snadstone)	6	SP SM	5	SS	0.1	50/.1	22		
	6.9 1733.1	7								
	POORLY GRADED SAND with silt; light brown, very dense (Weathered Sandstone)	8	SM	6	SS	0.05	50/.08	24		
	Continued Next Page	9								

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, m			
WL ▽	4.6	WD ▽	
WL ▽		▽	
WL			

Terracon

BORING STARTED	05-08-07		
BORING COMPLETED	05-08-07		
RIG	CME-75	FOREMAN	MD
APPROVED	KJS	JOB #	660450490

BOREHOLE_99 660450490.GPJ TERRACON.GDT 07/24/07

LOG OF BORING NO. B-04

Page 2 of 2

CLIENT: ASCG, Inc.

SITE: Kaibeto, Arizona

PROJECT: N310 Kaibeto

GRAPHIC LOG	DESCRIPTION	DEPTH, m.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, m.	SAMPLES SPT - N BLOWS / 0.3m.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT kN/m3	TESTS UNCONFINED STRENGTH, kPa
	POORLY GRADED SAND with silt; light brown, very dense (Weathered Sandstone)	9	SM	7	SS	0.08	50/.08	14		
	11.1 1728.9	10								
	Boring Terminated at 36.5 Feet.	11	SM	8	SS	0.08	50/.08	11		

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, m			
WL ▽	4.6	WD ▽	
WL ▽		▽	
WL			

Terracon

BORING STARTED	05-08-07		
BORING COMPLETED	05-08-07		
RIG	CME-75	FOREMAN	MD
APPROVED	KJS	JOB #	660450490

NOTE:
INFORMATION CONTAINED IN THE BORING LOGS ON THIS SHEET IS MADE AVAILABLE TO PROSPECTIVE BIDDERS FOR INFORMATIONAL PURPOSES ONLY. THIS INFORMATION WAS DEVELOPED AS ACCURATELY AS POSSIBLE BY THE METHODS USED. THE GOVERNMENT ACCEPTS NO RESPONSIBILITY FOR ANY CONDITIONS ENCOUNTERED WHICH MAY BE AT VARIANCE FROM THE INFORMATION CONTAINED HEREIN.

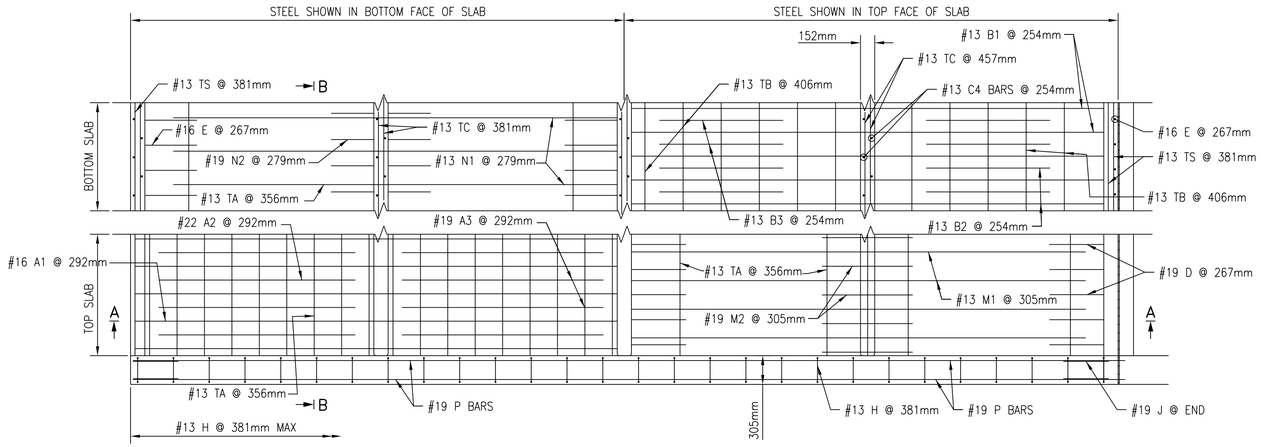
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

BORING LOGS

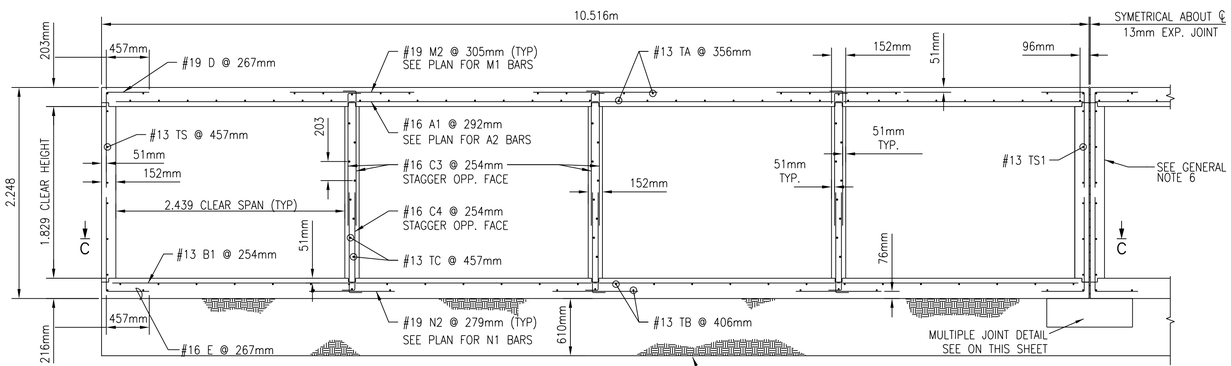
Designed by: Terracon	
Drawn by:	Date: 06-07
Revised by: 6/15	Date:
File Name: Drawing S-2	

Plot Date: 7/24/2007 11:48:37 AM

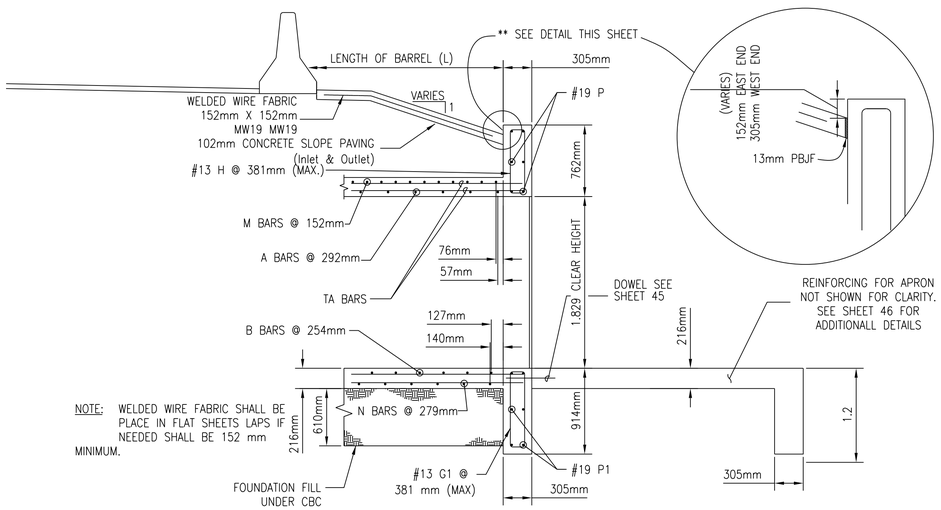
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	44	96



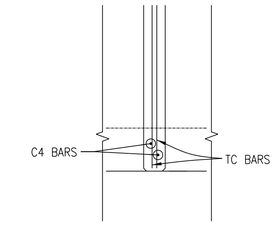
PART PLAN AND PART SECTION C–C



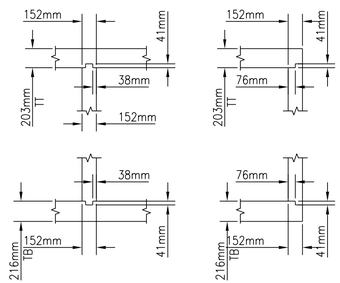
SECTION A–A



PART SECTION B–B



SECTION D–D

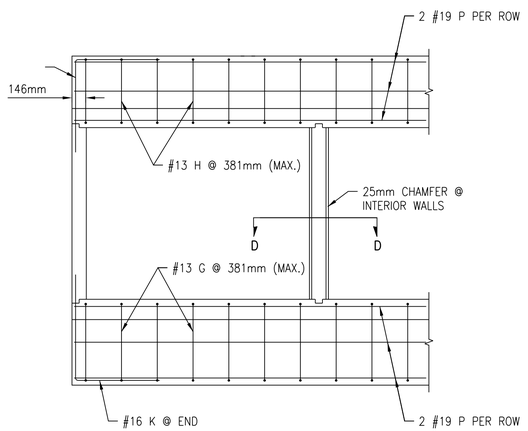


CONSTRUCTION JOINT DETAIL

** ESTIMATED QUANTITIES
FOR ONE QUADRUPLE OPENING

PER LINEAL METER OF BARREL		AT ONE ENDL	
REINFORCING STEEL - KG PER M	CONCRETE CU METERS PER M	REINFORCING STEEL - KG PER M	CONCRETE CU METERS
664.6	5.80	467.8	5.80

** FOR CONTRACTOR'S INFORMATION ONLY



PART END ELEVATION

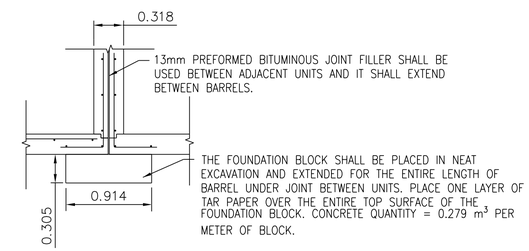
GENERAL NOTES

1. WHEN NECESSARY, "T" BARS MAY BE SPLICED BY LAPPING AT LEAST 20 BAR DIAMETERS. PAY WEIGHT FOR REINFORCING STEEL DOES NOT INCLUDE SPLICES. THE COST OF THE SPLICE MATERIAL IS NOT TO BE INCLUDED IN THE UNIT PRICE BID FOR REINFORCING STEEL.
2. PLACE "TA" BARS ON "A" BARS AND "TB" BARS UNDER "B" BARS, SPACED AS SHOWN IN THE TABLE. THE REMAINING "TA" BARS, AND "TB" BARS ARE TO BE PLACED ADJACENT TO THE "D", "E", "M", AND "N" BARS AS INDICATED IN SECTION "A–A", AT 610 MM MAX.
3. PLACE "TS" BARS NEXT TO "C1" BARS, SPACED AS SHOWN IN THE TABLE. THE REMAINING "TS" BARS SHALL BE PLACED IN SIDEWALL NEXT TO "C2", "D", AND "E" BARS. WHEN "C1" BARS ARE NOT REQUIRED, PLACE ALL "TS" BARS NEXT TO "C2", "D", AND "E" BARS.
4. PLACE "A1", "A3", "B1", "B3", "M1", AND "N1" BARS SYMMETRICAL TO THE CENTERLINE OF THE BOX. PLACE "M2" AND "N2" BARS SYMMETRICAL TO THE CENTERLINE OF THE WALLS.
5. "COVER" IS HEIGHT OF FILL FROM THE TOP OF THE BOX TO FINISH GRADE.
6. CONTRACTOR MAY EXTEND WALL TIES FROM ONE WALL THROUGH THE EXPANSION JOINT TO THE ADJACENT WALL TO FACILITATE FORM WORK INSTALLATION.
7. EXCAVATION AND FOUNDATION FILL SHALL CONFORM TO SECTION 208 OF FP 03. SUB EXCAVATE 610mm OF CHANNEL UNDER BID ITEM 20402-0000 FOR BOX STRUCTURE AND FOUNDATION FILL UNDER BID ITEM 20802-0000.
8. WHERE THE CONCRETE BLANKET CANNOT BE INSTALLED DUE TO SHALLOW DEPTH OF COVER OVER THE BOX STURTURE, OR THE PARAPET HEIGHT IS ABOVE THE AGGREGATE HINGE POINT, THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE PARAPET WALL HEIGHT TO 305mm, AND SHALL INSTALL TWO (2) ADDITIONAL #13M REBAR ON THE TOP WALL ACROSS THE ENTIRE LENGTH OF THE BOX STRUCTURE. THIS WORK WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.

NOTE: PBJF=PREMOLDED BITUMINOUS JOINT FILLER

CAST IN PLACE DESIGN DATA

DESIGN ACCORDING TO AASHTO SPECIFICATIONS.
LIVE LOAD: M18.
WEIGHT OF FILL ON TOP OF BOX: 1346 kg/m³ HORIZONTAL EARTH PRESSURE: 480 kg/m³, 610mm SURCHARGE
CONCRETE DESIGN STRESSES: f'c = 20.7 MPa



JOINT DETAIL FOR MULTIPLE UNIT BOXES

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

CAST IN PLACE 8 BARREL CONCRETE BOX CULVERT DETAILS

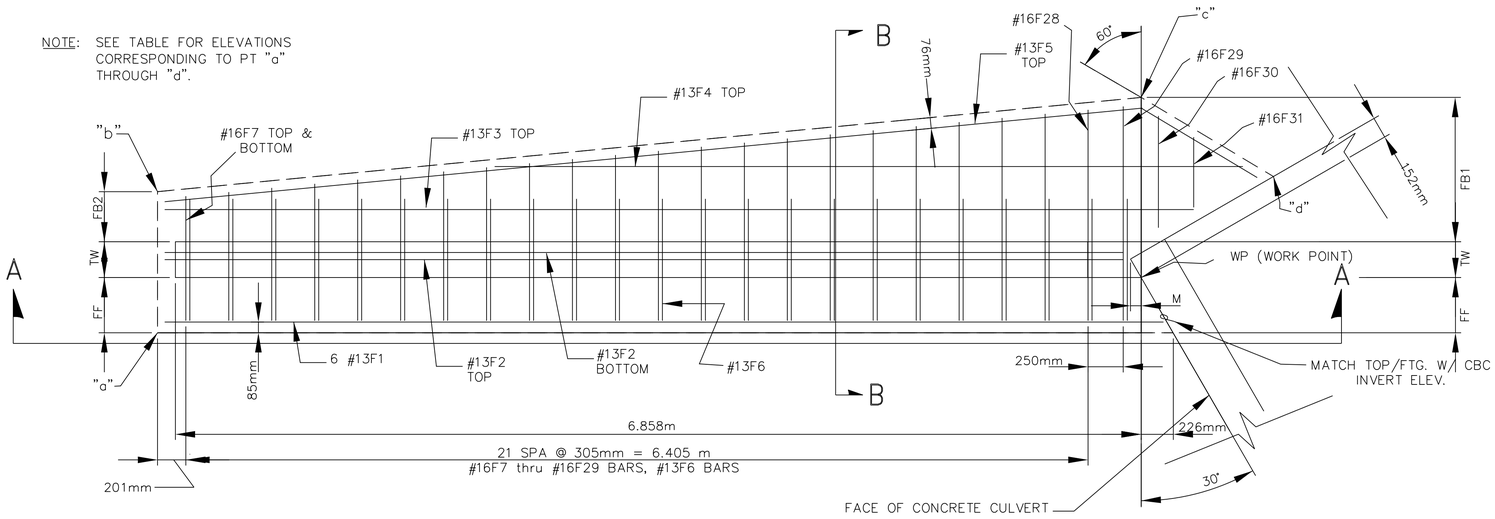
Designed by: Terracon	
Drawn by:	Date: 06-07
Revised by: NRODOT	Date: 07/20/15
File Name: Drawing S-2	

SCALE=1:30

Sht_44 N6330&BR310_CIP Concrete Box Culvert Quad 072015.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	45	96

NOTE: SEE TABLE FOR ELEVATIONS CORRESPONDING TO PT "a" THROUGH "d".

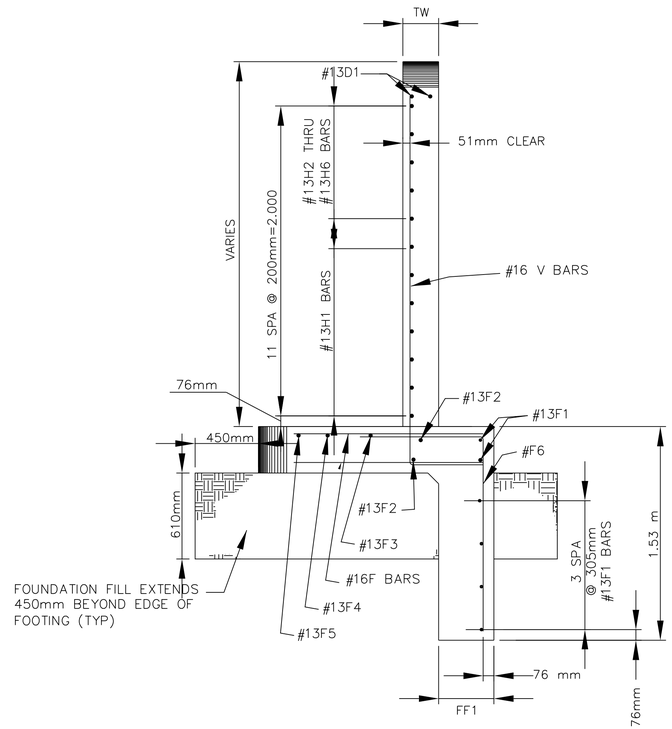


WINGWALL PLAN

SCALE=1:20

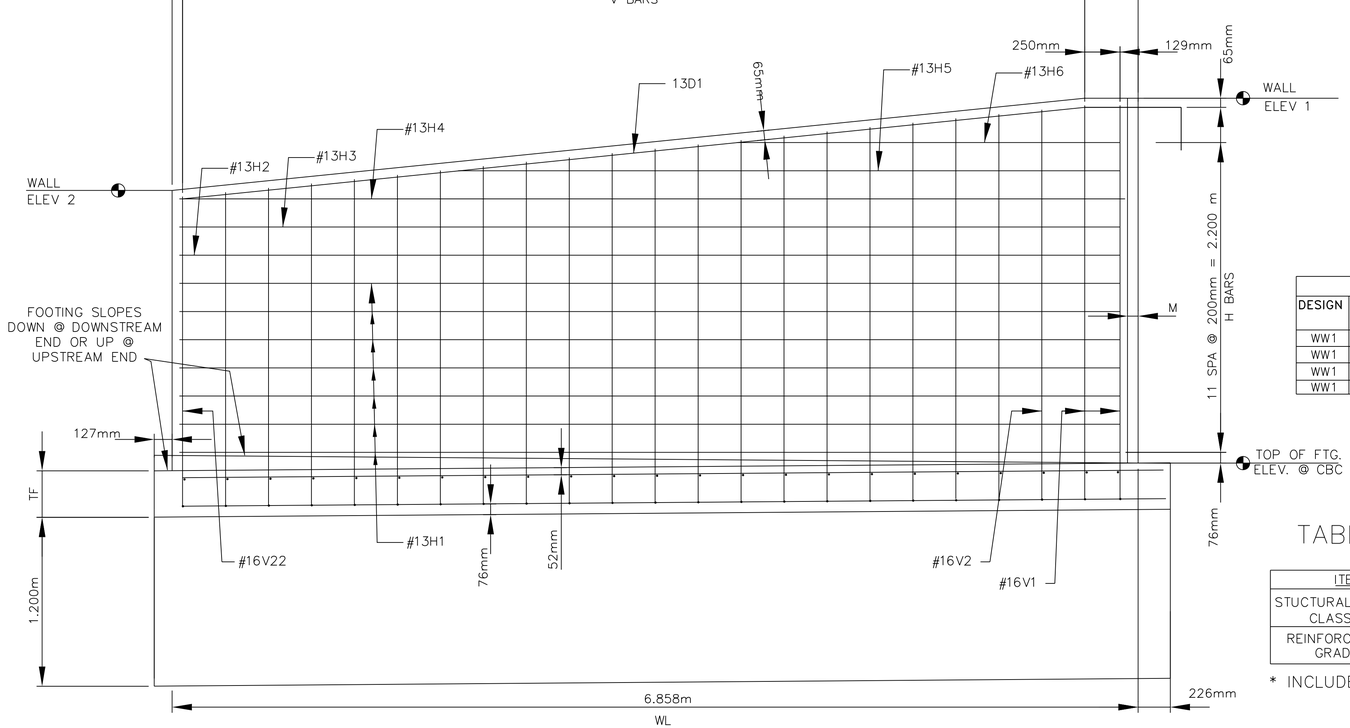
NOTE: EXCAVATION AND FOUNDATION FILL FOR THE WINGWALL SHALL CONFORM TO SECTION 208 OF FP-03.

SEE SHEET 41 & 46 FOR ADDITIONAL DETAILS



WINGWALL SECTION B-B

SCALE=1:20



WINGWALL SECTION A-A

SCALE=1:20

TABLE OF WINGWALL DIMENSIONS AND ELEVATIONS

DESIGN	WL (m)	FF (mm)	FB1 (m)	FB2 (mm)	TW (mm)	M (mm)	TF (mm)	T.O. Ftg Elev @ CBC	T.O. Ftg Elev "a"	T.O. Ftg Elev "b"	T.O. Ftg Elev "c"	T.O. Ftg Elev "d"	wall Elev 1	Wall Elev 2
WW1	6.858	392.00	1.025	356	254	76	330	1738.874	1738.932	1738.927	1738.868	1738.863	1741.465	1740.810
WW1	6.858	392.00	1.025	356	254	76	330	1738.874	1738.932	1738.927	1738.868	1738.863	1741.465	1740.310
WW1	6.858	392.00	1.025	356	254	76	330	1738.714	1738.656	1738.661	1738.720	1738.725	1741.305	1740.650
WW1	6.858	392.00	1.025	356	254	76	330	1738.714	1738.656	1738.661	1738.720	1738.725	1741.305	1740.150

TABLE OF WINGWALL QUANTITIES

ITEM	UNIT	WW1	WW2	WW3	WW4
STUCTURAL CONCRETE, CLASS A(AE)	m^3	10.53	10.12	10.62	10.17
REINFORCING BARS, GRADE 420	kg	366.8	350.4	368.8	352.4

* INCLUDES WINGWALL, FOOTING, AND CUTOFF WALL.

NOTE: CONSTRUCTION OF WINGWALLS, CUTOFF WALLS, APRONS, CONCRETE, REBAR, HEADWALLS, AND INCIDENTALS SHALL BE INCLUDED IN THE UNIT BID PRICE FOR BID ITEM 60224-1900 .

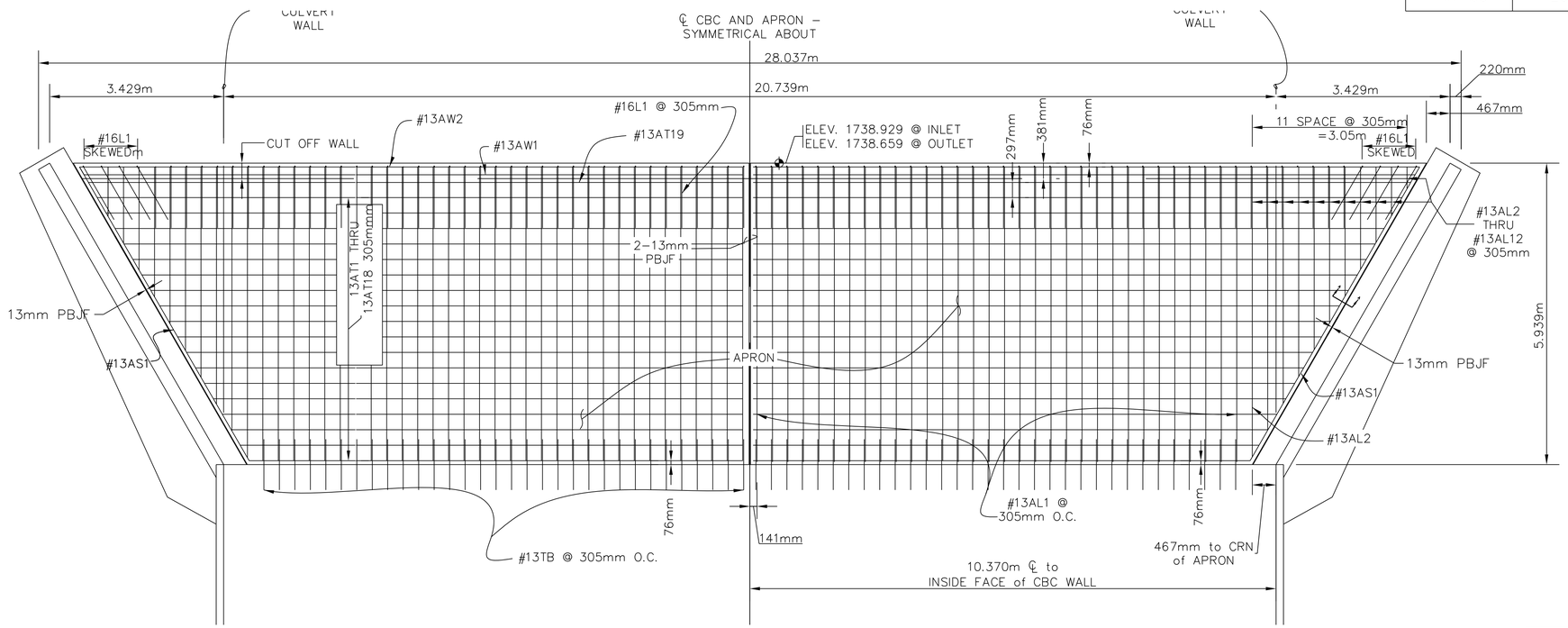
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BOX WINGWALL DETAILS

DRAWN BY: NRDOT	DATE: 7/20/2015
DESIGNED BY: NRDOT	DATE: 7/20/2015
REVISED: 7/20/2015	BY: Design 2
Sht_45 Concrete Box Wingwall Details 072015.dgn	

Sht_45 Concrete Box Wingwall Details 072015.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	46	96



CONCRETE APRON DETAIL (TYP)

SCALE: 1:50

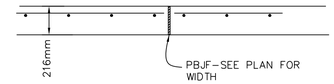
** QUANTITIES FOR ONE APRON		
REINFORCING BAR GRADE 420	1659.86	kg
STRUCTURAL CONCRETE CLASS A(AE)	37.75	m^3

** FOR CONTRACTORS INFORMATION ONLY

NOTES:

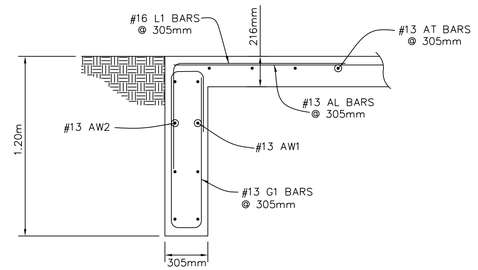
1. EXCAVATION FOR THE APRON SHALL CONFORM TO SECTION 209 FROM FP"03".
2. PBJF–PREFORMED BITUMINOUS JOINT FILLER
3. ALL MEASUREMENTS ARE IN METERS UNLESS OTHERWISE NOTED.

SECTION A–A



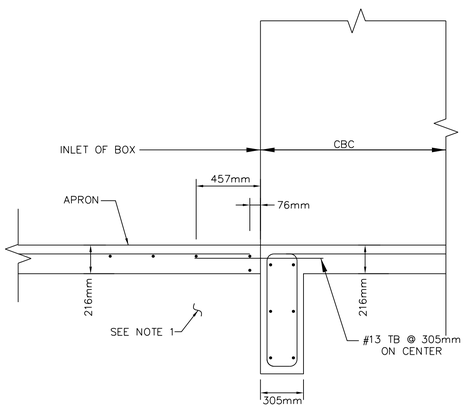
EXPANSION JOINT DETAIL

SCALE: 1:20



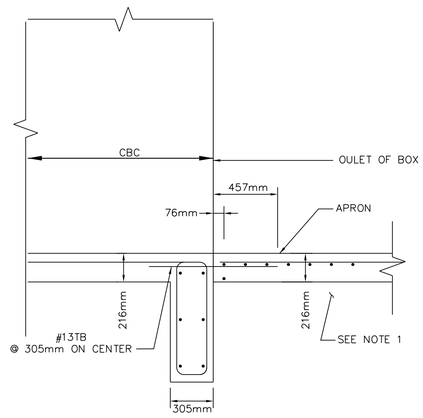
APRON CUT OFF WALL DETAIL

SCALE: 1:20



CONCRETE APRON AT INLET OF BOX CULVERT DETAIL

SCALE: 1:20



CONCRETE APRON AT OUTLET OF BOX CULVERT DETAIL

SCALE: 1:20

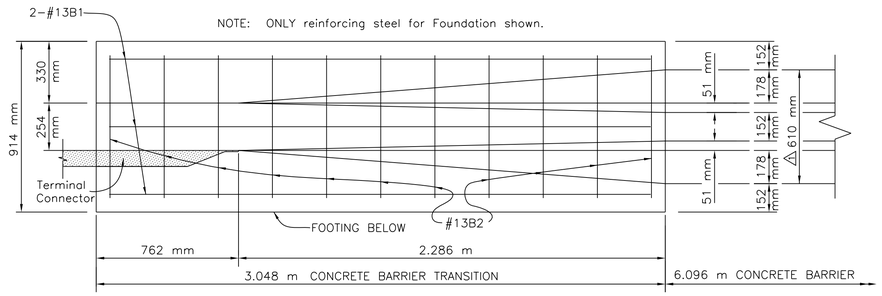
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BOX CULVERT APRON DETAILS

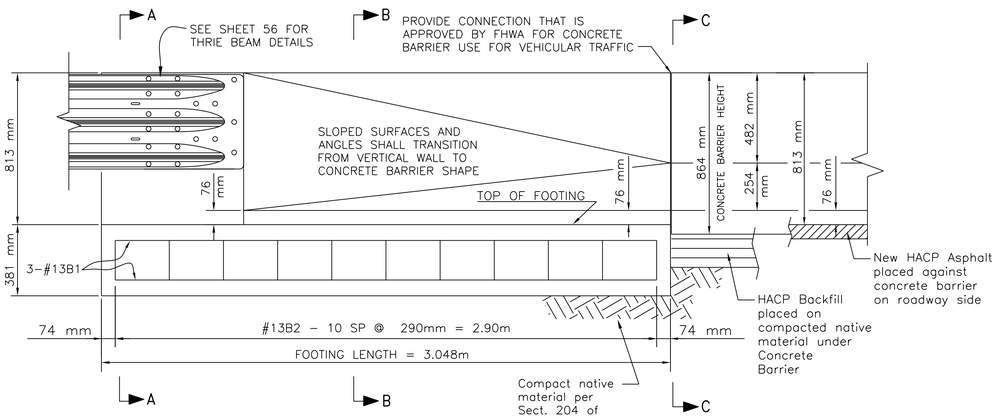
Designed by: MAZ	
Drawn by: MDF	Date: 07–07
Revised by: NRDOT	Date: 05/22/15
File Name: Drawing S–2	

Sht_46 Concrete Box Culvert Apron Details.dgn

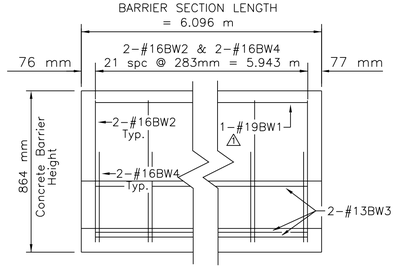
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2,4	47	96
			N6331	N6331(2)2,4		



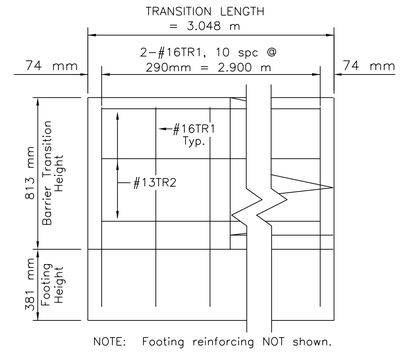
PLAN



ELEVATION



CONCRETE BARRIER
REINFORCING DETAILS – ELEVATION



CONCRETE BARRIER TRANSTION
REINFORCING DETAILS – ELEVATION

CONCRETE BARRIER NOTES:

1. SPECIFICATIONS: DESIGN: AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES, SEVENTEENTH EDITION, 2002 AND SUBSEQUENT INTERIM SPECS. CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP–03, AND ALL SUBSEQUENT REVISIONS.

2. UNITS: ALL DIMENSIONS ARE IN SI (METRIC) UNITS.

3. CONCRETE: CAST IN PLACE CONCRETE SHALL BE CLASS A(AE) WITH A 28 DAY MINIMUM STRENGTH OF 20.7 MPa. THE AIR CONTENT FOR CLASS A(AE) CONCRETE SHALL NOT BE LESS THAN SPECIFIED IN THE FP–03. CHAMFER EXPOSED CORNERS OF ALL CONCRETE 20mm UNLESS OTHERWISE SHOWN. ALL CONCRETE SHALL CONTAIN TYPE II PORTLAND CEMENT. THE TIME LIMITS SPECIFIED IN THE FP–03 SHALL APPLY. IF THE CONCRETE CANNOT BE DISCHARGED WITHIN THE SPECIFIED LIMIT, AN ALTERNATE METHOD OF DELIVERY, SUCH AS DRY BATCHING SHALL BE USED OR A SITE BATCHING PLANT CONFORMING TO THE SPECIFICATIONS SHALL BE USED. ALL CONCRETE FOR BARRIERS AND BARRIER TRANSTIONS AND ALL EXPANSION JOINTS INCLUDING ANY FILLER MATERIAL, SHALL BE CONSIDERED INCIDENTAL TO ITEM 61801–1000, CONCRETE BARRIER.

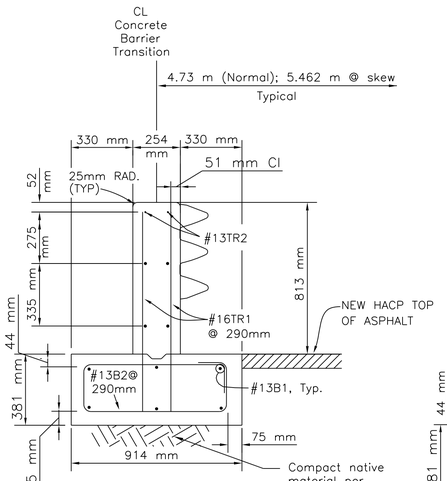
4. FINISHING CONCRETE SURFACES: ALL CONCRETE SURFACES ABOVE GROUND LEVEL SHALL BE GIVEN A CLASS 1 ORDINARY FINISH.

5. REINFORCING STEEL: ALL REINFORCING STEEL SHALL CONFORM TO AASHTO M 31M, GRADE 420 UNLESS A DIFFERENT GRADE IS SPECIFIED. THE MINIMUM COVER OF ANY REINFORCING STEEL SHALL BE 50mm UNLESS OTHERWISE SPECIFIED. DIMENSIONS SHOWN REFER TO THE CENTERLINE OR BARS UNLESS NOTED OTHERWISE. LENGTHS OF REINFORCING STEEL BARS SHOWN INCLUDE REQUIRED SPLICE LENGTHS FOR SPLICES SHOWN. ALL REINFORCING STEEL FOR PRECAST CONCRETE BARRIER AND CAST–IN–PLACE CONCRETE BARRIER TRANSITIONS SHALL BE CONSIDERED INCIDENTAL TO ITEM 61801–1000, CONCRETE BARRIER.

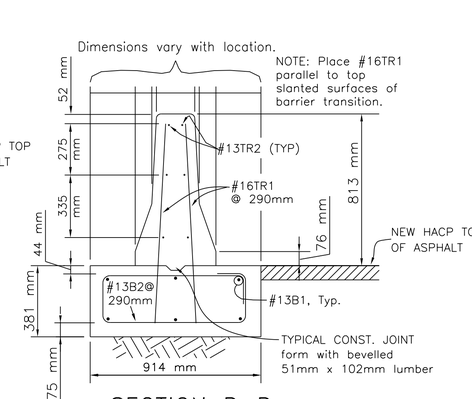
6. CONTRACTOR SHALL VERIFY: IN THE FIELD ALL DIMENSIONS, ELEVATIONS, AND DETAILS WHICH WILL BE INVOLVED IN THE NEW CONSTRUCTION BEFORE PROCEEDING WITH NEW WORK.

7. PRECAST CONCRETE BARRIERS: FABRICATE (PRE–CAST) OR CAST IN PLACE. CONTRACTOR SHALL SUBMIT A PROPOSED CONCRETE BARRIER (JERSEY BARRIER) DESIGN AND LAYOUT TO THE NAVAJO REGIONAL PLANNING AND DESIGN SECTION THROUGH THE COR/AOTR PRIOR TO FABRICATION OR ORDERING OF MATERIAL. SEE THIS SHEET FOR SAMPLE DESIGN/LAYOUT. THE CONTRACTOR HAS THE OPTION TO SUBMIT ALTERNATE DESIGNS FOR REVIEW AND APPROVAL AND SHALL INCLUDE DESIGN OF BARRIER SECTION CONNECTIONS CAPABLE OF RESISTING TRAFFIC IMPACTS CONFORMING TO FEDERAL STANDARDS, LIFTING ANCHORS, ANY ADDITIONAL REINFORCING STEEL NECESSARY TO SUIT LIFTING AND HANDLING OF THE PRECAST BARRIERS. ALTERNATE DESIGNS SHALL BE OF EQUAL OR GREATER CAPACITY FOR TRAFFIC IMPACT. PAYMENT FOR PRECAST CONCRETE BARRIERS, CAST–IN–PLACE CONCRETE BARRIER TRANSITIONS AND ALL NECESSARY LABOR, HARDWARE AND MATERIALS SHALL BE PAID BY THE LINEAR METER. UNDER BID ITEM 61801–0000. THE COST OF ALL REINFORCING STEEL, INSERTS AND CONNECTIONS ASSOCIATED WITH THESE ITEM ARE CONSIDERED INCIDENTAL TO ITEM 61801–1000.

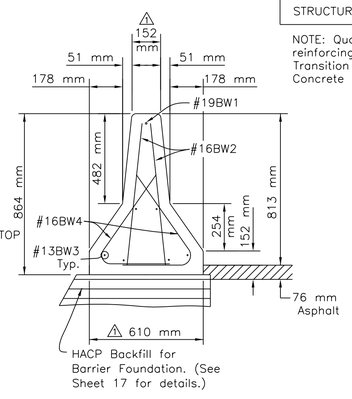
8. FOUNDATION BELOW CONCRETE BARREIR TRANSITION FOOTING SHALL BE COMPACTED NATIVE MATERIAL COMPACTED PER SECTION 204 OF THE FP–03. ALL WORK, MATERIALS AND LABOR NECESSARY FOR THE COMPACTION OF THE FOOTING BED SHALL BE CONSIDERED INCIDENTAL TO ITEM 61801–1000, CONCRETE BARRIER.



SECTION A–A



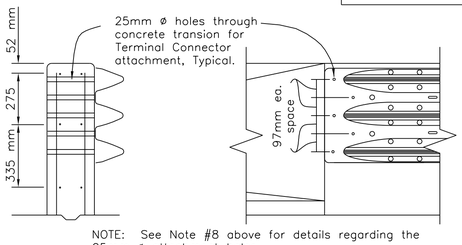
SECTION B–B



SECTION C–C

ESTIMATED QUANTITIES		
ONE 3.048 m TRANSITION W/ FOOTING		
REINFORCING BAR GRADE 420	96	kg
STRUCTURAL CONCRETE CLASS "AE"	1.81	m^3
ONE 6.096m CONCRETE BARRIER		
REINFORCING BAR GRADE 420	161	kg
STRUCTURAL CONCRETE CLASS "AE"	1.74	m^3

NOTE: Quantities shown for information only. Concrete and reinforcing steel for Concrete Barrier and Concrete Barrier Transition is considered incidental to Item 61801–0000, Concrete Barrier.



NOTE: See Note #8 above for details regarding the 25mm ø attachment holes.

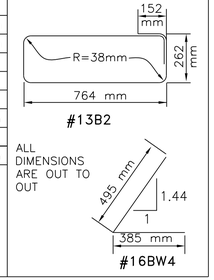
TERMINAL CONNECTOR
ATTACHMENT DETAIL

REINFORCING BAR SCHEDULE

LOCATION	MARK	QTY.	SIZE	LENGTH	SPACING
Footing, Longitudinal	13B1	6	13	2.900 m	
Footing, Stirrup (bent)	13B2	11	13	2.360 m	290 mm
Transition, Vertical	16TR1	22	16	1.070 m	290 mm
Transition, Horizontal	13TR2	6	13	2.900 m	
Barrier, Top Horizontal	19BW1	1	19	5.900 m	
Barrier, Vertical	16BW2	44	16	760 mm	283 mm
Barrier, Lower Horizontal	13BW3	6	13	5.900 m	
Barrier, Stirrup (bent)	16BW4	44	16	880 mm	283 mm

NOTE: Quantities shown above are for ONE 3.048 m long Concrete Barrier Transition with Footing, and for ONE 6.096 m long Concrete Barrier Section.

BENDING DIAGRAMS



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

CONCRETE BARRIER TRANSITION TO THRIE BEAM DETAILS

DRAWN BY: NRDOT	DATE: 9/18/2017
DESIGNED BY: NRDOT	DATE: 9/18/2017
REVISED: 9/19/2017	BY: Peterson.Yazzie

Sht_47 Conc Barrier Transition to Thrie Beam Details 091817.dgn

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_47 Conc Barrier Transition to Thrie Beam Details 091817.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	48	96

REINFORCING BAR SCHEDULE

MARK	SIZE	TYPE	NO.REQD	LENGTH	A	B	C	REMARK
Wing Wall 1								
# 13H1	#13	1	7	6.715				
# 13H2	#13	1	1	6.715				
# 13H3	#13	1	1	6.715				
# 13H4	#13	1	1	6.715				
# 13H5	#13	1	1	4.735				
# 13H6	#13	1	1	2.757				
# 13D1	#13	5	2	7.221	510 mm	305mm	6.437	ANGLE THETA=5.7936 DEG
# 16V1	#16	2	2	3.270	519mm	2.791		LENGTH ACCOUNTS FOR BEND
# 16V2	#16	2	1	3.235	519mm	2.756		LENGTH ACCOUNTS FOR BEND
THRU								DECREASE BY EQUAL INCREMENTS OF 33 mm
# 16V22	#16	2	1	2.575	519mm	2.096		LENGTH ACCOUNTS FOR BEND
Wing Wall 2								
# 13H1	#13	1	7	6.715				
# 13H2	#13	1	1	6.165				
# 13H3	#13	1	1	5.043				
# 13H4	#13	1	1	3.921				
# 13H5	#13	1	1	2.799				
# 13H6	#13	1	1	1.627				
# 13D1	#13	5	2	7.301	510mm	305mm	6.518	ANGLE THETA=10.1078 DEG
# 16V1	#16	2	2	3.270	519mm	2.791		LENGTH ACCOUNTS FOR BEND
# 16V2	#16	2	1	3.215	519mm	2.736		LENGTH ACCOUNTS FOR BEND
THRU								DECREASE BY EQUAL INCREMENTS OF 57 mm
# 16V22	#16	2	1	2.075	519mm	1.596		LENGTH ACCOUNTS FOR BEND
Wing Wall 3								
# 13H1	#13	1	7	6.715				
# 13H2	#13	1	1	6.715				
# 13H3	#13	1	1	6.715				
# 13H4	#13	1	1	6.715				
# 13H5	#13	1	1	4.735				
# 13H6	#13	1	1	2.757				
# 13D1	#13	5	2	7.221	510mm	305mm	6.437	ANGLE THETA=5.7936 DEG
# 16V1	#13	2	2	3.275	519mm	2.796		LENGTH ACCOUNTS FOR BEND
# 16V2	#16	2	1	3.250	519mm	2.771		LENGTH ACCOUNTS FOR BEND
THRU								DECREASE BY EQUAL INCREMENTS OF 28.5 mm
# 16V22	#16	2	1	2.680	519mm	2.201		LENGTH ACCOUNTS FOR BEND
Wing Wall 4								
# 13H1	#13	1	7	6.715				
# 13H2	#13	1	1	6.165				
# 13H3	#13	1	1	5.043				
# 13H4	#13	1	1	3.921				
# 13H5	#13	1	1	2.799				
# 13H6	#13	1	1	1.627				
# 13D1	#13	5	2	7.301	510mm	305mm	6.518	ANGLE THETA=10.1078 DEG
# 16V1	#16	2	2	3.275	519mm	2.796		LENGTH ACCOUNTS FOR BEND
# 16V2	#16	2	1	3.225	519mm	2.746		LENGTH ACCOUNTS FOR BEND
THRU								DECREASE BY EQUAL INCREMENTS OF 52 mm
# 16V22	#16	2	1	2.185	519mm	1.706		LENGTH ACCOUNTS FOR BEND
Footing 1								
# 13F1	#13	1	6	7.025				
# 13F2	#13	1	2	6.805				
# 13F3	#13	1	1	7.280				
# 13F4	#13	1	1	5.000				
# 13F5	#13	4	1	7.925	6.965	960mm		ANGLE THETA=35.471 DEG
# 13F6	#13	2	23	2.275	875mm	1.400		
# 16F7	#16	1	2	859 mm				
THRU								INCREASE BY EQUAL INCREMENTS OF 29 mm
# 16F29	#16	1	2	1.497				
# 16F30	#16	1	2	764 mm				
# 16F31	#16	1	2	470 mm				
Footing 2								
# 13F1	#13	1	6	7.025				
# 13F2	#13	1	2	6.805				
# 13F3	#13	1	1	7.280				
# 13F4	#13	1	1	5.000				
# 13F5	#13	4	1	7.925	6.965	960mm		ANGLE THETA=35.471 DEG
# 13F6	#13	2	23	2.275	875mm	1.400		
# 16F7	#16	1	2	859 mm				
THRU								INCREASE BY EQUAL INCREMENTS OF 29 mm
# 16F29	#16	1	2	1.497				
# 16F30	#16	1	2	764 mm				
# 16F31	#16	1	2	470 mm				

Footing 3								
# 13F1	#13	1	6	7.025				
# 13F2	#13	1	2	6.805				
# 13F3	#13	1	1	7.280				
# 13F4	#13	1	1	5.000				
# 13F5	#13	4	1	7.925	6.965	960mm		ANGLE THETA=35.471 DEG
# 13F6	#13	2	23	2.275	875mm	1.400		
# 16F7	#16	1	2	859 mm				
THRU								INCREASE BY EQUAL INCREMENTS OF 29 mm
# 16F29	#16	1	2	1.497				
# 16F30	#16	1	2	764 mm				
# 16F31	#16	1	2	470 mm				
Footing 4								
# 13F1	#13	1	6	7.025				
# 13F2	#13	1	2	6.805				
# 13F3	#13	1	1	7.280				
# 13F4	#13	1	1	5.000				
# 13F5	#13	4	1	7.925	6.965	960mm		ANGLE THETA=35.471 DEG
# 13F6	#13	2	23	2.275	875mm	1.400		
# 16F7	#16	1	2	859 mm				
THRU								INCREASE BY EQUAL INCREMENTS OF 29 mm
# 16F29	#16	1	2	1.497				
# 16F30	#16	1	2	764 mm				
# 16F31	#16	1	2	470 mm				

CONCRETE BOX CULVERT- BARRELS - 2 QUADRUPLE OPENINGS - TOTAL

Mark	SIZE	TYPE	No. Req'rd	LENGTH	A	B	C	REMARK
# 16A1	#16	1	116	10.439				
# 22A2	#22	1	228	2.362				
# 19A3	#19	1	228	1.905				
# 13B1	#13	1	134	10.439				
# 13B2	#13	1	264	1.981				
# 16C3	#16	2	798	1.905	191 mm	1.754		
# 16C4	#16	2	798	914 mm	191 mm	723 mm		
# 13M1	#13	2	112	10.363				
# 19M2	#19	2	330	2.362				
# 13N1	#13	2	122	10.363				
# 19N2	#19	2	360	2.362				
# 19D	#19	2	256	1.753	1.343	457mm		
# 16E	#16	2	256	1.676	1.259	457mm		
# 13TA	#13	1	114	17.272				
# 13TB	#13	1	90	17.272				
# 13TC	#13	1	48	17.272				
# 13TS	#13	1	20	17.272				

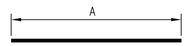
CONCRETE BOX CULVERT- ENDS - TOTAL

Mark	SIZE	TYPE	No. Req'rd	LENGTH	A	B	C	REMARK
# 19J	#19	2	16	3.048	2.362	686mm		
# 16K	#16	2	16	2.057	1.372	686mm		
# 13G	#13	2	112	2.310	229mm	825mm	305mm	
# 13H	#13	1	112	2.056	229mm	698mm	305mm	
# 19P	#19	1	48	10.439				
# 16C3	#16	2	24	1.905	191 mm	1.754		
# 16C4	#16	2	24	914 mm	191 mm	723 mm		

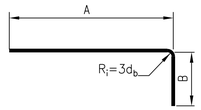
					A	B	C	REMARK
APRONS								
Mark	SIZE	TYPE	No. Reqr'd	LENGTH				
# 13AL1	#13	1	128	5.837				
# 13AL2	#13	1	4	5.788				
THRU								DECREASE BY EQUAL INCREMENTS OF 528 mm
# 13AL12	#13	1	4	508 mm	508			
# 13AT1	#13	1	4	9.825				
THRU								INCREASE BY EQUAL INCREMENTS OF 176 mm
# 13AT18	#13	1	4	12.817				
# 13AT19	#13	1	4	12.989				
# 13AS1	#13	1	4	6.74				
# 13AB	#13	1	128	914 mm				
# 13AW1	#13	1	16	13.077				
# 13AW2	#13	1	16	13.165				
# 13G1	#13	3	172	2.837	203mm	1.05	431mm	
# 16L1	#16	2	172	1.97	1.22	750mm		

BENDING DIAGRAMS

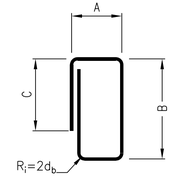
ALL DIMENSIONS ARE OUT TO OUT



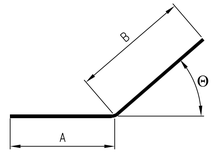
TYPE 1



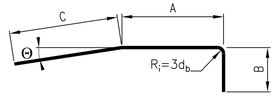
TYPE 2



TYPE 3



TYPE 4



TYPE 5

NOTE: CONTRACTOR SHALL REVIEW THE SCHEDULE WITH DETAILS AND PROVIDE AN UPDATED REINFORCING STEEL SCHEDULE TO THE COR/COTR FOR REVIEW AND APPROVAL PRIOR TO FABRICATING THE STEEL.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CAST IN PLACE BOX CULVERT REINFORCEING BAR SCHEDULE

DRAWN BY: WHPACIFIC DATE: 09/04/2015

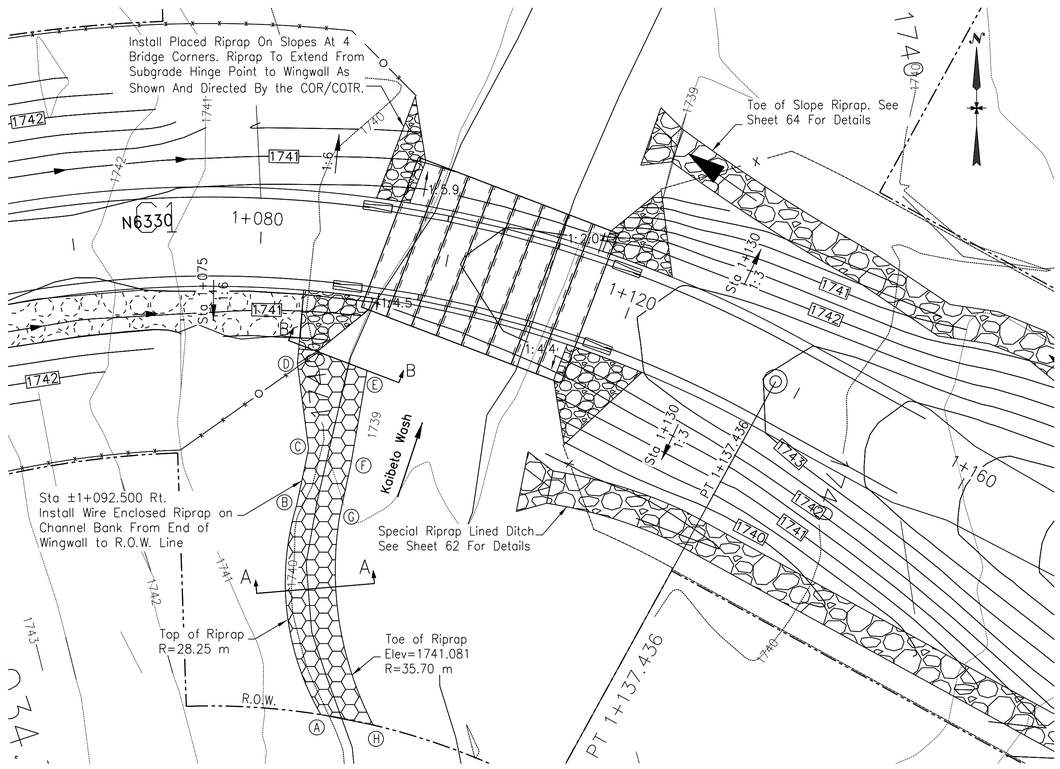
DESIGNED BY: WHPACIFIC DATE: 03/28/2008

REVISED: 07/06/2015 BY: Design 2

Sht_48 Cast in Place Box Culvert Reinforcing Schedule 072015.dgn

Sht_48 Cast in Place Box Culvert Reinforcing Schedule 072015.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	49	96

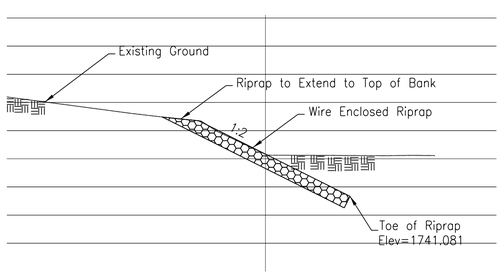


GRADING PLAN AT BOX CULVERTS

SCALE=1:300

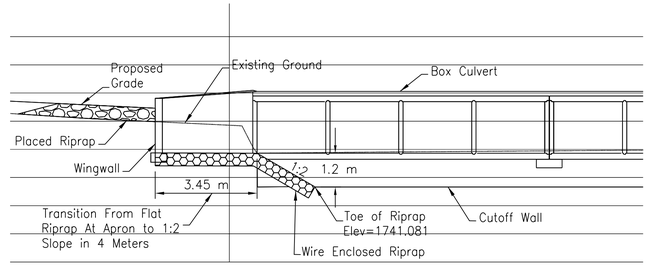
WIRE ENCLOSED RIPRAP NOTES

1. Workmanship and Materials Shall Conform to The Standard Specifications For Construction of Roads and Bridges on Federal Highway Projects (FP-03).
2. All Excavations and Backfill Operations Shall Be Done to Neat Lines in Accordance with Section 209 of FP-03 and Shall Be Incidental to Installation of Riprap. See the Supplemental Specifications for Additional Requirements.
3. The Quantities Shown Are Only An Estimate. Actual Quantities Shall Be Determined in the Field. The Contractor Shall Be Required to Make Any Necessary Adjustments to location and lengths in the Field to Match Existing Field Conditions. These Field Adjustments Are Incidental Obligations of the Contractor.
4. Wire Enclosed Riprap Shall Conform to Section 251 of FP-03, the Supplemental Specifications, and the Details Shown in These Construction Plans.
5. Wire Fabric Shall Be Galvanized and Be of the Configuration Shown on This Sheet. An Alternate Wire Fabric May Be Submitted For Review and Approval. Any Wire Fabric Used Shall Have a Class 3 Zinc Coating (Galvanizing), Have a Maximum Opening Dimension of 100 mm, and Shall Not Allow a 75 mm ø Sphere to Pass Through a Wire Fabric Opening.
6. Wire Enclosed Riprap Shall Be Anchored As Shown, By L 102 x 102 x 9.5 mm Steel Angles. Steel Angles Shall Extend 75 mm Above the Top Surface of the Wire Enclosed Riprap When Placed. Steel Angles Will Conform to AASHTO M270.
7. Embankment Below Riprap Shall Conform to Section 204 of FP-03. Excavation For Riprap Foundations Shall Conform to Section 209 of FP-03. All Embankment For Wire Enclosed Riprap Above Natural Ground Is Included in the Quantity For Item 20401-0000, Roadway Excavation, and Shall Be Paid For Under That Item. All Excavation For Riprap Construction Shall Be Considered Incidental to Item 25112-2000, Wire Enclosed Riprap.
8. Rock Size Shall Conform to FP-03, Section 705, Table 705-1, Class 2.
9. Erosion Control Geotextile Shall Be Installed Under All Wire Enclosed Riprap As Shown and Shall Be Incidental to Item 25112-2000, Wire Enclosed Riprap. Erosion Control Geotextile Shall Conform to Section 714.01(a)(4) Type IV-C of FP-03. Geotextile To Be Embedded 400 mm Into Ground Along All Riprap Edges.
10. In Rock Areas, Drive Angle Iron Anchors To Refusal (Min. embedment 500 mm) Then Cut At 75 mm Above Riprap. Anchors Shall Be Saw Cut To Leave A Smooth End, Do Not Use A Cutting Torch.



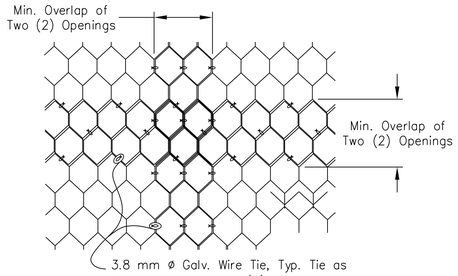
SECTION A-A

N.T.S.



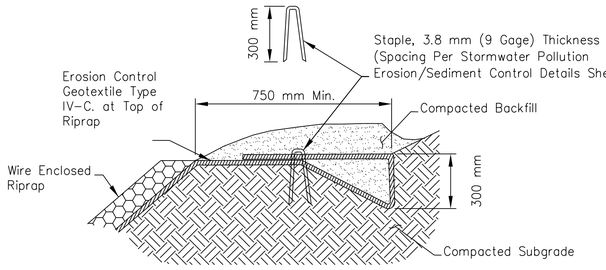
SECTION B-B

N.T.S.



FABRIC SPLICING DETAIL

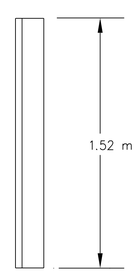
N.T.S.

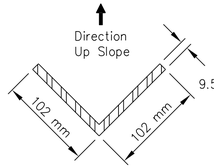


EROSION CONTROL GEOTEXTILE KEY DETAIL @ TOP OF RIPRAP

N.T.S.

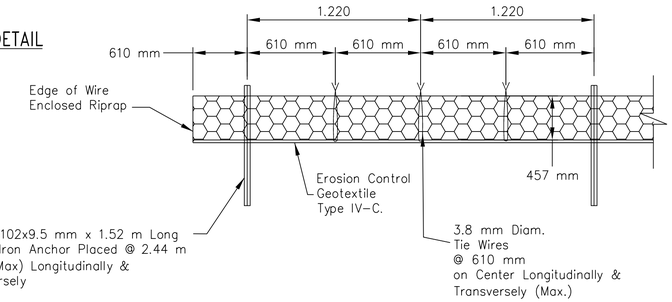
NOTE: Fabricate Staple with 3.8 mm Diameter Wire Conforming to AASHTO A641.





ANGLE IRON ANCHOR DETAIL

N.T.S.



TYPICAL WIRE ENCLOSED RIPRAP DETAIL

N.T.S.

WIRE ENCLOSED RIPRAP LAYOUT POINTS

POINT	STATION	OFFSET
Ⓐ	1+094.315	50.000
Ⓑ	1+086.511	28.150
Ⓒ	1+087.360	22.070
Ⓓ	1+085.000	13.170
Ⓔ	1+093.325	13.025
Ⓕ	1+093.050	23.210
Ⓖ	1+092.573	28.775
Ⓗ	1+103.893	50.000

LEGEND

- Existing Contour
- Proposed Contour
- Placed Riprap
- Wire Enclosed Riprap
- Gabions

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

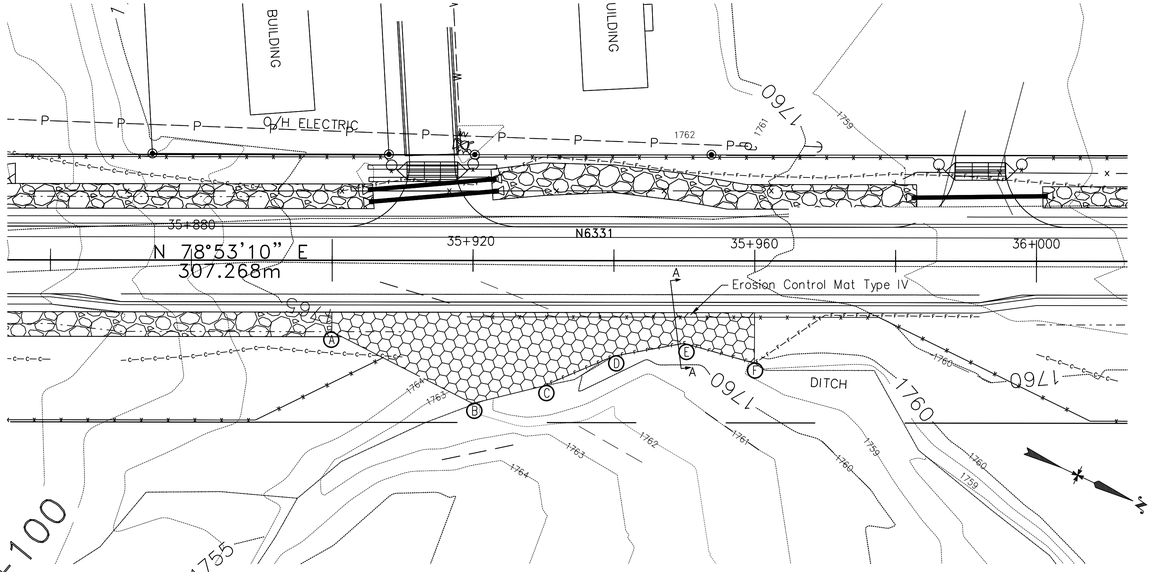
GRADING PLAN AND RIPRAP FOR BOX CULVERT Sta. 1+104.668

DRAWN BY: WHPacific	DATE: 6/2007
DESIGNED BY: WHPacific	DATE: 6/2007
REVISED: 5/28/2015	BY: Design 2

sht_49 REV N6331 Grading Plan at Box Culvert_Riprap_Gabion Layout 080115.dgn

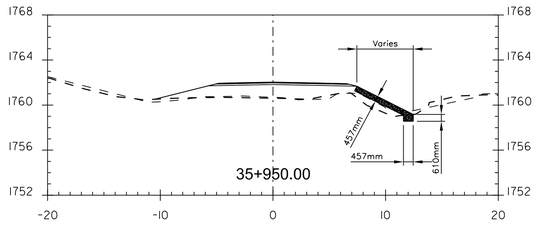
sht_49 REV N6331 Grading Plan at Box Culvert_Riprap_Gabion Layout 080115.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	50	96



CLASS 2 WIRE ENCLOSED RIPRAP LAYOUT 35+900 TO 35+960 RT.

(NTS)



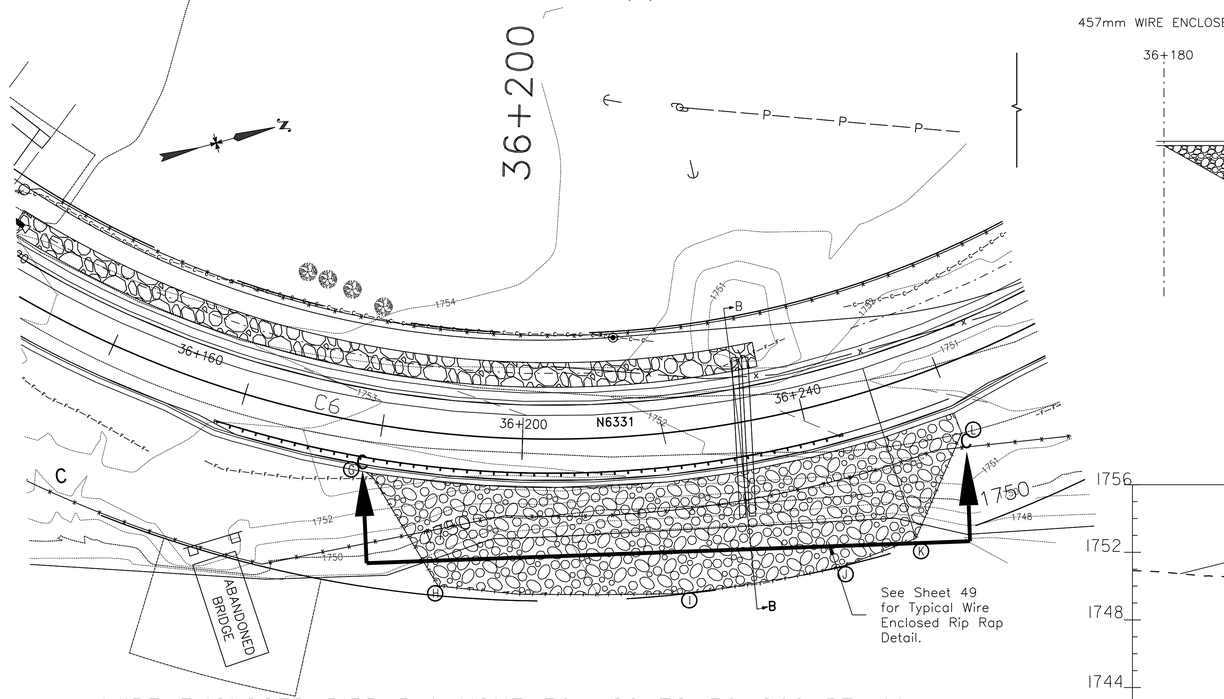
SECTION A-A

35+900 to 35+960
LAYOUT POINTS

POINT	STATION	OFFSET FROM ℄
Ⓐ	35+900.00	9.34
Ⓑ	35+920.00	10.21
Ⓒ	35+930.00	17.87
Ⓓ	35+940.00	14.29
Ⓔ	35+950.00	12.51
Ⓕ	35+960.00	16.73

GENERAL NOTES

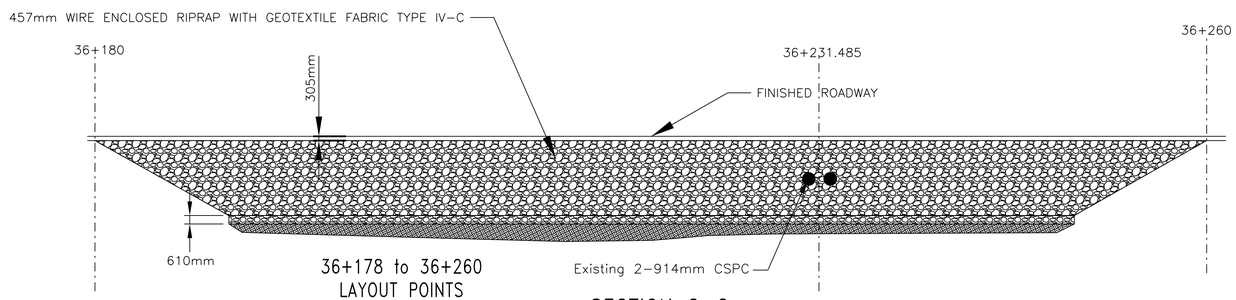
1. Wire Mesh For Wire Enclosed Riprap Shall Be Made From Cold Drawn Steel Wire With A Minimum Diameter Of 3 mm Conforming To ASTM A641 With A Class 3 Zinc Coating. Wire Mesh Shall Have A Maximum Nominal Opening Of 60 mm By 80 mm.
2. Tie Wire Shall Be Cold Drawn Steel Wire With A Minimum Diameter Of 2.2 mm Conforming To ASTM A641 With A Class 3 Zinc Coating.
3. Rock For Wire Enclosed Riprap Shall Conform To Class 2 Rock In Table 705-1 Of FP-03.
4. Erosion Control Geotextile Under And Behind Wire Enclosed Riprap Shall Conform To Type IV-C Of Section 714-4 Of FP-03. Furnishing And Installation Of Erosion Control Geotextile Shall Be Incidental To Item 25112-2000 Galvanized.
5. Backfill Material Under And Behind Riprap Revet Shall Be Native Material Compacted To 95% Per Section 253.07 Of FP-03. Placement And Compaction Of Native Material As Backfill Shall Be Incidental To Item 25112-2000.
6. Wire Mesh For Riprap 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 Wire Enclosed Riprap Structure, Grade Channel To Original Contours Shown Within Right-Of-Way Limits. Material Removed For Construction Of Riprap Structure Shall Be Placed As Directed By The COR/COTR. Channel Grading To The Original Contours Shown Shall Be Considered Incidental To The Completion Of The Project.
8. The Contractor Shall Be Required To Make All Field Adjustments To Meet Field Conditions. These Adjustments Shall Be Incidental Obligations Of The Contractor. Actual Offset Distances Shown May Change Based on Actual Field Conditions.



WIRE ENCLOSED RIPRAP LAYOUT 36+180 TO 36+260 RT. **

(NTS)

** The fill slopes between the above stations will need to be adjusted to 1:2 slopes before installation of the riprap.

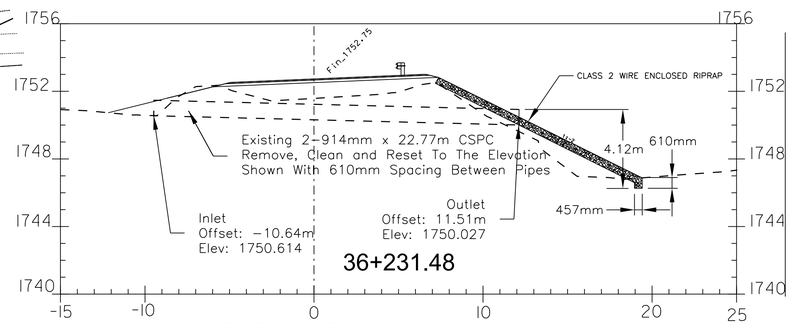


36+178 to 36+260
LAYOUT POINTS

POINT	STATION	OFFSET FROM ℄
Ⓖ	36+178.95	7.31
Ⓗ	36+190.70	15.90
Ⓘ	36+220.00	19.32
Ⓙ	36+240.00	17.11
Ⓚ	36+250.80	20.74
Ⓛ	36+260.00	10.01

SECTION C-C

N.T.S.



SECTION B-B

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

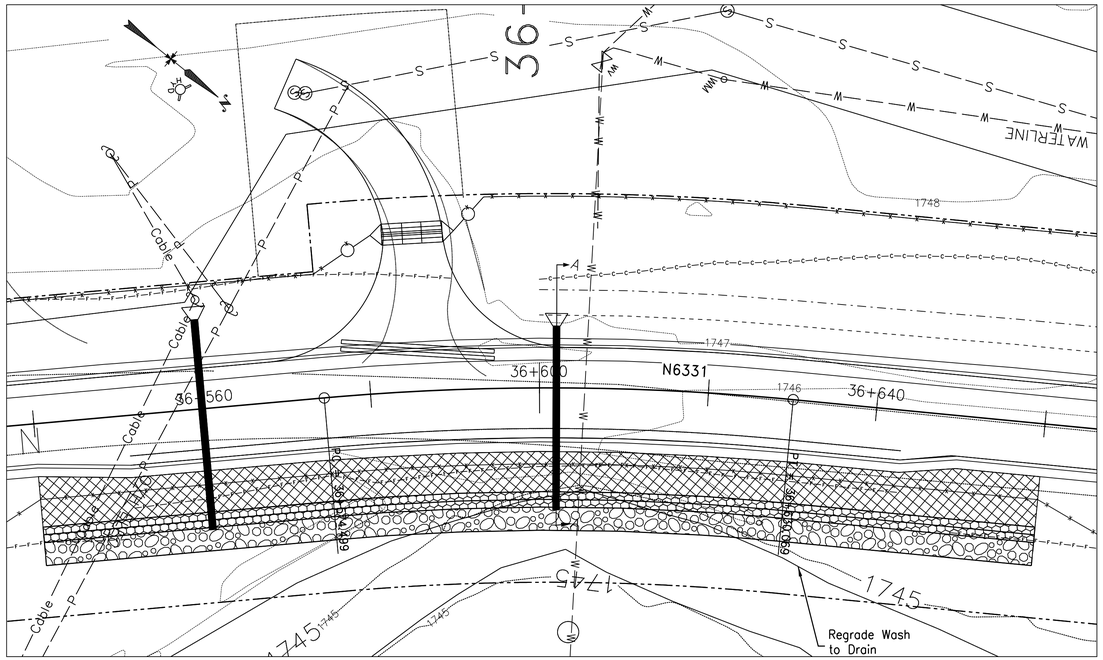
WIRE ENCLOSED RIPRAP
TEMPORARY TRAFFIC CONTROL DETAILS
EMBANKMENT DETAILS

DRAWN BY: NDOT	DATE: 05/29/2015
DESIGNED BY: WRPAC	DATE: 05/29/2015
REVISED: 05/29/2015	BY: Design 2

sht_50 REV N6331 Riprap Gabion Layout 111417.dgn

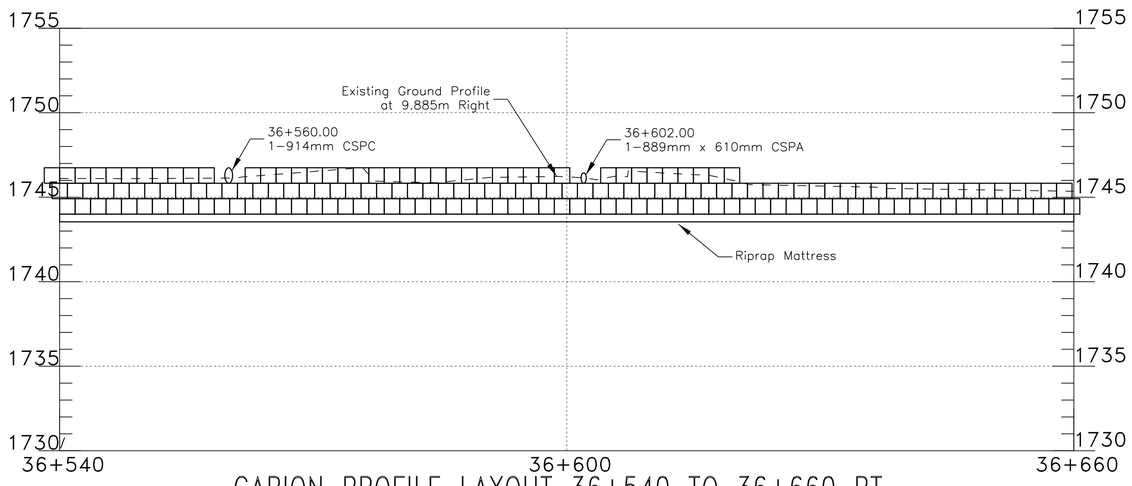
sht_50 REV N6331 Riprap Gabion Layout 111417.dgn
Date: 5/29/2015 2:12:16 PM
Design: C:\Projects\Riprap\Project 111417\dgn\06152016\sht_50 REV N6331 Riprap Gabion Layout 111417.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	51	96



GABION PLAN LAYOUT 36+540 TO 36+660 RT.

(NTS)



GABION PROFILE LAYOUT 36+540 TO 36+660 RT.

(NTS)

NOTE: All Gabions are 1m x 1m x 1.83m Size
Riprap Mattress is 457mm x 3.66m x 120.00m Long
With a Fixed Elevation of (top of mat) 1744.00.

GABION GENERAL NOTES

1. Wire Mesh For Gabion Baskets And Revet Mattresses Shall Be Made From Cold Drawn Steel Wire With A Minimum Diameter Of 3 mm Conforming To ASTM A641 With A Class 3 Zinc Coating. Wire Mesh Shall Have A Maximum Nominal Opening Of 60 mm By 80 mm.

2. Tie Wire Shall Be Cold Drawn Steel Wire With A Minimum Diameter Of 2.2 mm Conforming To ASTM A641 With A Class 3 Zinc Coating.

3. Rock For Filling Gabion Baskets And Wire Enclosed Mat Shall Conform To Class 2 Rock In Table 705-1 Of FP-03.

4. Erosion Control Geotextile Under And Behind Gabions And Revet Mattresses Shall Conform To Type IV-C Of Section 714-4 Of FP-03. Furnishing And Installation Of Erosion Control Geotextile Shall Be Incidental To Item 25303, Gabions, Galvanized.

5. Backfill Material Under And Behind Gabions And Revet Mattresses Shall Be Native Material Compacted To 95% Per Section 253.07 Of FP-03. Placement And Compaction Of Native Material As Backfill Shall Be Incidental To Item 253, Gabions, Galvanized.

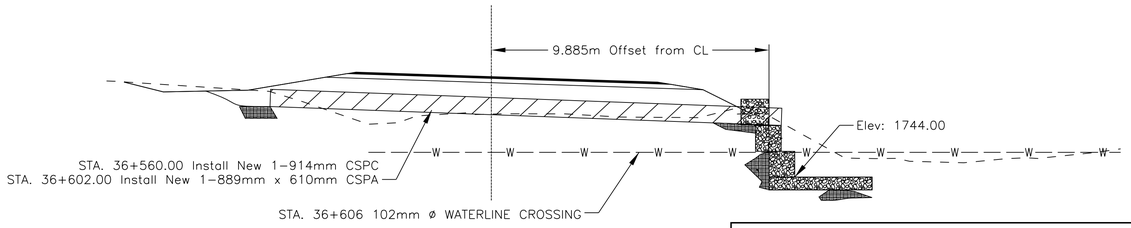
6. Wire Mesh For Gabions And/Or Revet Mattresses Shall Be 6x8 Mesh As Manufactured By Maccaferri, Or An Approved Equal. Furnishing, Fabrication And Installation Shall Be As Per The Manufacturer's Recommendations And Instructions. Material Information And Certifications Shall Be Submitted For Review And Be Approved Prior To Installation.

7. After Construction Of Gabion Structure, Grade Channel To Original Contours Shown Within Right-Of-Way Limits. Material Removed For Construction Of Gabion Structure Shall Be Placed As Directed By The COR/COTR. Partial Covering Of The Gabion Structure Will Be Necessary To Place Excavated Material As Shown. Material Placed After Construction Of Gabion Structure Shall Be Compacted Only By Thorough Tamping By Placement Equipment, While Avoiding Any Damage To Gabion Structure. Any Damage To Gabion Structure Shall Be Repaired By The Contractor At No Additional Cost To The Government. Channel Grading To The Original Contours Shown Shall Be Considered Incidental To The Completion Of The Project.

8. All Areas To Receive Gabions To Be Filled, Excavated And/Or Shaped under bid Item 25302-1000 and 25305-1000 As Directed By The COR/COTR.

9. The Contractor Shall Be Required To Make All Field Adjustments To Meet Field Conditions. These Adjustments Shall Be Incidental Obligations Of The Contractor.

10. The Existing wash shall be regraded back to its original contours to the fullest extent possible while maintaining a minimum of 610mm above and around the gabion revet mattress. This work shall be incidental to bid items 25302-1000 and 25305-1000.



SECTION A-A

(NTS)

36+560.00
36+602.00

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

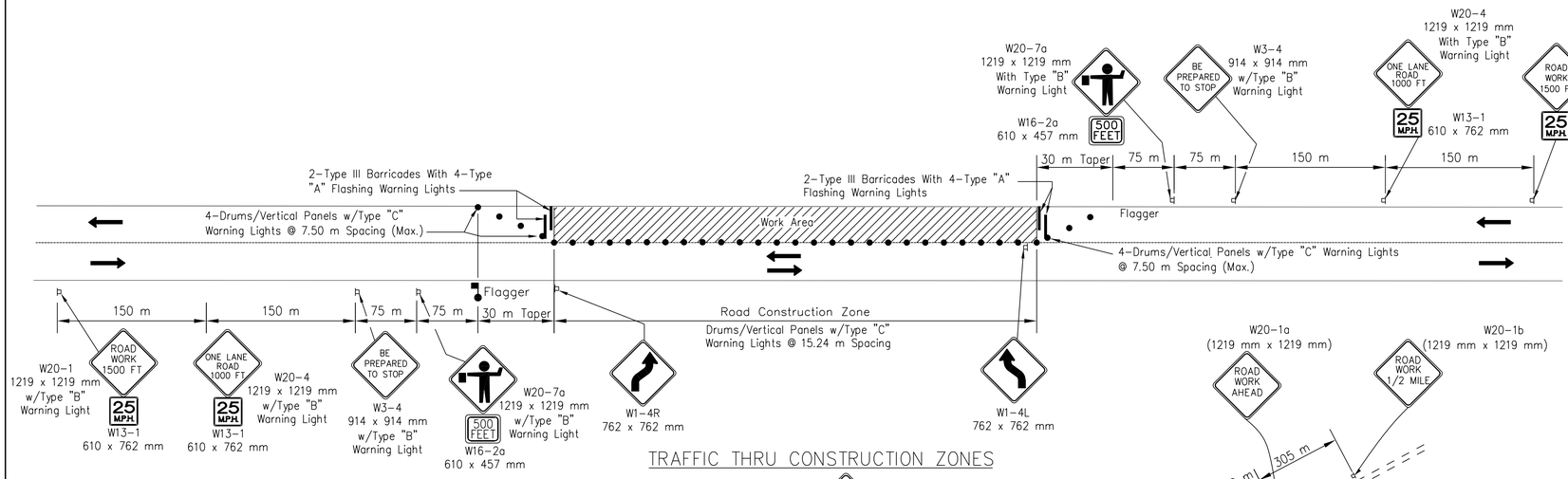
GABION WALL DETAILS
STA. 36+560 to STA. 36+602

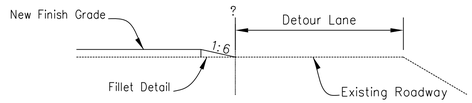
DRAWN BY: NRDOT	DATE: 9/1/2015
DESIGNED BY: NRDOT	DATE: 9/1/2015
REVISED: 11/8/2017	BY: Design 2

sht_51 REV N6331 Grading Plan at Box Culvert Riprap_Gabion Layout 080115.dgn

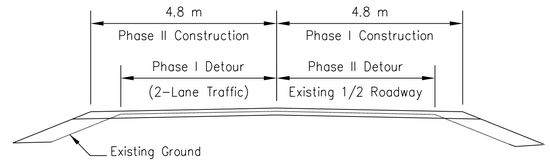
sht_51 REV N6331 Grading Plan at Box Culvert Riprap_Gabion Layout 0801

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	52	96
			N6331	N6331(2)(1−1)2&4		
			N21	N21(3A)2&4		





FILLET DETAIL



PHASED CONSTRUCTION

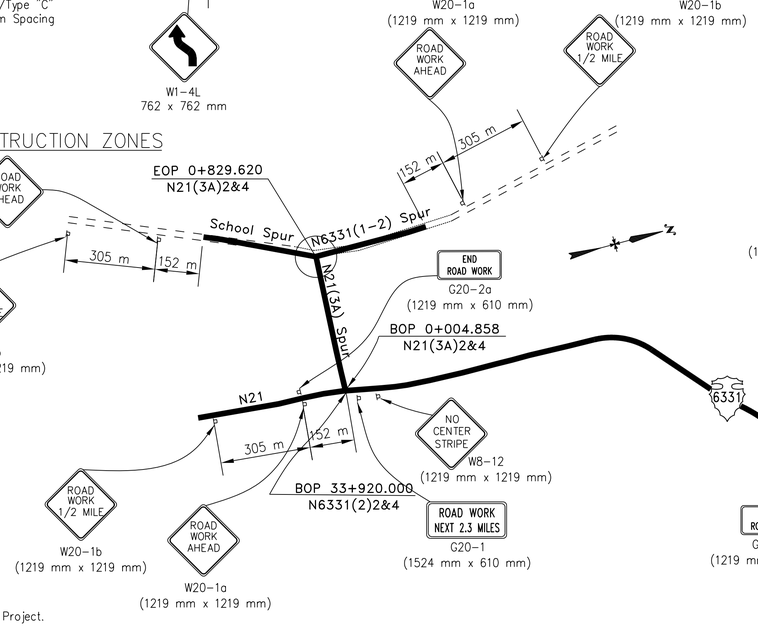
1. The Contractor May Construct Half The New Roadway (Under The Phase Construction Plan Shown) While Detouring Two−Way Traffic On The Other (Existing) Half. Once The First Half of The Roadway Is Built Up To The New Grades, Then Traffic Shall Be Channeled To The New Half of Roadway While The Other (Existing) Half is Reconstructed.

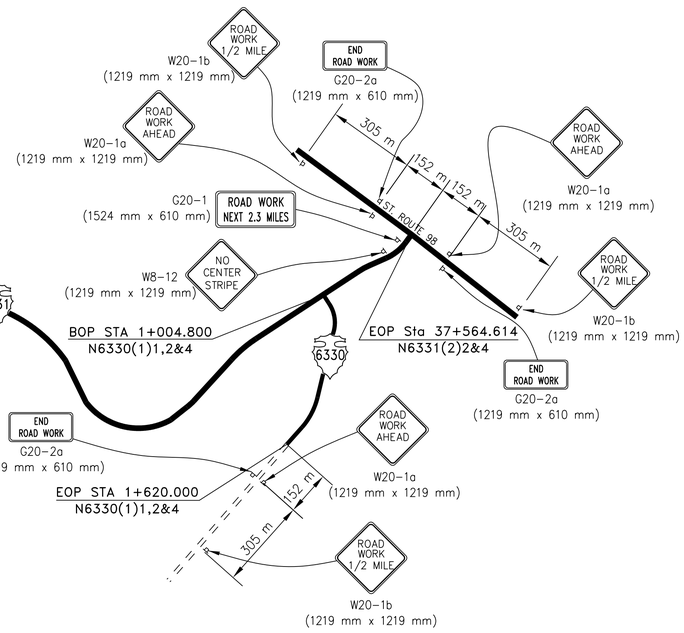
2. All (New) Drainage Pipe Installations Shall Be In Accordance With The Phased Construction Plan Above, As Well As Removal Of Existing Pipes. This may Require Cutting Half of All Existing Pipe At One Time. All the Pipe Installation And Removal Shall Be Considered Incidental To Pipe Items Shown And No Additional Payment Will Be Made.

3. This Phased Construction Shall Be Considered Incidental To The TCP Shown And No Additional Payment Shall Be Made.

4. The Contractor's Construction Sequence And Storm Water Pollution Plan Prevention Shall Reflect This Phased Construction.

TRAFFIC THRU CONSTRUCTION ZONES





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 Developing and Implementing a Temporary Traffic Control Plan (TTCP) in Accordance With These Details, Section 635 of FP−03, and the MUTCD Under Contract Item 63501−0000. The Contractor Shall Also Submit A Copy Of This Traffic Control Plan, Related to US 89, To The COR/COTR for submission to the Arizona Department Of Transportation (ADOT) For Approval, 4 Weeks Prior To The Start of Construction. 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 The Traffic Control Shown in the Bid Schedule. See the Supplemental Specifications For Additional Requirements.

3. Signs G20−1 and G20−2a Shall Be Placed at the Project Limits and Remain in Place Through the Duration of the Project.

4. Flaggers Shall Be Stationed Left & Right As Shown on approved TTCP When Equipment Is Crossing or Working Within the Existing Roadway Prism.

5. In Areas Open And/Or Crossed By The General Public, the Contractor Shall Ensure That No Pavement Drop−Offs Are Left Exposed During Non−Working Hours. The Contractor Shall Initiate Corrective Means to Achieve a 1:6 Or Flatter Slope As Shown in the Fillet Detail.

6. At the End of Each Working Day, It Will Be the Contractor's Responsibility to Provide a Driving Surface Free of Obstructions. Access to All Adjoining Properties and BIA/County System Routes Shall Be Maintained at All Times (Day and Night).

7. All Traffic Control Devices (Except at Detour Road Locations and as Noted in Above Note #3) Such as Construction Signs, Drums, Barricades, etc., Shall Be Removed to a Location at Least Nine (9) Meters From the Edge of the Shoulder When Construction Is Not in Progress.

8. During Construction Operations, Traffic Shall Be Moved Through the Work Zone Using Pilot Cars (As Required). Applicable Signs and Other Items (Two−Way Radio Contact) Related to the Traffic Control Shall Be Considered Incidental Obligations of the Contractor.

9. The Contractor Has the Option to Either Use Drums or Vertical Panels, But Shall Not Use a Combination of Both. No Traffic Cones Are Allowed.

10. The Contractor Has the Option to Utilize Detour Roads in Accordance With the MUTCD in Conjunction With or in Lieu of Using the "Traffic Thru Construction Zones" Details Shown on this Plan and in Accordance With Section 107 and 204. The Cost of Any Detour Roads (Including All Detour Related Earthwork and Maintenance) Shall Be Considered Incidental to the Temporary Traffic Control Bid Items. The Contractor Is Responsible For All Necessary Permits and Clearances For Any Detour Roads.

11. It is the Responsibility of the Contractor to Maintain the Existing Roadway And/Or Detour in a Drivable Condition During Construction. This Work is Considered Incidental to Item 63501−0000.

12. At Locations Where New Road Construction Intersects Existing Roadway And At Tie−Ins With Existing Roads at The End of of 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 Signs; Flaggers; Drums, Etc.

13. The Traffic Control on This Project Shall Be Coordinated With The Project Construction Schedule. The Contractor's TCP Shall Reflect This Coordination.

14. At Locations Where Road Construction Crosses Existing Roadways And At Tie−Ins With Existing Roads At The End Of The New Construction, Special Traffic Control Procedures Shall Be Included In The Contractor's TCP. These Include But Are Not Necessarily Limited To The Following; Type III Barricades With "Road Closed"; Detour; Signs; Flaggers; Drums; And/Or Detours.

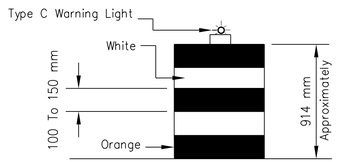
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TEMPORARY TRAFFIC CONTROL DETAILS

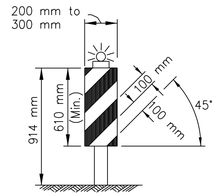
DRAWN BY: NRDOT	DATE: 1/31/2013
DESIGNED BY: NRDOT	DATE: 1/31/2013
REVISED: 07/20/2015	BY: Desing 2
Sht_52 Temporary Traffic Control Details 072015.dgn	

Sht_52 Temporary Traffic Control Details 072015.dgn

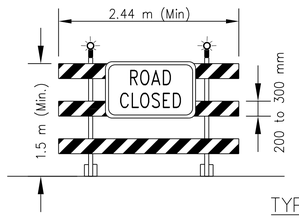
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	53	96
			N6331	N6331(2)(1-1)2&4		
			N21	N21(3A)2&4		

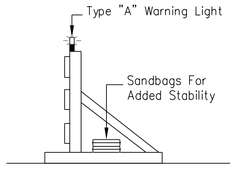


DRUM



VERTICAL PANEL
(Alternate)





TYPE III BARRICADE

TEMPORARY TRAFFIC CONTROL DEVICES

DESIGNATION	DETAIL	MINIMUM SIZE (mm)	DESIGNATION	DETAIL	SIZE (mm)
W20-1	ROAD WORK 1500 FT	1219 x 1219	W1-4R W1-4L		762 x 762 762 x 762
W20-1a	ROAD WORK AHEAD	1219 x 1219	W16-2a	500 FEET	610 x 457
W20-1b	ROAD WORK 1/2 MILE	1219 x 1219	G20-2a	END ROAD WORK	1219 x 610
W20-4	ONE LANE ROAD 1000 FT	1219 x 1219	Type III Barricade		As Shown
W20-7a		1219 x 1219	R11-2	ROAD CLOSED	1219 x 762
W13-1	25 M.P.H.	610 x 762	W8-12	NO CENTER STRIPE	1219 x 1219
Drums or Vertical Panels		As Shown	G20-1	ROAD WORK NEXT 2.3 MILES	1524 x 610
Type A Warning Lights		N/A			
Type C Warning Lights		N/A	W3-4	BE PREPARED TO STOP	914 x 914

TEMPORARY TRAFFIC CONTROL SIGNS (MINIMUM)

TYPE	DESCRIPTION	SIZE
W20-1 W13-1	ROAD WORK 1500 Ft. 25 MPH	1219mm x 1219mm 610mm x 610mm
W20-4 W13-1	ONE LANE ROAD 1000 Ft. 25 MPH	1219mm x 1219mm 610mm x 610mm
W20-7a supplemental plate	500 FEET	914mm x 914mm 457mm x 610mm
G20-2	END ROAD WORK	1219mm x 610mm
W20-1a	ROAD WORK AHEAD	1219mm x 1219mm
W3-4	BE PREPARED TO STOP	914mm x 914mm
G20-1	ROAD WORK NEXT 8.50 MILES	1524mm x 610mm
W8-12	NO CENTER STRIPE	1219mm x 1219mm
W8-3	PAVEMENT ENDS	1219mm x 1219mm 1219mm x 1219mm
W8-7	LOOSE GRAVEL	1219mm x 1219mm 1219mm x 1219mm
W1-4L		762mm x 762mm

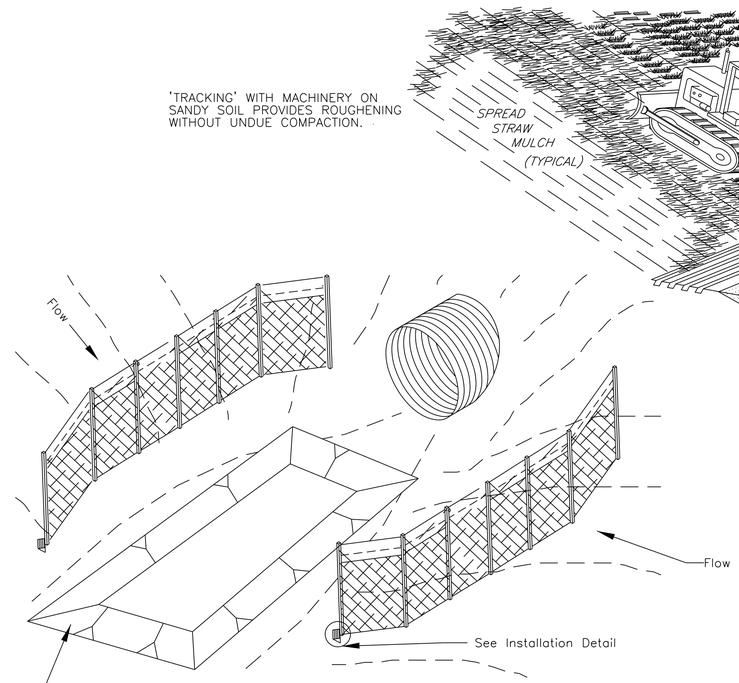
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TEMPORARY TRAFFIC CONTROL DETAILS

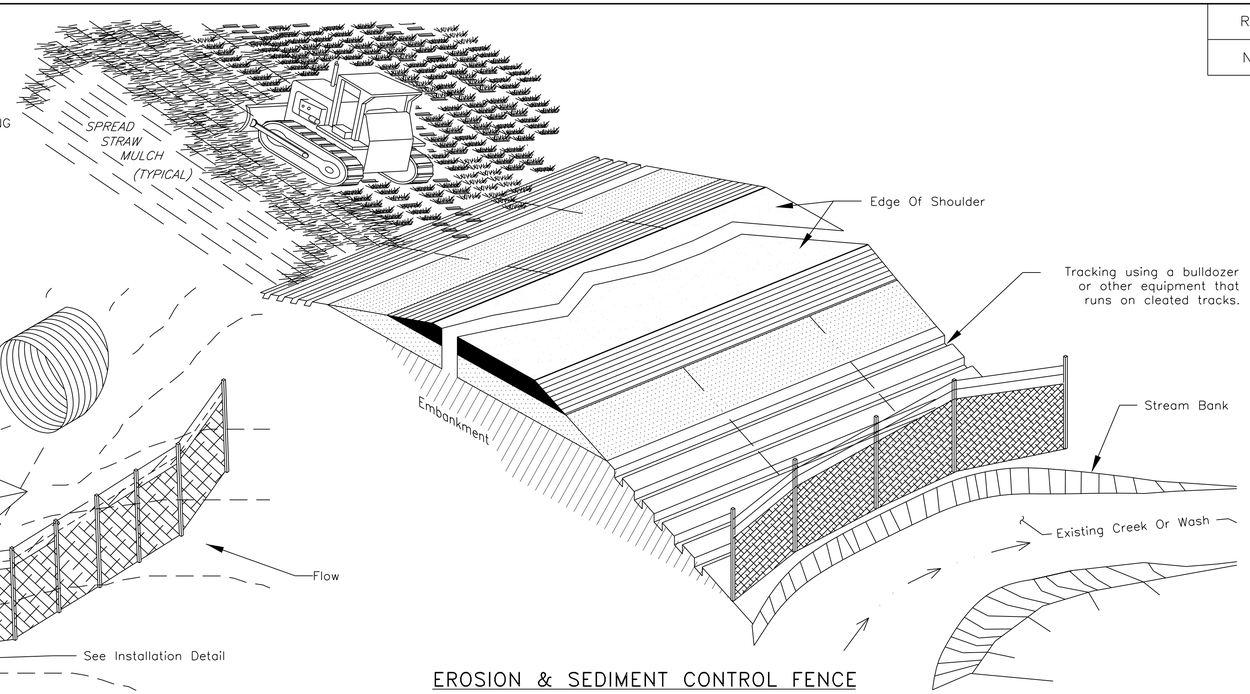
DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 09/29/17	BY: Design 2

Sht_53 Temporary Traffic Control Details 072015.dgn

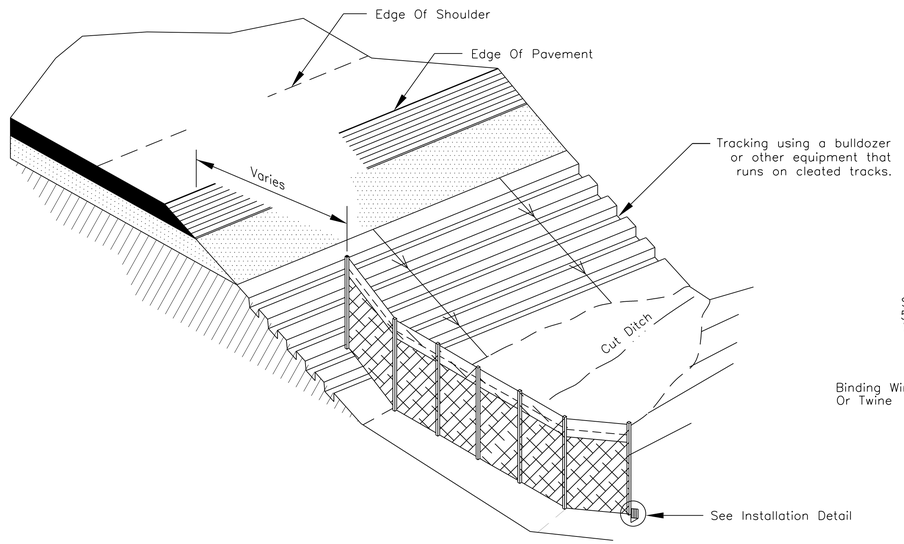
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	54	96
			N6331	N6331(2)2&4		
			N21	N21(3A)2&4		



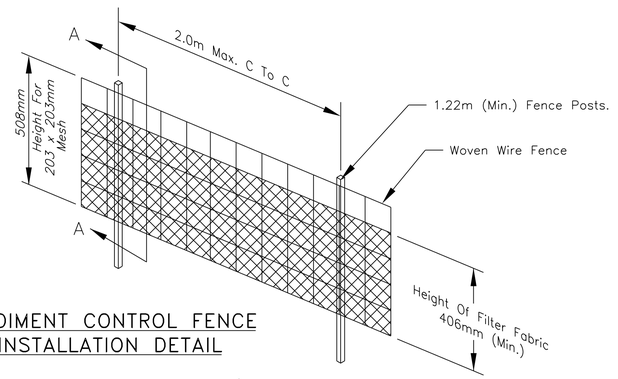
EROSION & SEDIMENT CONTROL FENCE
AT DRAINAGE STRUCTURE



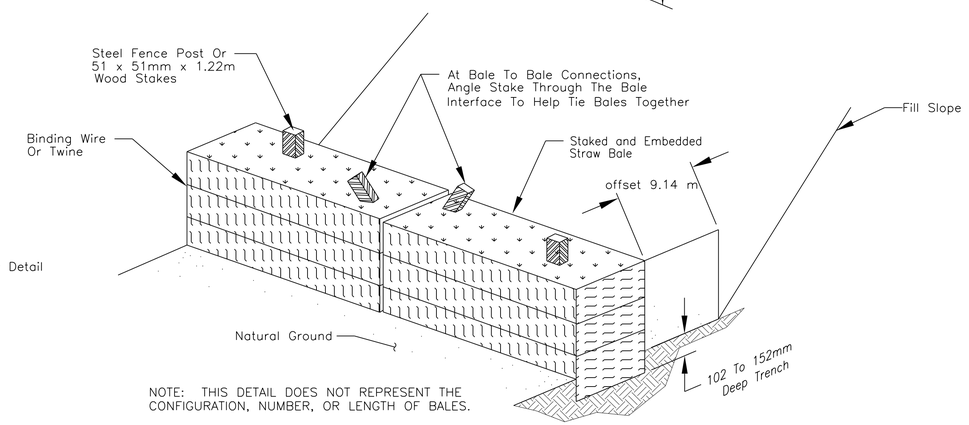
EROSION & SEDIMENT CONTROL FENCE
ALONG EDGE OF STREAM BANK (TOE OF SLOPE)



EROSION & SEDIMENT CONTROL FENCE
IN MINOR SWALES OR CUT DITCHES
(APPROX 60 m 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 DETAILS 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 914mm SEDIMENT CONTROL FABRIC CLOTH WITH BURIED-TOE, AND STEEL POSTS (TEE OR U TYPE) SPACED AT 3.00m WITH 2mm SIZE WELDED WIRE BACK-UP FENCE.

3. WOVEN WIRE FABRIC TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STABLES. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 610mm AT THE TOP AND MID-SECTION. GEOTEXTILE MATERIAL FOR SILT FENCING SHALL BE TYPE-V UNDER SUB-SECTION 714.01 OF FP-03.

4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 152mm AND FOLDED. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED TO PREVENT "BULGES" DEVELOPING IN THE SILT FENCE.

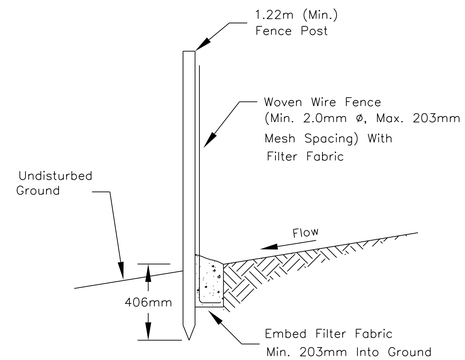
5. THE SILT FENCE SHALL BE INSTALLED ALONG THE ROADWAY DITCHES, ALONG THE BOTTOM OF ALL EMBANKMENT FILLS THAT ARE WITHIN 2.0m OF EXISTING STREAMS, CREEKS, OR WASHES, AND IN AREAS WITH HIGHLY EROSIVE SOILS. SILT FENCES TO BE PLACED 1-2 METERS TOWARD THE R/W LINES FROM THE BASE OF FILL SLOPES 1:3 OR STEEPER IN ACCORDANCE WITH SECTION 157 OF FP-03 AND THE SUPPLEMENTAL SPECIFICATION.

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 51x51mm x 1.22m WOOD STAKES (TWO PER BALE) ANCHORED 508mm 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 AND/OR 15714-0000.

8. SEDIMENT/SILT FENCING SHALL BE PLACED AT ALL LOCATIONS WHERE EMBANKMENTS HAVE SLOPE DISTANCES OF 30.0m OR GREATER. THE SEDIMENT FENCING WILL BE PLACED AT THE TOE OF SLOPES OFFSET 1-2 METERS.

9. THE CONTRACTOR SHALL INSPECT AND MAINTAIN ALL SWPPP MEASURES WEEKLY AND AFTER EACH SIGNIFICANT STORM EVENT (I.E. 25mm OF MOISTURE IN 24 HOURS). RECORD AS PER CLEAN WATER 402 REQUIREMENT.



SECTION A-A

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

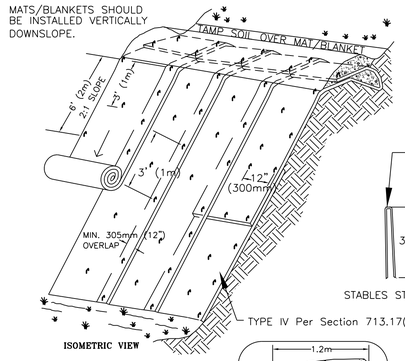
STORMWATER POLLUTION PREVENTION CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 01/01
DESIGNED BY: NRDOT	DATE: 01/01
REVISED: 7/20/15	BY: Design 2

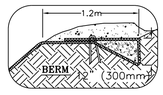
Sht_54 Stromwater Pollution Erosion-Sediment Control Details_1 072015.dgn

Sht_54 Stromwater Pollution Erosion-Sediment Control Details_1 072015.

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	55	96
			N6331	N6331(1-1)(2)2&4		
			N21	N21(3A)2&4		



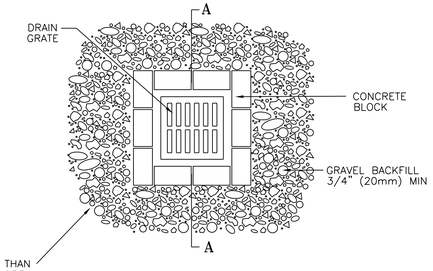
TYPICAL SLOPE SOIL STABLIZATION



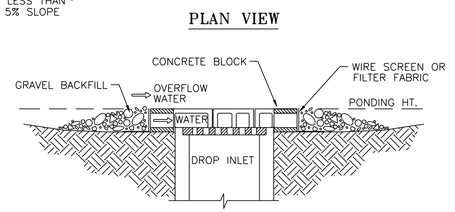
NOT TO SCALE

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

EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION



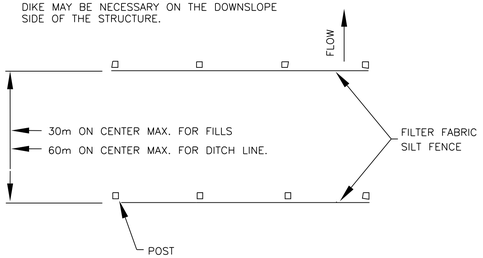
PLAN VIEW



SECTION A – A

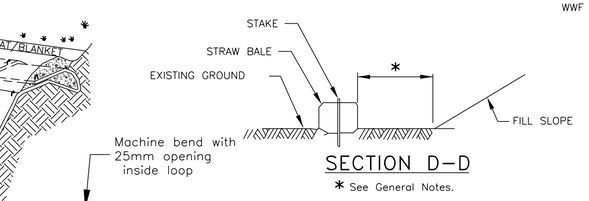
NOTES:
1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. EXCAVATE A BASIN OF SUFFICIENT SIZE ADJACENT TO THE DROP INLET.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING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

BLOCK AND GRAVEL DROP INLET SEDIMENT BARRIER



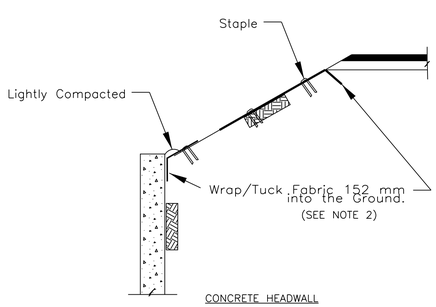
PLAN

SILT FENCE EROSION CHECK

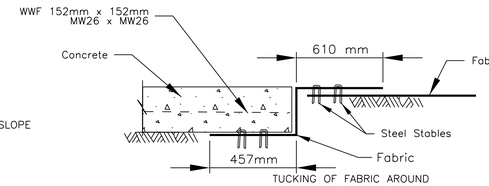


SECTION D-D

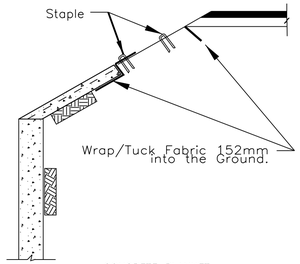
* See General Notes.



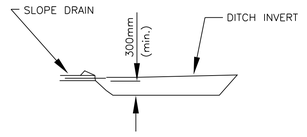
CONCRETE HEADWALL



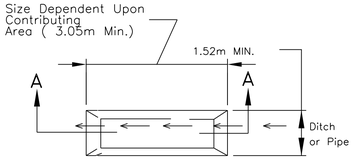
TUCKING OF FABRIC AROUND CONCRETE STRUCTURE DETAIL



CONCRETE BLANKET

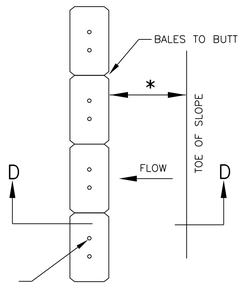


SECTION A-A



SEDIMENT TRAP

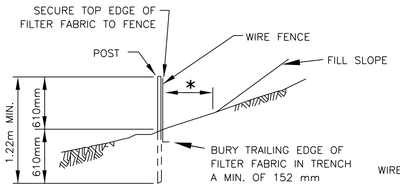
(Traps shall not fill to beyond one-half capacity prior to cleaning)

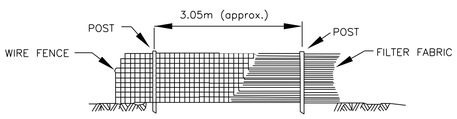


PLAN

STRAW BALE SILT BARRIER

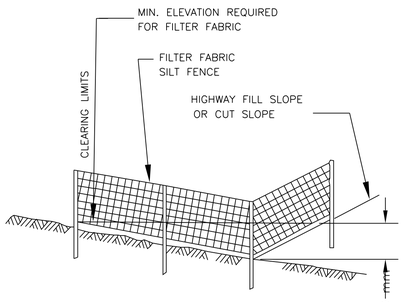
* See general notes.



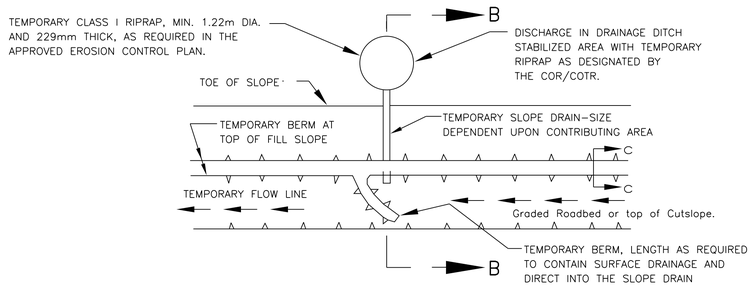


FILTER FABRIC SILT FENCE

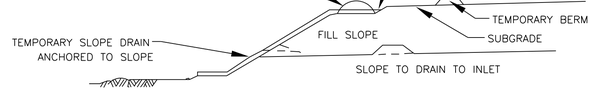
* See General Notes.



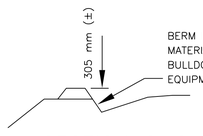
ELEVATION



PLAN VIEW

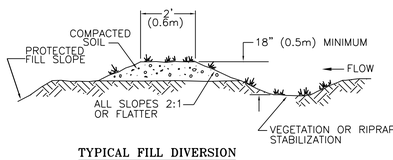


SECTION B-B

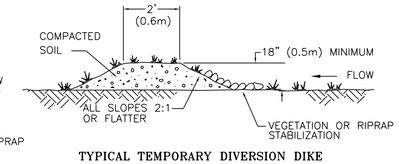


SECTION C-C

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



TYPICAL FILL DIVERSION



TYPICAL TEMPORARY DIVERSION DIKE

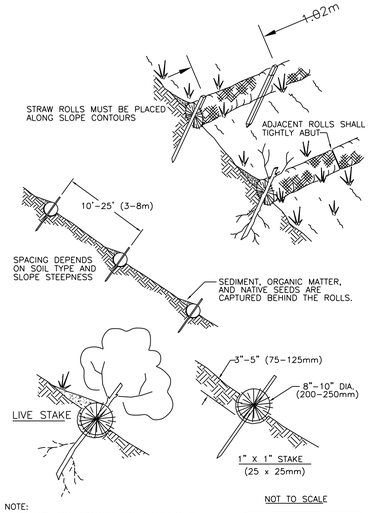
(FOR TOP OF CUT BACK SLOPES.)

NOTES:
1. THE CHANNEL BEHIND THE DIKE SHALL HAVE POSITIVE GRADE TO A STABILIZED OUTLET.
2. THE DIKE SHALL BE ADEQUATELY COMPACTED TO PREVENT FAILURE.
3. THE DIKE SHALL BE 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.

TEMPORARY DIVERSION DIKE

GENERAL NOTES

1. SEE SHEET 54 OF 96 FOR ADDITIONAL NOTES AND DETAILS.
2. THE CONTRACTOR SHALL INSTALL GEOTEXTILE FABRIC, TYPE IV, AROUND CONCRETE STRUCTURE, AS FOLLOWS:
   a) CONSTRUCT FINISH GRADING AROUND STRUCTURE TO BE PLACED.
   b) CUT TRENCHES FOR FOOTING OF SLAB.
   c) INSTALL 1.22 m OF GEOTEXTILE FABRIC ANCHORED ON FLOOR AND TOP, ALONG THE CUT FACE OF REACH AS SHOWN.
   d) PLACE CONCRETE FORMS, REINFORCEMENTS, AND SEQUENT 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.



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

NOT TO SCALE

STRAW ROLLS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STORMWATER POLLUTION PREVENTION CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 01/01
DESIGNED BY: NRDOT	DATE: 01/01
REVISED: 9/29/17	BY: Design 2

Sht_55 Stormwater Pollution Erosion_Sediment Control Details_2 072015.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	56	96
			N6331	N6331(1−1)(2)2&4		
			N21	N21(3A)2&4		

STATION	LOC.	SIGN DETAIL NO.	DESCRIPTION	SIGN PANEL SIZE (mm)	AREA OF SIGN (m^2)	NO. of TUBE	SIZE	TOTAL NO. SIGN PANELS
N6331(2) STATIONING								
35+909 Lt.	On Turnouts	R1−1	STOP	762 x 762	0.58	1	44mm x 44mm	1
36+579 Lt.		R1−1						1
36+785 Lt. 37+020 Lt.		R1−1 R1−1						1 1
37+500	Rt.	W3−1		762 x 762	0.58	1	44mm x 44mm	1
34+000	Rt.	R2−1(30)	SPEED LIMIT 30	610 x 762	0.46	1	44mm x 44mm	1
37+480	Lt.	R2−1(30)				1		1
33+960	Rt.	Route No.	6331	457 x 610	0.28	1	38mm x 38mm	1
37+560	Lt.	Route No.				1		1
34+740 35+040 35+350 35+740 36+000 36+510	Rt. Lt. Rt. Lt. Rt. Lt.	W1−2(R) W1−2(L) W1−2(R) W1−2(L) W1−2(L) W1−2(R)		762 x 762	0.58	1	44mm x 44mm	1 1 1 1 1 1
33+920	Rt.	R4−1	DO NOT PASS	610 x 762	0.46	1	44mm x 44mm	1
37+520	Lt.	R4−1				1		1
33+920	Lt.	W14−3	NO PASSING ZONE	914 x 1219 x 1219	0.56	2	50mm x 50mm	1
37+520	Rt.	W14−3				2		1
33+950	Lt.	M3−3 Route No. M6−3	SOUTH WEST 21 21	610 x 305 457 x 610 533 x 381	0.19 0.28 0.20	1	50mm x 50mm	3
		M3−4 Route No. M6−1	21	610 x 305 457 x 610 533 x 381	0.19 0.28 0.20	1	50mm x 50mm	3
34+030	Lt.	M2−1 Route No.	JCT 21	533 x 381 457 x 610	0.20 0.28	1	44mm x 44mm	2
37+160	Rt.	Route No. M6−1(R)	6330	457 x 610 533 x 381	0.28 0.20	1	44mm x 44mm	2
37+280	Lt.	Route No. M6−1(L)	6330	457 x 610 533 x 381	0.28 0.20	1	44mm x 44mm	2
37+460	Rt.	M2−1 M1−5	JCT ARIZONA 98	533 x 381 610 x 610	0.20 0.37	1	44mm x 44mm	2
37+560	Rt.	M3−4 M1−5 M6−1	WEST ARIZONA 98 EAST ARIZONA 98	610 x 305 610 x 610 533 x 381	0.19 0.37 0.20	1	50mm x 50mm	3
		M3−2 M1−5 M6−1		610 x 305 610 x 610 533 x 381	0.19 0.37 0.20	1	50mm x 50mm	3
37+220	Lt.	W1−7 OM4−2 OM4−2		1219 x 610 457 x 457 457 x 457	0.74 0.21 0.21	2	50mm x 50mm	3
63302−2001; Sign Installation, 1 Post 38mm x 38mm Square Steel Tube . . . . . Subtotal: 0.56 m^2								
63302−2002; Sign Installation, 1 Post 44mm x 44mm Square Steel Tube . . . . . Subtotal: 10.23 m^2								
63302−2003; Sign Installation, 1 Post 50mm x 50mm Square Steel Tube . . . . . Subtotal: 2.86 m^2								
63302−2006; Sign Installation, 2 Post 50mm x 50mm Square Steel Tube . . . . . Subtotal: 2.20 m^2								

ITEM 63405−3260 PAVEMENT MARKINGS, "STOP BAR", TYPE "H", SOLID WHITE

STATION	LOCATION	DESCRIPTION	QUANTITY (EA.)
N6330(1) STATIONING			
1+012	Rt.	Stop Bar	1
1+595	On Turnout	Stop Bar	1
N6331(2) STATIONING			
35+909	On Turnout	Stop Bar	1
36+579	On Turnout	Stop Bar	1
36+696	On Turnout	Stop Bar	1
		TOTAL	5

STATION	LOC.	SIGN DETAIL NO.	DESCRIPTION	SIGN PANEL SIZE (mm)	AREA OF SIGN (m^2)	NO. of TUBE	SIZE	TOTAL NO. SIGN PANELS
N6330(1) STATIONING								
1+010	Lt.	R1−1	STOP	762 x 762	0.58	1	44mm x 44mm	1
1+595 Lt.	On Turnout	R1−1						1
1+050	Lt.	Route No. M6−4	6330	457 x 610 533 x 381	0.28 0.20	1	44mm x 44mm	2
1+119 0+090	Lt. & Rt. Lt. & Rt.	OM−3L OM−3R		254 x 762 254 x 762	0.28 0.28	1 1	38mm x 38mm 38mm x 38mm	1 1
1+130	Rt.	Route No.	6330	457 x 610	0.28	1	38mm x 38mm	1
1+030	Rt.	R4−1	DO NOT PASS	610 x 762	0.46	1	44mm x 44mm	1
1+580	Lt.	R4−1				1		1
1+030	Lt.	W14−3	NO PASSING ZONE	914 x 1219 x 1219	0.56	2	50mm x 50mm	1
1+580	Rt.	W14−3				2		1
1+120	Lt.	W3−1		762 x 762	0.58	1	44mm x 44mm	1
1+070	Rt.	R2−1(25)	SPEED LIMIT 25	610 x 762	0.46	1	44mm x 44mm	1
1+560	Lt.	R2−1(25)				1		1
1+330	Rt.	W1−2(R)		762 x 762	0.58	1	44mm x 44mm	1
1+520	Lt.	W1−2(L)						1
1+470	Rt.	W8−3 W16−2a	PAVEMENT ENDS 500 FT	762 x 762 610 x 305	0.58 0.19	1	50mm x 50mm	2
1+620	Rt.	W8−3	PAVEMENT ENDS	762 x 762	0.58	1	44mm x 44mm	1
63302−2001; Sign Installation, 1 Post 38mm x 38mm Square Steel Tube . . . . . Subtotal: 0.67 m^2								
63302−2002; Sign Installation, 1 Post 44mm x 44mm Square Steel Tube . . . . . Subtotal: 5.80 m^2								
63302−2003; Sign Installation, 1 Post 50mm x 50mm Square Steel Tube . . . . . Subtotal: 0.77 m^2								
63302−2006; Sign Installation, 2 Post 50mm x 50mm Square Steel Tube . . . . . Subtotal: 1.04 m^2								

63401-1620 PAVEMENT MARKINGS: BROKEN WHITE

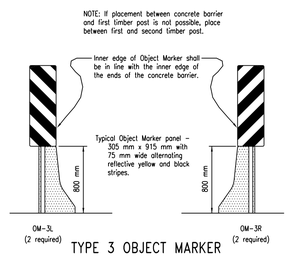
STATION TO STATION			LOCATION	DESCRIPTION	LENGTH(m)
0+003.697	To	0+012.585	North Round-a-bout	300 mm wide	8.84
0+036.307	To	0+045.371	North Round-a-bout	300 mm wide	9.14
0+069.955	To	0+079.024	North Round-a-bout	300 mm wide	7.92
				TOTAL:	**25.90**

63401-1520 PAVEMENT MARKINGS: SOLID WHITE

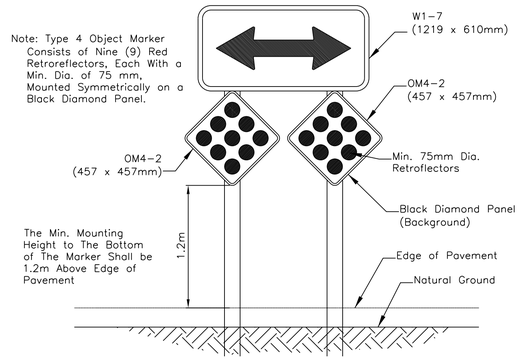
STATION TO STATION			LOCATION	DESCRIPTION	LENGTH(m)
0+103.576	To	0+003.697	North Round-a-bout	300 mm wide	99.97
0+029.371	To	0+036.307	North Round-a-bout	300 mm wide	7.00
0+063.014	To	0+069.955	North Round-a-bout	300 mm wide	7.01
				TOTAL:	**113.98**

ITEM 63401−1520 PAVEMENT MARKINGS, TYPE "H", SOLID WHITE 102 mm WIDE

STATION TO STATION	LOCATION	DESCRIPTION	LENGTH(m)
N6330(1) STATIONING			
1+004.800 to 1+617.530	Rt.	Solid White	612.73
1+004.800 to 1+617.530	Lt.	Solid White	612.73
Minus (1) 4.50 m T.O. @ 20.67 m		Solid White	−20.67
Minus (1) 9.00 m T.O. @ 37.17 m		Solid White	−37.17
		SUB−TOTAL:	1,167.62
N6331(2) STATIONING			
33+920.000 to 37+560.530	Rt.	Solid White	3,640.53
Minus (3) 4.50 m T.O. @ 20.67 m		Solid White	−62.01
Minus (4) 7.00 m T.O. @ 35.17 m		Solid White	−140.68
Minus 36.57 m @ N6330		Solid White	−36.57
		SUB−TOTAL:	3,401.27
33+901.882 to 37+560.053	Lt.	Solid White	3,640.53
Minus (7) 4.50 m T.O. @ 20.67 m		Solid White	−144.69
Minus (1) 6.39 m T.O. @ 22.56 m		Solid White	−22.56
Minus (14) 7.00 m T.O. @ 35.17 m		Solid White	−492.38
		SUB−TOTAL:	2,980.90
		GRAND−TOTAL:	7,549.79



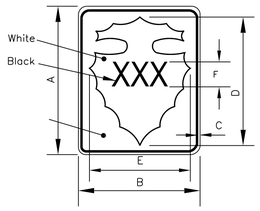
TYPE 3 OBJECT MARKER
CONCRETE BARRIER INSTALLATION
STATION 1+119.00 Lt. & Rt.
STATION 1+090.00 Lt. & Rt.



PERMANENT BARRICADE SIGN
Intersection of N6330 With N6331

ITEM 63401−1510 PAVEMENT MARKINGS, TYPE "H", SOLID YELLOW 102 mm WIDE

STATION TO STATION	LOCATION	DESCRIPTION	LENGTH(m)
N6330(1) STATIONS			
1+012.000 to 1+617.530	Lt. & Rt.	Double Yellow	1,211.06
N6331(2) STATIONS			
33+920.000 to 37+560.530	Lt. & Rt.	Double Yellow	7,207.92
		TOTAL	8,418.98



SIGN	DIMENSION (mm)					F NUMERALS				
	A	B	C	D	E	DIGITS IN ROUTE	1	2	3	4
MIN.	610	457	13	495	343	SIZE & SERIES (mm)	370	296	237	198

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

SIGN & STRIPING DETAILS AND QUANTITIES

DRAWN BY: WHPACIFIC DATE: 07/2007
DESIGNED BY: RDL DATE: 1/31/2013
REVISED: 07/20/16 BY: Design 2

Sht_56 Sign and Striping Details and Quantity_072015.dgn

Sht_56 Sign and Striping Details and Quantity_072015.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)	57	96
			N6331	N6331(1-2)		

PERMANENT ROADSIDE SIGNS FOR N6331(1-2) AND SPUR ROAD

STATION	LOC.	SIGN DETAIL NO.	DESCRIPTION	SIGN PANEL SIZE (mm)	AREA OF SIGN (Sq. m.)	NO. Of TUBE	SIZE	TOTAL SIGN PANELS
0+980.00 Spur"C"	Lt. & Rt.	W11-2 W16-7P		762 x 762 610 x 305	0.58 0.19	1	50mm x 50mm	2
0+948.00 Spur"C"	Rt.				0.84			
1+005.00 Spur"C"	Lt.				0.84			
1+050.00 Spur"C"	Lt.	R1-1	STOP	914 x 914	0.84	2	50mm x 50mm	5
1+532.00 Spur"C"	Lt.				0.84			
0+015.00 Spur"A"	Lt.				0.84			
N21(3A)Spur A								
0+122.00 Spur"A"	Lt.				0.58			
0+222.00 Spur"A"	Lt.				0.58			
0+235.00 Spur"A"	Rt.	R1-1	STOP	762 x 762	0.58	1	44mm x 44mm	7
0+355.00 Spur"A"	Lt.				0.58			
0+420.00 Spur"A"	Lt.				0.58			
0+725.00 Spur"A"	Rt.				0.58			
0+772.00 Spur"A"	Rt.				0.58			
0+090.00 Spur"A"	Lt.	W3-1		762 x 762	0.58	1	44mm x 44mm	1
N21(3A)Spur A								
0+090.00 Spur"A"	Rt.	M-1	21	457 x 610	0.29	1	38mm x 38mm	1
0+710.00 Spur"A"	Lt.	M-1	21	457 x 610	0.29	1		1
0+910.00 Spur"C"	Lt.				0.52			
1+550.00 Spur"C"	Rt.	W14-3	NO PASSING ZONE	914 x 1219 x 1219	0.52	2	50mm x 50mm	3
0+035.00 Spur"A"	Lt.				0.52			
0+750.00 Spur"A"	Rt.				0.52			
0+910.00 Spur"C"	Rt.	R4-1	DO NOT PASS	610 x 762	0.46	1	44mm x 44mm	4
1+550.00 Spur"C"	Lt.	R4-1		610 x 762	0.46	1		
0+035.00 Spur"A"	Rt.	R4-1		610 x 762	0.46	1		
0+750.00 Spur"A"	Lt.	R4-1		610 x 762	0.46	1		
1+460.00 Spur"B"	Rt.	W8-3 Plate Supplemental	PAVEMENT ENDS 300 FT.	914 x 914 610 x 457	0.84 0.28	2	57mm x 57mm	1
0+065.00 Spur"A"	Rt.	R2-1	SPEED LIMIT 30	610 x 762	0.46	1	44mm x 44mm	2
0+735.00 Spur"A"	Lt.	R2-1						

N6331(1-2)

63302-2003; Sign Installation, 1 Post 50mm x 50mm Square Steel Tube	Subtotal:	0.77	m^2
63302-2002; Sign Installation, 1 Post 44mm x 44mm Square Steel Tube	Subtotal:	0.92	m^2
63302-2006; Sign Installation, 2 Post 50mm x 50mm Square Steel Tube	Subtotal:	4.40	m^2
63302-2007; Sign Installation, 2 Post 57mm x 57mm Square Steel Tube	Subtotal:	1.12	m^2

N21(3A)

63302-2001; Sign Installation, 1 Post 38mm x 38mm Square Steel Tube	Subtotal:	0.58	m^2
63302-2002; Sign Installation, 1 Post 44mm x 44mm Square Steel Tube	Subtotal:	6.48	m^2
63302-2006; Sign Installation, 2 Post 50mm x 50mm Square Steel Tube	Subtotal:	1.88	m^2

63401-1520 PAVEMENT MARKINGS: SOLID WHITE

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH(m)
N6331(1-2); 0+920	To	1+095.575	Left	Solid White	165.58
Minus (2) 7.0m wide T.O. @ 35.172m					(70.34)
0+920	To	1+102.292	Right	Solid White	172.29
Minus (1) 7.0m wide T.O. @ 35.172m					(35.17)
1+095.575	To	0+782.404	left	North Roundabout	73.83
1+102.292	To	1+207.619	right	North Roundabout	89.54
1+200.902	To	0+782.462	left	South Roundabout	76.48
1+207.619	To	EOP; 1+541.25	left	Solid White	333.63
Minus (1) 7.0m wide T.O. @ 35.172m					(35.17)
1+200.902	To	EOP; 1+541.25	Right	Solid White	340.35
Minus (1) 4.5m wide T.O. @ 20.672m					(20.67)
Spur; 0+005.10	To	0+782.404	left	Solid White	778.00
Minus (4) 7.0m wide T.O. @ 35.172m					(140.69)
Spur; 0+005.10	To	0+782.404	Right	Solid White	778.00
Minus (2) 4.5m wide T.O. @ 41.344m					(41.34)
Minus (3) 7.0m wide T.O. @ 35.172m					(105.52)
varies	To	varies	North Roundabout	Island Splitter	8.16
varies	To	varies	South Roundabout	Island Splitter	8.16
varies	To	varies	East Roundabout	Island Splitter	8.16
varies	To	varies	North Chapter	parking lanes	255.59
varies	To	varies	West Chapter	parking lanes	306.22
varies	To	varies	South Chapter	parking lanes	661.85
varies	To	varies	Chapter entrance	edge lines	304.00
				TOTAL:	3,910.94

PERMANENT ROADSIDE SIGNS FOR ROUNDABOUT

STATION	LOC.	SIGN DETAIL NO.	DESCRIPTION	SIGN PANEL SIZE (mm)	AREA OF SIGN (Sq. m.)	NO. Of TUBE	SIZE	TOTAL SIGN PANELS
1+132.00 Spur"C"	Rt.				0.25			
1+172.00 Spur"B"	Lt.	R1-2	YIELD	762 x 762 x 762	0.25	1	38mm x 38mm	3
0+795.00, Spur"A"	Rt.				0.25			
0+791.00 Spur"A"	Lt.				0.77			
1+791.00 Spur"A"	Rt.				0.77			
1+125.00 Spur"C"	Rt.	W11-2		762 x 762	0.77	1	50mm x 50mm	6
1+125.00 Spur"C"	Lt.				0.77			
1+179.00 Spur"B"	Lt.	W16-7P		610 x 305	0.77			
1+179.00 Spur"B"	Rt.				0.77			
1+115.00 Spur"C"	℄				0.46			
0+185.00 Spur"B"	℄	R4-7		610 x 762	0.46	1	44mm x 44mm	3
0+760.00 Spur"A"	℄				0.46			
1+095.00 Spur"C"	Rt.				0.58			
1+210.00Spur"B"	Lt.	W3-2		762 x 762	0.58	1	44mm x 44mm	3
0+758.00 Spur"A"	Rt.				0.58			
1+050.00 Spur"C"	Rt.	W2-6		762 x 762	0.95	1	57mm x 57mm	6
1+250.00 Spur"B"	Lt.				0.95			
0+705.00 Spur"A"	Rt.	W13-1P	15 MPH	610 x 610	0.95			
1+145.00 Spur"C"	Inside	W1-6	ONE WAY	1219 x 610	1.67	2	57mm x 57mm	3
1+160.00 Spur"B"	Cirular	W1-8a		1524 x 610	1.67			3
0+807.00 Spur"A"					1.67			
0+920.00 Spur"C"	Rt.	R2-1	SPEED LIMIT 15	610 x 762	0.46	1	44mm x 44mm	2
1+080.00 Spur"C"	Lt.	R2-1		610 x 762	0.46			
1+480.00 Spur"B"	Lt.	R2-1		610 x 762	0.46			

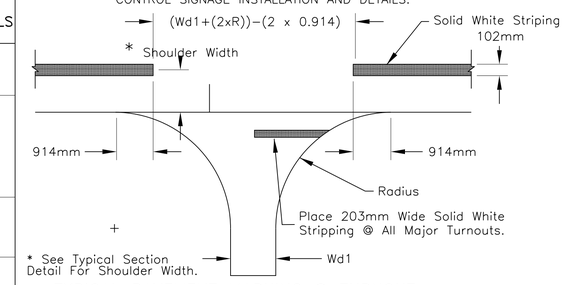
63302-2001; Sign Installation, 1 Post 38mm x 38mm Square Steel Tube	Subtotal:	0.75	m^2
63302-2002; Sign Installation, 1 Post 44mm x 44mm Square Steel Tube	Subtotal:	3.12	m^2
63302-2003; Sign Installation, 1 Post 50mm x 50mm Square Steel Tube	Subtotal:	4.62	m^2
63302-2004; Sign Installation, 1 Post 57mm x 57mm Square Steel Tube	Subtotal:	2.88	m^2
63302-2007; Sign Installation, 2 Post 57mm x 57mm Square Steel Tube	Subtotal:	5.01	m^2

PERMANENT ROADSIDE SIGNS FOR CHAPTER HOUSE PARKING LOT

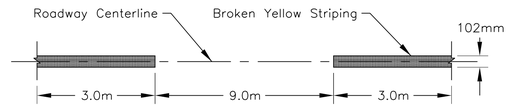
STATION	SIGN DETAIL NO.	DESCRIPTION	SIGN PANEL SIZE (mm)	AREA OF SIGN (Sq. m.)	NO. Of TUBE	SIZE	TOTAL SIGN PANELS
Varies	R7-8a	RESERVED PARKING ONLY	457 x 610	0.28	1	44mm x 44mm	4
	R7-8P	VAN ACCESSIBLE	457 x 229	0.11	1		
Varies	R7-8	RESERVED PARKING	457 x 610	0.28 0.28 0.28	1	38mm x 38mm	8

63302-2001; Sign Installation, 1 Post 38mm x 38mm Square Steel Tube	Subtotal:	2.24	m^2
63302-2002; Sign Installation, 1 Post 44mm x 44mm Square Steel Tube	Subtotal:	1.56	m^2

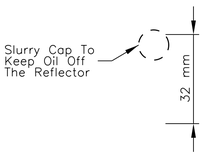
1. SEE SHEET 52 & 53 FOR PERMANENT TRAFFIC CONTROL SIGNAGE INSTALLATION AND DETAILS.



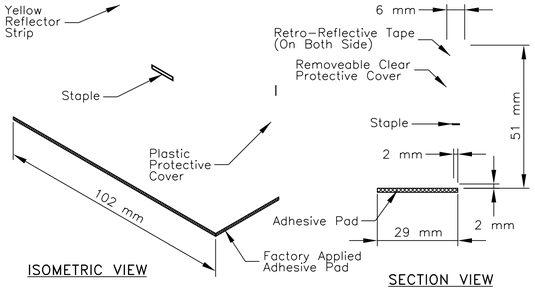
TYPICAL PAVEMENT MARKING @ TURNOUT



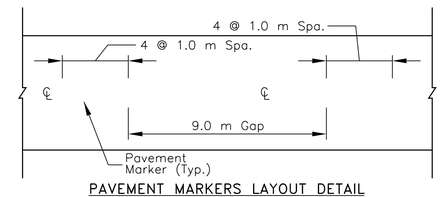
TYPICAL PAVEMENT MARKING "BROKEN YELLOW"



PROTECTIVE COVER DETAIL



ISOMETRIC VIEW SECTION VIEW



PAVEMENT MARKERS LAYOUT DETAIL

ITEM 63502-3000 TEMP. TRAFFIC CONTROL
RAISED PAVEMENT MARKER, YELLOW TYPE Y-2

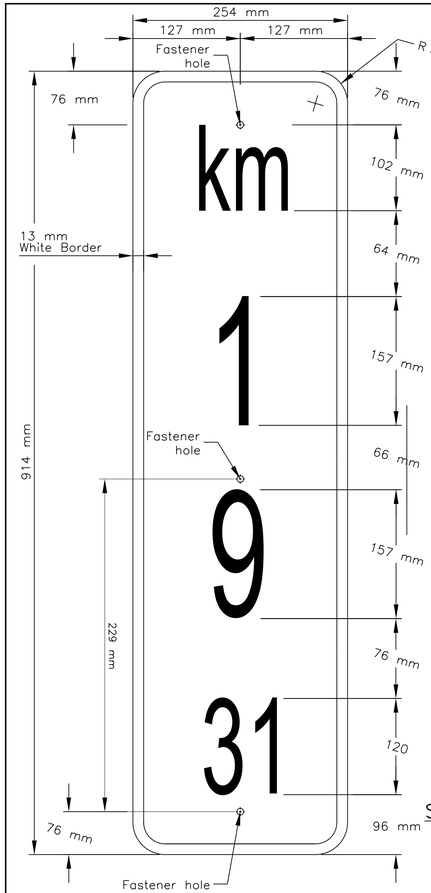
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

Striping & Signing Details & Quantites

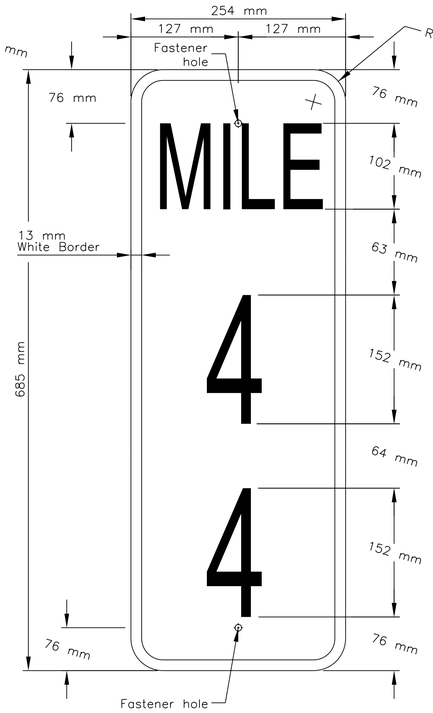
DRAWN BY: NRDOT	DATE: 7/31/2015
DESIGNED BY: NRDOT	DATE: 7/31/2015
REVISED: 11/3/2017	BY: Gerald.Hood
Sht_57 Striping and Signing Details073115.dgn	

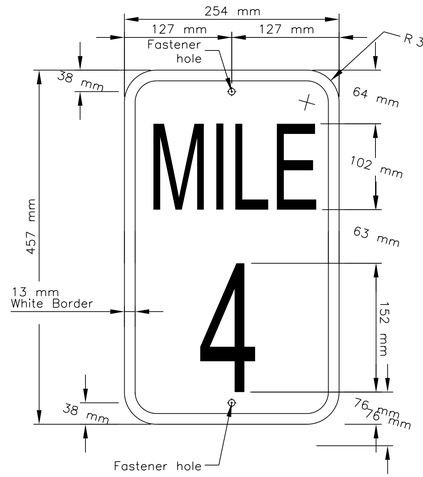
Sht_57 Striping and Signing Details073115.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	58	96
			N6330	N6330(1)2&4		
			N6331	N6331(1-2)(2)2&4		

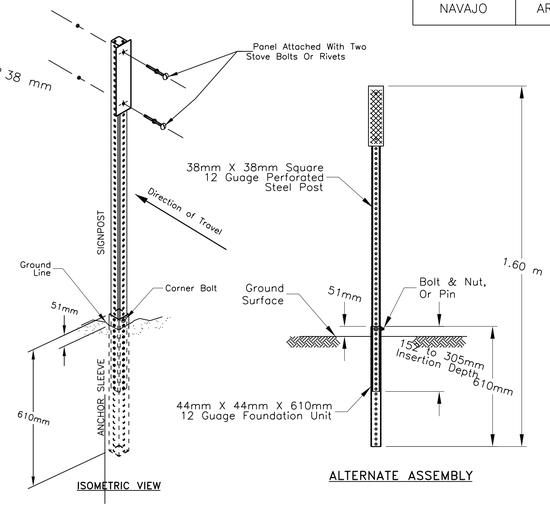


STANDARD NUMERAL POSITION





TYPICAL MILEPOST DETAIL

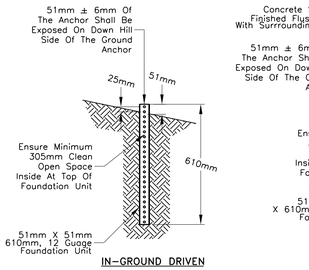


ISOMETRIC VIEW

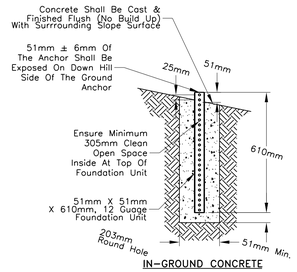
ALTERNATE ASSEMBLY

GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS A(AE) AND SHALL CONFORM TO SECTION 601 OF THE FP-03. FURNISHING AND PLACING OF CONCRETE, WHEN REQUIRED, SHALL BE CONSIDERED INCIDENTAL TO ITEM 63309-0020.
2. THE CONTRACTOR SHALL USE 51mm X 51mm ALL STEEL SQUARE TUBE DELINEATORS. SEE SHEET 59 & 60 FOR POST SPACING.
3. THE MILE POSTS SHALL BE PLACED ON BOTH SIDE OF THE ROADWAY WITH ENGLISH UNITS PANEL ON APPROACHING TRAFFIC AND METRIC UNITS PANEL ON OPPOSING TRAFFIC.
4. MILE POST PLATES SHALL BE FABRICATED FROM 16 GAGE MINIMUM THICKNESS 5052-H38 OR 6061-T6 ALUMINUM ALLOY.
5. ALL SURFACE TO BE COVERED WITH REFLECTIVE SHEETING, AND SHALL BE PREPARED IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION SECTION 718.11, TABLE 718-3.
6. THE BORDER AND LEGEND SHALL BE STANDARD REFLECTIVITY SILVER-WHITE. THE BACKGROUND SHALL BE STANDARD REFLECTIVITY GREEN AND MAY BE REVERSE SILK-SCREENED.
7. THE BACK SIDE OF THE ALUMINUM SHEETS SHALL BE ETCHED BY APPROVED METHODS TO REDUCE GLARE FROM REFLECTED SUNLIGHT.
8. STEEL POSTS SHALL CONFORM TO ASTM A499- YIELD POINT AND TENSILE STRENGTH OF STEEL SHALL BE 550 & 689 MPa (MINIMUM) RESPECTFULLY AND SHALL NOT WEIGHT LESS THAN 2.98 kg/m. AN APPROVED ALTERNATE BREAKAWAY ASSEMBLY MAY BE SUBMITTED TO THE COR/AOTR FOR REVIEW AND APPROVAL PRIOR TO IT'S USE. THE POSTS SHALL BE GALVANIZED AFTER FABICATION IN ACCORDANCE WITH ASTM A-123.
9. INSTALL MILE POST MARKER 1.80 METER (MAXIMUM) FROM ROADWAY SHOULDER. AT GUARDRAIL LOCATIONS, THE MILE POST MARKER SHALL LINE UP WITH THE GUARDRAIL POSTS.
10. THE POSTS LENGTH SHALL BE DETERMINED IN THE FIELD BASED ON FINISH GROUND ELEVATION WITH RESPECT TO EDGE OF PAVEMENT ELEVATION.
11. THE UNIT PRICE BID FOR FURNISHING AND INSTALLING MILE POSTS SHALL INCLUDE ALL MATERIALS INCLUDING TWO SIGNS PER POST.

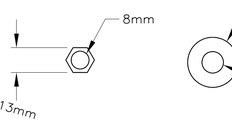


IN-GROUND DRIVEN

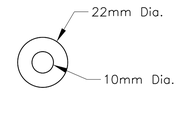


IN-GROUND CONCRETE

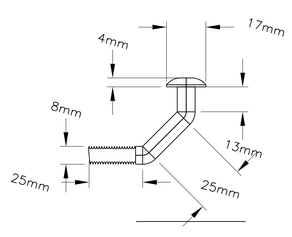
Use Chair Device To Ensure Minimum 51mm Clearance Above Bottom Of Hole



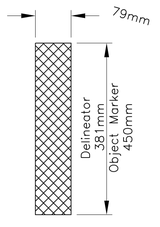
LOCK NUT



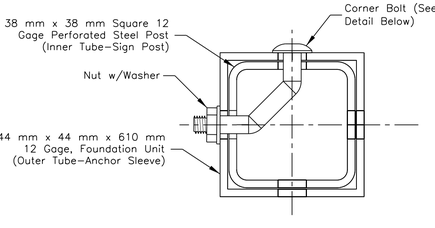
FLAT WASHER



BREAK-AWAY BOLT



REFLECTIVE PANEL
(Pre-Drilled/Punched)

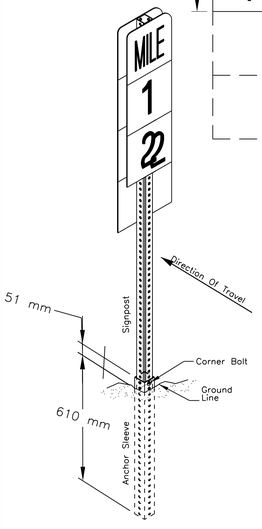


"BREAK-AWAY" DETAIL
SIGN POST/SLEEVE INTERFACE

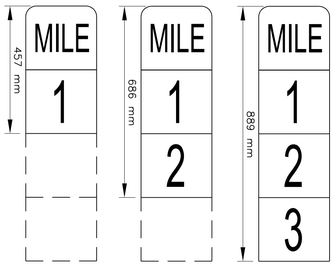
ITEM NO. 63318-1000: MILE POST

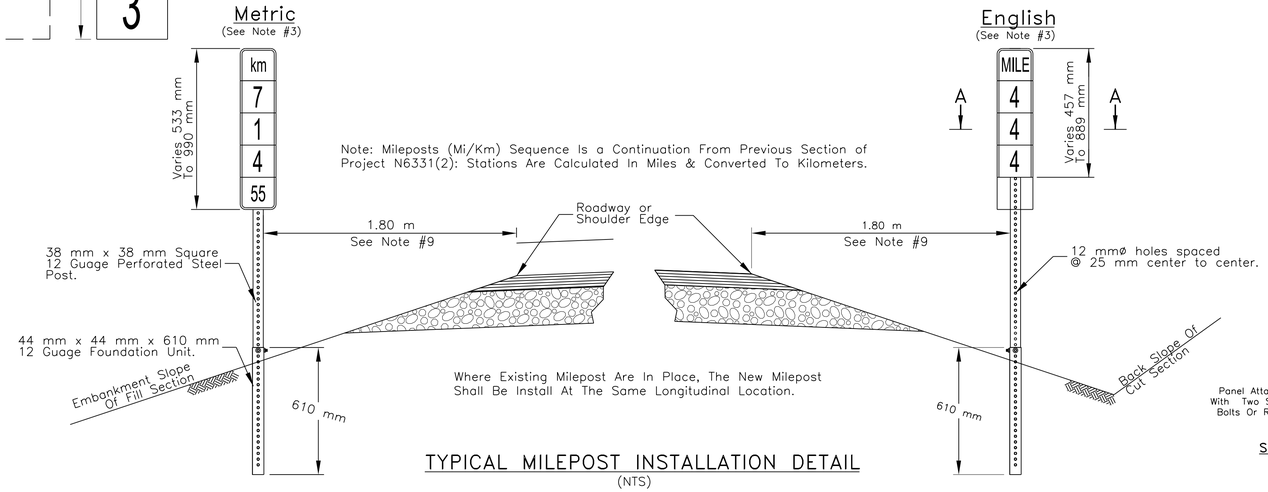
N6330 1- POST & HARDWARE: 38 x 38mm Square Tube					
STATION	LOCATION	METRIC	ENGLISH	QUANTITY (Each)	
Sta. 1+614.144	Lt. & Rt.	1.61	1	2	2
SUB TOTAL:				2	2
N6331					
Sta. 35+405.564	Lt. & Rt.	1.61	23	2	2
Sta. 37+014.908	Lt. & Rt.	3.22	24	2	2
SUB TOTAL:				4	4
N21(3A)					
Sta. 1+614.202	Lt. & Rt.	1.61	1	2	2
SUB TOTAL:				2	2
GRAND TOTAL:				8	8

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

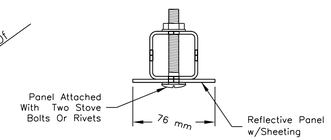


ISOMETRIC VIEW
NOTE: Square Tube Splice Connection Detail on Sheet 59





TYPICAL MILEPOST INSTALLATION DETAIL
(NTS)



SQUARE TUBE POST AND PANEL

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

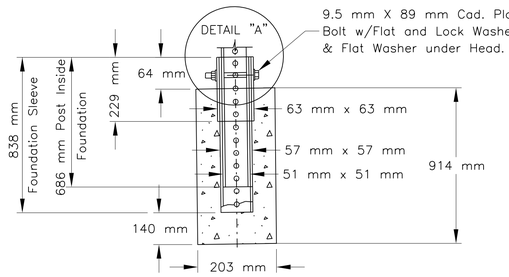
SQUARE TUBE, STEEL POST, REFLECTIVE PANEL & MILE POST MARKER DETAILS

DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 08/12/2015	BY: Design 2

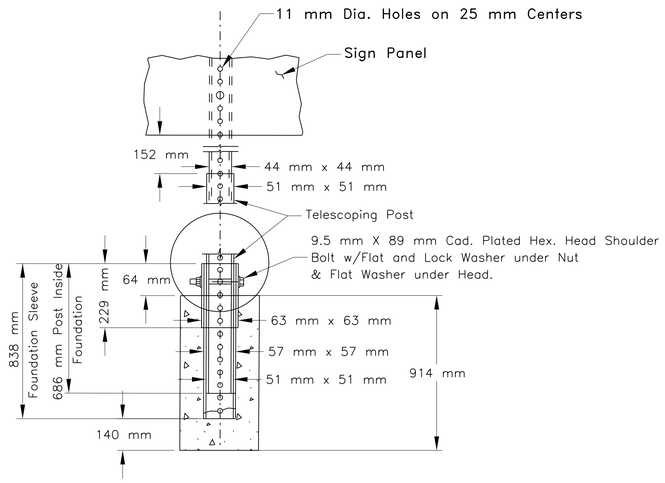
Sht_58 Square Tube Steel Post for Mile Post Marker Details 062016.dgn

Sht_58 Square Tube Steel Post for Mile Post Marker Details 062016.dgn

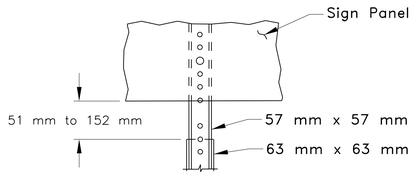
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	59	96
			N6331	N6331(1–2)(2)2&4		
			N21	N21(3A)		



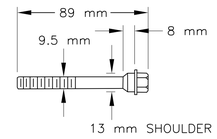
SINGLE POST FOUNDATION DETAIL



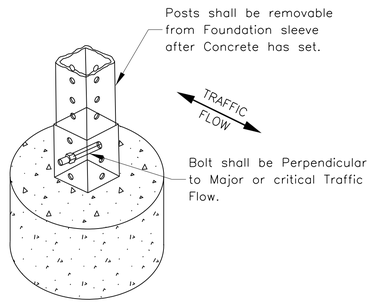
TELESCOPING POST DETAIL



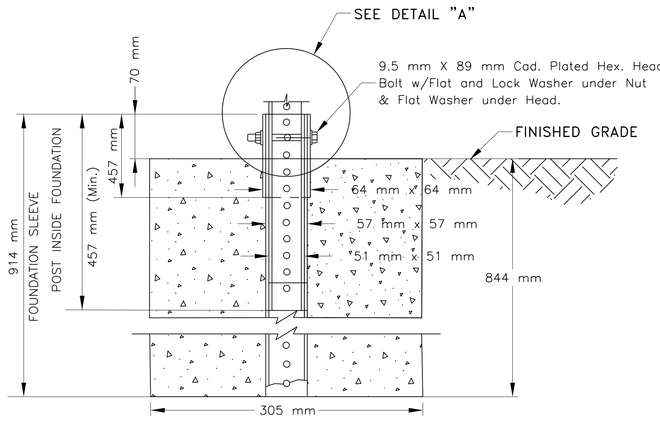
TELESCOPING POST INSTALLATION



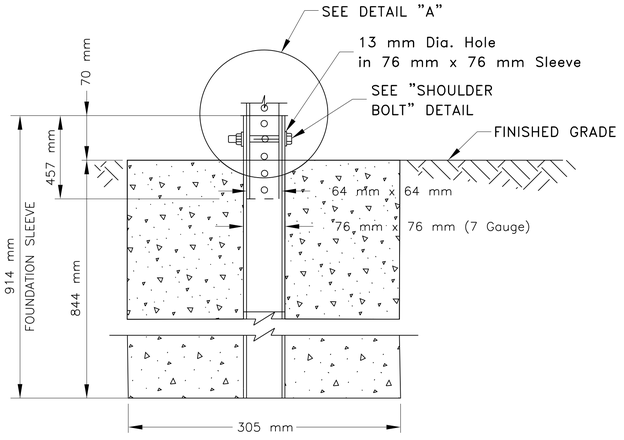
SHOULDER BOLT (HEAD)



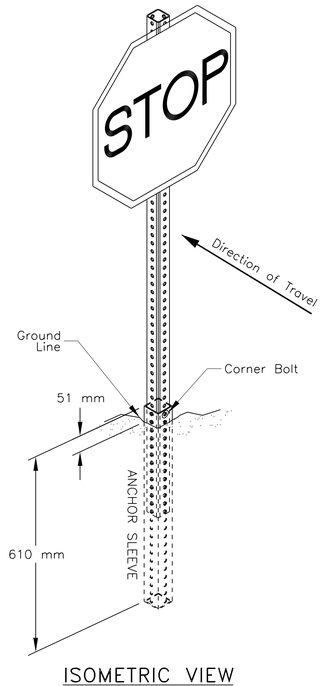
DETAIL "A"



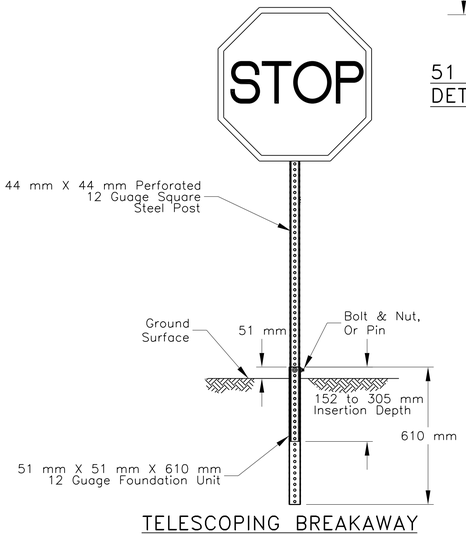
51 mm SINGLE POST CONCRETE FOUNDATION DETAIL (IN WEAK SOILS OR SANDSTONE)



64 mm SINGLE POST CONCRETE FOUNDATION DETAIL (IN WEAK SOILS OR SANDSTONE)



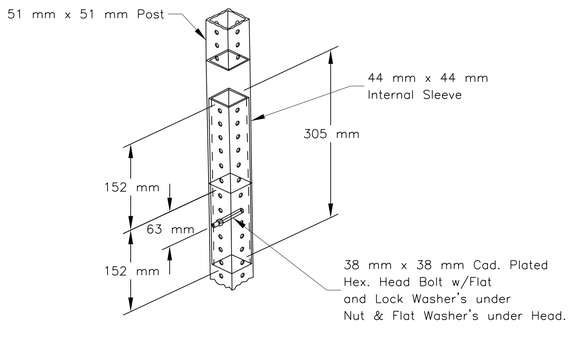
ISOMETRIC VIEW



TELESCOPING BREAKAWAY

(Single Post)
For all other soils

Note: Post size shown will vary depending upon the size of sign.



SINGLE POST PERMISSIBLE FIELD SPLICE

(Not allowed on Telescoping Post)

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

SQUARE TUBE POST BREAK-A-WAY AND SIGN MOUNTING DETAILS

DRAWN BY: NRDOT	DATE: 1/23/2015
DESIGNED BY: NRDOT	DATE: 1/23/2015
REVISED: 07/08/2015	BY: Design 2

Sht_59 Steel Tube Post Break-a-way and Sign Mounting Details 072215.dgn

Sht_59 Steel Tube Post Break-a-way and Sign Mounting Details 072215

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	60	96
			N6331	N6331(2)2&4		
			N21	N21(3A)		

Galvanized Square Tube Selection; Single post - 2.80 mm thickness (12gage)

Post Size	H = C+(D/2) (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H (m)
38 mm x 38 mm	0.51	0.43	0.37	0.31	n/a	<=Maximum Sign Area (m^2)
44 mm x 44 mm	0.81	0.68	0.58	0.47	0.41	
50 mm x 50 mm	1.14	0.95	0.84	0.70	0.58	
57 mm x 57 mm	1.49	1.27	1.07	0.95	0.84	
64 mm x 64 mm	1.88	1.68	1.41	1.25	1.07	
	5.00	6.00	7.00	8.00	9.00	<--- H (ft)

Galvanized Square Tube Selection; Double post - 2.80 mm thickness (12 gage)

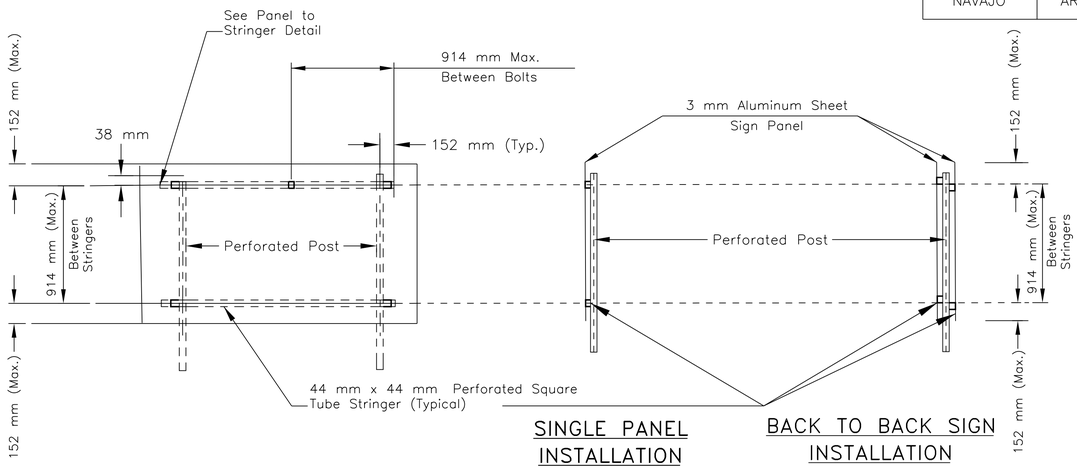
Post Size	H = C+(D/2) (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H (m)
57 mm x 57 mm	n/a	2.97	2.23	2.04	1.95	<=Maximum Sign Area (m^2)
64 mm x 64 mm	n/a	4.09	3.53	3.16	2.60	
	5.00	6.00	7.00	8.00	9.00	<--- H (ft)

Galvanized Square Tube Selection; Triple post - 2.80 mm thickness (12 gage)

Post Size	H = C+(D/2) (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H (m)
57 mm x 57 mm	4.74	4.74	3.85	2.83	2.61	<=Maximum Sign Area (m^2)
64 mm x 64 mm	6.13	6.13	5.30	4.46	3.90	
	5.00	6.00	7.00	8.00	9.00	<--- H (ft)

Guide Sign Post Dimensions
(Not for use with Warning, Regulatory or Marker Panels)

Panel Width	914 mm	1.22 m	1.52 m	1.83 m	2.13 m	2.44 m	2.74 m	3.05 m
two posts spacing (A)	559 mm	711mm	914 mm	1.12 m	1.27 m	1.47 m	1.63 m	1.83 m
bolts to panel (per stringer)	-	-	3	3	3	3	4	4
length of each stringer	-	-	1.22 m	1.42 m	1.57 m	1.78 m	1.93 m	2.13 m
three posts spacing (B)	-	-	533 mm	635 mm	737 mm	864 mm	965 mm	1.07 m
bolts to panel (per stringer)	-	-	3	3	3	4	4	4
length of each stringer	-	-	1.37 m	1.57 m	1.78 m	2.03 m	2.24 m	2.44 m



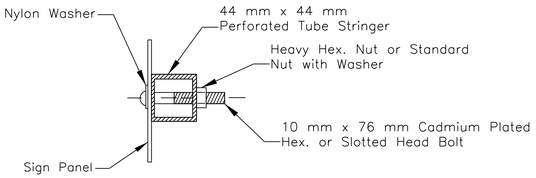
SINGLE PANEL INSTALLATION

BACK TO BACK SIGN INSTALLATION

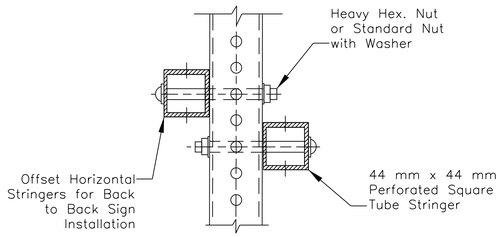
STRINGER DETAILS (FOR GUIDE SIGNS UP TO AND INCLUDING 3.05 mm WIDE)

GENERAL NOTES:

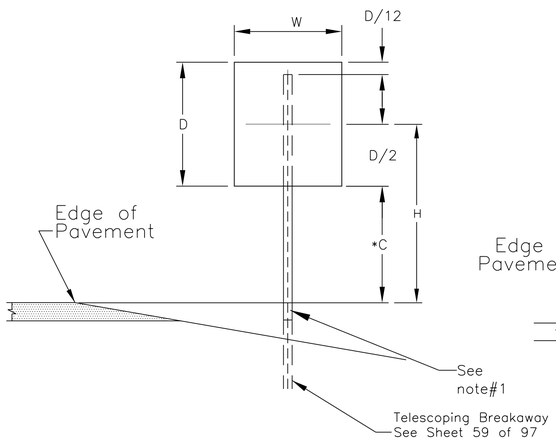
1. THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE LENGTH OF SIGN SUPPORT POST(S). THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE FOR THE APPROPRIATE BID ITEMS SHOWN IN THE BID SCHEDULE.
2. SIGNS GREATER THAN 762 mm IN WIDTH SHALL BE MOUNTED ON TWO OR MORE POSTS.
3. CONCRETE FOUNDATION SHOULD NOT BE USED IN LOCATIONS PROTECTED BY GUARDRAIL,BARRIER, OR OUTSIDE THE CLEAR ZONE.
4. STEEL POSTS SHALL BE UNIFORM DESIGN. THE POST SHALL BE PUNCHED WITH CONTINOUS 9mm HOLES ON 25mm INTERVAL ON CENTERS FOR THE ENTIRE LENGTH OF POST.
5. STEEL POSTS SHALL BE MACHINED STRAIGHTENED TO HAVE A SMOOTH UNIFORM FINISH, FREE FROM DEFECTS AFFECTING STRENGTH, DURABILITY, AND APPEARANCE. ALL HOLES AND EDGES SHALL BE FREE OF BURRS. THE PERMISSABLE TOLERANCE FOR STRAIGHTNESS SHALL BE WITHIN 6.35mm IN 1.52 METER.
6. STEEL POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM 123. BOLTS, NUTS, AND WASHERS SHALL BE CADMIUM PLATED IN ACCORDANCE WITH ASTM A-165 OR ZINC PLATED IN ACCORDANCE WITH ASTM B-633.
7. SPLICE HARDWARE SHALL CONSIST OF TWO FULLY THREADED, 8mm X 38mm GRADE-9 PLATED HEX HEAD BOLTS, FLAT WASHERS, AND SELF LOCKING HEX NUTS PER POST. IN ADDITION, ONE 19mm X 127mm PLATED SPACER BAR PER POST, TO STIFFEN THE SPLICE CONNECTION. EACH SPACER SHALL BE DRILLED AND TAPPED WITH 8mm-18 UNC THREADS. THE SPACER SHALL BE FABRICATED FROM HOT ROLLED CARBON STEEL BAR CONFORMING TO ASTM A-36 OR M-1020.
8. BOLTS AND LOCK NUT HARDWARE FOR SIGN ATTACHMENT SHALL BE CARRIAGE HEAD TYPE, 8mm-18 UNC, AND SHALL BE CADMIUM PLATED CONFORMING TO ASTM B-766.
9. AN APPROVED ALTERNATE BREAKAWAY SYSTEM AND SIGN SUPPORT POST ASSEMBLY MAY BE SUBMITTED TO THE COTR FOR REVIEW AND APPROVAL PRIOR TO IT'S USE.
10. THE CONTRACTOR HAS THE OPTION TO USE "ANTI-THIEF" NUTS IN LIEU OF JAMMING THE BOLT THREADS. NO ADDITIONAL PAYMENT WILL BE MADE IN RELATION TO USING ANTI-THIEF BOLTS.



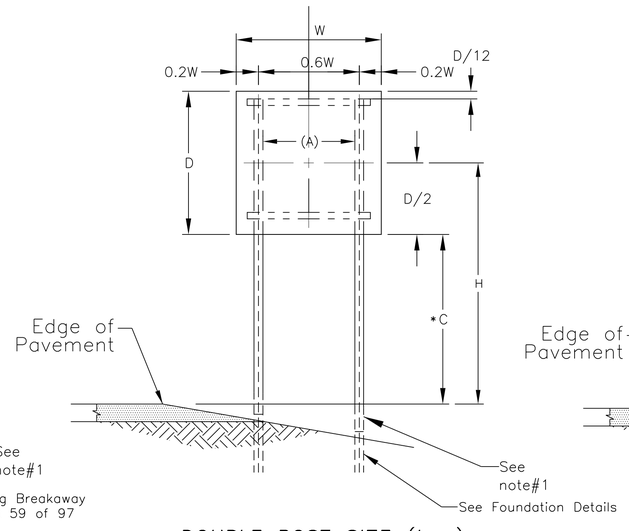
PANEL TO STRINGER OR POST



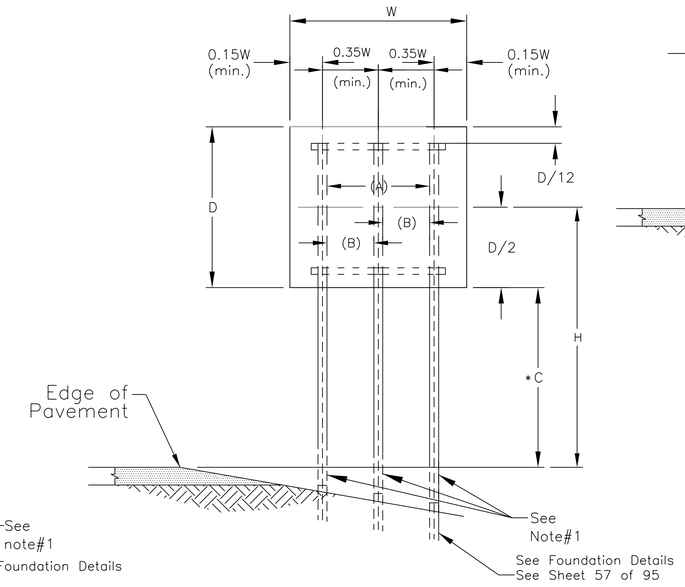
STRINGER TO POST



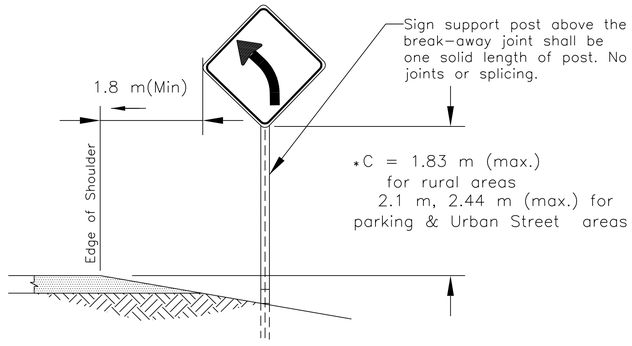
SINGLE POST SIZE (typ.)



DOUBLE POST SIZE (typ.)



THREE POST SIZE (typ.)



TYPICAL ROADSIDE SIGN LOCATION

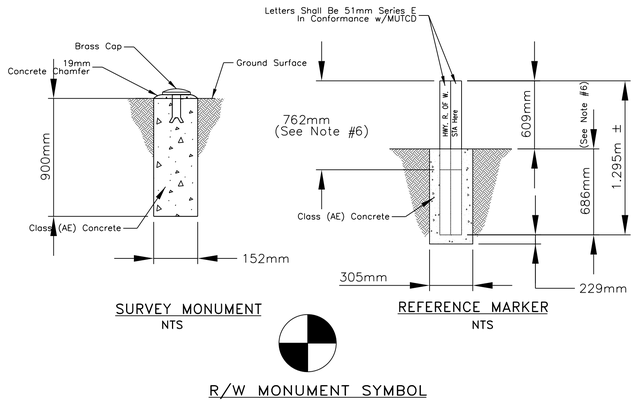
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SQUARE TUBE POST SELECTION AND SIGN MOUNTING DETAILS

DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 7/08/15	BY: Design 2
Sht_60 Square Tube Post Section and Sign Mounting Details072215.dgn	

Sht_60 Square Tube Post Section and Sign Mounting Details072215.dgn

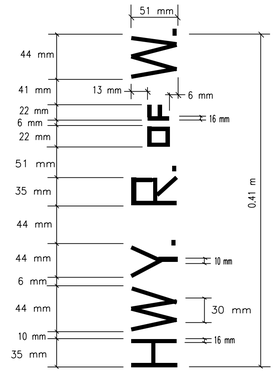
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	61	96
			N6331	N6331(1-2)(2)2&4		
			N21	N21(3A)		



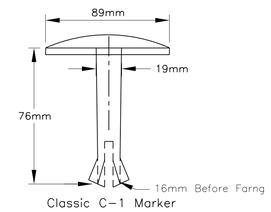
SURVEY MONUMENT
NTS

REFERENCE MARKER
NTS

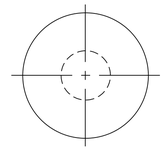
R/W MONUMENT SYMBOL



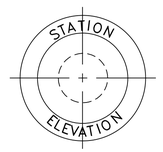
DETAIL OF LETTERS



BRASS CAP DETAIL



BOTTOM VIEW



TOP VIEW

GENERAL NOTES

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

TYPE	POST COLOR	HIGH INTENSITY REFLECTIVE SHEETING
1a	White	White, One Side
1b	White	White, Both Sides
2	Yellow	Amber, One Side

RADIUS OF CURVE (m)	APPROXIMATE SPACING (S) ON CURVE (m)	SPACING ON ADVANCE OF OR BEYOND A CURVE (m)		
		A (2S)	B (3S)	C (6S)
15	6	12	18	36
35	8	16	24	48
55	11	22	33	66
75	13	26	39	78
95	15	30	45	90
125	18	36	54	108
155	20	40	60	120
185	22	44	66	132
215	24	48	72	144
245	26	52	78	156
275	27	54	81	162
305	29	58	87	174
400	33	67	100	200
500	37	75	112	225
600	41	82	123	247
700	44	89	133	267
800	48	95	143	286
900	51	101	152	303
1000	53	107	160	320
1500	66	131	197	393
2000	76	151	227	454
2500	85	169	254	508
3000	93	186	279	557
3500	100	201	301	602
4000	107	215	322	644
4500	114	228	342	683
5000	120	240	360	720
5500	126	252	378	755
6000	132	263	395	789

S= 1.7 * sq. rt.(R-15).
Spacing for specific radii may be interpolated from table.
The spacing on curves should not exceed 90 meters.
Shaded areas denotes to use 90 meter spacings.
Delineators should be spaced 60 to 160 meters 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.

RIGHT-OF-WAY MONUMENT TABLE

N6330(1) LEFT OF CENTERLINE				
STATION	QUANTITY (EA.)	OFFSET (m)	NORTH	EAST
1+023.000	2	Begin R/W 23	622301.327	288728.598
1+034.735	2	23	622305.011	288739.740
1+070.349	2	23	622310.101	288768.252
1+070.349	2	50	622283.117	288769.177
1+137.436	2	50	622273.891	288807.863
1+137.436	2	23	622297.555	288820.865
1+374.989	2	23	622183.157	289029.059
1+492.719	2	23	622111.905	289107.423
1+631.212	2	23	621997.401	289185.328
	sub-total: 18			

N6330(1) RIGHT OF CENTERLINE				
STATION	QUANTITY (EA.)	OFFSET (m)	NORTH	EAST
1+023.000	2	Begin R/W 23	622345.004	288714.164
1+034.735	2	23	622348.687	288725.307
1+070.349	2	23	622356.074	288766.677
1+070.349	2	50	622383.058	288765.752
1+137.436	2	50	622361.532	288856.019
1+137.439	2	23	622337.868	288843.021
1+374.989	2	23	622223.472	289051.211
1+492.719	2	23	622137.781	289145.455
1+631.212	2	23	622023.278	289223.360
	sub-total: 18			

N6331(2)				
STATION	QUANTITY (EA.)	OFFSET (m)	NORTH	EAST
34+035.389	2	Begin R/W 23	619913.605	287980.851
34+203.967	2	23	620077.237	287997.795
34+793.049	2	23	620666.213	288008.926
35+001.294	2	23	620866.493	288102.087
35+391.209	2	23	621123.279	288395.504
35+732.423	2	23	621277.213	288708.996
35+732.423	2	15	621269.363	288710.538
36+039.692	2	15	621328.592	289012.043
36+309.923	2	15	621516.552	289111.088
36+381.173	2	15	621581.985	289082.891
36+468.010	2	15	621649.895	289038.344
36+574.499	2	15	621727.505	288965.428
36+574.499	2	23	621722.027	288959.598
36+630.069	2	23	621769.166	288922.891
36+827.521	2	23	621935.508	288816.506
36+939.947	2	23	622041.941	288765.868
37+368.333	2	23	622448.692	288631.453
37+409.315	2	23	622492.143	288620.949
37+473.445	2	23	622555.502	288611.033
37+564.627	2	23	622626.882	288579.245
	sub-total: 40			
	Grand-total: 58			

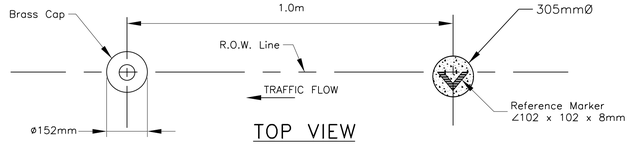
N6331(2)				
STATION	QUANTITY (EA.)	OFFSET (m)	NORTH	EAST
33+920.000	2	Begin R/W 15	619793.080	287997.082
33+920.000	2	23	619791.665	288004.539
34+035.389	2	23	619905.032	288026.045
34+203.967	2	23	620076.367	288043.787
34+793.049	2	23	620665.344	288054.917
35+001.294	2	23	620831.877	288132.381
35+391.209	2	23	621088.663	288425.798
35+732.423	2	23	621232.076	288717.863
36+039.692	2	23	621291.305	289019.368
36+309.923	2	23	621531.590	289145.985
36+381.173	2	23	621597.023	289117.789
36+468.010	2	23	621675.915	289066.039
36+574.499	2	23	621753.525	288993.122
36+630.069	2	23	621793.950	288961.644
36+827.521	2	23	621960.292	288855.258
36+827.521	2	14	621955.443	288847.676
36+939.947	2	14	622053.550	288801.000
37+969.976	2	14	622082.062	288791.578
37+969.976	2	23	622084.886	288801.123
37+197.929	2	23	622301.327	288728.598
37+243.929	2	23	622345.004	288714.164
37+368.333	2	23	622463.126	288675.130
37+409.315	2	23	622499.255	288666.396
37+473.445	2	23	622562.614	288656.480
37+564.614	2	23	622655.891	288614.946
	sub-total: 50			
	Grand-total: 68			

RIGHT-OF-WAY MONUMENT TABLE

N21(3A) SPUR "A" LEFT OF CENTERLINE				
STATION	QUANTITY (EA.)	OFFSET (m)	NORTH	EAST
0+033.961	2	Begin R/W 20	619766.566	287945.344
0+409.883	2	20	619778.974	287569.627
0+534.326	2	20	619796.468	287442.464
0+793.697	2	20	619858.227	287190.553
	sub-total: 8			
N6331(1-2) Begin from S/R 198				
* STATION	QUANTITY (EA.)	OFFSET (m)	NORTH	EAST
0+025.441	2	Begin R/W 23	621090.871	286917.604
0+075.295	2	23	621033.144	286965.946
0+414.174	2	23	620713.980	287102.749
1+016.093	2	23	620115.883	287170.469
1+197.119	2	23	619936.006	287190.836
1+215.000	2	23	619912.799	287190.721
1+215.000	2	38	619910.947	287205.748
1+265.000	2	38	619844.672	287173.596
1+265.000	2	23	619855.327	287162.840
1+280.000	2	23	619842.907	287147.832
1+280.000	2	11	619852.744	287141.208
1+285.867	2	11	619849.211	287135.497
1+637.623	2	11	619675.840	286829.434
	sub-total: 26			
	Grand-total: 34			

N21(3A) SPUR "A" RIGHT OF CENTERLINE				
STATION	QUANTITY (EA.)	OFFSET (m)	NORTH	EAST
0+027.733	2	Begin R/W 20	619806.339	287952.889
0+409.883	2	20	619818.952	287570.947
0+534.326	2	20	619835.317	287451.989
0+791.750	2	20	619896.613	287201.969
	sub-total: 8			
N6331(1-2) Begin from S/R 198				
* STATION	QUANTITY (EA.)	OFFSET (m)	NORTH	EAST
0+037.647	2	Begin R/W 23	621061.518	286882.551
0+075.295	2	23	621003.790	286930.893
0+414.174	2	23	620708.837	287057.320
1+015.873	2	23	620110.958	287125.015
1+197.119	2	23	619930.862	287145.406
1+285.867	2	23	619878.673	287118.808
1+637.623	2	23	619705.301	286812.745
	sub-total: 14			
	Grand-total: 22			

* STATION BASE ON RIGHT OF WAY PLAT



TOP VIEW

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

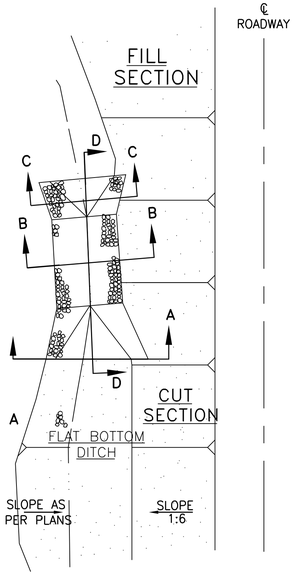
R/W MONUMENTS & DELINEATOR LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 1/31/2013
DESIGNED BY: NRDOT	DATE: 1/31/2013
REVISED: 7/22/15	BY: Design 2

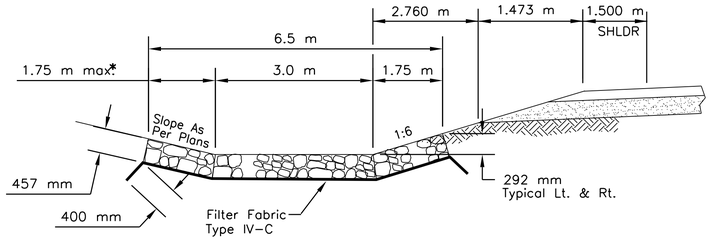
Sht_61 ROW Monuments & Delineator Details_rev101515.dgn

Sht_61 ROW Monuments & Delineator Details_rev101515.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	62	96
			N6331	N6331(2)2&4		

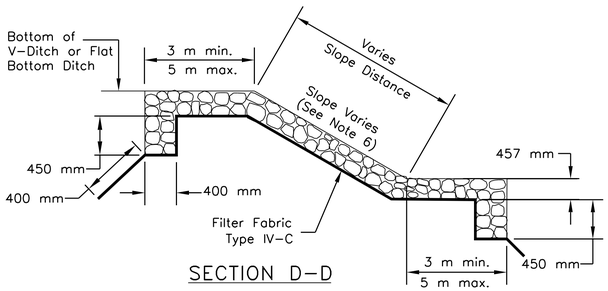


PLAN VIEW
CUT TO FILL TRANSITION AT FLAT BOTTOM DITCH

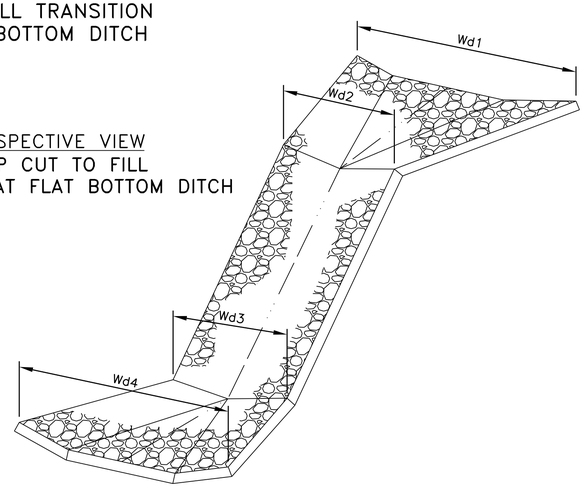


SECTION A–A & TYPICAL FLAT BOTTOM DITCH LINING DETAIL

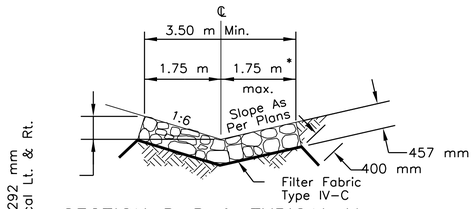
* Width=Depth Divided By Backslope(As Per Plans)



SECTION D–D

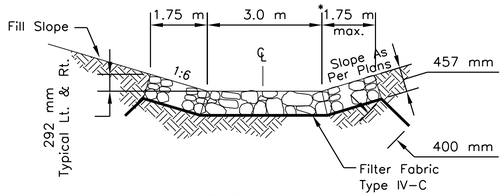


PERSPECTIVE VIEW
RIPRAP CUT TO FILL TRANSITION AT FLAT BOTTOM DITCH



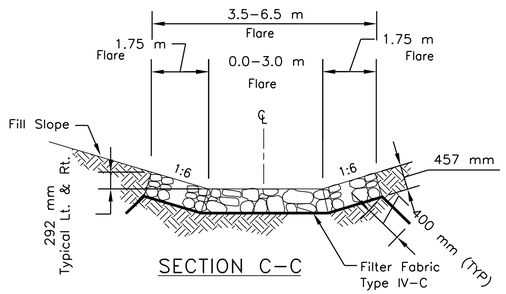
SECTION B–B & TYPICAL V–BOTTOM DITCH LINING DETAIL (PARKING LOT)

*Width=Depth Divided By Backslope(As Per Plans)



FLAT BOTTOM DITCH LINING

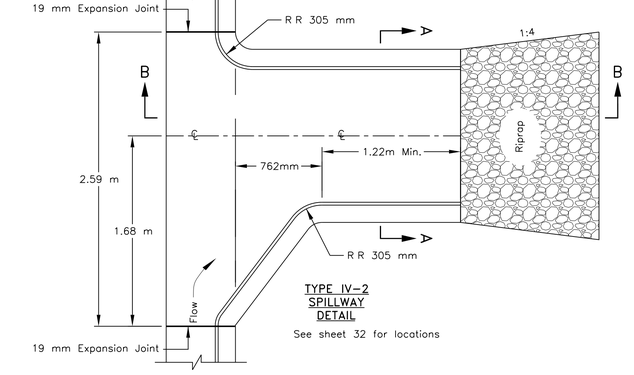
*Width=Depth Divided By Backslope(As Per Plans)



SECTION C–C

ITEM 25112 –2000 WIRE ENCLOSED RIPRA P, CLASS 2
N6330(1) LOCATION@ CUT TO FILL TRANSITION& DITCH LINING

STATION	TO	STATION	LOCATION	Wd1(m)	Wd2 (m)	Wd3 (m)	Wd4 (m)	THICKNESS (mm)	LENGTH (m)	VOLUME (m3)	REMARKS
1+120.000	to	1 +135.000	Lt.	N/A	3.50	3.50	6.50	457	15.00	37.35	Cut to Fill Transition
1+120.000	to	1 +135.000	Rt.	N/A	3.50	3.50	6.50	457	15.00	28.58	Cut to Fill Transition
1+135.000	to	1 +140.000	Rt.	N/A	3.50	3.50	N/A	457	5.00	29.42	Vee Ditch Lining
1 +315.000	to	1 +330.000	Rt.	N/A	3.50	3.50	6.50	457	15.00	38.52	Cut to Fill Transition
1 +330.000	to	1 +400.000	Rt.	N/A	3.50	3.50	N/A	457	70.00	105.79	Vee Ditch Lining
1+420.000	to	1 +560.000	Rt.	N/A	3.50	3.50	N/A	457	140.00	218.01	Vee Ditch Lining
1+325.000	to	1 +345.000	Lt.	N/A	3.50	3.50	6.50	457	20.00	43.75	Cut to Fill Transition
1 +345.000	to	1 +390.000	Lt.	N/A	3.50	3.50	N/A	457	45.00	72.62	Vee Ditch Lining
1+425.000	to	1 +560.000	Lt.	N/A	3.50	3.50	N/A	457	135.00	220.10	Vee Ditch Lining
N6331 (2)											
35+200.000	to	35+305.000	Lt.	N/A	3.50	3.50	N/A	457	105.00	180.27	Vee Ditch Lining
35+220.000	to	35+335.000	Rt.	N/A	3.50	3.50	N/A	457	15.00	188.88	Vee Ditch Lining
35+560.000	to	35+620.000	Lt.	N/A	6.50	6.50	N/A	457	60.00	176.92	Flat Bottom Ditch
35+620.000	to	35+640.000	Lt.	N/A	3.50	3.50	10.00	457	20.00	55.40	Cut to Fill Transition
37+520.000	to	37+537.000	Lt.	N/A	3.50	3.50	6.50	457	17.00	30.33	Cut to Fill Transition
									TOTAL	1,425.	



TYPE IV–2 SPILLWAY DETAIL

See sheet 32 for locations

ITEM 25101 –2000 PLACED RIPRAP, CLASS 2
LOCATION @ CUT TO FILL TRANSITION & DITCH LINING

N6330(1)	STATION	LOCATION	Wd1 (m)	Wd2 (m)	Wd3 (m)	Wd4 (m)	THICKNESS(mm)	LENGTH(m)	VOLUME(m3)	REMARKS
1+140.00	to 1+220.00	Rt.	N/A	3.50	3.50	N/A	457	80.00	135.70	V-Ditch Lining
N6331(2)										
34+986.00	to 35+134.00	Lt.	N/A	6.50	6.50	N/A	457	121.20	366.20	Flat Bottom Ditch Lining
37+073.00	to 37+101.00	Lt.	N/A	3.50	3.50	N/A	457	26.30	41.50	V-Ditch Lining
37+101.00	to 37+116.00	Lt.	N/A	3.50	3.50	N/A	457	16.70	26.90	V-Ditch Lining
								TOTAL	434.40	
N21(3A)										
1+552.52		Lt. & Rt.	N/A	3.50	3.50	N/A	457	5.00	8.00	Ditch Lining
								TOTAL	16.00	

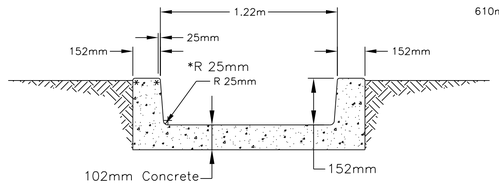
ITEM 25110– 2000 GROUTED RIPRAP, CLASS 2
LOCATION @ CUT TO FILL TRANSITION & DITCH LINING

N6331 (2)	STATION	LOCATION	Wd1 (m)	Wd2 (m)	Wd3 (m)	Wd4 (m)	THICKNESS(mm)	LENGTH(m)	VOLUME(m3)	REMARKS
35+740.00	to 35+940.00	Rt.	N/A	3.50	3.50	N/A	457	200.00	324.60	V-Ditch Lining
35+780.00	to 36+235.00	Lt.	N/A	3.50	3.50	N/A	457	391.60	610.70	V-Ditch Lining
								TOTAL	935.30	

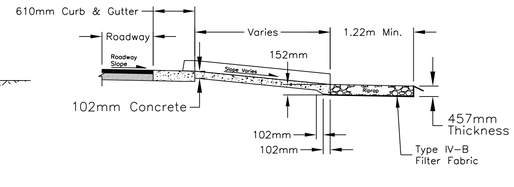
Placed & Wire Enclosed Riprap At Miscellaneous Locations

STATION	LOCATION	PLACED RIRRAP (m3)	WIRE ENCLOSED Riprap (m3)	REMARKS
1+092.500± N6330(1)	Rt.		235.20	Bank Protection Length=36.8
Box Culvert Wingwall Slopes N6330(1)	Rt.	29.40		
Box Culvert Wingwall Slopes N6330(1)	Lt.	29.40		
Culvert 1+423 N6330(1)	Rt.		21.00	Outlet V-Ditch Riprap
Culvert 34+331 N6331(2)	Lt.	24.50		Inlet Riprap
SE Corner of N6330/N6331 Intersection	Rt.	90.90		Intersection Slople Proctection
35+900.00 to 35+960.00 N6331(2)	Rt.		205.30	Wire Enclosed Embankment Protection
36+180.00 to 36+256.00 N6331(2)	Rt.		589.00	Wire Enclosed Embankment Protection
36+785.88 to 36+790.00 N6331(2)	Rt.		7.50	Riprap Pad At Bottom of Spillway
36+995.88 to 37+000.00 N6331(2)	Rt.		7.50	Riprap Pad At Bottom of Spillway
Parking Lot Behind Curbing N6331(2)		95.97		
	Total:	270.20	1,065.50	

The Riprap Listed In This Table Shall Be Installed 457 mm Thick And To The Approximate Shapes And Sizes Shown On The Plan & Profile & Bridge Grading Sheets. The COR/COTR May Adjust The Riprap Layouts And Size As Needed. Adjustments To The Riprap Layouts Shall Be Considered Indicental Obligations Of The Contractor And No Additional Payment Will Be Made.



SECTION A–A
FOR SPILLWAY
NTS



SECTION B–B
FOR SPILLWAY
NTS

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CUT TO FILL TRANSITION AND SPILLWAY DETAILS

DRAWN BY: NRDOT	DATE: 6/25/15
DESIGNED BY: NRDOT	DATE: 6/25/15
REVISED: 10/24/17	BY: Design 2
Sht_62 Cut to Fill Transition and Spillway Details 102417.dgn	

GENERAL NOTES

1. Workmanship and Materials Shall Conform to the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03), Along with All Supplemental Specifications for This Project.

2. The Quantities Shown are Only an Estimate. Actual Quantities Shall Be Determined in the Field. The Project Manager, COR/COTR, and Contractor Shall Review All Rock Cut Areas After the Construction of Vee and/or Flat Bottom Ditches Have Been "Roughed In". If in the Opinion of the COR/COTR the Rock Cut Is Stable, the COR/COTR May Elect to Delete Sections of the Placed Riprap. The Contractor Will Be Required to Make Adjustments to the Placed Riprap as Necessary to Fit Actual Field Conditions. These Field Adjustments Will Be Incidental Obligations of the Contractor.

3. Ditch and Back Slope Reshaping, Cleaning, and Excavation Shall Be Done in Accordance with the Plans and as Determined By the COR/COTR All Ditch Excavation, Cleaning, and Reshaping Shall Be Considered Incidentol to Completion of the Structure.

4. The Size of All Stone For Riprap Is to Be Class 2, Meeting the Grading Requirements of Table 705-1, and Section 251 of FP-03.

5. Filter Fabric Shall Be Installed Under All Placed Or Wire Enclosed Riprap and Shall Conform to Section 714, Type IV-C, of FP-96, and Shall Be Considered Incidental to Item 25101. Filter Fabric Shall Be Tucked or Embedded 400mm Into the Ground Along All Edges As Shown.

6. Riprap Downdrains Shall Be Carried Down Slope to the Intersection of the Fill Slope and Extended Until a 2% or Lower Slope Is Achieved Before Termination.

7. Riprap Shall Be Placed, Wire Enclosed, or Mortarted Riprap As Shown on the Plans.

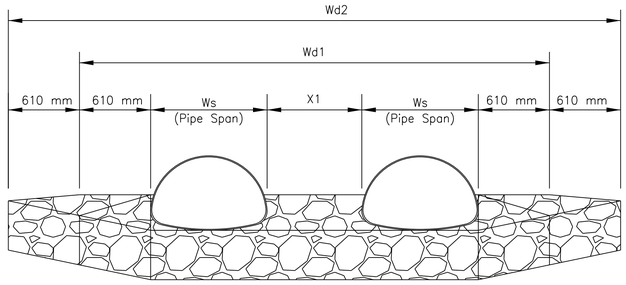
8. At All Locations Where Riprap Ditch Lining Connects To Culverts Or Culvert Riprap Inlet/Outlet Structures, The Contractor Shall Shape The Ditch Lining To Connect To The Drainage Structure(s) As Directed By The COR/COTR This Work Shall Be Considered Incidental Obligations Of The Contractor.

9. Wire Enclosed Cut To Fill Transitions And Ditch Linings Shall Be Constructed To The Same General Shape As The Placed Riprap Structures Shown On This Sheet And To The Wire Enclosed Anchoring Details And Notes Shown On Sheet 64.

10. Mortared Riprap Ditch Lines Shall Be Constructed To The Same General Shape As The Placed Riprap Structures Shown On This Sheet And To The Typical Mortared Riprap Detail And Notes Shown On Sheet .

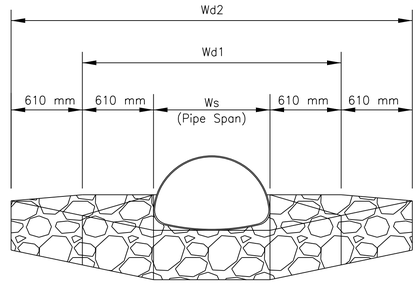
Sht_62 Cut to Fill Transition and Spillway Details 102417.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	63	96

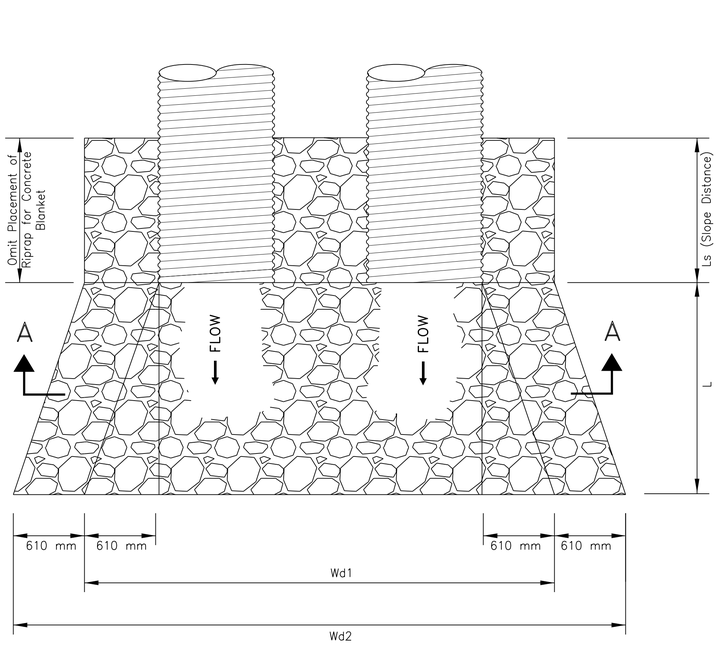


ELEVATION – MULTIPLE BARREL
SECTION A–A

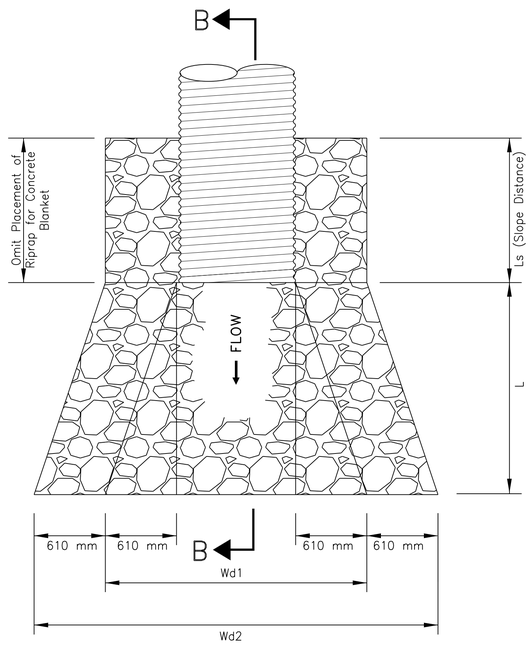
X1 = 1.23 m for 610 mm
X1 = 1.48 m for 762 mm
X1 = 1.73 m for 914 mm
X1 = 1.07 m for 711 mm x 508 mm
X1 = 1.27 m for 889 mm x 610 mm
X1 = 1.57 m for 1067 mm x 737 mm
X1 = 0.40 m for 1956 mm x 1321 mm



ELEVATION – SINGLE BARREL
SECTION A–A



PLAN – MULTIPLE BARREL



PLAN – SINGLE BARREL

EQUATION FOR 3 BARRELS OR MORE

Wd1= (X1 x (#Barrels–1)) + (Ws x #Barrels)+ (2x 0.610)

Wd2= Wd1 + (2x0.610)

GENERAL NOTES

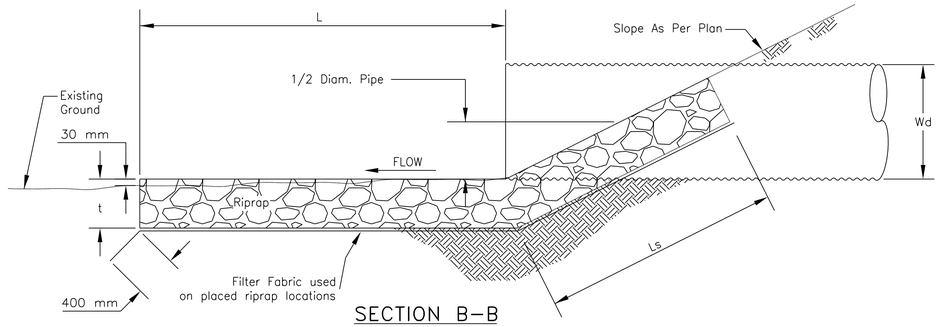
1. Workmanship And Materials Shall Conform To The Standard Specifications For Construction Of Roads And Bridges On Federal Highway Projects (FP–03).
2. All Stone For Riprap Shall Be Class 2 Meeting The Grading Requirements Of Table 705–1 Of The FP–03.
3. All Excavations And Backfill Operations Shall Be Done To Neat Lines In Accordance With Section 209 Of The FP–03 And Will Be Incidental To Installation Of Riprap. See Supplemental Specifications For Additional Requirements.
4. The Quantities Shown Are Only An Estimate. Actual Quantities Shall Be Determined In The Field. The Contractor Will Be Required To Make Any Necessary Adjustments In The Field To Match Existing Field Conditions. These Field Adjustments Are Incidental Obligations Of The Contractor.
5. Any Borrow Material Needed To Bring Existing Channels Up To Grade Shall Be Incidental To Item 20401–0000 & 20403–0000.
6. Filter Fabric Shall Conform To Sections 207 And 714.01(a) Of The FP–03 For Type IV–C Material And Shall Be Included In The Unit Price Bid For Item 25101–2000 & 25110–2000. DO NOT place filter fabric under grouted riprap.
7. Embankment to be Compacted to 95% of Maximum Density as Determined by AASHTO T99 Method C.
8. For all Riprap Downdrain And Culvert Outlets, Provide For A Center Of Riprap 305mm (Min) Dip Below Outer Edges At Outlet End. Place Riprap To Fit Channel Banks Where Possible. All Excavation And Apron Warp Reshaping And installation of riprap Shall Be Included in the unit price bid for the items shown.

ITEM: 25101–2000 PLACED RIPRAP, CLASS 2

CULVERT STATION	STRUCTURE	LOCATION	Ws(m)	Wd1(m)	Wd2(m)	L(m)	Ls(m)	t(mm)	QUANTITY(m^3)
33+987.000 Lt.	3–711 mm x 508 mm	Outlet	0.711	5.493	6.713	5.33	2.93	457	19.37
34+135.000 Lt.	3–711 mm x 508 mm	Outlet	0.711	5.493	6.713	5.33	2.93	457	19.37
34+244.000 Lt.	3–711 mm x 508 mm	Outlet	0.711	5.493	6.713	5.33	2.93	457	19.37
35+135.000	1–711 mm x 508 mm @ 45° Skew	Outlet	0.711	1.931	3.151	3.00	3.68	457	5.50
35+315.000	1–610 mm @ 40° Skew	Outlet	0.610	1.830	3.050	3.00	2.41	457	4.69
36+680.000	1–711 mm x 508 mm @ 90° Skew	Outlet	0.711	1.931	3.151	4.00	4.32	457	7.05
36+780.000	1–914 mm @ 90° Skew	Outlet	0.914	2.134	3.354	3.00	2.89	457	6.17
37+101.000	1–914 mm @ 90° Skew	Outlet	0.914	2.134	3.354	3.00	3.77	457	5.86
37+290.000	1–889 mm x 610 mm @ 50° Skew	Outlet	0.889	2.109	3.329	3.00	5.92	457	7.03
36+520.000	1–762 mm @ 90° Skew	Outlet	0.762	1.982	3.20	3.00	4.32	457	6.70
Parking Lot	1–711 mm x 508 mm x 62.0 m	Outlet	0.711	1.931	3.151	4.00	4.32	457	7.05
								TOTAL	108.13

ITEM: 25110–2000 GROUTED RIPRAP, CLASS 2

CULVERT STATION	STRUCTURE	LOCATION	Ws(m)	Wd1(m)	Wd2(m)	L(m)	t(mm)	QUANTITY(m^3)
37+537.640	3–1219 mm x 21.946 mm @ 50°	Outlet	1.956	7.888	9.108	18.300	457	98.0
							Total	98.0



SECTION B–B

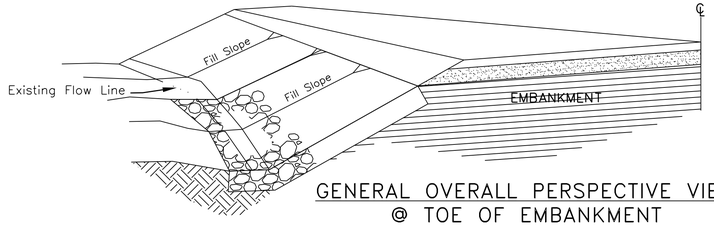
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CULVERT RIPRAP DETAILS

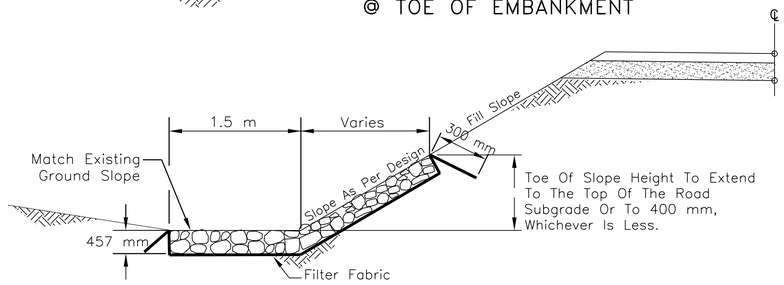
DRAWN BY: RDL	DATE: 12/07
DESIGNED BY: RDL	DATE: 12/07
REVISED: 7/22/15	BY: Design 2
Sht_63 Culvert Riprap Details 072215.dgn	

Sht_63 Culvert Riprap Details 072215.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	64	96
			N6331	N6331(2)2&4		

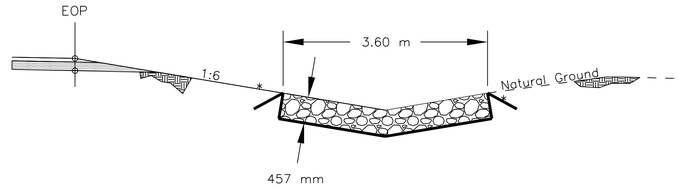


GENERAL OVERALL PERSPECTIVE VIEW
@ TOE OF EMBANKMENT

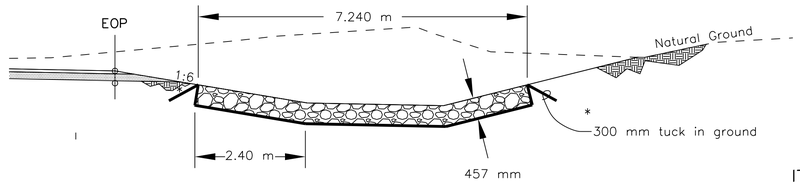


TOE OF SLOPE PROTECTION WITH PLACED RIPRAP, CLASS 2
LOCATIONS AS FIELD DETERMINED BY THE COTR

NOTE: The Toe Of Slope And Ditch Lining Details Shown On This Sheet Repesent The Two (2) Types Of Riprap Protection To Be At The General Stations Shown. However, It Is The COR/COTR's Responsibility, In Consultation With The NRDOT P&D Branch, To Field Determine The Type Of Riprap Protection For Specific Areas After Final Earthwork Is Completed. The COR/COTR Shall Provide The Contractor With A Riprap Location And Type Plan Prior To Installation Of The Riprap.



N6330(1) SECTION A–A From Sheet 12 of 96
Sta. 1+010 to Sta. 1+090, Right



N6331(2) SECTION A–A From Sheet 14 of 96
Sta. 35+036 to Sta. 35+150, Right

TOE OF SLOPE RIPRAP NOTES

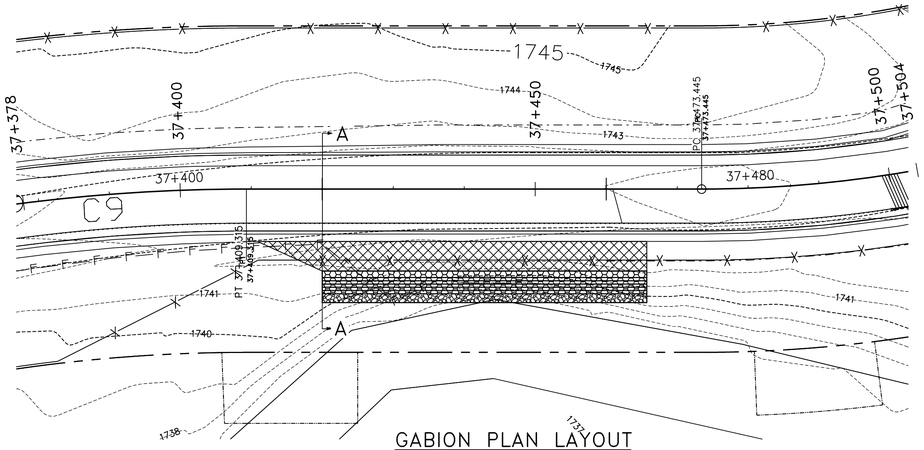
1. Workmanship and Materials Shall Conform to the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03), Along with All Supplemental Specifications for This Project.
2. The Quantities Shown are Only an Estimate. Actual Quantities Shall Be Determined in the Field. The Project Manager, COR/COTR and Contractor Shall Review All Rock Cut Areas After the Construction of Vee and/or Flat Bottom Ditches Have Been "Roughed In". If in the Opinion of the COR/COTR, the Rock Cut Is Stable, the COR/COTR. May Elect to Delete Sections of the Placed Riprap. The Contractor Will Be Required to Make Adjustments to the Riprap as Necessary to Fit Actual Field Conditions. These Field Adjustments Will Be Incidental Obligations of the Contractor.
3. Ditch and Back Slope Reshaping, Cleaning, Backfilling, and Excavation Shall Be Done in Accordance with the Plans and as Determined By the COR/COTR All Ditch Excavation, Cleaning, and Reshaping Shall Be Considered Incidental to Completion of the Structure.
4. The Size of All Stone For Placed Riprap Is to Be Class 2, Meeting the Grading Requirements of Table 705-1, and Section 251 of FP-03.
5. Filter Fabric Shall Be Installed Under All Riprap and Shall Conform to Section 714, Type IV-C, of FP-03, and Shall Be Considered Incidental to Item 25101. Filter Fabric Shall Be Tucked or Embedded 400 mm Into the Ground Along All Edges As Shown.
6. The Finished Surface of All Placed Riprap Shall Be Set 30 mm Below the Ground Surface Except at Riprap Discharge Ends, Which Shall Be Set 30 mm Above the Ground Surface.
7. See Sheet 9, 17 & 49 For Notes & Quantities Concerning Gabion Retaining Wall Construction. The Gabions shall be burried at each end into the ditch embankment as shown in profile on this sheet with compaction control.

ITEM 25101-2000: PLACED RIPRAP, CLASS 2 AT TOE OF SLOPE LOCATIONS

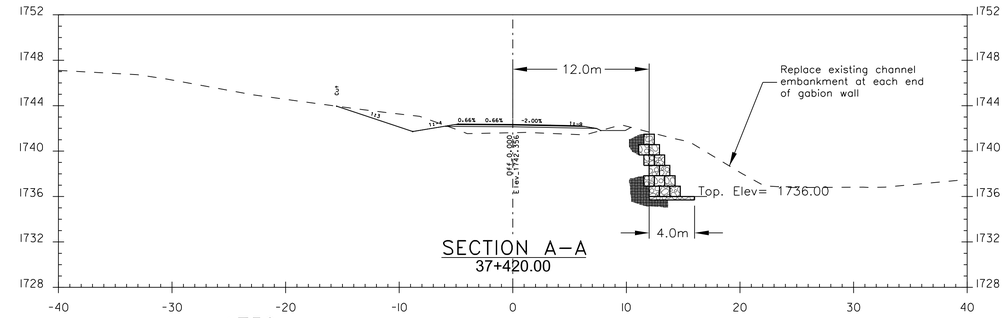
	STATION	LOCATION	WIDTH(m)	THICKNESS (mm)	ESTIMATED LENGTH (m)	VOLUME (m^3)
N6330(1)	1+140.000 to 1+240.000	Lt.	3.10 & 3.90	457	100.00	162.2
N6331(2)	37+250.000 to 37+283.000	Lt.	3.90	457	33.00	58.5
					TOTAL	220.7

ITEM 25112-2000: WIRE ENCLOSED RIPRAP, CLASS 2 AT TOE OF SLOPE LOCATIONS

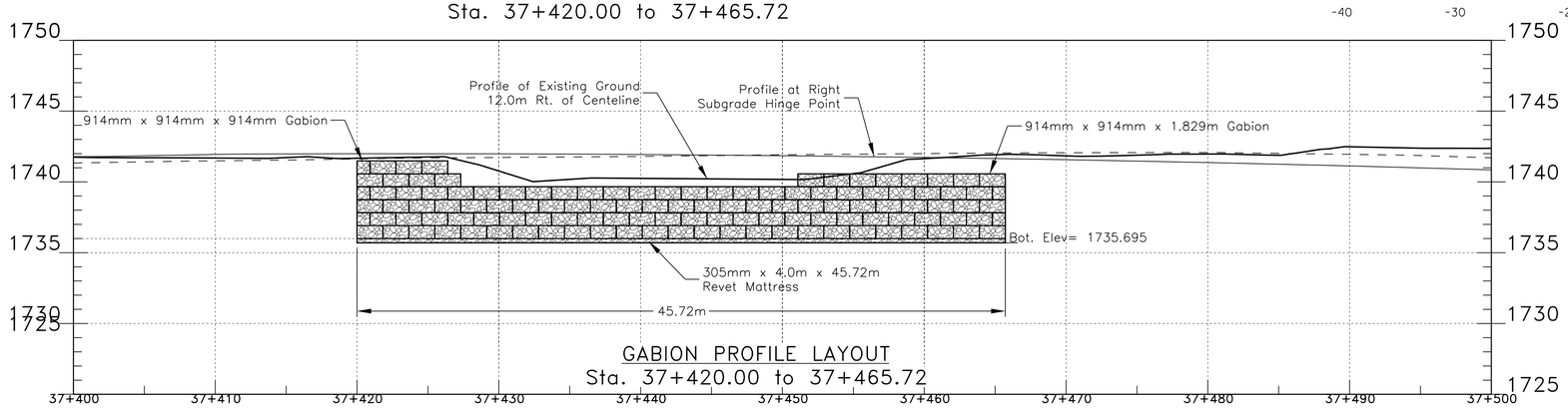
	STATION	LOCATION	WIDTH(m)	THICKNESS (mm)	ESTIMATED LENGTH (m)	VOLUME (m^3)
N6330(1)	1+135.000 to 1+140.000	Lt.	2.70	457	5.00	6.2
N6331(2)	35+045.000 to 35+147.400	Rt.	3.90	457	103.6	184.7
	35+350.000 to 35+560.000	Lt.	3.10 & 3.90	457	210.00	336.0
N6331(1)	35+200.000 to 35+305.000	Lt.	3.10 & 3.90	457	105.00	168.0
					TOTAL	694.9



GABION PLAN LAYOUT
Sta. 37+420.00 to 37+465.72



SECTION A–A
37+420.00



GABION PROFILE LAYOUT
Sta. 37+420.00 to 37+465.72

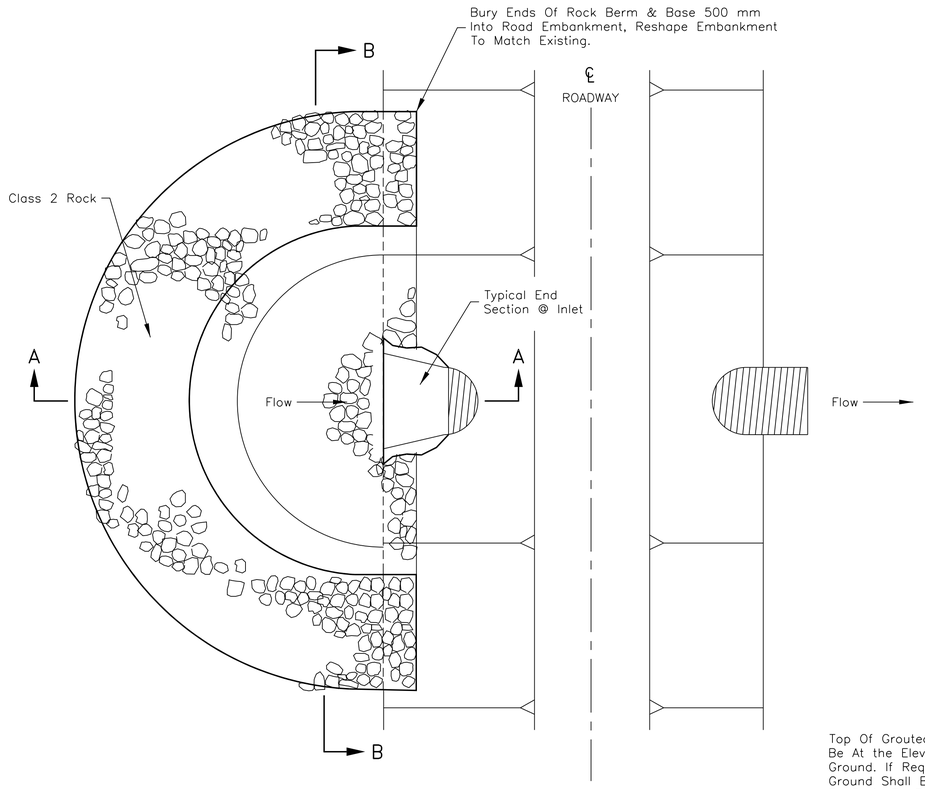
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

TOE OF SLOPE RIPRAP
& GABION LAYOUT DETAILS

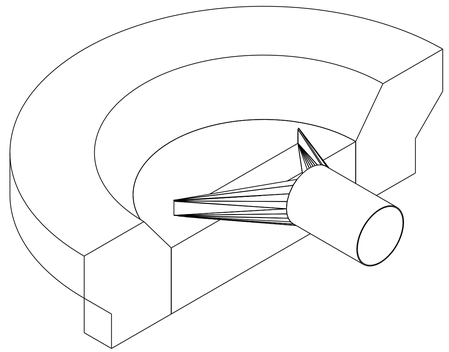
DRAWN BY: NRDOT	DATE: 6/20/2016
DESIGNED BY: NRDOT	DATE: 7/8/15
REVISED: 7/08/15	BY: Design 2
Sht_64 Toe of Slope Riprap and Gabion Layout Detail_062016.dgn	

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_64 Toe of Slope Riprap and Gabion Layout Detail 062016.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6330(1)1,2&4	65	96
			N6330	N6330(1)2&4		



PLAN VIEW



ISOMETRIC VIEW

GENERAL NOTES

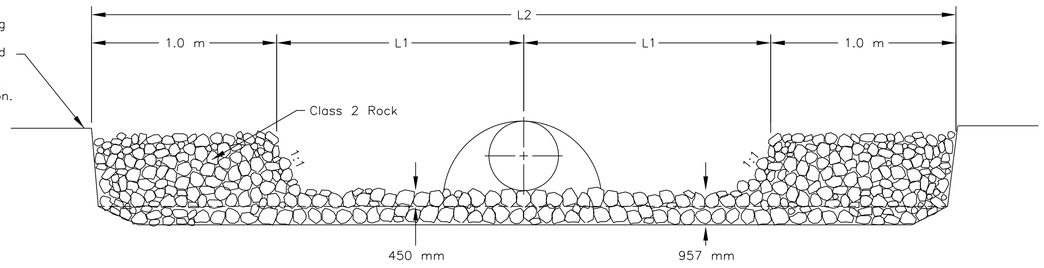
1. Workmanship And Materials Shall Conform To The Standard Specifications For Construction Of Roads And Bridges On Federal Highway Projects (FP-03).
2. The Quantities Shown Are Only An Estimate. Actual Quantities Shall Be Determined In The Field. The Contractor Will Be Required To Make Any Necessary Adjustments In The Field To Match Existing Field Conditions. These Field Adjustments Are Incidental Obligations Of The Contractor.
3. Excavate, Clean, And Reshape Inlet To Install Rock Berm As Shown. This Work Shall Be Considered Incidental To Item 25110-2000.
4. Stone Size Shall Conform To FP-03, Table 705-1, Class 2.
5. Fill Rock Voids With Grouted Per Section 251 & 712.05. Leave Rock On Surface Exposed 1/4 To 1/2 Rock Depth. See Detail Below.
6. All Excavations Around The Rock Berm Inlet Structures Shall Be Backfilled With Compacted Material As Per FP-03 Section 204.10.

25110-2000 GROUTED ROCK BERM VOLUME

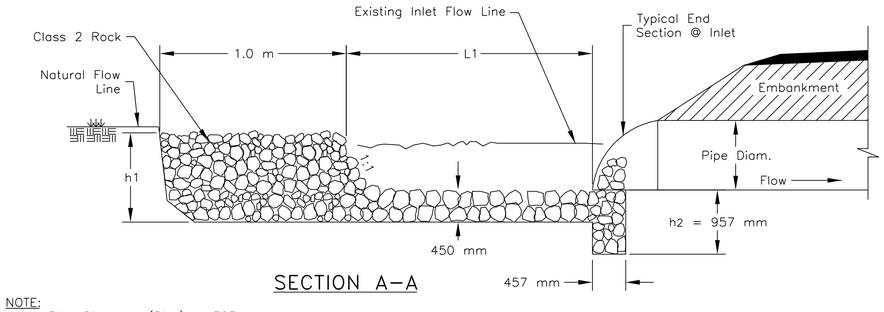
CULVERT STATION	STRUCTURE	LOCATION	h1	L1	L2	VOLUME (m^3) CLASS 2
N6330 STATIONING						
1+423.000	1-711 mm x 508 mm x 16.470 m CSPA	Lt. (Inlet)	813 mm	1.5 m	5.0 m	8.1
N6331 STATIONING						
35+135.000	1-711 mm x 508 mm x 27.45 m CSPA	Rt. (Inlet)	813 mm	1.5 m	5.0 m	8.1
37+101.000	1-914 mm X 22.57 m CSPA	Rt. (Inlet)	813 mm	2.0 m	6.0 m	9.4
					TOTAL:	25.6

CHAPTER HOUSE						
Parking Lot	1-711mm x 508mm x 62.179m CSPA	(Inlet)	813 mm	1.5 m	5.0 m	8.1
			Depth	Width	Length	
Parking Lot	Ditchline Grouted Riprap	(Inlet)	203 mm	6.8m	21.2m	21.2
					TOTAL:	29.3

Top Of Grouted Rip Rap Berm To Be At the Elevation Of The Adjoining Ground. If Required The Adjoining Ground Shall Be Graded And Shaped To Drain To Pipe Inlet, As Directed By the COR/COTR. This Work To Be Incidental To The Rip Rap Installation.

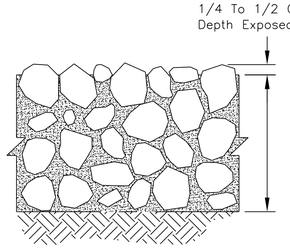


SECTION B-B



SECTION A-A

NOTE:
h1 = Pipe Diameter (Rise) + 305 mm



TYPICAL GROUTED RIPRAP DETAIL

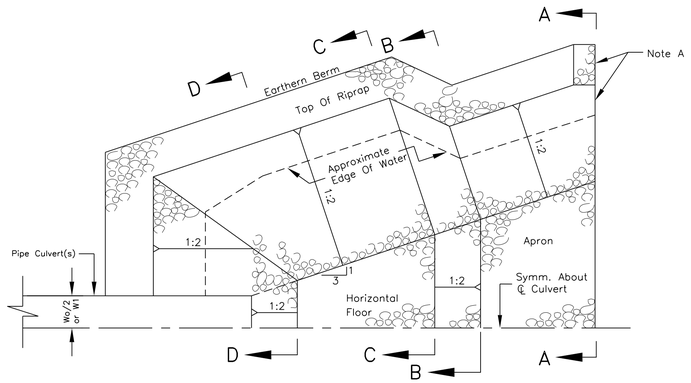
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GROUTED ROCK BERM DROP INLET DETAILS

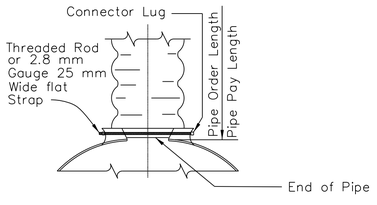
DRAWN BY: NRDOT	DATE: 9/24/2015
DESIGNED BY: NRDOT	DATE: 9/24/2015
REVISED: 10/24/2017	BY: Harold.Riley
Sht_65 Grouted Rock Berm Drop Inlet Details 0722	.dgn

Sht_65 Grouted Rock Berm Drop Inlet Details 072215.dgn

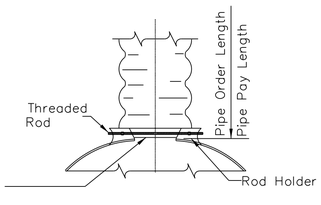
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	66	96
			N6331	N6331(2)2&4		


A
B
C
D
Earthern Berm
Top Of Riprap
Note A
Approximate Edge Of Water
1:2
1:2
1:2

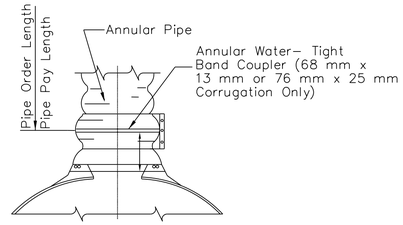
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	67	96
			N6331	N6331(2)2&4		



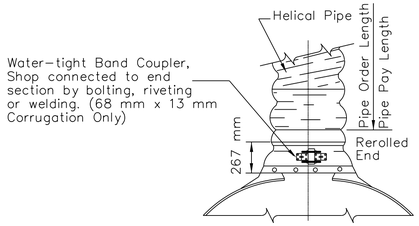
TYPE NO. 1



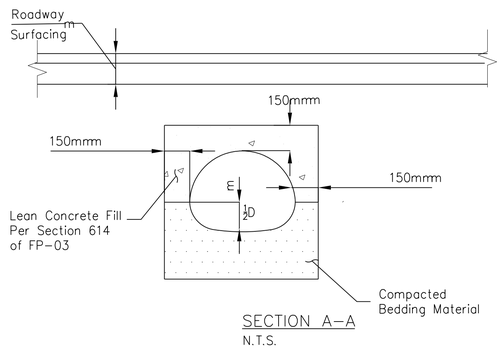
TYPE NO. 2



TYPE NO. 3



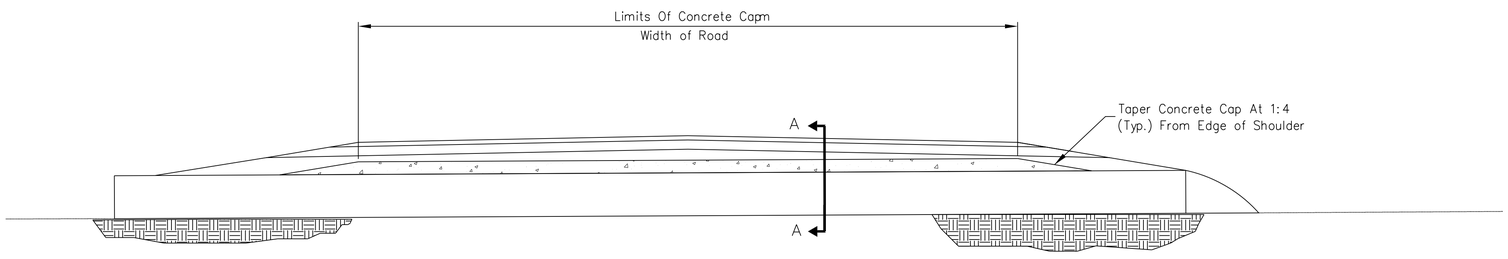
TYPE NO. 5



SECTION A–A
N.T.S.

CONCRETE CAP NOTES

1. All Materials and Labor Required To Cap Culverts Will Be Considered Incidental To The Culvert items.
2. If Aluminum Coated Pipes Are Used, Coat Pipe Surfaces In Contact With The Concrete With Asphalt Mastic.



CONCRETE CAP FOR CULVERTS
N.T.S. N6331(2) Sta 36+602.000

END SECTION NOTES

1. FOR MULTIPLE INSTALLATIONS OF ALL TYPES, SPACE CULVERTS SUCH THAT FLARED END SECTIONS JUST TOUCH AT THEIR WIDEST CROSS SECTION.
2. ALL THREE (3) PIECE BODIES TO HAVE SIDE THICKNESS OF 2.77 mm AND 3.5 mm THICK 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 9.53 mm ø GALVANIZED RIVETS OR BOLTS.
3. END SECTIONS FOR STEEL PIPE–ARCHES: FOR THE 1956 mm X 1321 mm AND 2108 mm X 1448 mm SIZES, REINFORCED EDGE TO BE SUPPLEMENTED BY 51 mm X 51 mm X 6.35 mm GALVANIZED ANGLES. THE ANGLES TO BE ATTACHED BY 9.53 mm DIA. GALVANIZED NUTS AND BOLTS. ANGLE REINFORCEMENT WILL BE PLACED UNDER THE CENTER PANEL SEAMS.
4. END SECTIONS FOR STEEL CIRCULAR PIPES: FOR 1524 mm ø THRU 2134 mm ø SIZES, REINFORCED EDGE TO BE SUPPLEMENTED WITH GALVANIZED STIFFENER ANGLES. THE ANGLES WILL BE 51 mm X 51 mm X 6.35 mm FOR 1524 mm ø THRU 1829 mm ø, AND 64 mm X 64 mm X 6.35 mm FOR 1981 mm ø AND 2134 mm ø. THE ANGLES TO BE ATTACHED BY 9.53 mm 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, AND CONNECTOR LUG FOR 610 mm ø PIPE ONLY.
7. TYPE NO. 2 STEEL END SECTION: CONNECT END SECTION WITH THREADED ROD AND ROD HOLDER, FOR 762 mm ø AND 914 mm ø ROUND PIPE; AND 432 mm X 330 mm THRU 1448 mm X 965 mm CSPA.
8. TYPE NO. 3 STEEL END SECTION: THE CONNECTION INCLUDES 305 mm OF THE PIPE LENGTH AS A CONNECTOR SECTION FOR PIPE ARCH SIZES 1626 mm X 1092 mm THRU 2108 mm X 1448 mm AND ROUND PIPE SIZES 1067 mm ø THRU 2134 mm ø. GAGES OF CONNECTOR SECTIONS SHALL BE THE SAME AS THE END SECTIONS AS MENTIONED ABOVE. THE CONNECTOR SECTION WILL BE ATTACHED TO THE END SECTION BY 9.5 mm ø GALVANIZED RIVETS OR BOLTS SPACED AT APPROXIMATELY 152 mm CENTERS.
9. HELICALLY CORRUGATED PIPE: FOR TYPE NO. 5 AND TYPE NO. 3 CONNECTIONS, THE DIMPLE BAND OR CORRUGATED PIPE CONNECTOR SECTION SHALL BE ATTACHED TO THE END SECTION BY 9.5 mm ø GALVANIZED STEEL RIVETS OR BOLTS SPACED AT APPROXIMATELY 152 mm 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. SEE SHEET 76 FOR ADDITIONAL DETAILS ON HUGGER BANDS.
12. THIS WORK, INCLUDING THE LEAN CONCRETE, SHALL BE INCLUDED IN THE BID PRICE FOR INSTALLATION OF THE STRUCTURE.

Item 61401–0000
LEAN CONCRETE BACKFILL

LOCATION	m^3
N6331(2) Sta 36+602.00	4
TOTAL	4

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

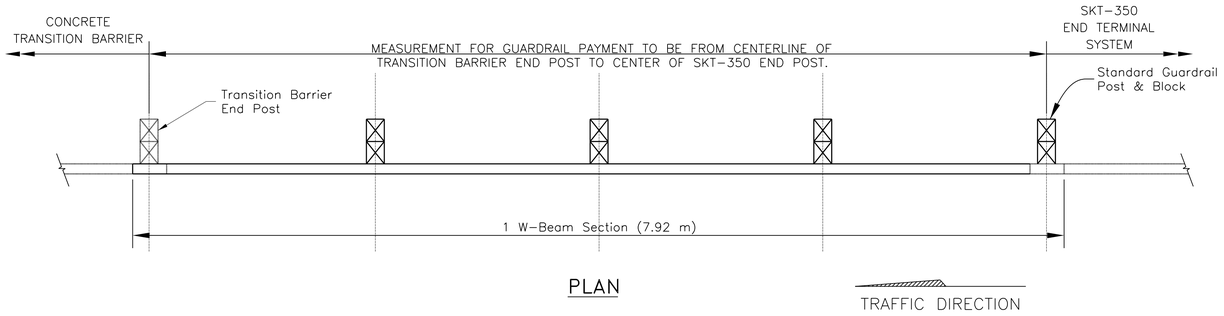
END SECTIONS AND CSPC LEAN CONCRETE BACKFILL DETAILS

DRAWN BY: RDL	DATE: 06/07
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 7/23/15	BY: Design 2

Sht_67 End Sections and CSPC Lean Concrete Backfill Details 072315.dgn

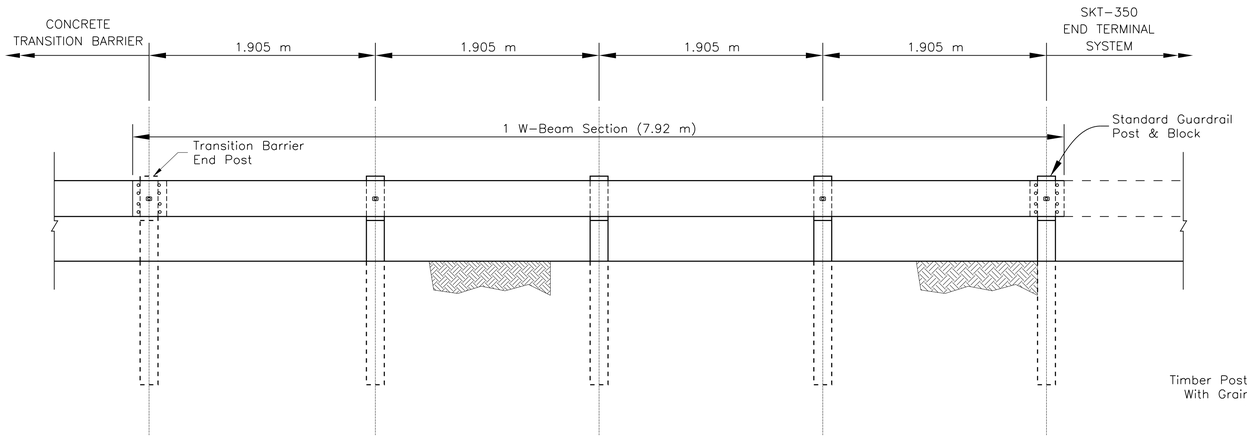
Sht_67 End Sections and CSPC Lean Concrete Backfill Details 072315.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	68	96
			N6331	N6331(2)2&4		

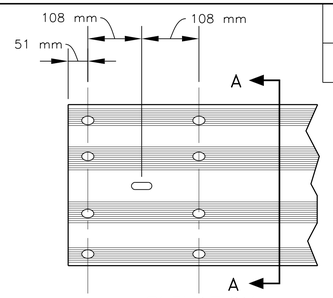


PLAN

TRAFFIC DIRECTION

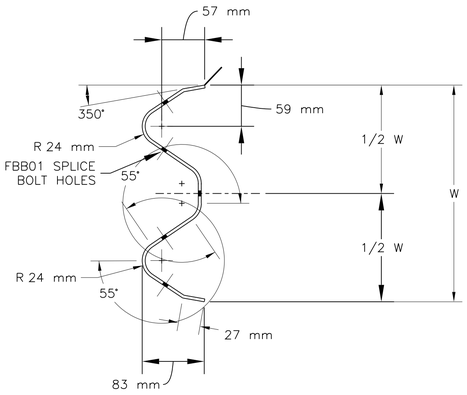


ELEVATION

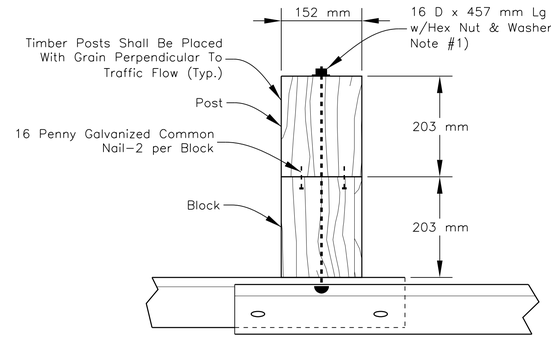


ELEVATION
RAIL

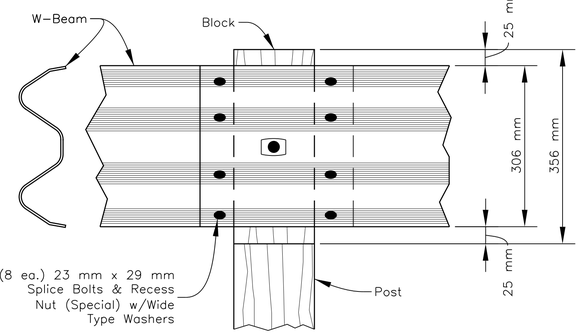
DESIGNATOR	COMPONENT	NUMBER
FBB01	Splice Bolt and Nut	2
FBB02	Guardrail-Post Bolt and Nut	2
FBB03	Guardrail-Post Bolt and Nut	2
FBB04	Guardrail-Post Bolt and Nut	2
FBX16a	Post Blockout Bolt (40 mm)	4
FWC16a	Round Washer	2
PDB01a	Timber Post Blockout	2
PDB01b	Timber Post Blockout	2
PDE02	Timber Post	2
PDE13	Timber Post	2
PWB01	Steel Post Blockout	2
PWE01	Steel Post	2
PWE02	Steel Post	2
RWB01a	W-Beam Backup Plate	1
RWM02a	W-Beam Rail	1



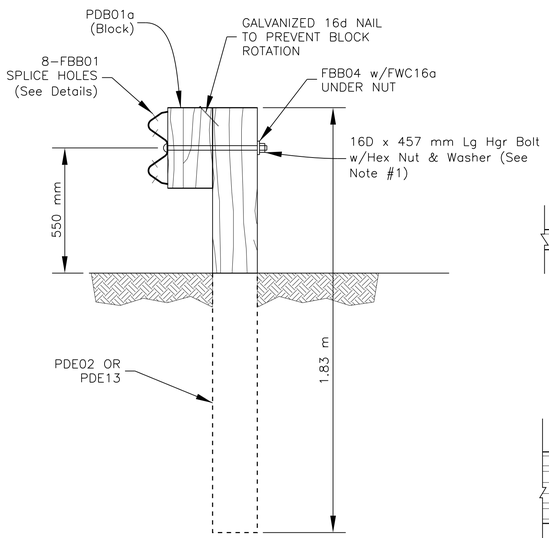
SECTION A-A
W-BEAM (RWM02A)



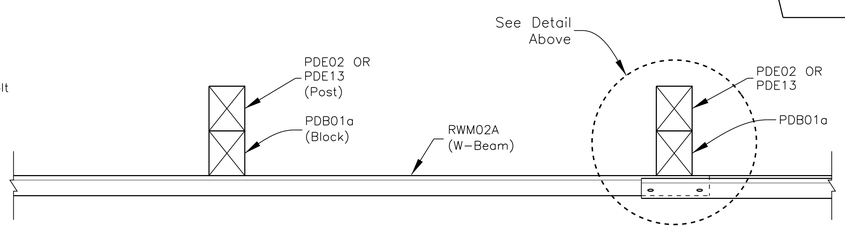
PLAN
POST/BLOCK &
SPLICE DETAIL



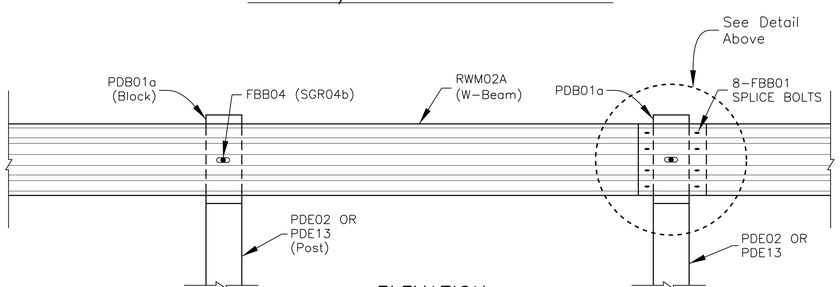
ELEVATION
POST/BLOCK
SPLICE DETAIL



ELEVATION
STRONG-POST W-BEAM



PLAN
W-BEAM/POST & BLOCK DETAILS



ELEVATION
W-BEAM/POST & BLOCK DETAILS

GENERAL NOTES

1. THE 16 D FLAT WASHER IS USED UNDER THE NUT, BEHIND THE POST ONLY. NO WASHER IS USED AT THE RAIL.
2. SEE SHEET 70 OF 96 FOR ADDITIONAL NOTES.
3. THE CONTRACTOR HAS THE OPTION TO USE ALL-STEEL POSTS W/WOODEN BLOCK ON STANDARD LINE POSTS, UNLESS OTEHERWISE NOTED ON THE DESIGN PLANS.
4. IF STEEL POSTS ARE APPROVED THEN RUBBER BLOCKS WILL BE REQUIRED.
5. BEGIN/END ASPHALT CURB AT POST #9.
6. BEGIN REFLECTIVE TABS ON THE W-BEAM AT EVERY FOURTH POST. THE COLOR OF THE TABS SHALL CONFORM TO THE COLOR OF THE ADJACENT EDGE LINE.
7. ANGLE STRUT MUST BE ATTACHED USING 19D HIGH STRENGTH BOLTS.

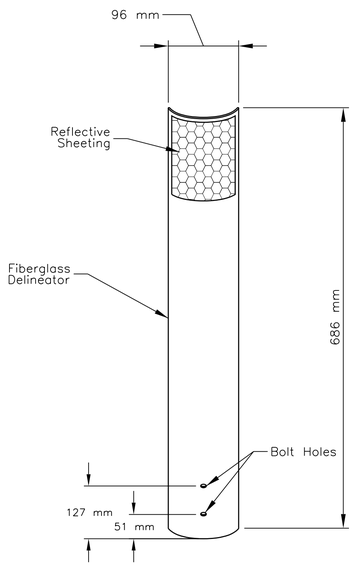
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD GUARDRAIL DETAIL 1

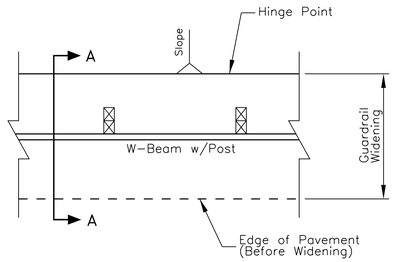
DRAWN BY: NRDOT	DATE: 6/03/15
DESIGNED BY: NRDOT	DATE: 6/03/15
REVISED: 7/23/15	BY: Design 2
Sht_68 SGR04 Std Gdrail Details 072315.dgn	

Sht_68 SGR04 Std Gdrail Details 072315.dgn

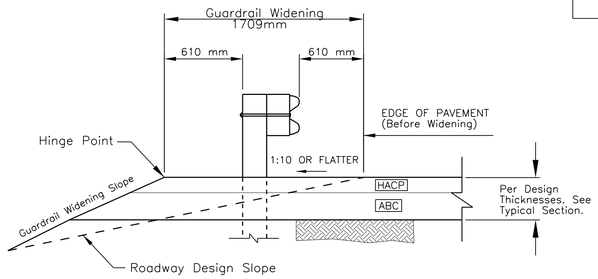
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	69	96
			N6331	N6331(2)2&4		



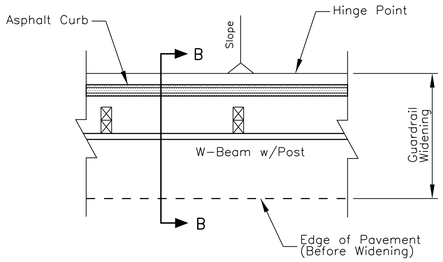
DELINEATOR DETAIL BRIDGE LOCATIONS
(Reflective Sheeting Shall Face Traffic)



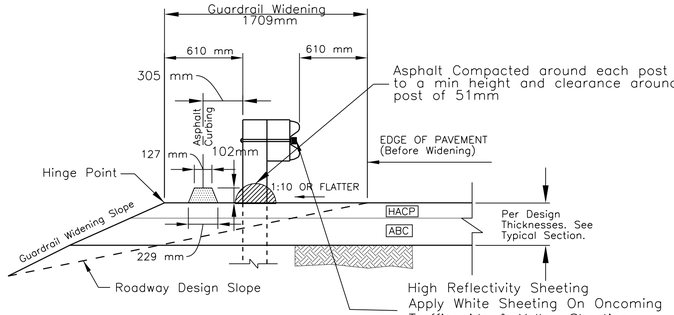
PLAN VIEW
w/NO CURBING



SECTION A-A
w/No Curbing



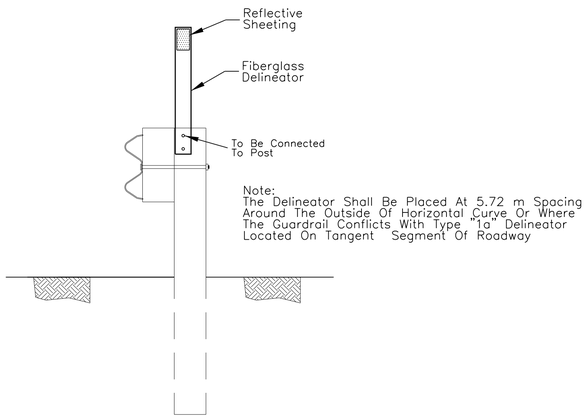
PLAN VIEW
w/CURBING



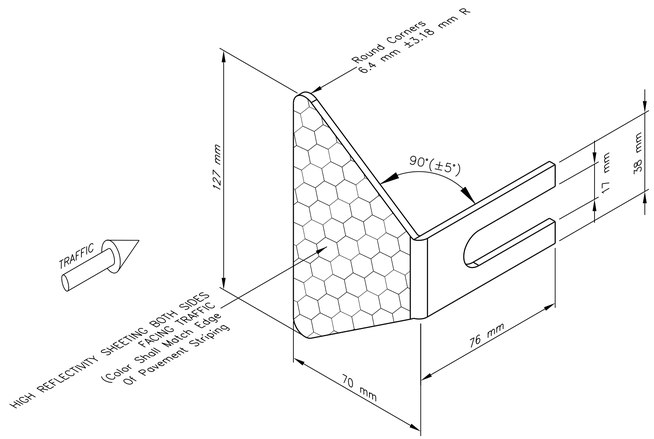
SECTION B-B
w/CURBING
Asphalt Curb Depth=102 mm

GENERAL NOTES

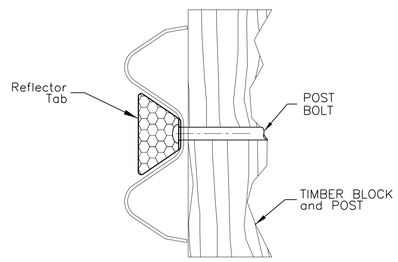
1. ALL GUARDRAIL "W" BEAMS, SHALL BE GALVANIZED IN ACCORDANCE WITH (AASHTO M-180, CLASS A, TYPE 1) SPECIFICATION. ALL HARDWARE SHALL CONFORM TO (ASTM A-325) AND GALVANIZED IN ACCORDANCE WITH (ASTM A-153).
2. ALL STRUCTURAL STEEL ITEMS SHOWN SHALL CONFORM TO (AASHTO N183/ASTM A36) AND BE GALVANIZED IN ACCORDANCE WITH (AASHTO M-111) SPECIFICATION.
3. WIRE ROPE, FITTINGS AND HARDWARE SHALL CONFORM TO (ASSHTO M-30) SPECIFICATION TYPE II WITH A 19 mm DIAMETER AND A CLASS B ZINC COATING.
4. WOOD POSTS AND BLOCKS SHALL BE ROUGH SAWN LUMBER OR (S4S) HAVING MINIMUM BENDING STRENGTH OF 8.27 MPa (SINGLE MEMBER USE) AND MEETING AASHTO N168 (21TH EDITION), ALL POSTS SHALL BE TREATED IN ACCORDANCE WITH (AASHTO M-133) SPECIFICATION.
5. ASPHALT CONCRETE CURBING SHALL BE INSTALLED IN ACCORDANCE WITH SECTION B-B, AND THE TABLE SHOWN ON SHEET 8 OF 96 AND CONSIDERED INCIDENTAL TO PAVING ITEMS AND NO DIRECT PAYMENT SHALL BE MADE.
6. ALL EMBANKMENT AND AGGREGATE BASE COURSE MATERIALS SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY.
7. THE EMBANKMENT MATERIALS AND THE PLACING THEREOF SHALL BE INCLUDED IN CONTRACT ITEM 20401-0000 AND NO DIRECT PAYMENT SHALL BE MADE.
8. THE CONTRACTOR SHALL BE REQUIRED TO COMPACT THE BACKFILL AND THE ASPHALT ALL AROUND EACH GUARD RAIL POST WITH HAND TAMPERS TO INSURE INTEGRITY OF THE PAVEMENT AND GUARDRAIL AND TO PREVENT SEEPAGE OF WATER INTO THE PAVEMENT FROM THE GUARD RAIL POST HOLES. THIS WORK SHALL BE INCIDENTAL OBLIGATIONS OF THE WORK DESCRIBED HEREIN.
9. PLACEMENT OF HOT ASPHALT AND ABC MATERIAL FOR GUARDRAIL WIDENING SHALL BE INCLUDED WITH ITEMS 30101-2000 AND 40201-0500.
10. FURNISHING & PLACEMENT OF 371 mm x 701 mm REFLECTIVE SHEETING AND REFLECTIVE TABS SHALL BE CONSIDERED INCIDENTAL TO ITEM 61701-5000 AND NO DIRECT PAYMENT SHALL BE MADE.
11. ANY RELATED PATENT RIGHTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AS PER SECTION 107.01 OF THE FP-03.
12. THE CONTRACTOR HAS THE OPTION TO USE STEEL POSTS. IF STEEL POSTS ARE APPROVED THEN RUBBER BLOCKS WILL BE REQUIRED.
13. PLACE REFLECTIVE TABS ON POSTS AT EVERY FOURTH POST. THE COLOR OF THE TABS SHALL CONFORM TO THE COLOR OF THE ADJACENT EDGE LINE.



ELEVATION
GUARDRAIL/POST MOUNTED
DELINEATOR (TYP.)



ISOMETRIC VIEW
REFLECTOR TAB DETAIL



SECTION
REFLECTOR TAB
MOUNTING DETAIL
Install Tab on Every Fourth Post

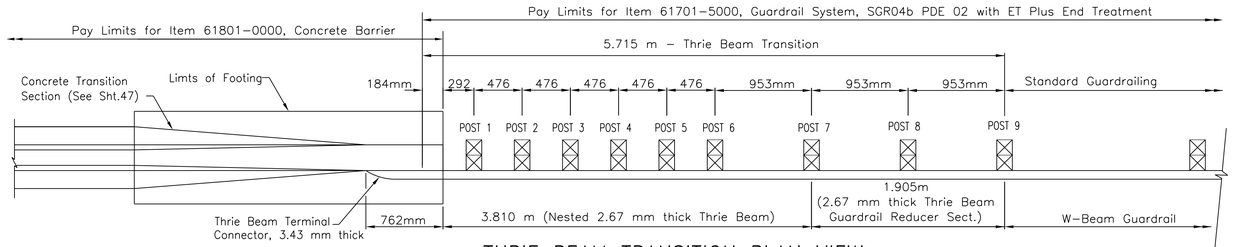
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD GUARDRAIL, CURBING AND REFLECTOR TAB DETAIL

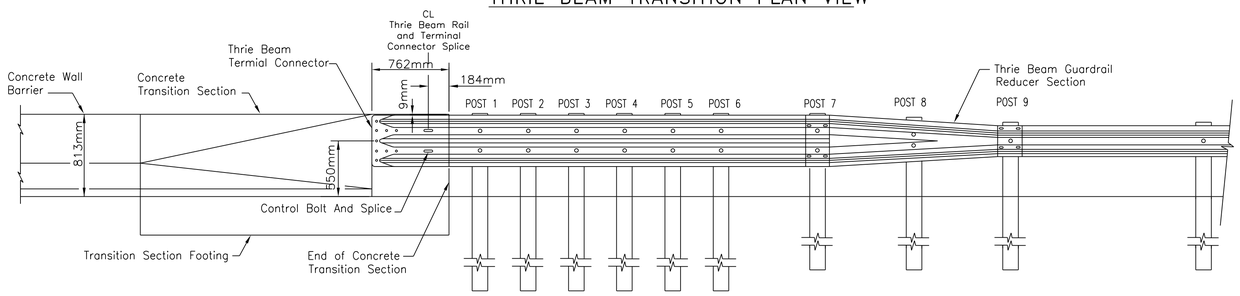
DRAWN BY: NRDOT	DATE: 6/3/15
DESIGNED BY: NRDOT	DATE: 6/3/15
REVISED: 7/23/15	BY: Design 2
Sht_69 SGR04 Std Gdrail Curbing and Reflector Details 072315.dgn	

Sht_69 SGR04 Std Gdrail Curbing and Reflector Details 072315.dgn

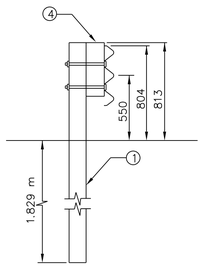
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	70	96
			N6331	N6331(2)2&4		



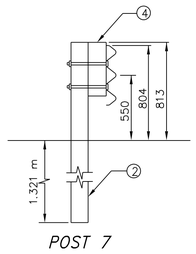
THRIE BEAM TRANSITION PLAN VIEW



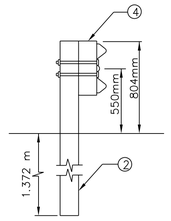
THRIE BEAM TRANSITION ELEVATION VIEW



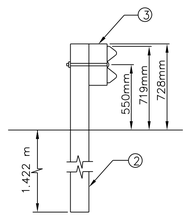
POSTS 1-6



POST 7



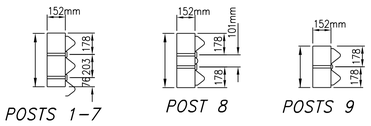
POST 8



POST 9

LEGEND

① 152 x 635 x 2.591 m or W203 x 533 x 2.591 m Post
② W152 x 508 x 2.134 m or W203 x 457 x 2.134 m Post
③ 152 x 203 x 356 Treated Timber Offset Block
④ 152 x 203 x 457 Treated Timber Offset Block

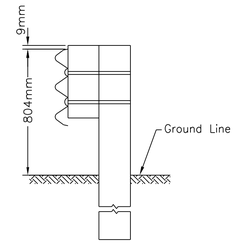


POSTS 1-7 | POST 8 | POSTS 9

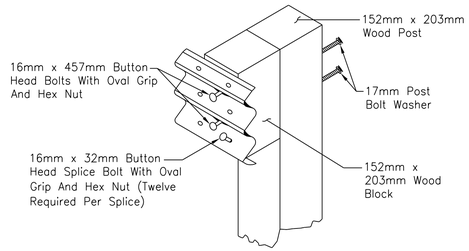
BLOCK DETAILS

GENERAL NOTES

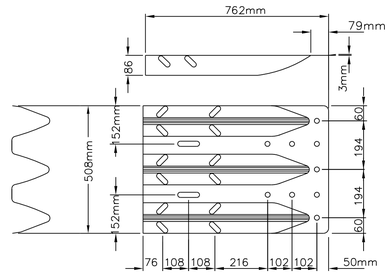
1. All Dimensions In Millimeters Unless Otherwise Shown.
2. All Materials and Workmanship Shall Conform To FP-03.
3. All Hardware Shall Meet FHWA Crash Worthiness Requirements As Per NCHRP 350 Guidelines.
4. Five 22 mm Diameter Galvanized AASHTO M164 Bolts Are Required For The Attachment Of The Thrie Beam Terminal Connector To The Concrete Barrier, Length To Be Determined In The Field By The COR/COTR. Holes For Bolts Shall Be 25 mm Dia. And Shall Be Either Formed Or Core Drilled.
5. Furnishing And Placing Of Bolts, Washers, And Bearing Plate Shall Be Considered Incidental To The Cost OF Metal Barrier And No Direct Payment Will Be Made Therefor.
6. Install Thrie Beam Terminal Connector Between Nested Guardrail Elements On The Approach Section.
7. Install Thrie Beam Terminal Connector Outside Of The Nested Guardrail Elements On The Departure Section.
8. Bolts Are To Be Installed As Shown So That The Threaded End Of The Bolts And Nuts Are Placed Away From Traffic Side Of Rail.
9. Do Not Place Any Washers Under The Bolts On The Traffic Side Of The Barrier.
10. Place Reflector Tabs on posts 1, 6 and 9..
11. The Color Of The Reflective Sheeting On The Reflector Tabs Shall Be The Same As The Color Of The Edgeline Pavement Marking In Front Of The Barrier.
12. Reflector Tabs Shall Have a Minimum Of 76 mm x 127 mm Reflective Sheeting On Both Sides And Shall Attach Securely To The Blockout.
13. Splices Shall Be Lapped So The Free End Does Not Face Traffic Flow.
14. Construction Tolerance For Height Of Guardrail Is 13 mm.
15. Terminal Connector, Bearing plate and associated hardware shall be considered incidental to Bid Item 61701-5000. Thrie Beam transition shall be measured and paid under Item 61701-5000 as shown.



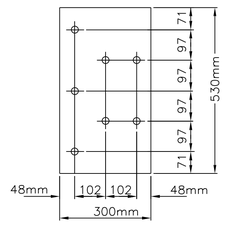
THRIE BEAM RAIL ASSEMBLY



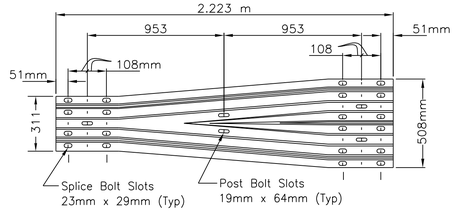
THRIE BEAM POST ASSEMBLY



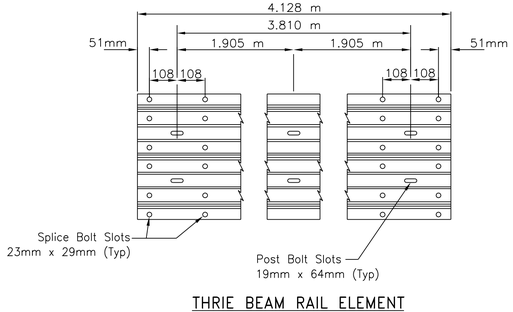
STANDARD THRIE BEAM TERMINAL CONNECTOR



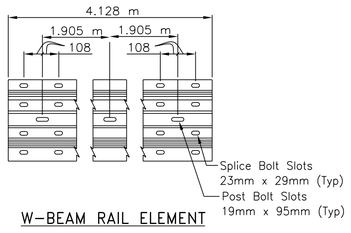
16 mm BEARING PLATE



THRIE BEAM GUARDRAIL REDUCER SECTION



THRIE BEAM RAIL ELEMENT



W-BEAM RAIL ELEMENT

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

GUARDRAIL TRANSITION AND THRIE BEAM DETAILS

DRAWN BY: NRDOT	DATE: 7/24/2015
DESIGNED BY: NRDOT	DATE: 7/24/2015
REVISED: 7/24/15	BY: Design 2
Sht_70 Gdrail Transition and Thrie Beam Details 072415.dgn	

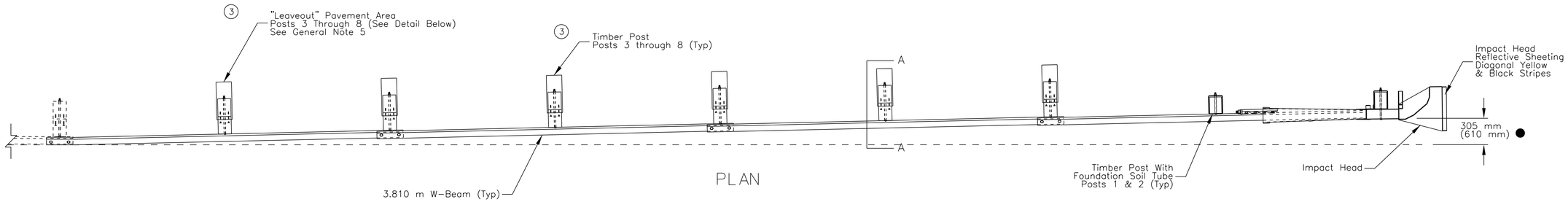
Sht_70 Gdrail Transition and Thrie Beam Details 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	71	96
			N6331	N6331(2)2&4		

FOR ELEVATIONS ABOVE (1,220 m) USE THE VALUES IN PARENTHESES

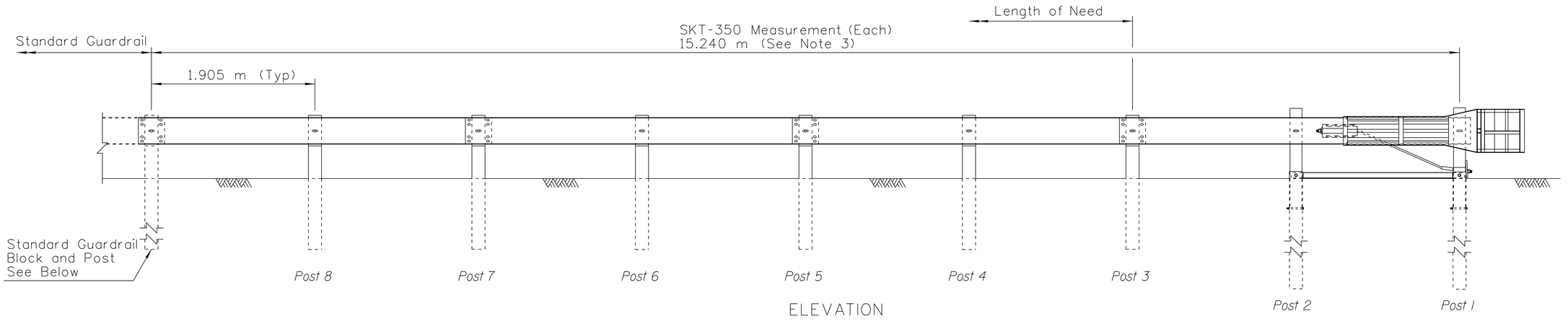
GENERAL NOTES

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 15.240m W-Beam Length Shall Consist Of Four 4.0m Sections, The End Section Being A Proprietary Split Rail.
4. See Sheet 72 & 73 For Additional Details & Notes.
5. "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 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.
6. This Project shall use the Type A Guardrail Installation details on sht 72 of 96.

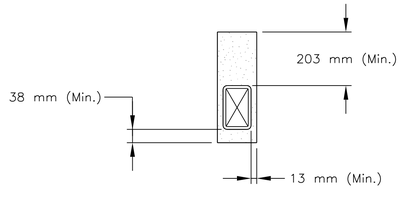


PLAN

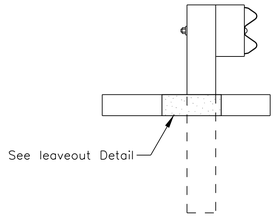
Traffic



ELEVATION



LEAVEOUT DETAIL



SECTION A-A
typical at Post 3 thru 8

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

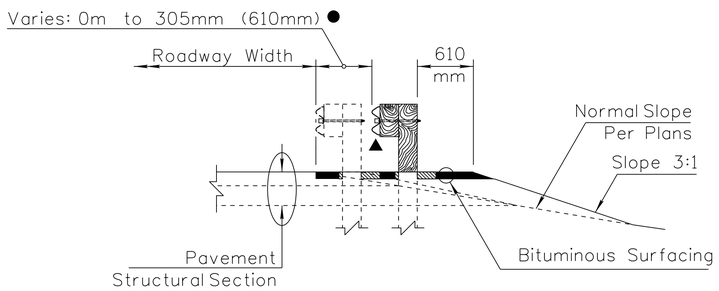
GUARDRAIL END TREATMENT
SKT-350 LAYOUT; SHEET 1 of 3

DRAWN BY: NRDOT	DATE: 7/24/2015
DESIGNED BY: NRDOT	DATE: 7/24/2015
REVISED: 7/24/15	BY: Design 2
Sht_71 SKT-350 Terminal End Section_1 of 3_072415.dgn	

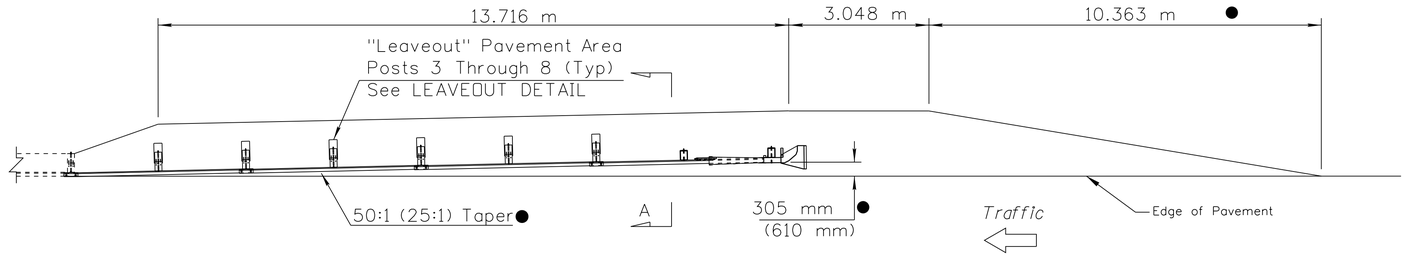
Sht_71 SKT-350 Terminal End Section_1 of 3_072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	72	96
			N6331	N6331(2)2&4		

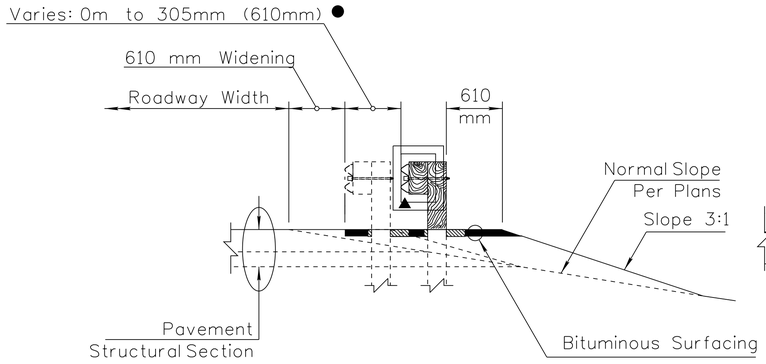
See Sheet 70 & 72 For General Notes.



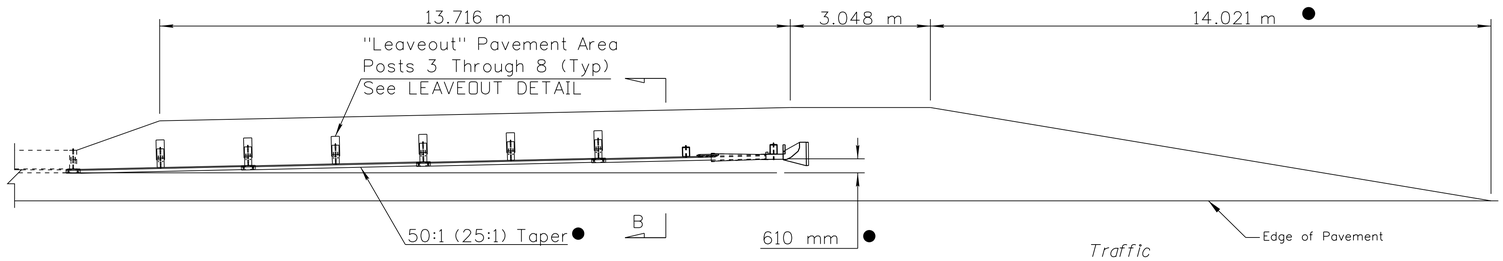
TYPE A SECTION



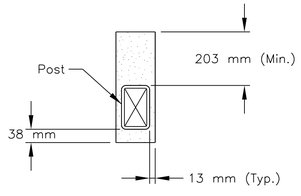
TYPE A GUARDRAIL INSTALLATION
(FACE OF RAIL AT EDGE OF PAVEMENT)



TYPE B SECTION



TYPE B GUARDRAIL INSTALLATION
(FACE OF RAIL OFFSET 610mm FROM NORMAL EDGE OF PAVEMENT)



LEAVEOUT DETAIL

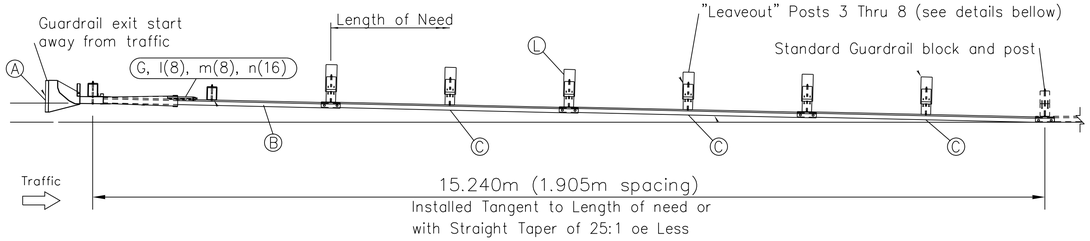
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

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

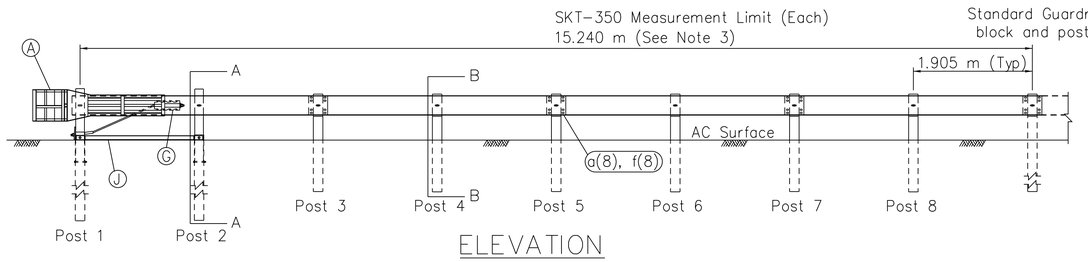
DRAWN BY: NRDOT	DATE: 7/24/2015
DESIGNED BY: NRDOT	DATE: 7/24/2015
REVISED: 12/4/2017	BY: Design 2
Sht_72 SKT-350 GR WIDING DETAIL_2 of 3	072415.dgn

Sht_72 SKT-350 GR WIDING DETAIL_2 of 3 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	73	96
			N6331	N6331(2)2&4		



PLAN

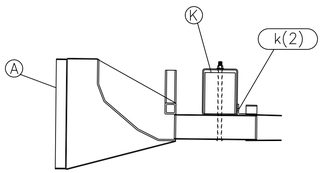


ELEVATION

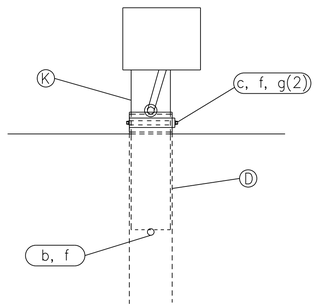
GENERAL NOTES

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 25:1 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 102mm above ground (measured along a 1.5m 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. See section 617.03 for additional requirements.
6. When rock is encountered during excavation, a 305mm Dia. post hole, 508mm into rock may be used if approved by the engineer. Granular material will be placed in the bottom of the hole approx. 64mm 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 7.620m 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.

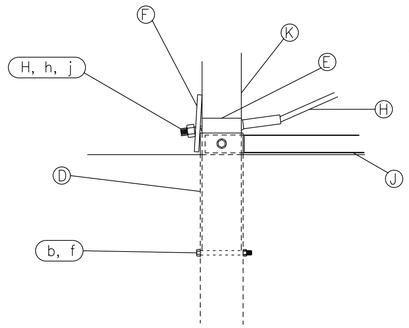
Code	QTY.	BILL OF MATERIALS	ITEM#
A	1	IMPACT HEAD	S3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 GA., 3.810m	FS1303
C	3	W-BEAM GUARDRAIL, 12 GA., 3.810m RAIL ELEMENTS	G1203
D	2	FOUNDATION SOIL TUBE, 152mm x 203mm x 1.829m	E731
E	1	PIPE SLEEVE	E740
F	1	BEARING PLATE, 203mm x 203mm x 16mm	E750
G	1	CABLE ANCHOR BOX	S760
H	1	BCT CABLE ANCHOR ASSEMBLY	E770
J	1	GROUND STRUT	E780
K	2	140mm x 191mm x 1.143m WOOD POSTS	P650
L	6	152mm x 203mm x 1.829m WOOD CRT POST	P671
M	6	152mm x 203mm x 356mm TIMBER BLOCKOUT	P675
		HARDWARE	
a	32	16mm Dia. x 32mm SPLICE BOLT	B580122
b	2	16mm Dia. x 191mm HEX BOLT	B580754
c	2	16mm Dia. x 254mm HEX BOLT	B581004
d	1	16mm Dia. x 191mm H.G.R. BOLT (post 2 only)	B581002
e	6	16mm Dia. x 457mm H.G.R. BOLT (posts 3-8)	B581802
f	43	16mm Dia. H.G.R. NUT	N050
g	11	H.G.R. WASHER	W050
h	2	25mm ANCHOR CABLE HEX NUT	N100
j	2	25mm ANCHOR CABLE WASHER	W100
k	2	9.5mm X 76mm LAG SCREW	E350
l	8	CABLE ANCHOR BOX SHOULDER BOLTS	SB58A
m	8	12.7mm A325 STRUCTURAL NUTS	N055A
n	16	27mm OD x 14mm ID A325 STR. WASHER	W050A



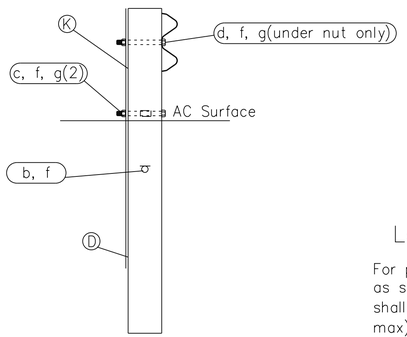
IMPACT HEAD CONNECTING DETAIL



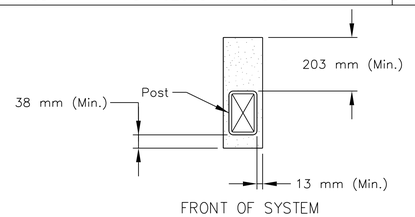
FRONT VIEW OF POST 1



SIDE VIEW OF POST 1



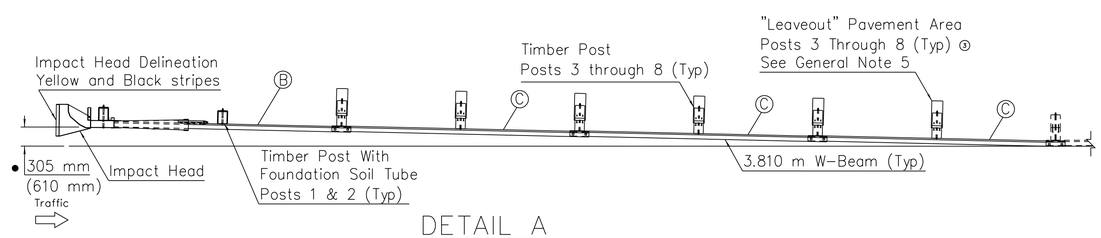
SECTION A-A



LEAVEOUT DETAIL

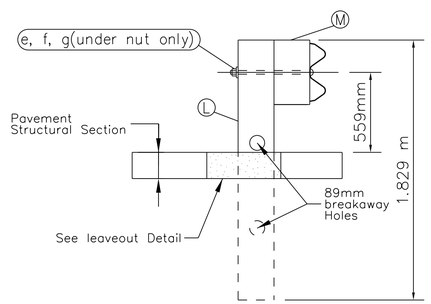
Leaveout Requirement:

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 39mm nominal (51mm max) and where the asplalt extends more than 457mm 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 concrete grout mix or other non-cohesive material as approved by the NRDOT (owner).



DETAIL A

optional flared installation, 25:1 maximum flare rate



SECTION B-B

typical at Post 3 thru 8

APPROVED AS NCHRP 350 T3 TERMINAL

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

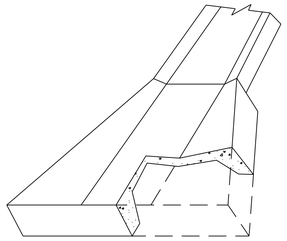
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

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

DRAWN BY: NRDOT	DATE: 7/24/2015
DESIGNED BY: NRDOT	DATE: 7/24/2015
REVISED: 7/24/2015	BY: Design 2
Sht_73 SKT-350 GR End Treatment Details_3 of 3 072415.dgn	

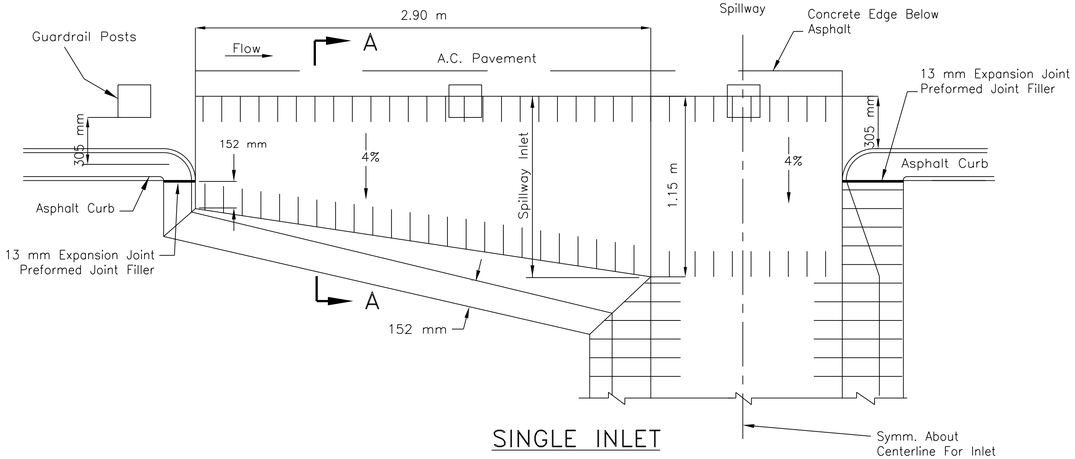
Sht_73 SKT-350 GR End Treatment Details_3 of 3 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	74	96

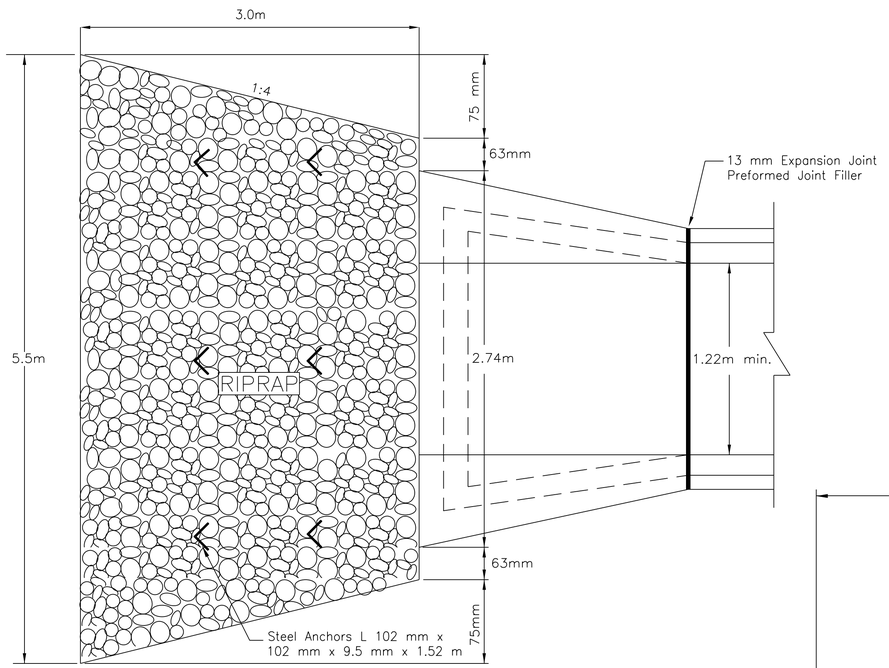


OUTLET DETAIL

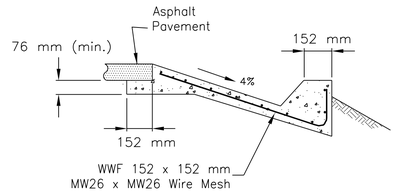
DESCRIPTION	SYMBOL
Indicates Inlet	
Indicates Spillway	



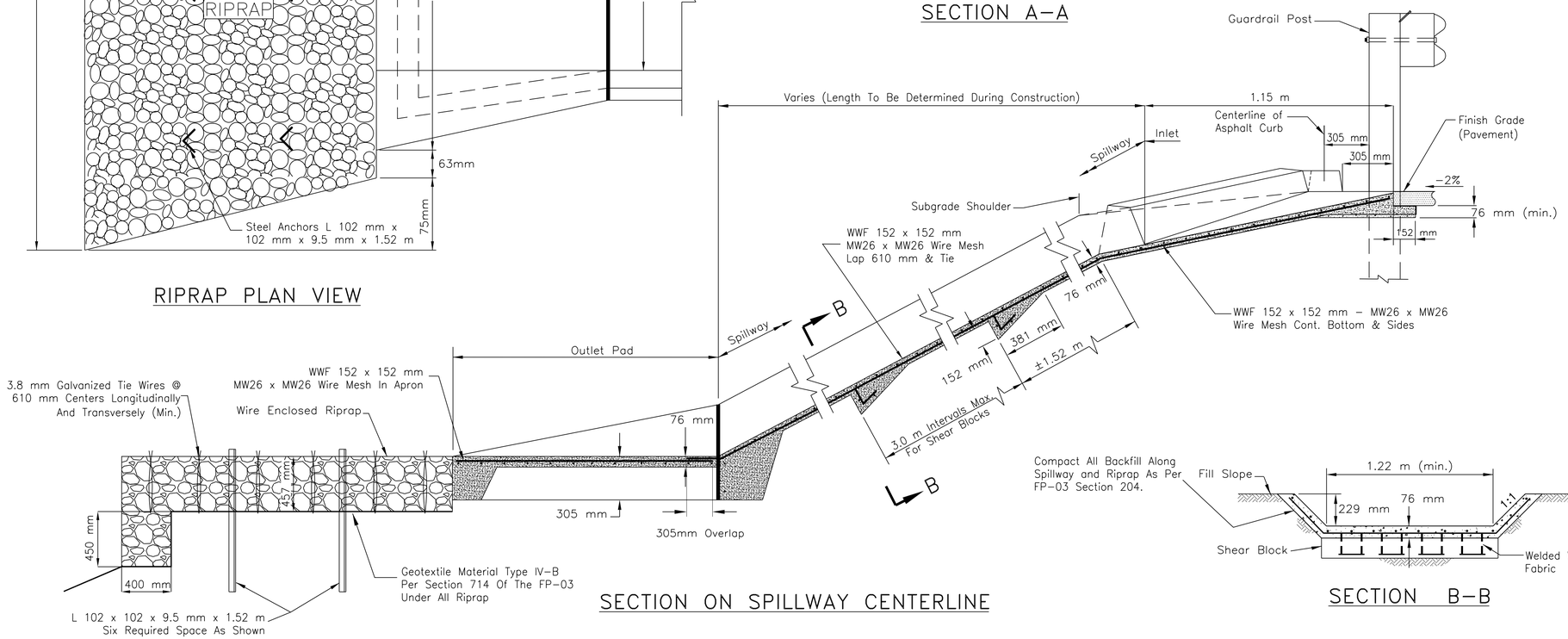
SINGLE INLET



RIPRAP PLAN VIEW



SECTION A–A



SECTION ON SPILLWAY CENTERLINE

SECTION B–B

GENERAL NOTES

1. Workmanship And Materials Shall Conform To The Standard Specifications For Construction Of Roads And Bridges On Federal Highway Projects (FP-03) Along With All Supplemental Specifications For This Project.
2. Any Unsuitable Material Encountered During The Footing Excavations Shall Be Removed As Directed By The COR/COTR And Replaced With Structural Backfill Material Conforming To Section 704.04 Of FP-03 And Shall Be Measured and Paid For Under Bid Item 20403-0000.
3. All Stone For Loose Riprap To Be Class 2, Meeting The Grading Requirements Of Table 705-1, Section 251 Of FP-03.
4. All Excavation And Backfill Operations Shall Be Done To Neat Lines In Accordance With Section 209.09 & 209.11 Of FP-03 And The Details Shown. This Work Shall Be Incidental To Installation Of Riprap And Spillway.
5. The Contractor Shall Be Required To Make Any Length & Location Adjustments In The Field To Match Existing Field Conditions. These Field Adjustments Are Incidental Obligations Under Bid Item 60812-0410.
6. Concrete For The Spillway Inlet, Spillway. And Outlet Shall Be Class A(AE) Meeting The Construction Requirements Of Section 601 Of FP-03.
7. Welded Wire Fabric For The Spillway Shall Conform To ASTM A185 If Made Of Smooth Wire Or A497 If Made Of Deformed Wire. Furnishing And Placement Of The Welded Wire Fabric Shall Be Considered Incidental To Item 2512-0200.
8. When Constructing Outlet Pad, The Wire Mesh Shall Extend Through The Joint Into The Spillway and Outlet Pad 305mm Overlap In Lieu Of Bending Into The Spillway Key.
9. See Sheet 66 For Additional Wire Enclosed Riprap Details And Notes.

ITEM 60812-0200 & 60812-0410 CONCRETE SPILLWAY FOR GUARDRAIL

STATION	LOCATION	SPILLWAY
Proj. N6331(2) 60812-0200		
36+786.750	Rt.	1 EA
37+000.000	Rt.	1 EA
CHAPTER PARKING LOT 60812-0410		
-00+003.655	Lt.	1 EA
00+030.72	Lt.	1 EA
00+065.031	Lt.	1 EA
Proj. N6331(1-2) Spur C 60812-0410		
01+190.000	Rt.	1 EA
01+190.000	Lt.	1 EA
	TOTAL	7

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

GUARDRAIL CONCRETE SPILLWAY WITH WIRE ENCLOSED RIPRAP

DRAWN BY: WHPACIFIC DATE: 3/99
DESIGNED BY: WHPACIFIC DATE: 3/99
REVISED: 10/25/2017 BY: Design 2

Sht_74 Guardrail Conc, Spillway with Wire Enclosed Riprap102517.dgn

Sht_74 Guardrail Conc, Spillway with Wire Enclosed Riprap102517.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330(1)	N6330(1)1,2&4	75	96
			N6331(2)	N6331(2)2&4		
			N21(3A)	N21(3A)2&4		

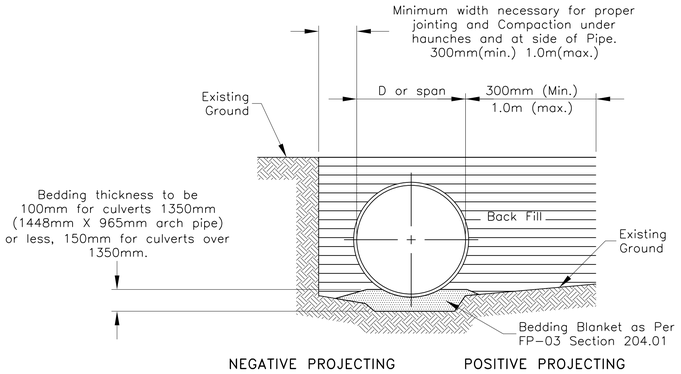


FIGURE A: BEDDING

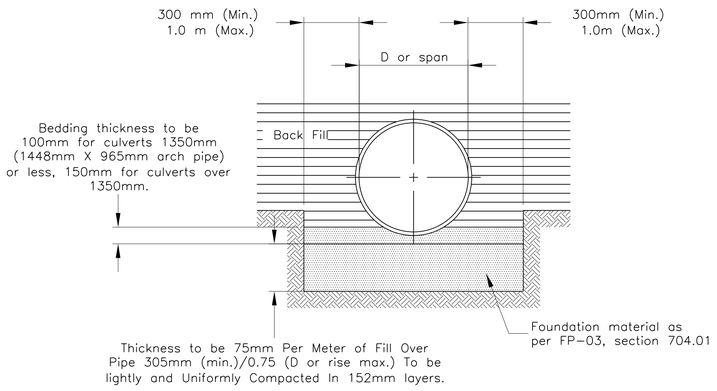


FIGURE B: ROCK BEDDING

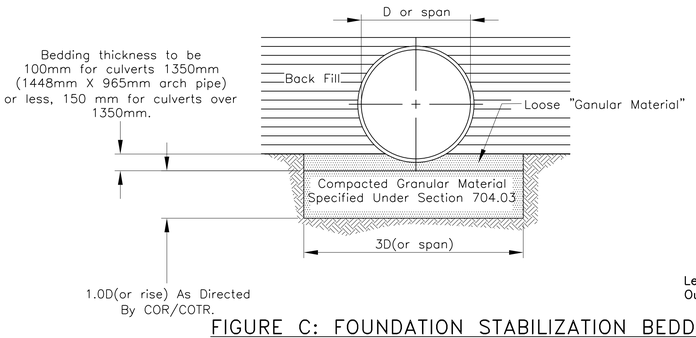
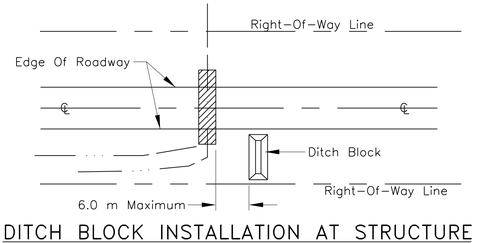


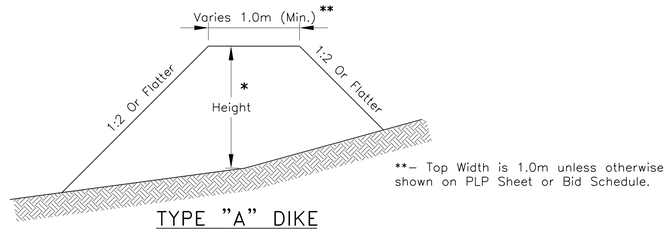
FIGURE C: FOUNDATION STABILIZATION BEDDING



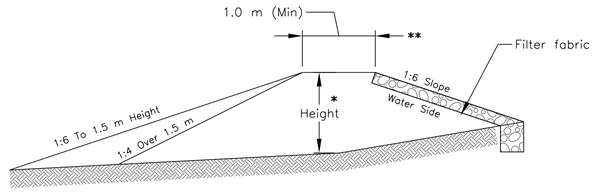
DITCH BLOCK INSTALLATION AT STRUCTURE

1. Ditch Blocks At Structures Shall Be Placed Such That The Water is Diverted Into Structure. The Elevation At Top Of Ditch Block Shall Be 305mm Above Elevation Of Top Of Pipe Unless Otherwise Shown Or Directed by the COR/COTR. SEE NOTE 14 THIS SHEET.

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 3.0m.



TYPE "A" DIKE



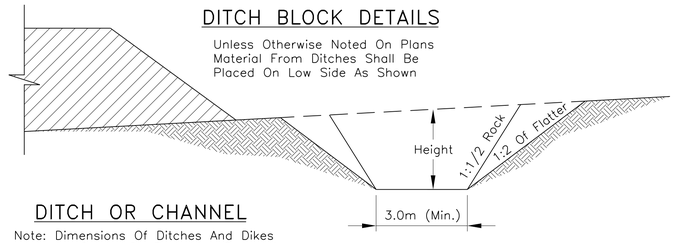
TYPE "B" DIKE/BERM

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

*Height = Pipe Diameter + 305mm (Not To Exceed Paved Shoulder and Elevation.)

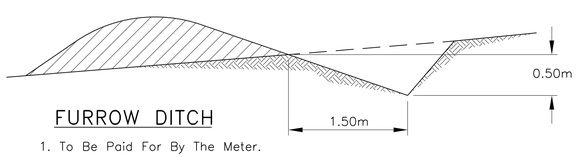
DITCH BLOCK DETAILS

Unless Otherwise Noted On Plans Material From Ditches Shall Be Placed On Low Side As Shown



DITCH OR CHANNEL

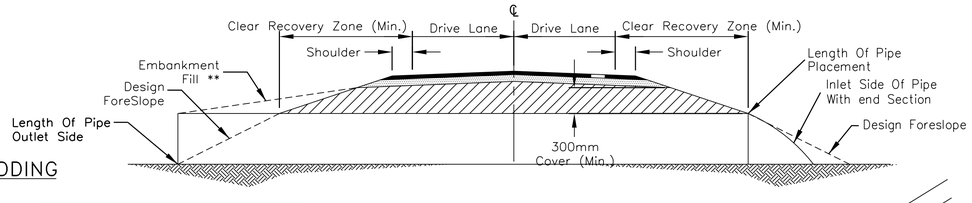
Note: Dimensions Of Ditches And Dikes As Shown On Plans Are Respectively Width Depth Or Height And Length.



FURROW DITCH

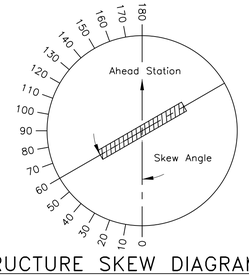
1. To Be Paid For By The Meter.

2. Furrow Ditch Sections As Shown Above Or And Approved Equivalent Shall Be Built As Directed By The COR/COTR UNDER BID ITEM 20410-2000.

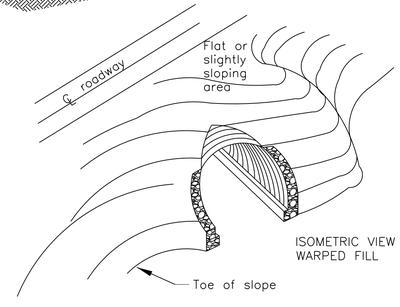


** Adjust Slopes To Catch At Top Of Pipe At Each Opening

TYPICAL PIPE INSTALLATION– MAINLINE SHOWN
Turnout/Driveway, use 2-End Sections



STRUCTURE SKEW DIAGRAM



PIPE SKEWS TO THE EMBANKMENT WARPING (TYP.)

1. The Contractor shall be required to built the warped embankment around the skewed drainage pipe(s). This work shall be incidental to the earthwork and installation of drainage pipe items shown.

GENERAL NOTE

1. PLACE LOOSE BEDDING ROUGHLY SHAPED TO BOTTOM OF PIPE, THEN COMPACTED UNDER HAUNCHES AFTER PIPE PLACEMENT.

2. SEE SECTIONS 204, 209, 602, AND 704 OF FP-03, INCLUDING THE SUPPLEMENTAL SPECIFICATION FOR ADDITIONAL NOTES.

3. ALL DRAINAGE STRUCTURE MATERIAL SHALL BE UNLOADED AND HANDLED WITH REASONABLE CARE. NO STRUCTURE SHALL BE DRAGGED OR ALLOWED TO STRIKE ANY HARD SURFACE DURING PLACEMENT. ANY DAMAGED STRUCTURE SHALL BE REPAIRED OR REPLACED, BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE GOVERNMENT.

4. ALL STRUCTURAL PLATE PIPE & BOX STRUCTURES SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE FABRICATOR'S RECOMMENDATIONS AND DETAILS ELSE WHERE ON THESE PLANS.

5. BACKFILL MATERIAL SHALL BE PLACED 305mm(min.) 1.0m(max) PIPE DIAMETER WIDTH ON THE SIDES AND 305mm OVER THE PIPE. BACKFILL MATERIAL BEYOND THESE LIMITS SHALL BE REGULAR EARTHWORK EMBANKMENT MATERIAL. THE BACKFILL MATERIAL SHALL BE APPROVED BY THE COR/COTR 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 610mm MINIMUM BETWEEN END SECTIONS UNLESS OTHERWISE DIRECTED BY THE COR/COTR OR AS SHOWN ON THE PLANS.

9. ALL PIPES SHALL BE PROTECTED BY A COVER OF NOT LESS THAN 914mm OF EMBANKMENT ABOVE PIPE BEFORE AND 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 INCIDIDENTAL TO COMPLETION OF PROJECT AND NO ADDITIONAL PAYMENT SHALL BE MADE.

11. AT DRAINAGE PIPE REPLACEMENTS, INSTALLATION, EXTENSIONS, AND IN-PLACE PIPE CLEANING LOCATIONS, THE CONTRACTOR SHALL RESHAPE, REGRADE AND CLEAN THE INLET AND OUTLET CHANNELS TO THE RIGHT-OF-WAY LINE AND/OR EXISTING DRAINAGE CHANNEL, TO PRODUCE SMOOTH FLOWS AT CULVERT INTAKES AND DISCHARGES AS DIRECTED BY THE COR/COTR. THIS WORK SHALL BE INCIDENTAL TO THE 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 COR/COTR TO PROVIDE FOR THE MINIMUM COVE.

13. TYPE "B" DIKE SHALL BE USED ON THIS PROJECT UNLESS OTHEWISE NOTED ON THE PLANS. EMBANKMENT MATERIAL NEEDED TO BUILD EARTHEN DIKES SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEMS FOR DITCH BLOCKS AS SHOWN IN THE BID SCHEDULE.

14. ADJUST THE DITCH BLOCKS WITH A CURVE TO FIT FIELD CONDITIONS AS DIRECTED BY THE COR/COTR. THESE ADJUSTMENTS SHALL BE CONSIDERED INCIDENTAL TO BID ITEMS FOR DITCH BLOCKS SHOWN IN THE BID SCHEDULE.

15. BACKFILL AND BEDDING MATERIAL INSTALLATION FOR PRECAST BOX, STRUCTURES SHALL BE INACCORDANCE WITH THE FABRICATORS RECOMMENDATIONS AND APPROVED SHOP PLANS

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

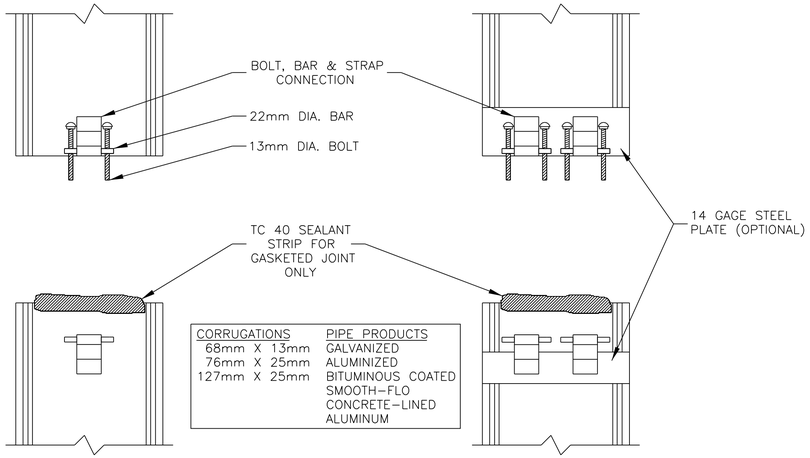
DRAINAGE STRUCTURE INSTALLATION AND DITCH/DIKE DETAILS

DRAWN BY: NRDOT	DATE: 05/04
DESIGNED BY: NRDOT	DATE: 05/04
REVISED: 10/26/2015	BY: Design 2

Sht_75 Drainage Structure Installion and Ditch_Dike Details 061516.dgn

Sht_75 Drainage Structure Installion and Ditch_Dike Details 061516.dgn

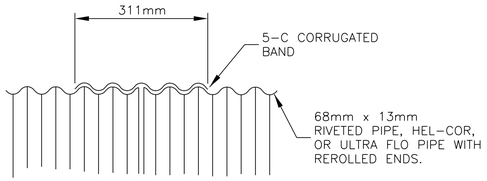
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	76	96
			N6331	N6331(2)2&4		
			N21	N21(3A)2&4		



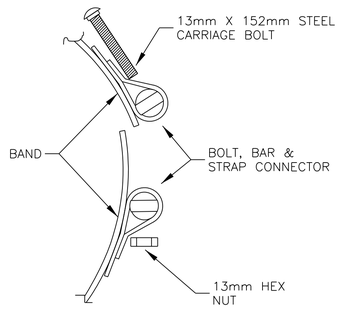
CONNECTION DETAIL
SINGLE
BOLT, BAR & STRAP

CONNECTION DETAIL
DOUBLE
BOLT, BAR & STRAP

H-10 HUGGER BAND



SECTION

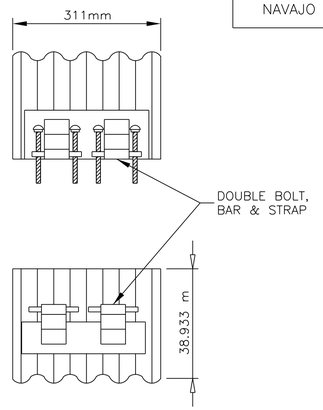


BOLT, BAR & STRAP
CONNECTION DETAIL

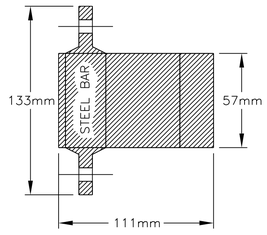


STRAP DETAIL

CORRUGATIONS	PIPE PRODUCTS
68mm X 13mm	GALVANIZED
ULTRA FLO	ALUMINIZED
	BITUMINOUS COATED
	FIBER-BONDED

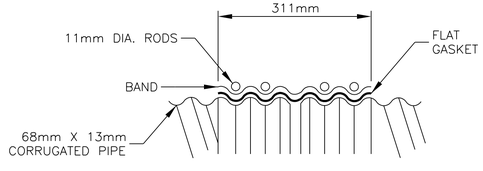


CONNECTION DETAIL

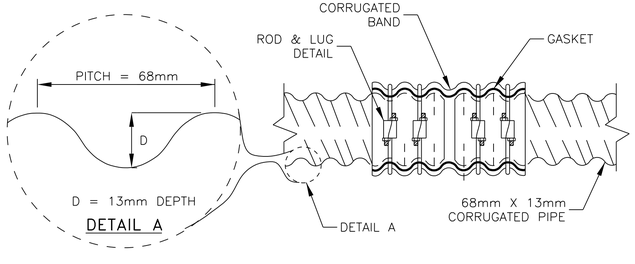


TOP VIEW

5-C CORRUGATED BAND



SECTION



5-C CORRUGATED BAND
SIDE VIEW

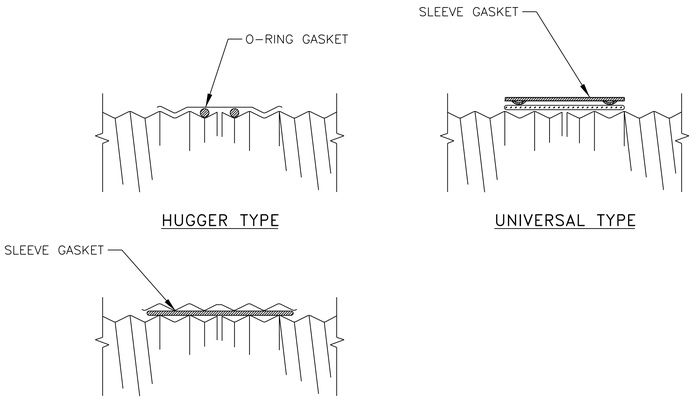
FLAT GASKET INSTALLATION GUIDELINES

1. CLEAN THE PIPE EDGES.
2. APPLY A LIBERALLY AMOUNT OF LUBRICANT TO THE FIRST TWO ANNULAR CORRUGATIONS ON THE OUTSIDE OF THE PIPE.
3. SNAP THE FLAT GASKET INTO POSITION SUCH THAT THE GASKET COVERS THE FIRST ANNULAR CORRUGATION OR THE RECORRUGATED END. HALF OF THE GASKET WILL BE HANGING OVER THE END OF THE PIPE.
4. FOLD THE REMAINING HALF OF THE GASKET THAT IS EXTENDED OVER THE PIPE END BACK OVER THE SECTION OF THE GASKET POSITIONED ON THE END OF THE PIPE.
5. APPLY A LIBERAL AMOUNT OF LUBRICANT TO THE ENTIRE INNER SURFACE OF THE BAND.
6. PLACE THE BAND INTO POSITION ON THE INSTALLED LENGTH OF PIPE SO THAT THE NEXT LENGTH OF PIPE CAN BE INDEXED CORRECTLY AND THE FLAT GASKET ROLLED OVER THE SECOND PIPE END.
7. APPLY A LIBERAL AMOUNT OF LUBRICANT TO THE END OF THE SECOND LENGTH OF PIPE.
8. PLACE THE SECOND LENGTH OF PIPE INTO POSITION. THE TWO PIPE LENGTHS MUST BE POSITIONED PROPERLY FOR THE GASKET TO FIT OVER, AND THE BAND TO INDEX ONTO THE SECOND PIPE END.
9. UNFOLD THE GASKET INTO POSITION OVER THE SECOND LENGTH OF PIPE. TAKE CARE TO INSURE THAT THE GASKET FITS OVER THE END OF THE SECOND PIPE SECTION. ALSO, THE BAND MUST BE INDEXED INTO THE PROPER ANNULAR CORRUGATION ON EACH LENGTH OF PIPE.
10. CHECK THE COMPLETE PERIPHERY OF THE PIPE TO INSURE THAT THE GASKET IS CENTERED EVENLY ON THE TWO LENGTHS OF PIPE.
11. SLIDE THE BAND INTO POSITION AND TIGHTEN THE BOLTS. FOR MAXIMUM COMPRESSION OF THE GASKET, THE BAND CORRUGATIONS MUST BE FULLY SEATED INTO THE PROPER CORRUGATION ON EACH PIPE END. THIS WILL INSURE THAT THE PIPE LENGTHS ARE POSITIONED PROPERLY FOR THE GASKET.

GENERAL NOTES

1. CARE SHALL BE TAKEN TO INSURE THAT NO FOREIGN MATERIAL GETS INTO OR ENTER BETWEEN THE OUTER PIPE SURFACE AND THE INNER SURFACE OF THE BAND.
2. TIGHTENING OF THE BOLTS MAY BE ACCOMPLISHED WITH THE USE OF SPANNER OR SOCKETHEAD DEEPWELL WRENCHES, EITHER MANUAL OR POWER. FASTENERS SHOULD BE TIGHTENED UNIFORMLY TO PREVENT UNEVEN COMPRESSION AGAINST THE PIPE WALL. FELTON BAND PULLER SHALL BE USED TO TIGHTEN BAND ON LARGER DIAMETER STRUCTURES, WHICH QUICKLY DRAWS THE BAND CONNECTORS TOGETHER TO FACILITATE BOLT AND NUT TIGHTENING. BOLTS SHOULD BE TIGHENED TO THE RECOMMENDED TORQUE OF 40 N•m
3. BANDS FOR PIPE-ARCH ARE THE SAME AS FOR EQUIVALENT DIAMETER ROUND PIPE.
4. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:

   305mm THRU 1219mm; 1-PIECE
   1372mm THRU 2438mm; 2-PIECE
   2591mm THRU 3658mm; 3-PIECE
5. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS BY THE MANUFACTURER. ALL ALUMINUM BANDS ARE FURNISHED WITH A 14 GAGE ALUMINUM BACK-UP PLATE WELDED TO THE BAND AND THE STRAP.
6. THE GASKET AND BAND INSTALLATION SHALL BE ASSEMBLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. A REPRESENTATIVE OF THE MANUFACTURER MAY BE PRESENT AT THE SITE DURING INSTALLATION.
7. THE COST OF SUPPLYING ALL MATERIALS AND INSTALLATION OF THE GASKET AND BAND ASSEMBLY SHALL BE INCLUDED IN THE BID ITEMS FOR SECTIONS 602, 603, AND 607.
8. ANY RELATED PATENT RIGHTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AS PER SECTION 107.01 OF THE FP-03.



HUGGER TYPE

UNIVERSAL TYPE

CORRUGATED

TYPICAL GASKET/BAND COUPLERS

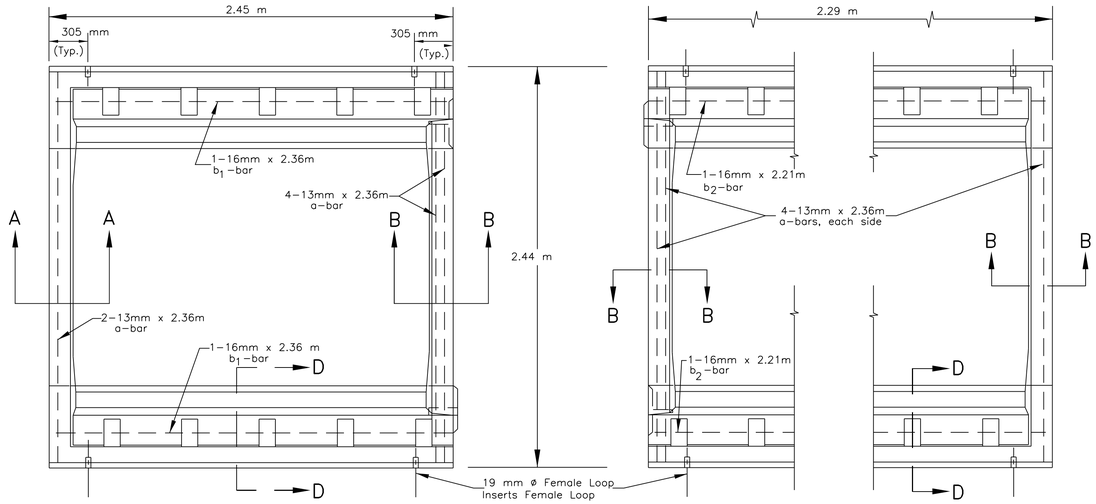
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PIPE GASKET/HUGGER BAND DETAILS

DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 07/24/2015	BY: Design 2
Sht_76 Pipe Gasket HBand Details 072415.dgn	

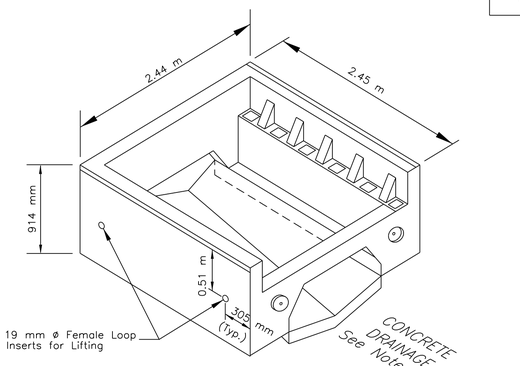
Sht_76 Pipe Gasket HBand Details 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	77	96
			N6331	N6331(2)2&4		
			N21	N21(3A)2&4		



PLAN – END UNIT

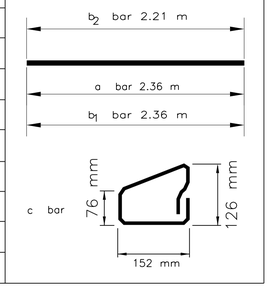
PLAN – INTERMEDIATE UNIT

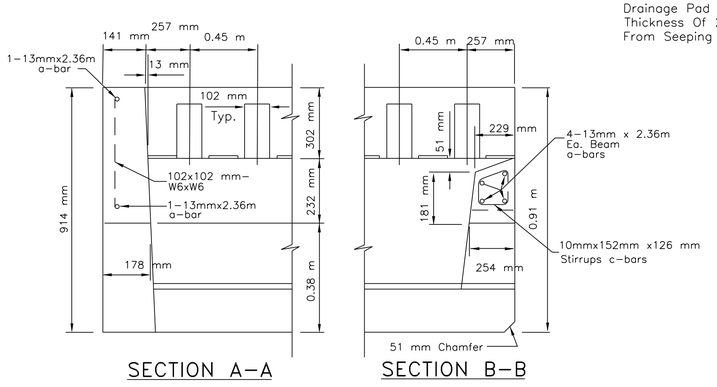


ISOMETRIC VIEW – END UNIT

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	13	2.36 m					
b_1	2	16	2.36 m					
				c	3	10	0.61 m	
D_1	20	13	0.46 m					
INTERMEDIATE UNIT								
a	8	13	2.36 m					
b_2	2	16	2.21 m					
				c	6	10	0.61 m	
D_1	18	13	0.46 m					

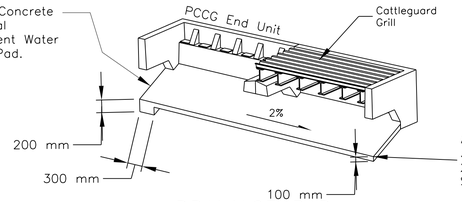




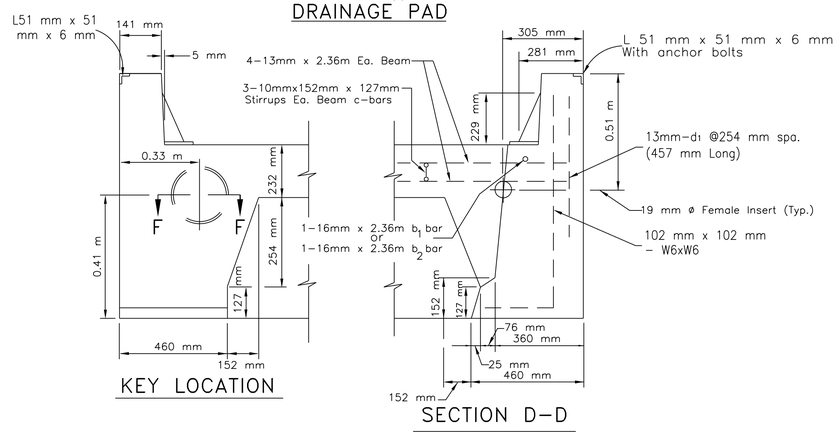
SECTION A–A

SECTION B–B

Thicken The First 300 mm Of Concrete Drainage Pad Bottom To A Total Thickness Of 200 mm To Prevent Water From Seeping Under Drainage Pad.



DRAINAGE PAD

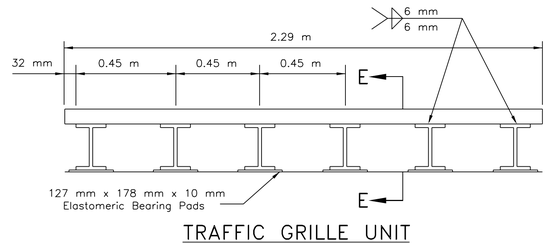


KEY LOCATION

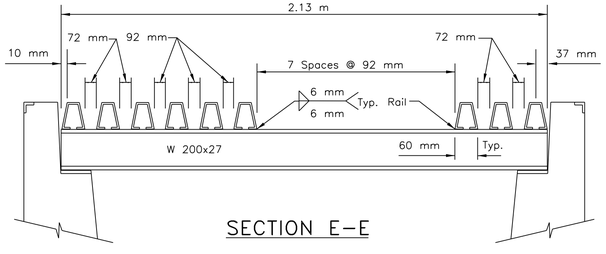
SECTION D–D

GENERAL NOTES

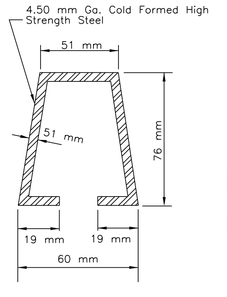
1. PRECAST CONCRETE SHALL ATTAIN A MINIMUM 28–DAY COMPRESSIVE STRENGTH OF 27.6 MPa, IN ACCORDANCE WITH AASHTO T22 (ASTM C–39). THE CONCRETE SHALL BE CLASS A(AE) CONFORMING TO SECTION 552 OF THE FP–03.
2. REINFORCING STEEL SHALL CONFORM TO ASTM SPECIFICATION A615, GRADE 300. ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M270M, GRADE 250.
3. EACH UNIT SHALL CONFORM TO THE AASHTO MS–18 HIGHWAY LOADING REQUIREMENTS.
4. EACH UNIT SHALL BE FABRICATED TO CONFORM TO THE ROADWAY CROWN AS SHOWN ON THE PLANS, OR AS DESIGNATED BY THE COR/COTR.
5. BOLTS, WASHER, AND NUTS, SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M–111.
6. ALL TRAFFIC GRILL UNIT, INCLUDING STEEL ANGLES SHALL BE SHOP PAINTED WITH ONE (1) PRIMER COAT, ONE (1) INTERMEDIATE COAT, AND ONE (1) FINISH COAT IN ACCORDANCE WITH SECTION 563, PAINT SYSTEM 2 OF FP–03.
7. WING BRACES SHALL BE CONSIDERED SUBSIDIARY ITEMS TO THE CATTLEGUARD UNIT.
8. SEE SHEET 78 FOR REINFORCING STEEL TO BE USE AT PCC DRAINAGE PAD.
9. SEE DETAIL ON THIS SHEET AND SHEET 78 FOR CONCRETE DRAINAGE PAD LOCATIONS AND NOTES.



TRAFFIC GRILLE UNIT

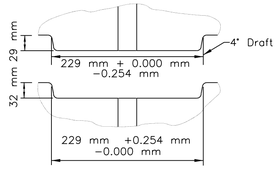


SECTION E–E

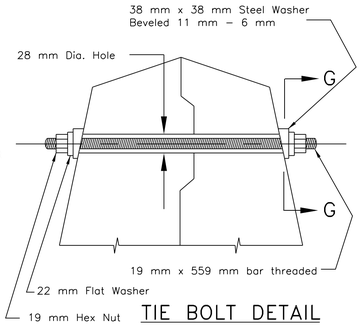


STEEL CROSSBAR SECTION

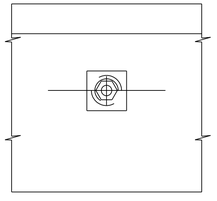
15 Req'd for 1 Grid



SECTION F–F



TIE BOLT DETAIL



SECTION G–G

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

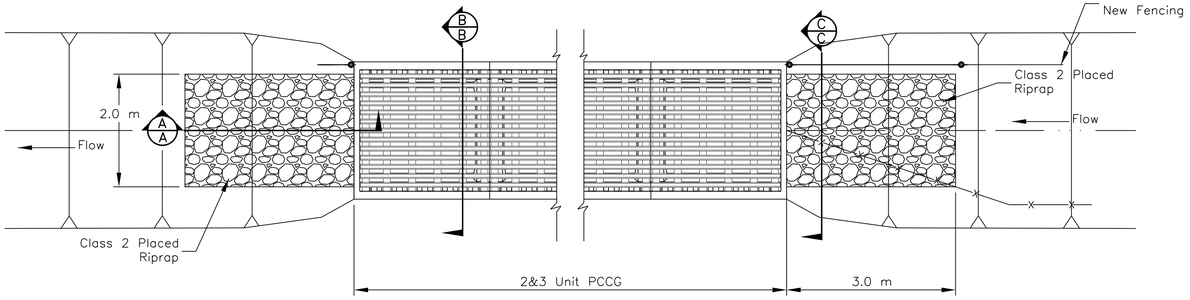
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRECAST CONCRETE CATTLEGUARD DETAILS

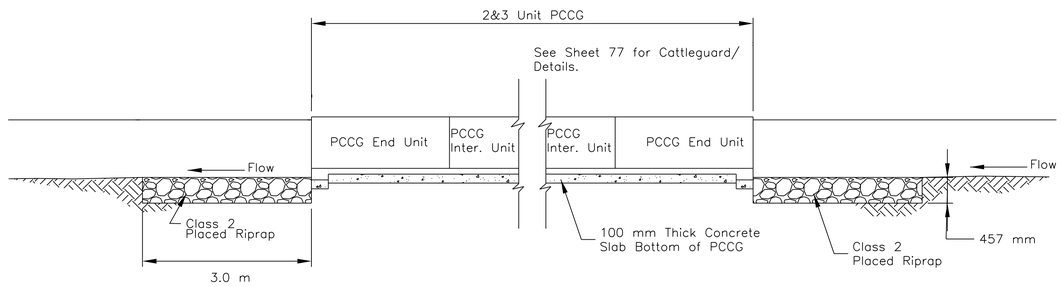
DRAWN BY: NRDOT	DATE: 7/2007
DESIGNED BY: NRDOT	DATE: 4/2003
REVISED: 07/24/2015	BY: Design 2
Sht_77 Precast Concrete Cattleguard Details	072415.dgn

Sht_77 Precast Concrete Cattleguard Details 072415.dgn

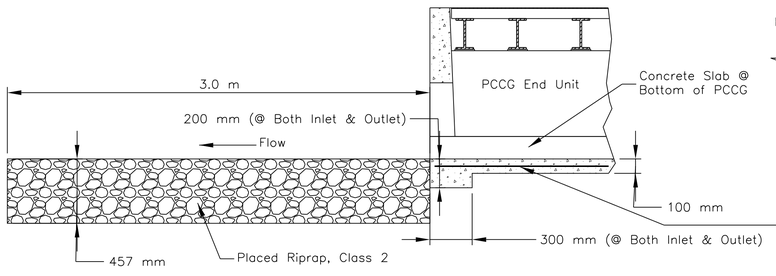
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)	78	96
			N6331	N6331(2)		



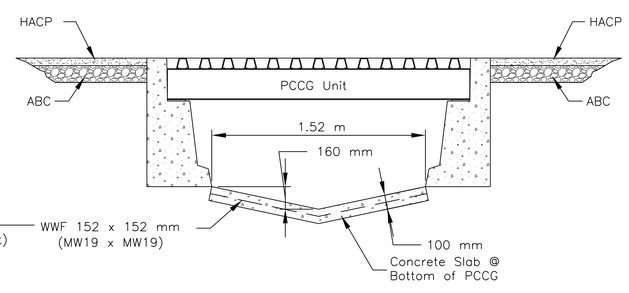
PLAN VIEW – PCCG WITH CONCRETE BOTTOM
NTS



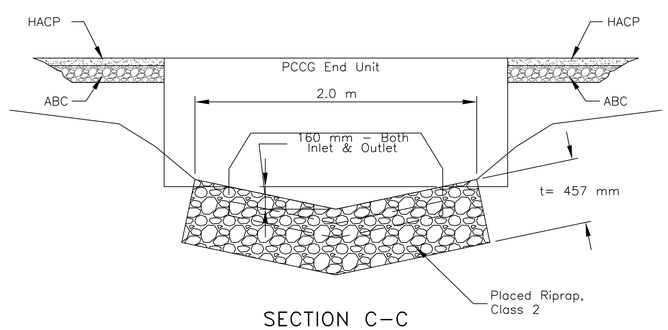
ELEVATION – PCCG WITH CONCRETE BOTTOM
NTS



SECTION A–A



SECTION B–B



SECTION C–C

Item 60101–0000; Minor Concrete, Class A(AE) and Item 25101–2000; Placed Riprap, Class 2

LOCATION	NO. OF PCCG UNITS	LENGTH OF PAD (m):	LENGTH OF RIPRAP (m):	CONCRETE (M^3)	WEIGHT OF WWF (kg/m^2)	RIPRAP (m^3)	REMARKS:
0+132	2	4.30	6.00	0.85	13.70	5.76	N21(3A), right side
0+538	2	4.30	6.00	0.85	13.70	5.76	N21(3A), right side
0+770	2	6.59	6.00	1.21	20.99	5.76	N21(3A), right side
35+915	2	6.59	6.00	1.21	20.99	5.76	N6331(2), left side
35+992	2	6.59	6.00	1.21	20.99	5.76	N6331(2), left side
36+110	2	6.59	6.00	1.21	20.99	5.76	N6331(2), left side
			TOTAL:	6.54		34.56	

GENERAL NOTES

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

2. ALL CONCRETE SHALL BE CLASS A(AE) WITH CLASS 1 FINISH. CHAMFER ALL EXPOSED EDGES 19 mm. ALL CONCRETE SHALL CONFORM TO SECTION 552 & 601 OF THE FP–03. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF F'c = 20.7 MPa IN 28 DAYS.

3. REINFORCING STEEL SHALL CONFORM TO AASHTO SPECIFICATION M–31 ASTM A 615M, GRADE 40, AND SECTION 554 OF FP–03. ALL BEND DIMENSIONS FOR REINFORCING STEEL SHALL BE OUT TO OUT OF BARS. ALL REINFORCING STEEL SHALL HAVE 51 mm CLEARANCE COVER UNLESS OTHERWISE NOTED. ALL REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF STRUCTURE.

4. IN NO CASE SHALL ANY BACKFILL BE PLACED UNTIL THE CONCRETE HAS ATTAINED A COMPRESSIVE STRENGTH OF 17.2 MPa.

5. ALL STRUCTURE EXCAVATIONS SHALL BE DONE TO NEAT LINES AND WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.

6. FOOTINGS SHALL BE PLACED TO THE ELEVATIONS SHOWN. IF UNSUITABLE MATERIAL IS FOUND AT THE FOOTING LOCATION AND ELEVATIONS, THE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED STRUCTURAL BACKFILL AS DETERMINED BY THE COR/COTR. ALL STRUCTURAL BACKFILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T99 METHOD C, BEFORE AND AFTER FOOTINGS ARE PLACED. THE STRUCTURAL BACKFILL MATERIAL SHALL CONFORM TO SECTION 208 AND 209 OF THE FP–03. THIS WORK SHALL INCLUDED IN THE UNIT PRICE BID FOR BID ITEM 60101–0000.

7. THE CONTRACTOR WILL BE REQUIRED TO MAKE FIELD ADJUSTMENTS AS DIRECTED BY THE COR/COTR TO MATCH FIELD CONDITIONS. THESE ADJUSTMENTS SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF PROJECT AND NO ADDITIONAL PAYMENT SHALL BE MADE.

8. SLOPES RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE PLANS AND AS DETERMINED BY THE COR/COTR ANY WASTE MATERIAL SHALL BE USED AS BORROW WHERE NEEDED AT OTHER PROJECT LOCATION AS DIRECTED AND APPROVED BY THE COR/COTR ALL EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.

9. SEE SHEET 77 FOR THE CATTLEGUARD DETAILS AND DIMENSIONS.

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

CONCRETE DRAINAGE PAD DETAIL FOR PRECAST CATTLEGUARD

DRAWN BY: NRDOT	DATE: 12/2000
DESIGNED BY: NRDOT	DATE: 12/2000
REVISED: 07/24/2015	BY: Design 2

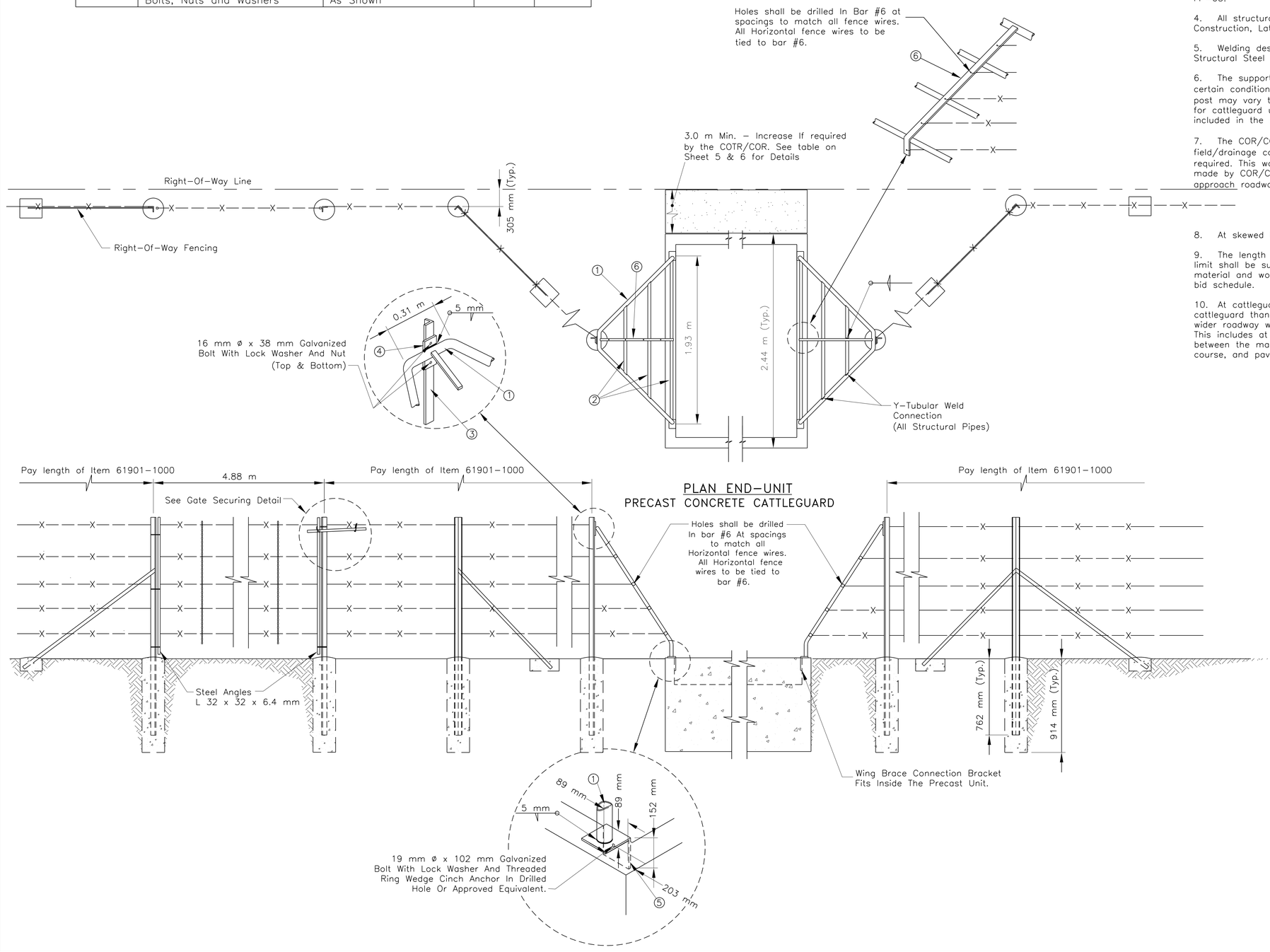
Sht_78 Concrete Drainage Pad for Precast Cattleguard Details 072415.dgn

Sht_78 Concrete Drainage Pad for Precast Cattleguard Details 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21(3A)	N21(3A)2&4	79	96
			N6330(1)	N6330(1)1,2&4		
			N6331(2)	N6331(2)2&4		

ESTIMATED MATERIAL LIST

PART NO.	MATERIAL	SIZE AND THICKNESS	LENGTH	QUANTITY
1	Structural Steel Pipe	64 mm ø Nominal	4.23 m	2
2	Structural Steel Pipe	32 mm ø Nominal	4.19 m	2
3	Steel Angle (See Note 6 & 7)	L 64 x 64 x 9.5 mm	2.29 m	2
4	Steel Plate	89 mm x 10 mm	178 mm	2
5	Steel Angle	L 152 x 89 x 9.5 mm	89 mm	4
6	Bar	25 mm x 6 mm	1.68 m	2
	Bolts, Nuts and Washers	As Shown		



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.

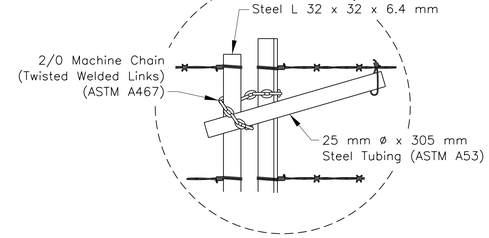
6. The supporting wing brace posts length (part 3) shall be 2.3 meter (minimum). Under certain conditions (such as drain through cattleguard, high embankment, etc) the length of the post may vary to fully support the wing braces. This work shall be incidental to the bid items for cattleguard under section 619. Installation of Gates at cattleguard locations shall be included in the unit price bid for the cattleguard bid item(s) shown in the bid schedule.

7. The COR/COTR may adjust the finished cattleguard elevation as needed to fit field/drainage conditions. The Contractor shall re–grade the adjoining turnout approaches as required. This work shall be considered incidental to item 61903–1000 of FP–03. Any mistakes made by COR/COTR in directing adjustments to the finished grade for the cattleguards and approach roadway will be corrected under a negotiated modification under subsection 109.02(m).

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 100 mm 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 typical width is wider on one side of the cattleguard than the other side, the narrower roadway width shall flared out to match the wider roadway width using an 8:1 taper or to the length allow by the right–of–way width. This includes at narrow right–of–way 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.



GATE SECURING DETAIL

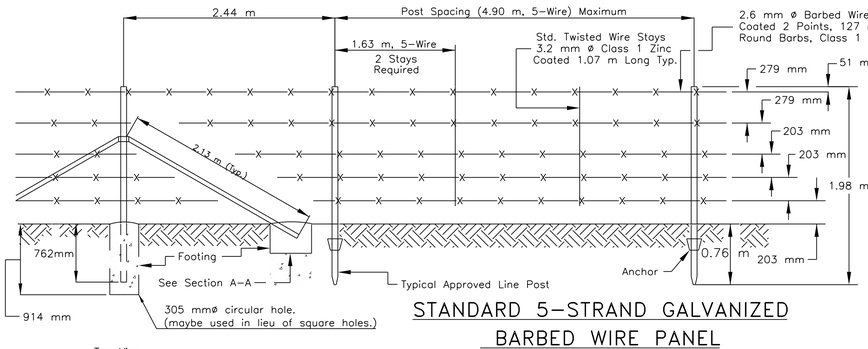
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CATTLEGUARD LOCATION WING BRACE DETAILS

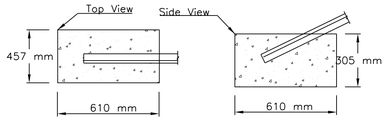
DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 07/10/15	BY: Design 2
Sht_79 Cattleguard Location _Wing Brace Details 072415.dgn	

Sht_79 Cattleguard Location _Wing Brace Details 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(1)2&4	80	96
			N6330	N6330(1)1,2&4		
			N21	N21(3A)2&4		

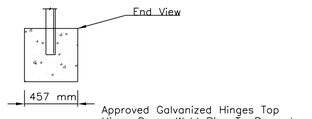


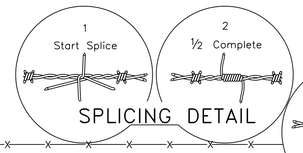
STANDARD 5-STRAND GALVANIZED BARBED WIRE PANEL



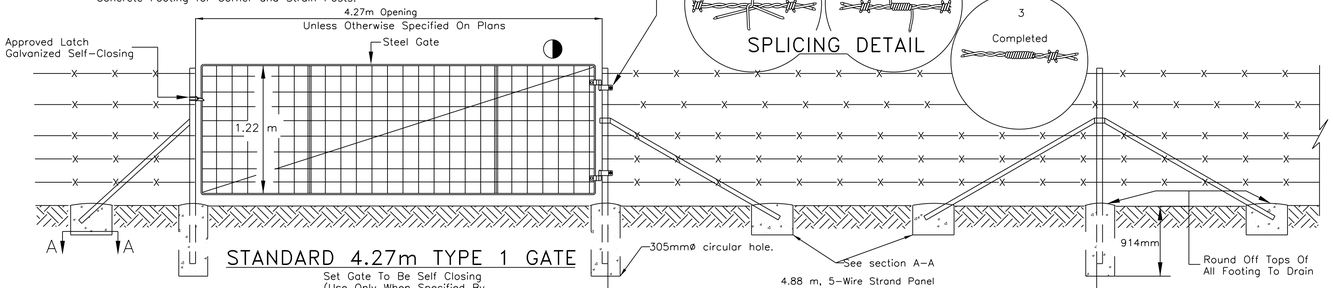
SECTION A-A

Concrete Footing for Corner and Strain Posts.





SPLICING DETAIL



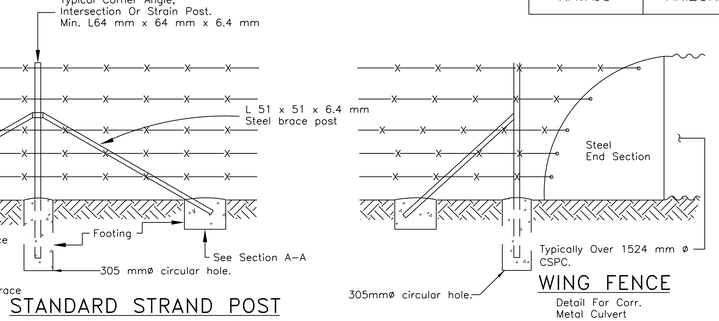
STANDARD 4.27m TYPE 1 GATE

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 2.38 mm ø Min. Drive Pin To Prevent Rotation Of The Hangers And/Or Latches.

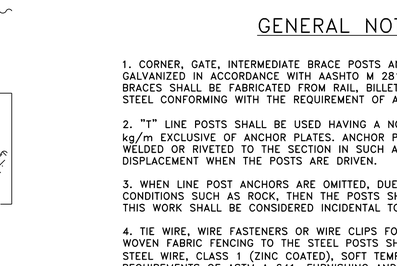
For Gate Details At Cattle guard Location See Standard Cattle guard Drawings.

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



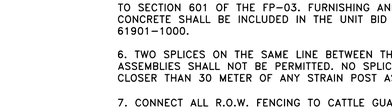
STANDARD STRAND POST

To Be Placed @ 198 m Max. Intervals. Strand 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.



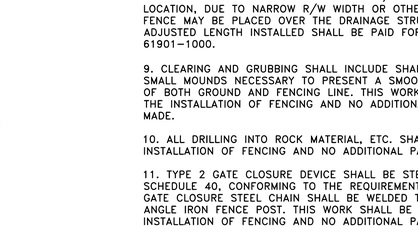
WING FENCE

Detail For Corr. Metal Culvert



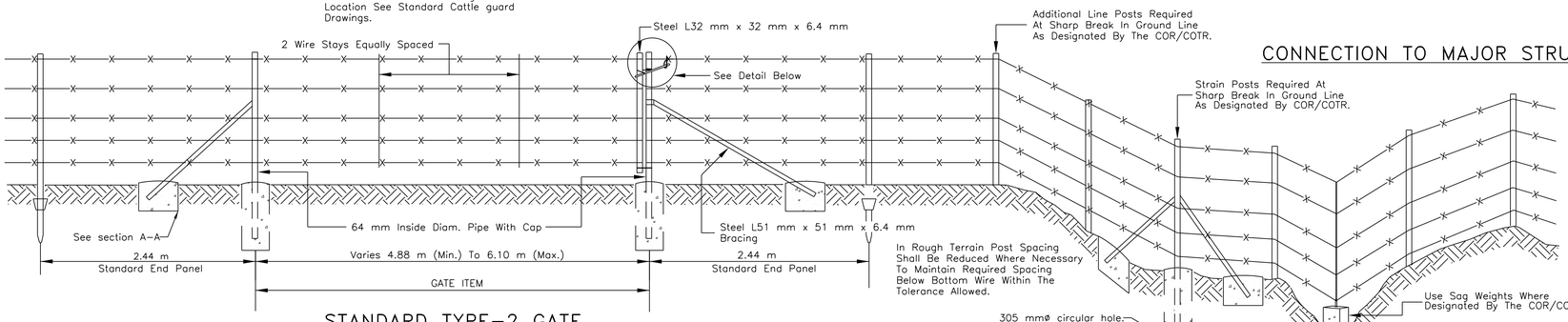
CONCRETE SAG WEIGHT DETAIL

Min. Weight Of Concrete Sag Shall Be 16 kg.



Fence to Wingwall Connection Type 2

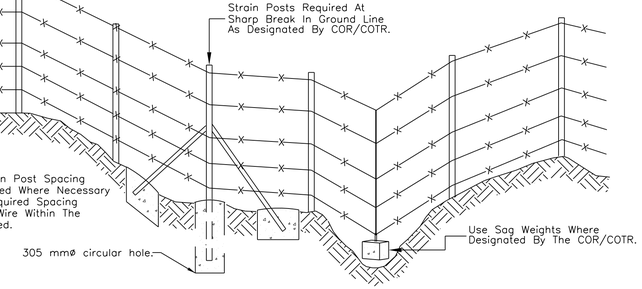
END POST



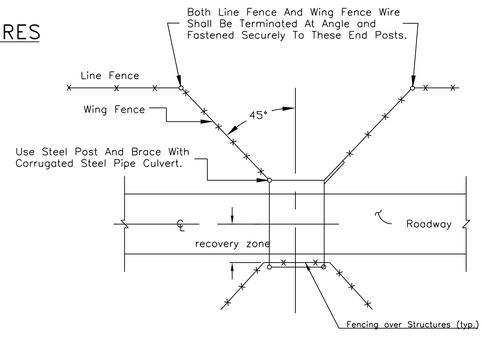
STANDARD TYPE-2 GATE

Use At Locations Noted On Plans

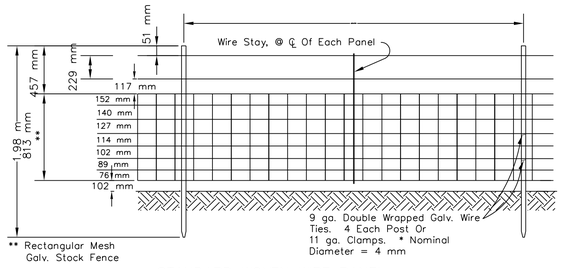
CONNECTION TO MAJOR STRUCTURES



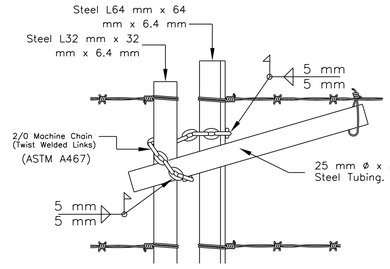
FENCE PROFILE IN ROUGH TERRAIN



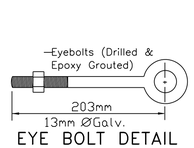
WING FENCE DETAIL



STANDARD WOVEN WIRE PANEL



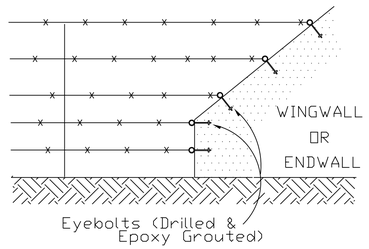
GATE SECURING DETAIL



EYE BOLT DETAIL



TYPICAL STEEL POST SECTION



Fence to Wingwall Connection Type 1

GENERAL NOTES

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

2. "T" LINE POSTS SHALL BE USED HAVING A NOMINAL WEIGHT OF 1.98 kg/m EXCLUSIVE OF ANCHOR PLATES. ANCHOR PLATES SHALL BE CLAMPED, WELDED OR RIVETED TO THE SECTION IN SUCH A MANNER AS TO PREVENT DISPLACEMENT WHEN THE POSTS ARE DRIVEN.

3. WHEN LINE POST ANCHORS ARE OMITTED, DUE TO CHANGE IN SOIL CONDITIONS SUCH AS ROCK, THEN THE POSTS SHALL BE SET IN CONCRETE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 61901-1000.

4. TIE WIRE, WIRE FASTENERS OR WIRE CLIPS FOR FASTENING BARBED AND WOVEN FABRIC FENCING TO THE STEEL POSTS SHALL BE 3.0 mm DIA. STEEL WIRE, CLASS 1 (ZINC COATED), SOFT TEMPER AND MEET THE REQUIREMENTS OF ASTM A 641. FURNISHING AND PLACEMENT OF FASTENERS SHALL BE INCLUDED WITH ITEM 61901-1000.

5. CONCRETE FOR ANCHORS, POST HOLES, ETC. SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa IN 28 DAYS AND SHALL CONFORM TO SECTION 601 OF THE FP-03. FURNISHING AND PLACEMENT OF CONCRETE SHALL BE INCLUDED IN THE UNIT BID PRICE FOR BID 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 30 METER OF ANY STRAIN POST ASSEMBLIES.

7. CONNECT ALL R.O.W. FENCING TO CATTLE GUARDS, CULVERTS (GREATER THAN 1524 mm DIA.), AND CONCRETE BOX STRUCTURES AS SHOWN ON THESE PLANS, AND/OR AS DIRECTED BY THE COR/COTR.

8. ANY CONFLICT IN PLACEMENT OF THE R/W FENCING AT DRAINAGE PIPE LOCATION, DUE TO NARROW R/W WIDTH OR OTHER CONSTRICTIONS, THE FENCE MAY BE PLACED OVER THE DRAINAGE STRUCTURE. THIS WORK AND ADJUSTED LENGTH INSTALLED SHALL BE PAID FOR UNDER BID ITEM 61901-1000.

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

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

11. TYPE 2 GATE CLOSURE DEVICE SHALL BE STEEL PIPE, NPS 26.7 mm 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 610 mm OR GREATER. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING.

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

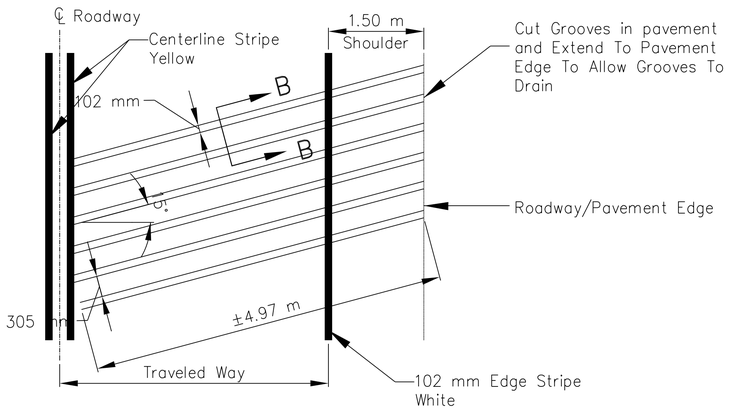
STANDARD FENCING DETAIL

DRAWN BY: NRDOT	DATE: 10/10/2013
DESIGNED BY: NRDOT	DATE: 10/10/2013
REVISED: 07/24/2015	BY: Design 2
Sht_80 Standard Fencing Details_rev072415.dgn	

Sht_80 Standard Fencing Details_rev072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	81	96

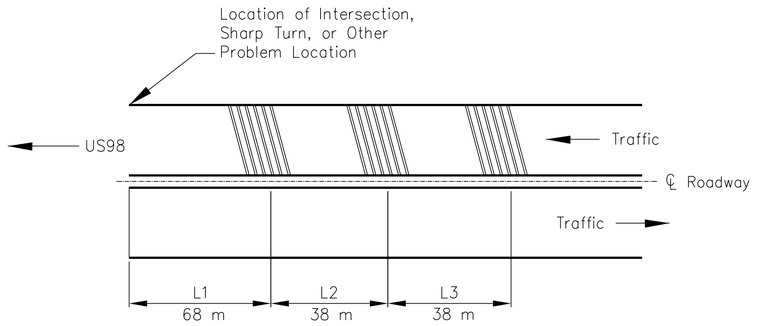
NOTE: WHEN CUTTING GROVES IN PAVEMENT, MAKE SURE THE GROOVES ARE CLEANED TO ALLOW RUNOFF TO THE SHOULDERS.



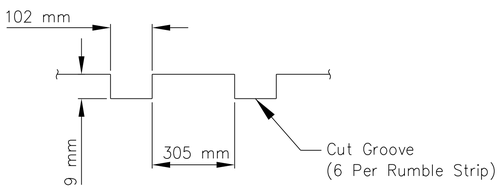
CUT GROOVE RUMBLE STRIP

ITEM 63313-0000 RUMBLE STRIP

STATION	LOCATION	QUANTITY
37+462	Rt.	1
37+500	Rt.	1
37+538	Rt.	1
	TOTAL	3



TYPICAL INSTALLATION



SECTION B-B

APPROACH SPEED	L1	L2	L3
≥ 90 km/h	USE TABLE 2C-4 SECTION 2c.05 IN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES	61 m	61 m
80 km/h		50 m	50 m
75 km/h		46 m	46 m
70 km/h		43 m	43 m
≤ 60 km/h	68 m	38 m	38 m

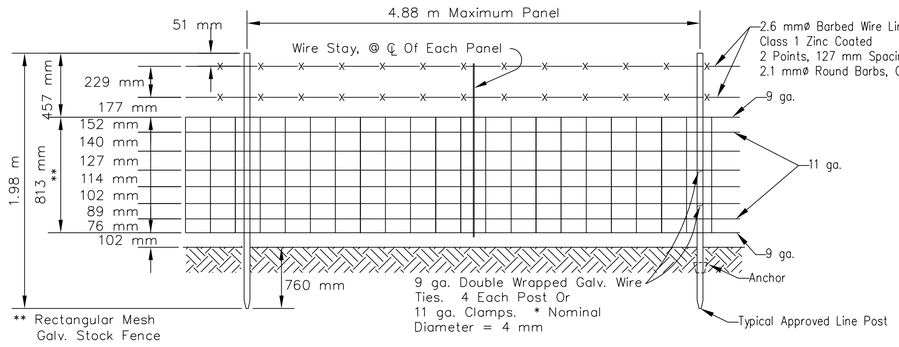
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PAVEMENT RUMBLE STRIP DETAILS

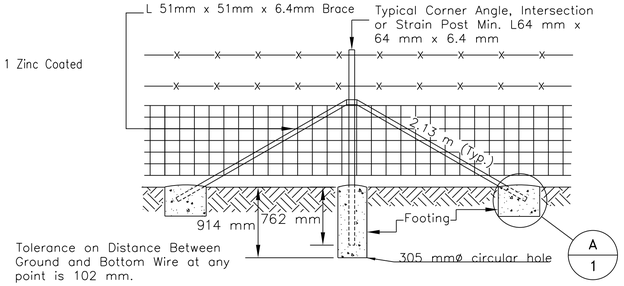
DRAWN BY: NRDOT	DATE: 12/10/2013
DESIGNED BY: NRDOT	DATE: 12/10/2013
REVISED: 7/24/2015	BY: Design 2
Sht_81 Pavement Rumble Strip Details 072415.dgn	

Sht_81 Pavement Rumble Strip Details 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	82	96
			N21	N21(3A)2&4		



STANDARD WOVEN WIRE PANEL

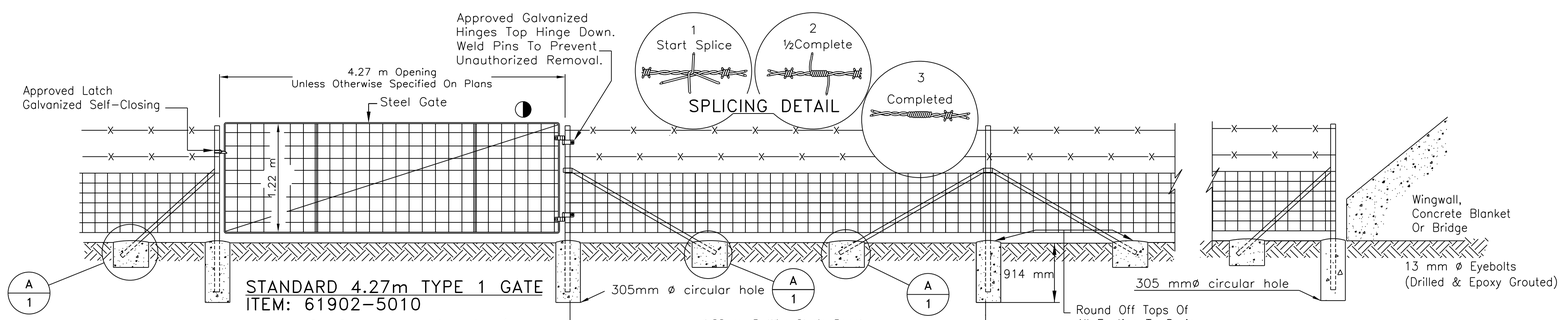


STANDARD STRAIN POST

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

GENERAL NOTES

1. Structural Pipe For Wingbracing Shall Conform To ASTM A53-93A, Grade B. All Other Structural Steel Shall Conform To ASTM-A36.
2. Structural Steel/Pipe For Wing Braces 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.
3. All Structural Pipe Joints Shall Be Fabricated In Accordance With The AISC Manual of Steel Construction, Ninth Edition.
4. Welding Design Details Shall Conform To The AASHTO Standard Specifications For Welding At Structural Steel Highway Bridges, Latest Edition.
5. See Sheet 6, 8, 79 & 80 For Additional Notes And Details.

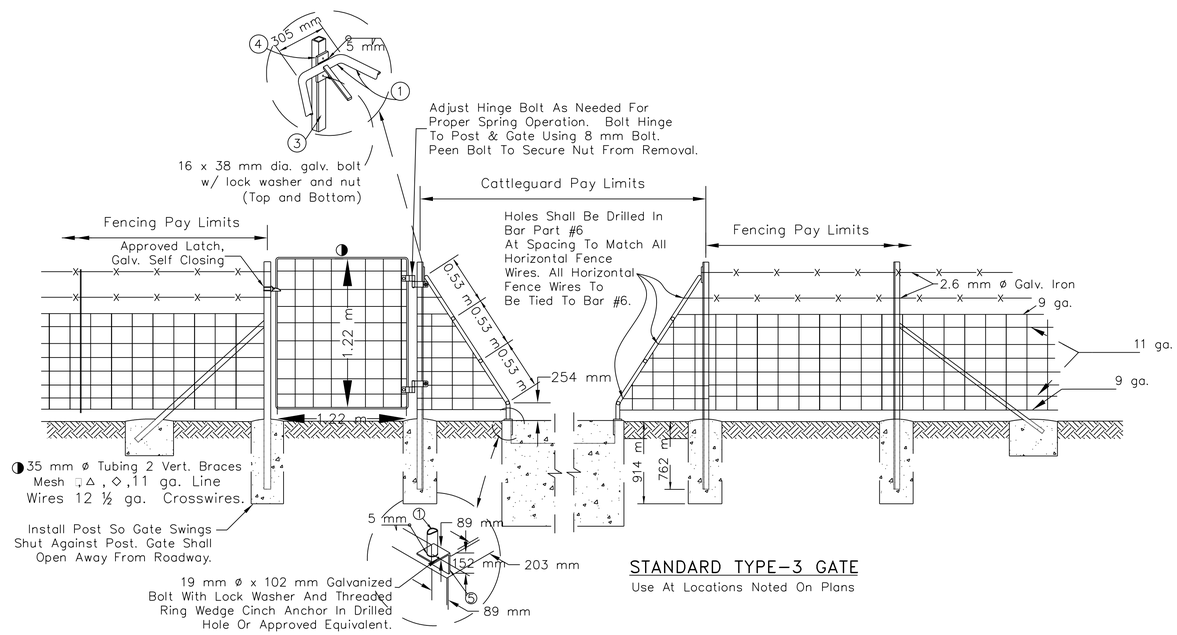


STANDARD 4.27m TYPE 1 GATE
ITEM: 61902-5010

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

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

END POST



STANDARD TYPE-3 GATE
Use At Locations Noted On Plans

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

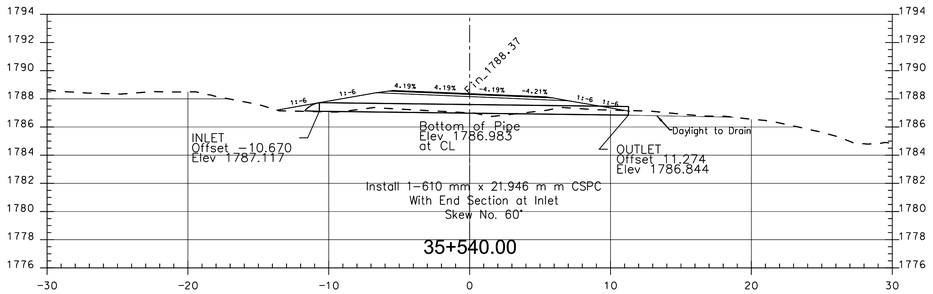
WOVEN WIRE FENCE DETAILS

DRAWN BY: NRDOT	DATE: 2/9/2015
DESIGNED BY: NRDOT	DATE: 2/9/2015
REVISED: 7/10/2015	BY: Design 2
Sht_82 Woven Fencing Details 072415.dgn	

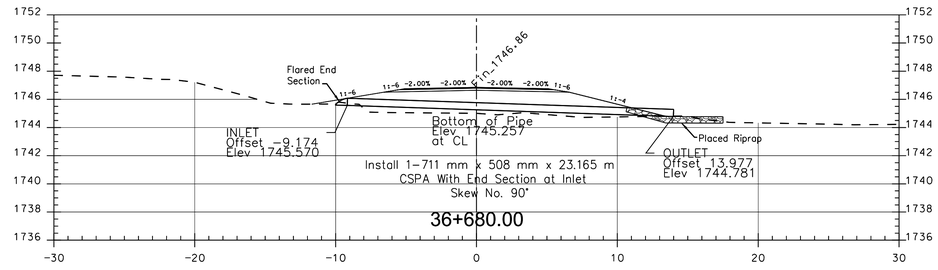
Sht_82 Woven Fencing Details 072415.dgn

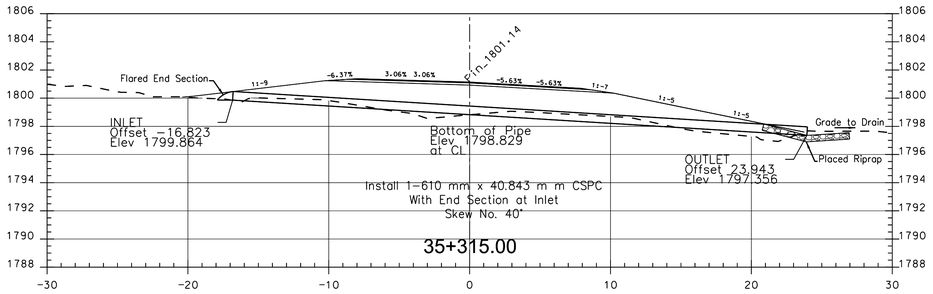
REVISED 06/07/2016 PIPE CROSS SECTION FROM Sta. 34+331.00 TO Sta. 37+537.64 N6331(2)

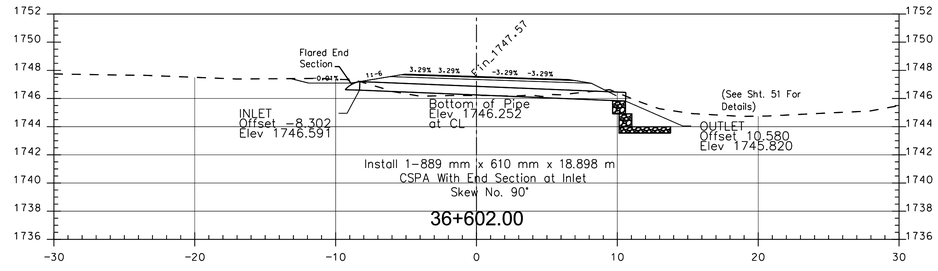
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	83	96

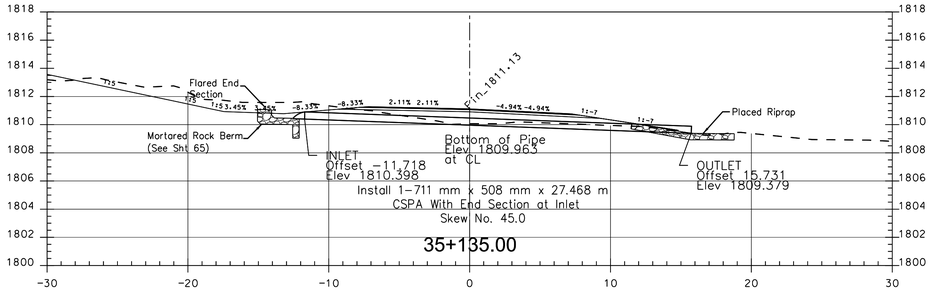


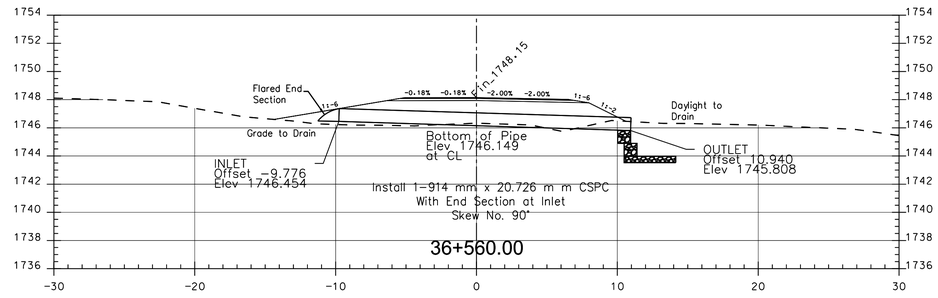
Cont. on Sheet 85

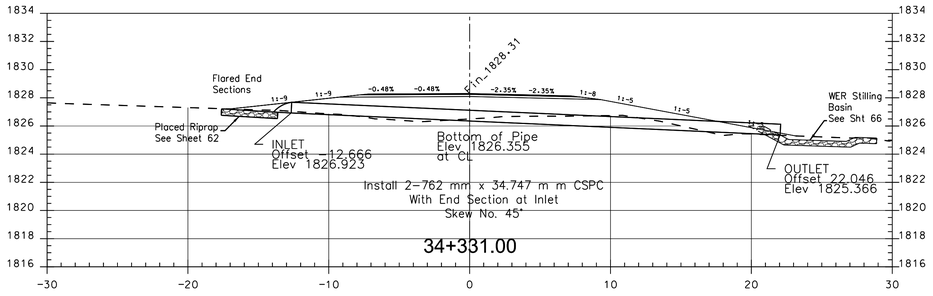


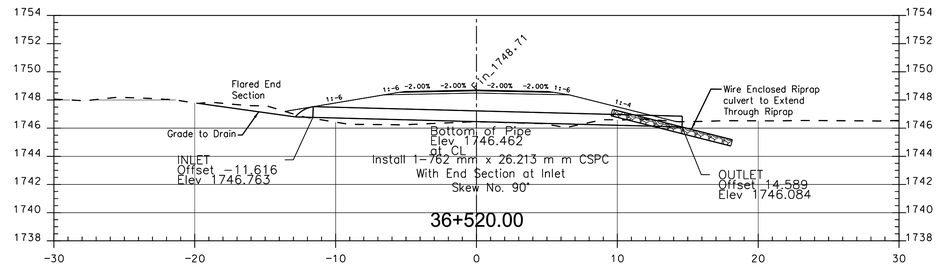








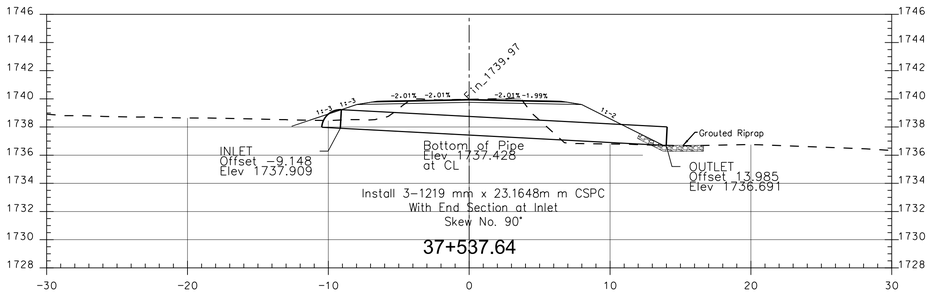


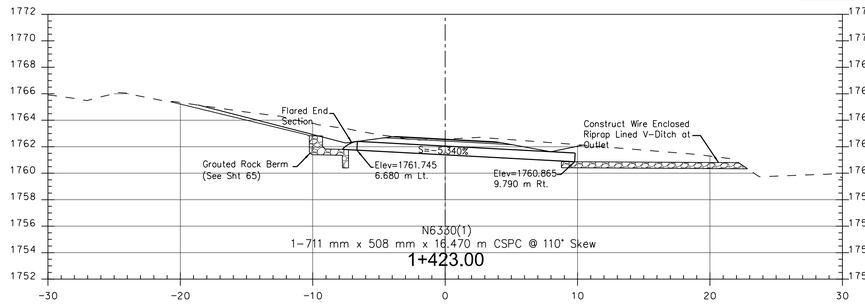


Sht_83 REV N6331 PXS 06-07-2016.dgn

REVISED 06/07/2016 PIPE CROSS SECTION FROM Sta. 34+331.00 TO Sta. 37+537.64 N6331(2)

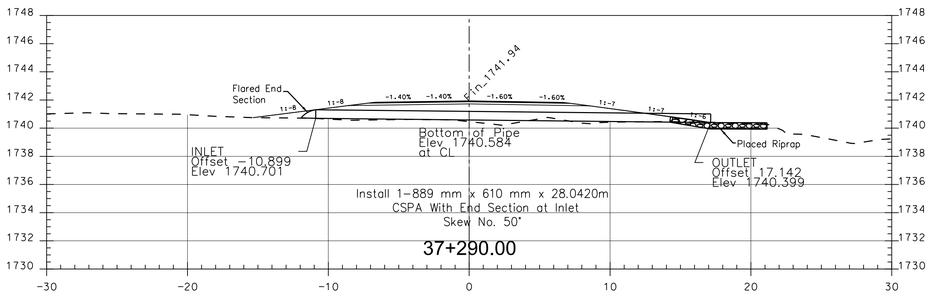
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	84	96
			N6330	N6330(1)		



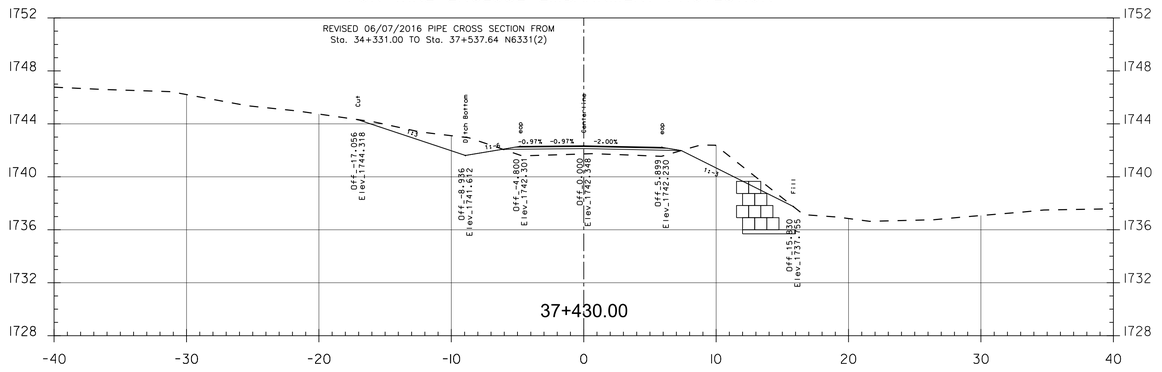


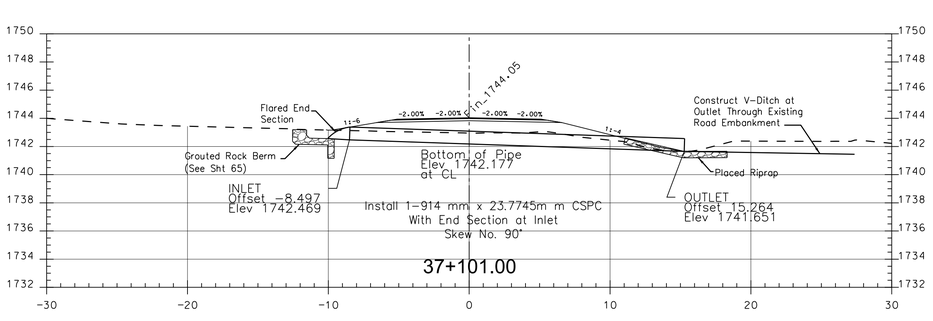
GENERAL CULVERT NOTES

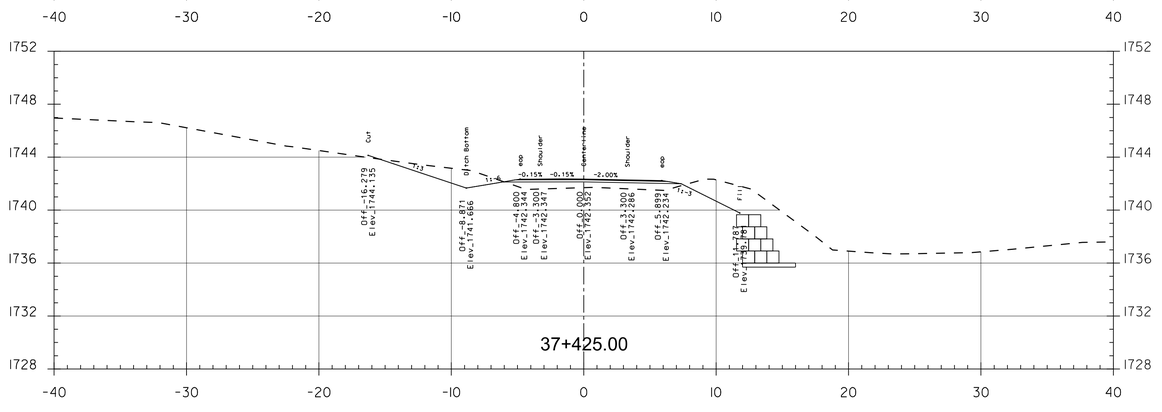
1. See Sheet 65 & 93 For Concrete Slope Blanket Details. Concrete Slope Blankets Shall Be Paid Under Item 61601-1000.
2. Outlet V-Ditches To Have 1:4 Side Slopes.
3. Drainage Pipe(s) Invert Elevations and Lengths are Approximate. Final Elevations and Lengths to be Field Determined By The Contractor as Part of the Revised Pipe List Submittal Package. Guidance on Developing a Revised Pipe List Will be Provided Upon Request of the Contractor.
4. At Pipe Cross Sections Drawn On Skew, The Right-Of-Way Line is no Longer ocated at the Standard Right-Of-Way e-005,i6.36,tz; Offset, But is Shifted Away (Outward) From the Centerline a Distance Based on the Skew Angle.
5. The Revised Pipe List Survey Data Shall be Verified by the COR/COTR and Contractor's QCM Prior to Submittal to the Navajo Regional Office, Division of Transportation.
6. In Cut Sections the Contractor is Reminded to Account For Flat Bottom Ditch Elevations When Developing Pipe List.

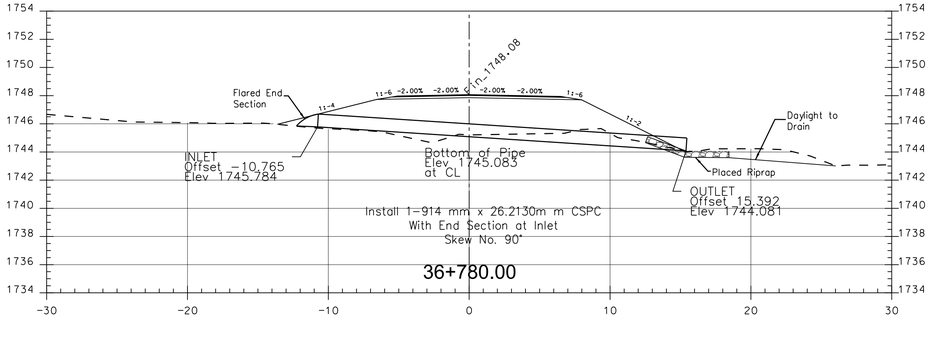


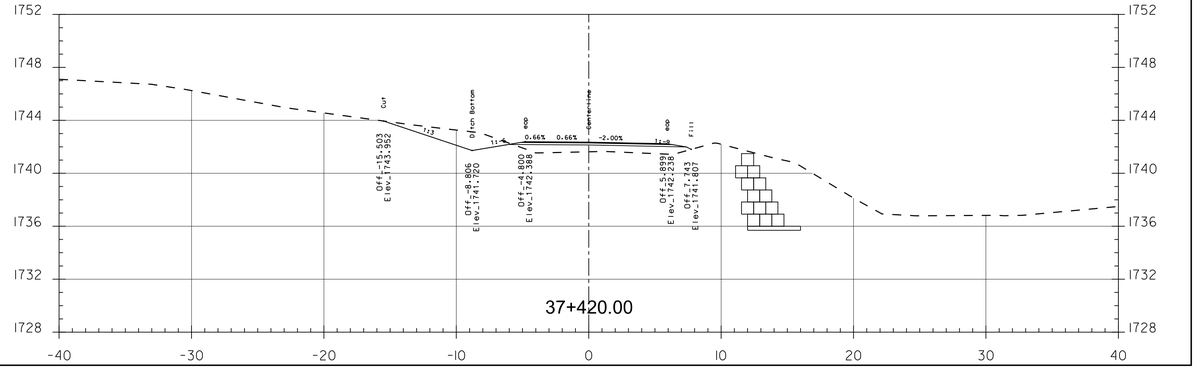
CROSS SECTION ONLY FROM STATION 37+420.00 TO STATION 37+340.00 FOR WIRE ENCLOSE EMBANKMENT PROTECTION







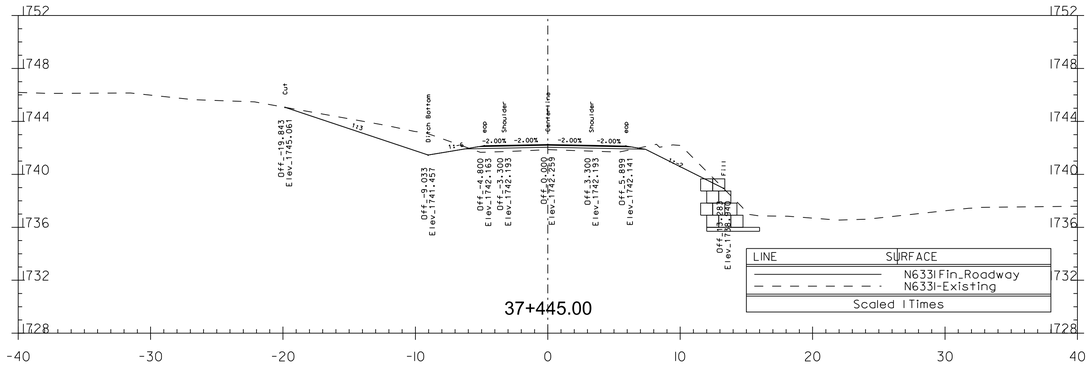


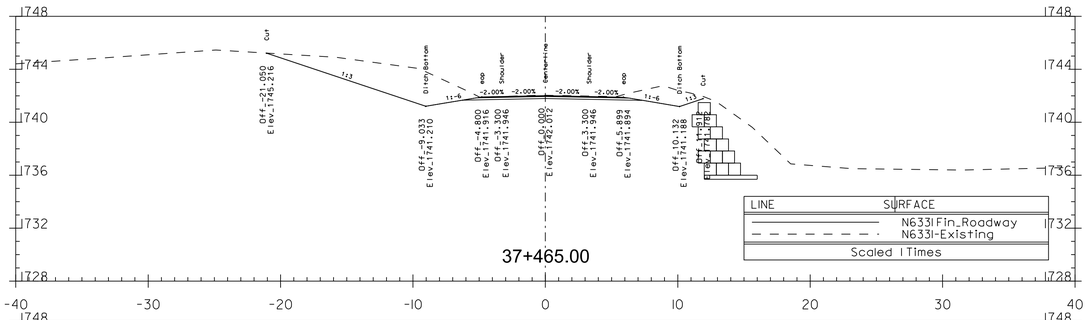


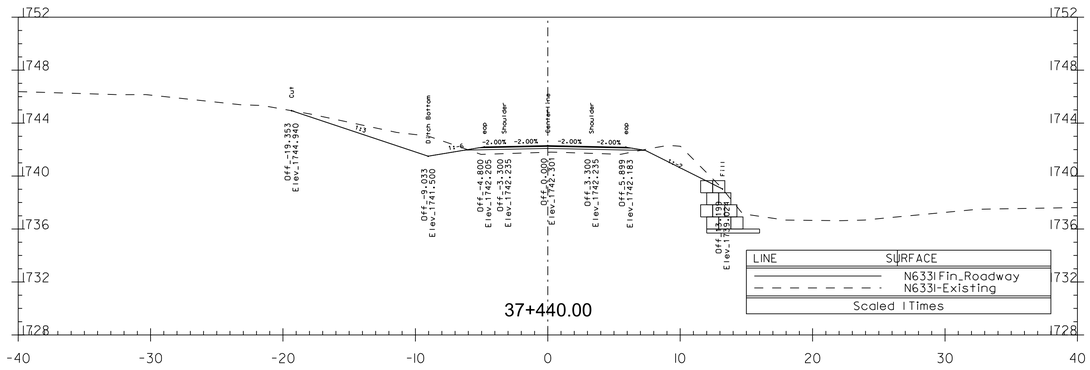
Sht_84 REV N6330 N6331 Pipe Xsec 072415.dgn

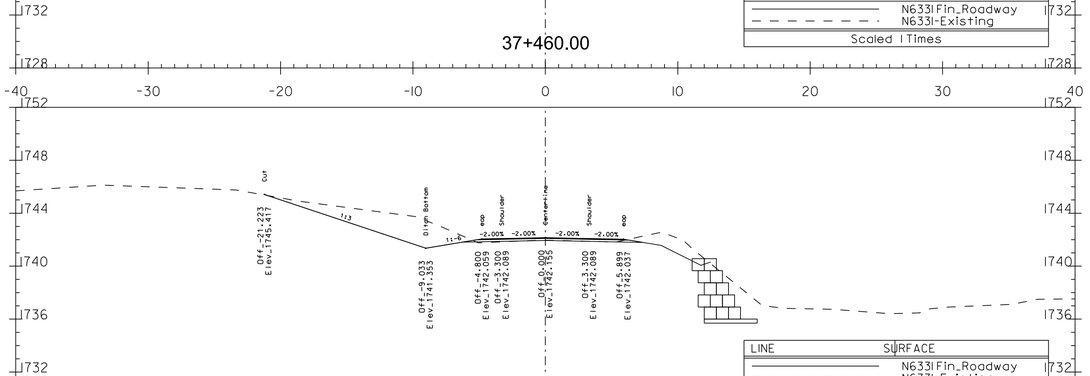
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6331	N6331(2)2&4	85	96
			N6330	N6330(1)		

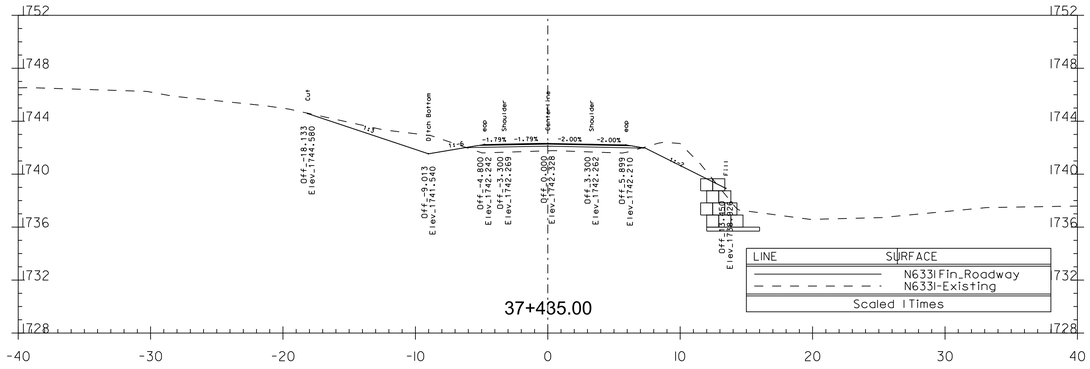
CROSS SECTION ONLY FROM STATION 37+435.00 TO STATION 37+465.00 FOR WIRE ENCLOSE EMBANKMENT PROTECTION

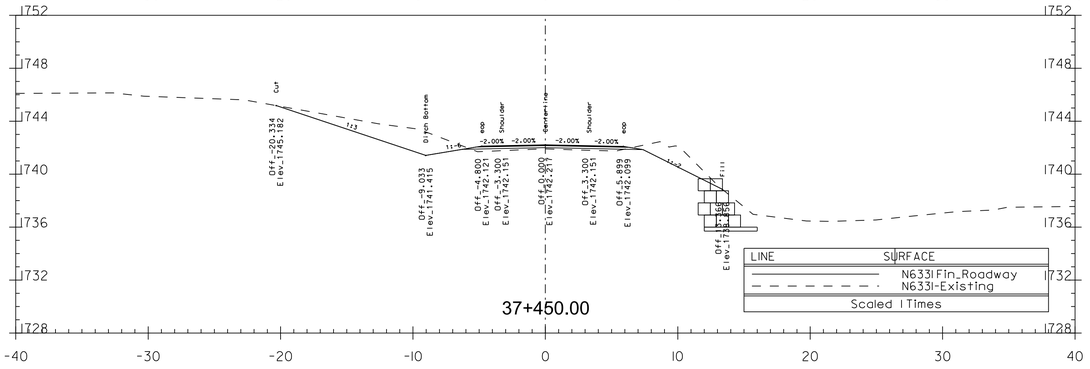








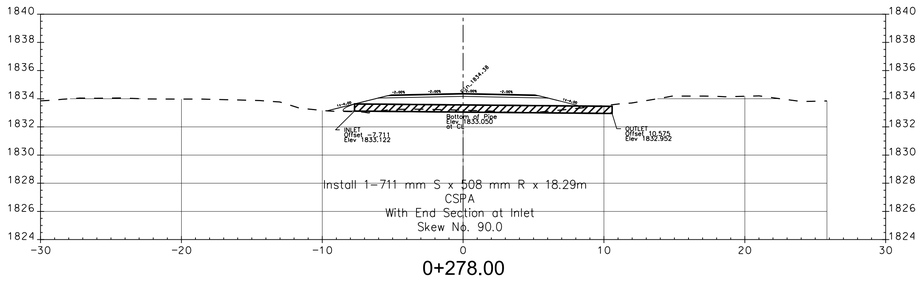




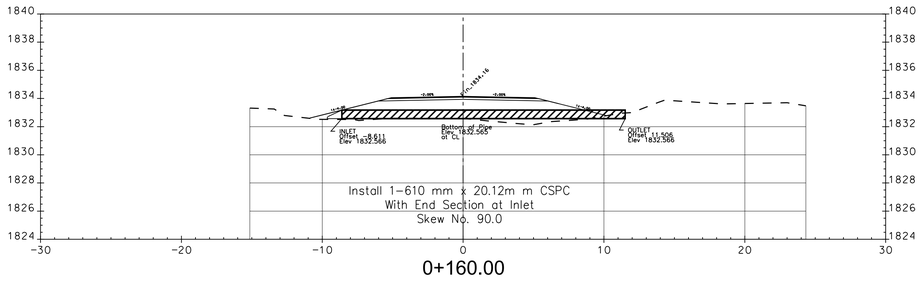
Sht_85 N6330 N6331 Pipe Xsec 072415.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N21	N21(3A)2&4	86	96

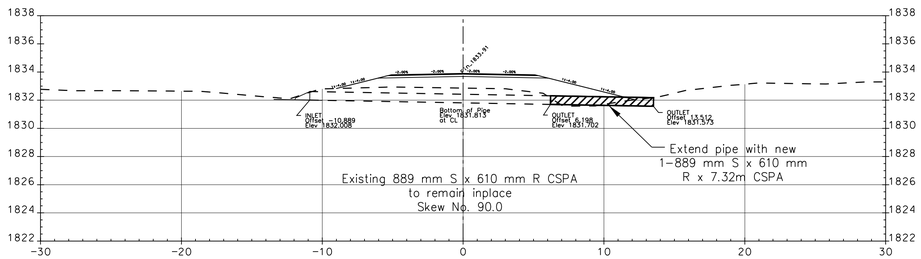
STA. 0+047.21 to STA. 0+512.00



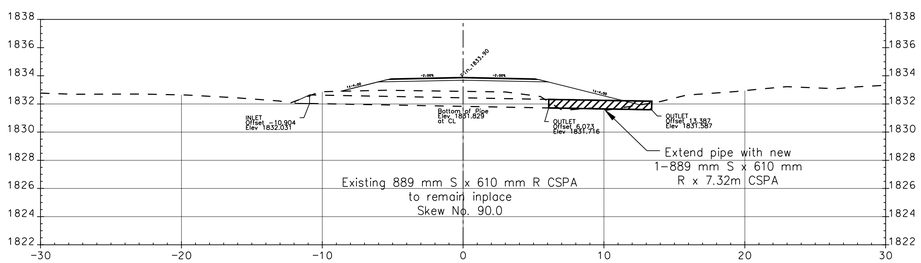
0+278.00



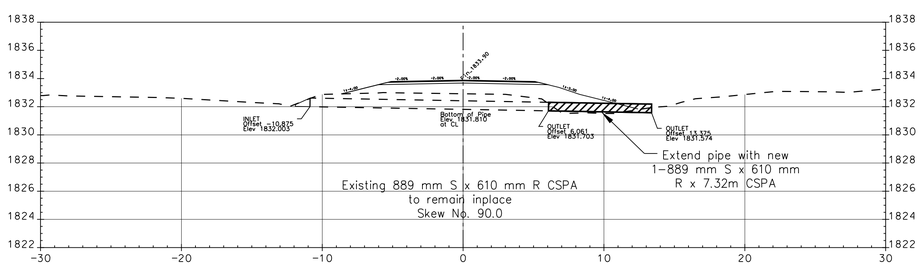
0+160.00



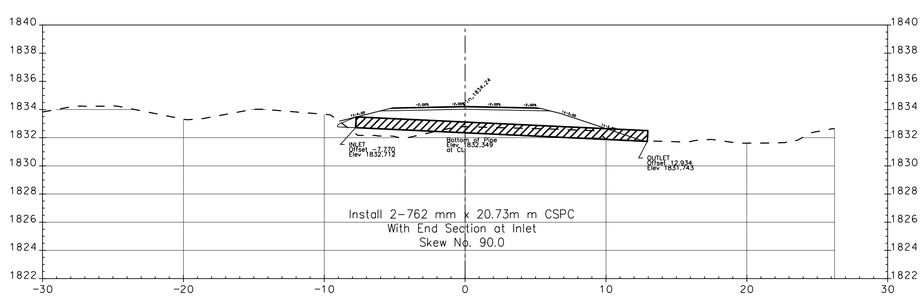
0+052.85



0+050.00



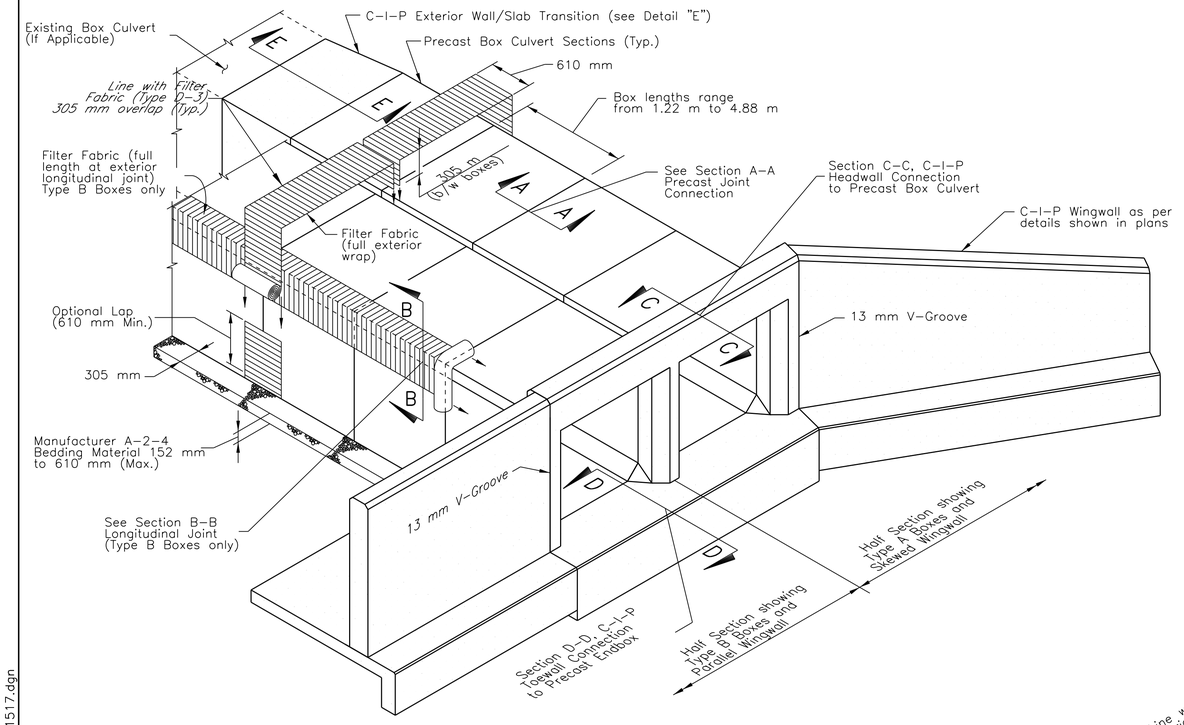
0+047.21



0+512.00

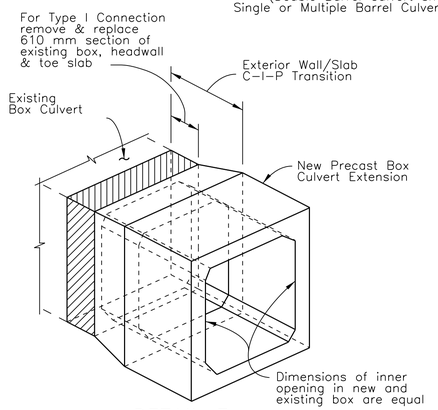
Sht_86 REV N21 Pipe Xsec 062816.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(2)1,2&4	87	96



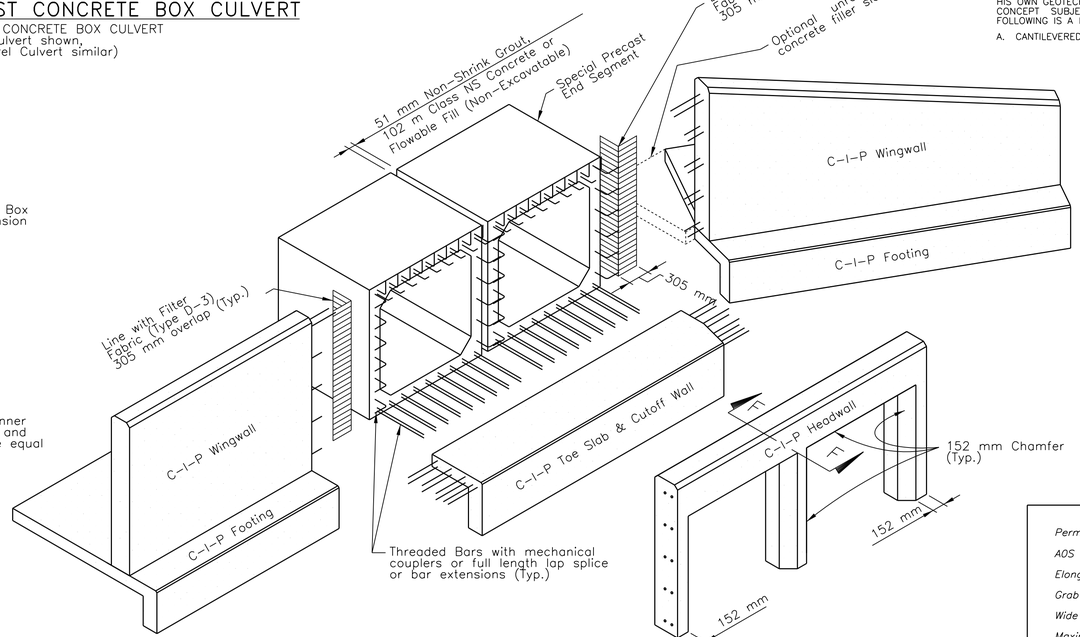
ISOMETRIC VIEW OF PRECAST CONCRETE BOX CULVERT

ISOMETRIC VIEW OF PRECAST CONCRETE BOX CULVERT
(Double Barrel Culvert shown,
Single or Multiple Barrel Culvert similar)



DETAIL E

PICTORIAL VIEW OF EXTERIOR
WALL/SLAB TRANSITION



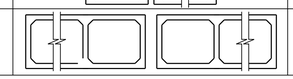
EXPLODED VIEW OF CONNECTIONS AT END OF CULVERT

(Double Barrel Culvert shown, Single or Multiple Barrel Culvert similar)

GENERAL NOTES

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) ALONG WITH ALL SUPPLEMENTAL SPECIFICATIONS FOR THIS PROJECT.
2. THE CONTRACTOR SHALL DESIGN, MANUFACTURER, AND CONSTRUCT A FOUR BARREL PRE-CAST CONCRETE BOX CULVERT STRUCTURES WITH WINGWALLS IN ACCORDANCE WITH ASTM C-1501-04 AND DESIGN CRITERIA BELOW. THE DESIGN SHALL INCLUDE DETAILS OF THE CULVERT BARREL, HEADWALLS, APRONS, WINGWALLS AND FOUNDATIONS INCLUDING DRAINAGE AND BACKFILL REQUIREMENTS. THE NORMAL OPENING WIDTH AND HEIGHT OF THE CBC SHALL BE 2.438m SPAN BY 1.298m RISE. THE REQUIRED MINIMUM LENGTH OF STRUCTURE AND ORIENTATION OF WINGWALLS IS SHOWN ON THE DRAWINGS. JOINTS IN THE BOX SHALL BE SEALED TO PREVENT WATER LEAKAGE USING AN APPROVED JOINT COMPOUND CONFORMING TO ASTM C 990 AS REFLECTED IN THE SHOP DRAWINGS.
3. PRE-CASTER QUALIFICATIONS:
   A. SUPPLIERS MUST HAVE A MINIMUM OF 5-YEARS EXPERIENCE DESIGNING AND MANUFACTURING PRECAST CONCRETE BOX STRUCTURES
   B. PRECASTER SHALL BE CERTIFIED BY THE PRECAST/PRESTRESSED CONCRETE INSTITUTE PLANT CERTIFICATION PROGRAM OR THE NATIONAL PRECAST CONCRETE ASSOCIATION'S PLANT CERTIFICATION PROGRAM PRIOR TO AND DURING PRODUCTION OF THE PRODUCTS COVERED UNDER THIS CONTRACT.
   C. PRECAST BOX CULVERT SUPPLIER MUST BE PRESENT AT PRE-CONSTRUCTION MEETING, IF ONE IS HELD.
4. SUBMITTAL REQUIREMENTS: SUBMIT PRECASTER QUALIFICATIONS. SUBMIT A COMPLETE SET OF STRUCTURAL CALCULATIONS, SHOP DRAWINGS, PERTINENT STANDARD DETAILS AND PRODUCT DATA OF ALL MATERIALS TO BE USED IN THE MANUFACTURER OF PRECAST UNITS AND COMPONENTS. IF CALCULATIONS ARE BASED ON COMPUTER PROGRAMS, COMPLETE INPUT FILES OF GEOMETRY, MATERIALS PROPERTIES, MEMBER SIZES AND DESIGN ANALYSIS AND CALCULATION OF REINFORCING STEEL SHALL BE SUBMITTED. CALCULATIONS AND ALL DRAWINGS SHALL BE SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT RESIDES AND WHO IS RESPONSIBLE FOR THEIR PREPARATION. THE DIMENSIONS SHOWN ON THE SHOP DRAWINGS SHALL BE PREPARED IN METRIC UNITS.
5. SUBSTITUTION: PRECAST MANUFACTURER MAY SUBMIT A DIFFERENT TYPE OF BOX CULVERT THAN THE ONE DEPICTED ON THE DRAWINGS, PROVIDED THAT THE MINIMUM OPENING AREA OF BOX UNITS IS PROVIDED AND OTHER MINIMUM AND MAXIMUM DIMENSIONS ARE MAINTAINED. THE NET OPENING AREA SHALL NOT BE LESS THAN THAT SHOWN IN THESE DESIGN PLANS. ANY PROPOSED CHANGES IN LENGTH OR HEIGHT OF STRUCTURE OR IN GRADING SHALL BE INCLUDED IN THE DESIGN CALCULATIONS AND DETAILS.
6. DESIGN CRITERIA:
   A. DESIGN CODE: LATEST EDITION OF THE AASHTO LRFD DESIGN SPECIFICATIONS.
   B. LIVE LOAD: HL-93 FOR BOX UNITS ONLY.
7. MATERIAL PROPERTIES:
   A. PRECAST CONCRETE COMPRESSIVE STRENGTH: 34.5 MPa (5,000 psi) AT 28-DAYS.
   B. CAST-IN-PLACE CONCRETE: FP-03, f'c = 20.7 MPa (3,000 psi) MIN AT 28-DAYS.
   C. ALL CONCRETE SHALL BE AIR ENTRAINED.
   D. REINFORCING STEEL: ASTM A615, fy=413.7 MPa (60,000 psi) EPOXY COATED
   E. STEEL HARDWARE: ASTM A36, GALVANIZED IN ACCORDANCE WITH ASTM-123.
   F. ALLOWABLE BEARING PRESURE: 143kPa/sm (1.33t/SF).
   G. HEIGHT OF FILL OVER BOX: 0.972m or 2045kg/cm.
   H. ANGLE OF INTERNALFRICTION Ø: 34 degrees.
8. A GEOTECHNICAL DATA IS AVAILABLE FOR BIDDER'S INSPECTION UPON WRITTEN REQUEST TO THE CONTRACTING OFFICER (CO). THE CONTRACTOR MAY CONDUCT HIS OWN GEOTECHNICAL INVESTIGATIONS AND PROPOSE A DIFFERENT FOUNDATION CONCEPT SUBJECT TO REVIEW AND APPROVAL BY THE BIA-NRDOT. THE FOLLOWING IS A PARTIAL LIST OF DESIGN INFORMATION TO BE USED:
   A. CANTILEVERED WINGWALLS:
      1. LEVEL BACKFILL: SOIL PRESSURE EQUIVALENT TO FLUID WITH UNIT WEIGHT OF 560 kg PER CUBIC METER (115 pcf), HORIZONTAL PRESSURE DUE TO A SURCHARGE LOAD: 342kg/sm UNIFORM PRESSURE EQUAL TO 0.33 TIMES THE SURCHARGE LOAD.
      2. SLOPING BACKFILL: SOIL PRESSURE EQUIVALENT TO FLUID WITH UNIT WEIGHT OF 342kg PER CUBIC METER (115 pcf), HORIZONTAL PRESSURE DUE TO A SURCHARGE LOAD: UNIFORM PRESSURE EQUAL TO 0.40 TIMES THE SURCHARGE LOAD.
   B. BELOW GRADE REINFORCED CONCRETE BOX: NON-YIELDING BELOW GRADE WALLS WHICH CANNOT DEFLECT TO MOBILIZE THE ACTIVE SOIL PRESSURE SHOULD BE DESIGN FOR THE AT-REST LATERAL EARTH PRESSURE STATE EQUAL TO AN EQUIVALENT FLUID LATERAL EARTH PRESSURE OF 8.5 kN PER CUBIC METER (178 pcf).
   C. FACTOR OF SAFETY AGAINST SLIDING: 1.5 MINIMUM. FACTOR OF SAFETY AGAINST OVERTURNING: 1.5 MINIMUM FOR FOOTINGS ON ROCK AND 2.0 FOR ALL OTHER SOILS.
   D. ALLOWABLE BEARING PRESSURE: 143 kPa (1.33 Ton per ft^2), TO SUPPORT ON SPREAD FOOTINGS PLACED ON THE UNDISTURBED SANDY-SILT SOILS.
   E. COEFFICIENT OF BASE FRICTION = 0.37 FOR FOUNDATIONS FOUNDED ON SANDY-SILT SOILS.
9. THE TOP LAYER OF UNSUITABLE SOIL UNDER BOX UNITS AND WINGWALLS SHALL BE REMOVED TO A MAX DEPTH OF 610mm AND MANUFACTURER RECOMMENDED (A-2-4) BACKFILL PLACED PRIOR TO CONSTRUCTING CONCRETE FOUNDATION FOR PRECAST UNITS AND ANY WINGWALLS.
10. ALL DIMENSIONS ARE IN METRIC UNITS.
11. MANUFACTURER: MANUFACTURING OF PRECAST UNITS SHALL NOT BE STARTED UNTIL THE DESIGN CALCULATIONS AND SHOP DRAWINGS HAVE BEEN APPROVED BY THE BIA-NRDOT. MANUFACTURE PRECAST UNITS AT THE PRECASTER'S PLANT ONLY.
12. CONSTRUCTION: CONTRACTOR SHALL COORDINATE INSTALLATION OF THE PRECAST STRUCTURE TO PREVENT DAMAGE. PROVIDE CRANES WITH SUFFICIENT CAPACITY TO ALLOW SAFE INSTALLATION OF THE STRUCTURE. IF ANY PRECAST UNIT IS CRACKED OR DAMAGED, THE PRECAST UNITS SHALL BE REPLACED AT NO ADDITIONAL COST TO THE GOVERNMENT. CONTRACTOR SHALL SUBMIT A PROCEDURE FOR REPAIR OF MINOR SPALLS FOR THE CO'S APPROVAL.
13. EACH PRECAST UNIT SHALL BE JOINED TOGETHER BY A METHOD RECOMMENDED BY THE MANUFACTURER THAT DOES NOT CAUSE ANY DAMAGE TO THE SECTIONS. DO NOT DRIVE OR RAM SECTIONS TOGETHER WITH MACHINERY OR HAND TOOLS.
14. BASIS OF PAYMENT: PAYMENT FOR DESIGN, MANUFACTURER, AND ERECTION OF THE COMPLETE STRUCTURE, INCLUDING THE BOX BARREL(S), CONCRETE APRONS, WINGWALLS, HEADWALLS, CAST-IN-PLACE FOUNDATIONS, ROCK REMOVAL FOR WINGWALL FOOTINGS, AND DRAINAGE SYSTEM SHALL BE PAID FOR BY LUMP SUM OR LINEAR METER AS REFLECTED IN THE BID SCHEDULE.
15. ANY RELATED PATENT RIGHTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AS PER SECTION 107.01 OF THE FP-03.

PERMITTED PRECAST ALTERNATE BOX SECTIONS

TYPE	DESCRIPTION	SINGLE BARREL	MULTIPLE BARRELS	DESIGN NOTES
A	Single Cell Monolithic (Four Sided)			Contractor Design
B	Single Cell Two-Piece (Four Sided)			Contractor Design
C	Multicell Monolithic	Not Applicable		Contractor Design

STANDARD CRITERA

CLASS	TYPE (1)	APPLICATION DESCRIPTION	INDEX No.	PERMITTIVITY SEC^{-1}	AOS SIEVE #	Min. GRAB TENSILE STRENGTH kg	Min. SEWN STRENGTH kg/cm	Min. PUNCTURE kg	Min. TRAPEZOIDAL TEAR kg	UV RESISTANCE (Min. Allowed) %	UV RESISTANCE (Min. Allowed) Time (Hrs.)	REMARKS
DRAINAGE (D)	D-3	Underdrain ***	286	% SOIL PASSING	% SOIL PASSING	Elongation	Elongation	Elongation	Elongation	50	500	No woven slit film fabrics allowed.50 sieve. * For cohesive soils with plasticity index >7, maximum average role value AOS is number ** Required Trapezoidal tear for woven monofilament is 250. *** See Index No. 286 for the permittivity and AOS values of the internal filter fabric of Type V Underdrain
		French Drain	285	No. 200 SIEVE	No. 200 SIEVE							
		Sheet Piling Filter		<15% 0.5	<15% 40							
		Filter Fabric Jacket (Culvert)	280	15% to 50% 0.2	15% to 50% 60	<50% 248 ≥ 50% 128	<50% ≥50% 5.7 3.6	<50% 90 ≥ 50% 57	<50% 90** ≥50% 57			
		Concrete Pavement Subdrainage	287	>50% 0.1	>50% 70*							

TABLE 1

Test	Unit	Test Method
Permittivity	sec^{-1}	ASTM-D-4491
AOS	US Sieve No.	ASTM-D-4751
Elongation	%	ASTM-D-4632
Grab Tensile Strength	kg	ASTM-D-4595
Wide With Tensile Strength	kg/cm	See Note Below
Maximum Design Velocity	m/sec	ASTM-D-4884
Sewn Strength	kg/cm	ASTM-D-4833
Puncture	kg	ASTM-D-4533
Tranapezoidial Tear	kg	ASTM-D-4355
Ultraviolet Resistance	% Retained In Strength	
Filtration Efficiency	%	ASTM-D-5141
Flow Rate	l^2/ min.	ASTM-D-5141

*Note: Shear stress limits for plastic erosion mats determined by 30 minutes susutained flow in unvegotated state as determined by tests performed by Utah State University, Texas Transportation Institute or

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

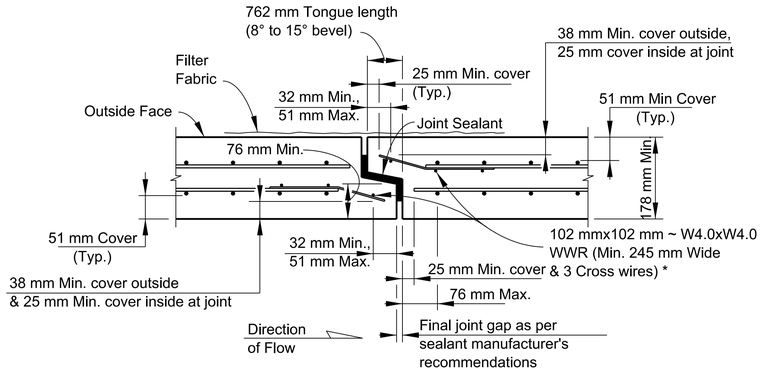
PRECAST CONCRETE BOX CULVERTS WITH WINGWALLS DETAILS

DRAWN BY: NRDOT	DATE: 11/15/2017
DESIGNED BY: NRDOT	DATE: 11/15/2017
REVISED: 11/20/2017	BY: Peterson.Yazzie

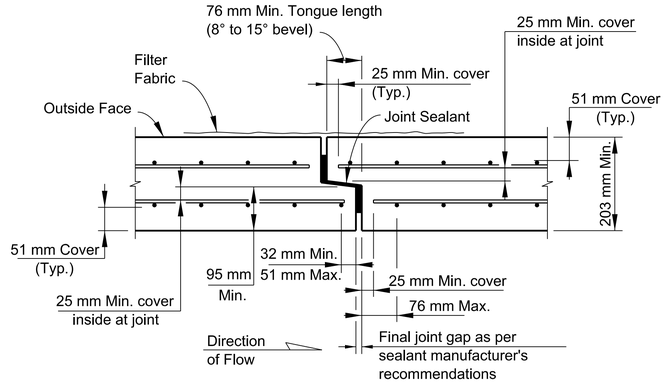
Sht_87 N6330 Precast Concrete Box Culverts w-Wingwall 111517.dgn

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_87 N6330 Precast Concrete Box Culverts w-Wingwall 111517.dgn

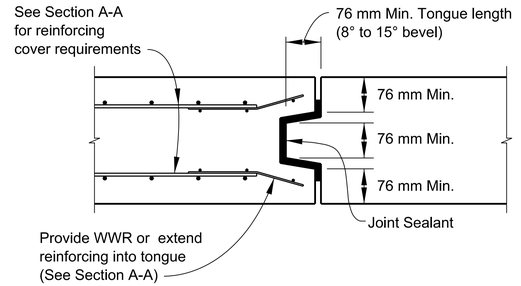
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	88	96



SECTION A-A
(51 mm Cover - Thin Wall Detail)

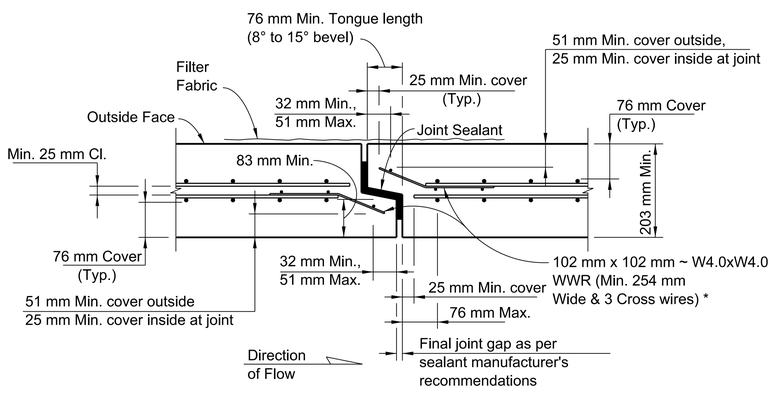


SECTION A-A
(51 mm Cover - Thick Wall Detail)



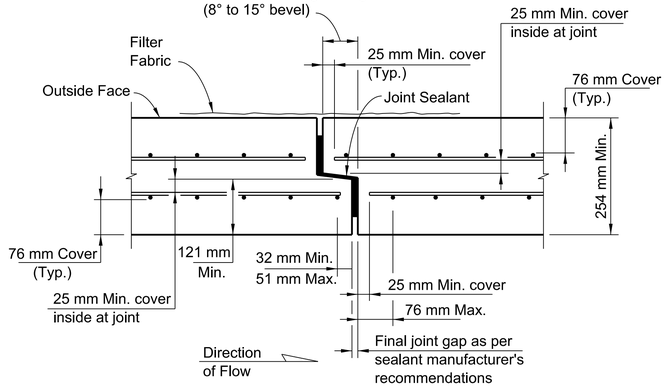
ALTERNATE BOTTOM SLAB TRANSVERSE JOINT
TYPICAL SECTION
(DOUBLE-SIDED TONGUE & GROOVE JOINT)
(All reinforcing not shown for clarity)

NOTE:
Bottom Slab Joints in Type B Boxes may be single tongue & groove joints as shown in Section A-A when the Top Slab Joints are oriented as shown in Schematic "A".

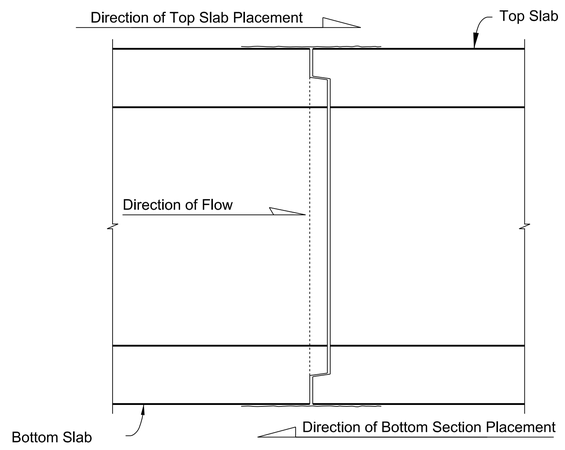


SECTION A-A
(76 mm Cover - Thin Wall Detail)

* At the Contractor's option when the box culvert reinforcing utilizes WWR, extend wall and slab reinforcing into the joint and bend to maintain cover in lieu of 102 x102 ~ MW26xMW26 WWR at joint. Transverse wire in tongue may be cut at corners of box to allow bending of the WWR.



SECTION A-A
(76 mm Cover - Thick Wall Detail)



SCHEMATIC "A"
TYPE B BOX SECTION PLACEMENT
FOR SINGLE TONGUE & GROOVE JOINTS

PRECAST SEGMENT TO SEGMENT TONGUE & GROOVE TRANSVERSE JOINTS

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

OPTIONAL PRECAST SEGMENT
JOINT DETAILS

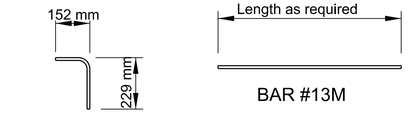
DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 07/27/2015	BY: Design 2
Sht_88 N6330 Precast Segment Joint Details 072715.dgn	

Sht_88 N6330 Precast Segment Joint Details 072715.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	89	96

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D	LENGTH
L	#13M	2 per Barrel/mm	381 mm
M	#13M	As Reqd.	As Reqd.

REINFORCING STEEL BENDING DIAGRAMS



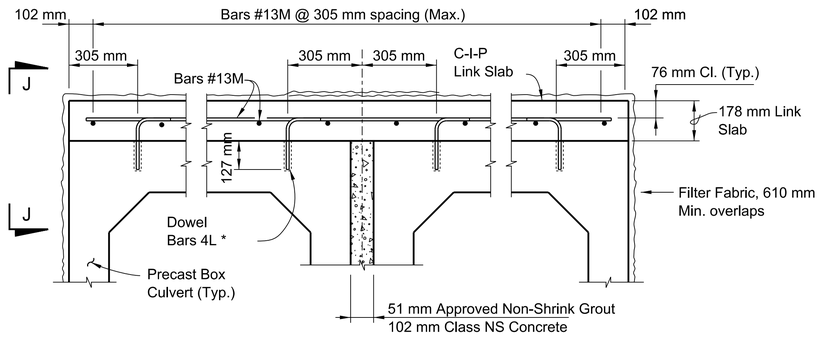
DOWEL BARS 4L

BAR #13M

NOTES:
1. All bar dimensions are out to out.
2. Lap splice length for Bars #13M is 406 mm minimum.

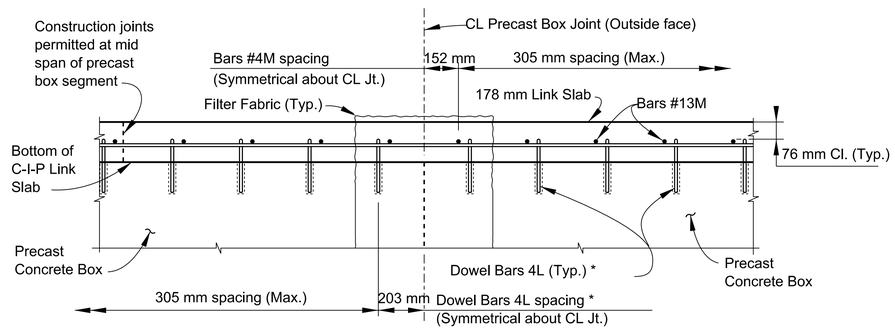
DESIGN NOTE:

1. Link Slab required when joint openings from differential settlement exceed 26 mm as determined in Link Slab Note 1.

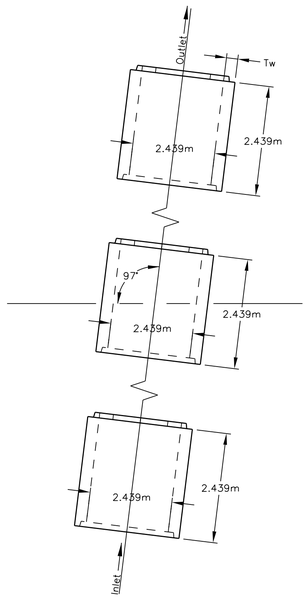


LINK SLAB TYPICAL SECTION
(Multiple Barrel Culvert shown, Single Barrel Culvert similar)

* Install dowels with an Adhesive Bonding Material System in accordance with manufacture Specification. The Contractor may substitute mechanical couplers in lieu of adhesive bonded dowels. Shift dowels to clear box culvert reinforcing.



VIEW J-J



PLAN VIEW
56 PRE-CAST BOX SECTIONS
REQUIRED LAYOUT DETAIL
NTS

LINK SLAB NOTES:

1. Provide a Cast-In-Place Link Slab to ensure uniform joint opening of precast box culverts when the differential settlement shown in the plans exceeds the following limits, except that a Link Slab is not required for differential settlements less than 21 mm

$$\Delta Y \leq \frac{(L)^2}{2493 \times R \times W} \times 1000$$

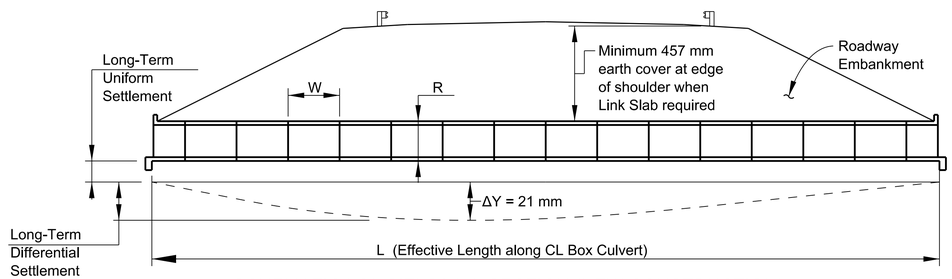
Where:
ΔY = Maximum Long-Term Differential Settlement (mm)
R = Exterior height of Box Culvert (m)
W = Length of Box Culvert Segments (m)
L = Effective length for single curvature deflection (m)

2. Extend Link Slab to back face of headwalls and to limits of existing box culverts for extensions.

3. The P&D Branch Chief will inspect the Box Sections completed in-place before backfilling to determined if link slabs are required per sec.109.02(m).

ESTIMATED LINK SLAB QUANTITIES		
ITEM	UNIT	QUANTITY
Class A(AE) Concrete (Culvert)	m^3/m^2	0.1778
Reinforcing Steel (Roadway)	Kg/m^2	7.0214

NOTE: Estimated quantities are based the plan area of precast box slabs, and are provided for information only. No additional payment will be made for Link Slabs where these are required for the precast box culverts.



SCHEMATIC LONGITUDINAL SECTION (NEW CONSTRUCTION)

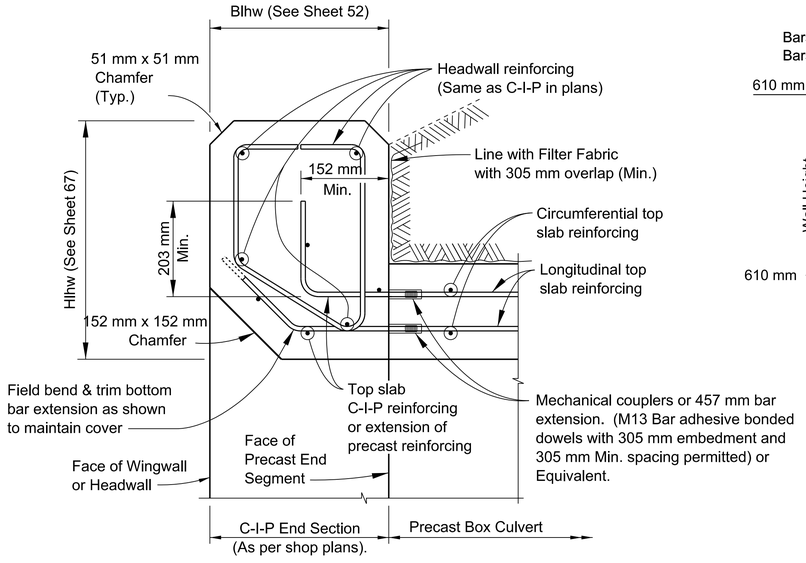
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRECAST BOX SEGMENT LAYOUT & LINK SLAB DETAILS

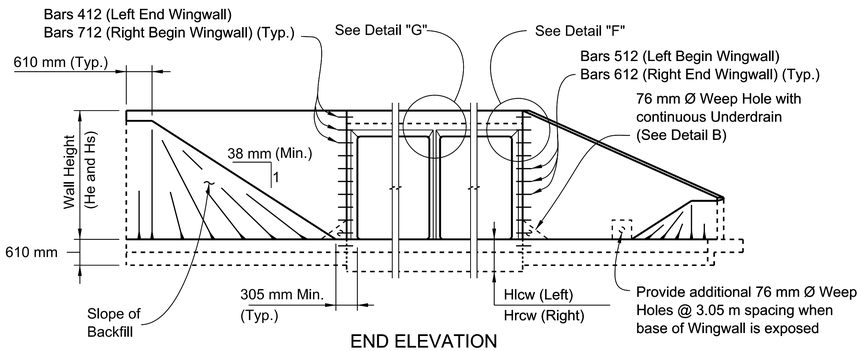
DRAWN BY: NRDOT	DATE: 6/29/2015
DESIGNED BY: NRDOT	DATE: 6/29/2015
REVISED: 07/28/2015	BY: Design 2

Sht_89 N6330 Precast box Seg Layout w link slab Details 111417.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(2)1,2&4	90	96

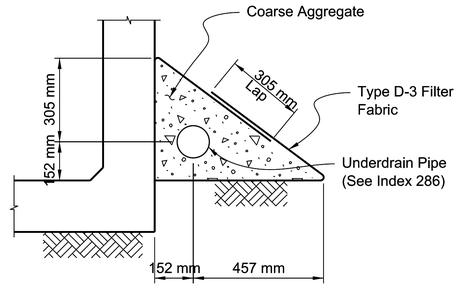


SECTION C-C
C-I-P HEADWALL DETAILS AND CONNECTION TO PRECAST BOX

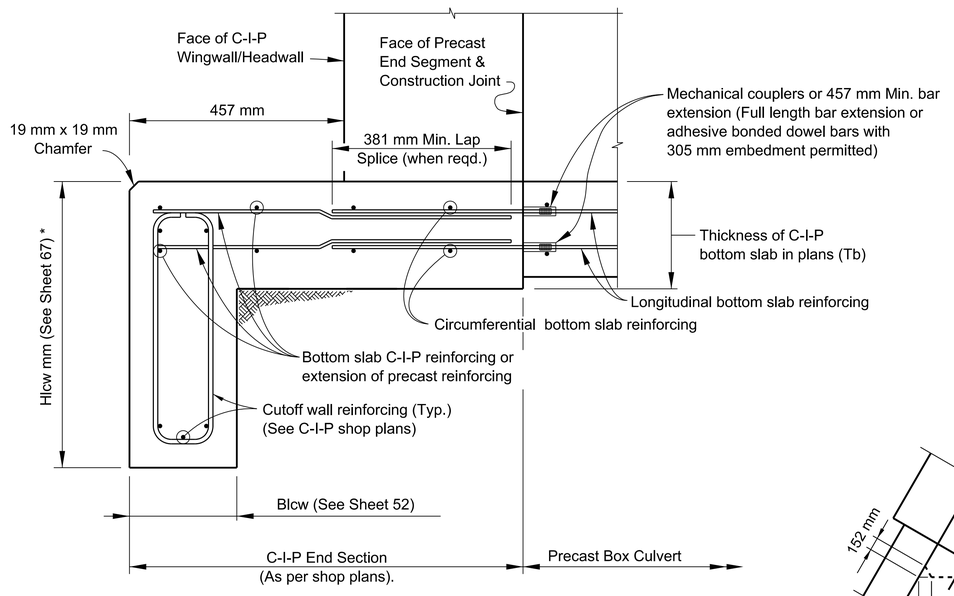


END ELEVATION
(Showing Constant Height And Variable Height Wingwalls)

NOTES:
1. For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less then 90 degrees, field bend wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this work.
2. Location of Construction Joint determined by WP at theoretical intersection of:
   - Soil side face of Headwall and outside face of Box Exterior Wall, for SW≤90°;
   - Outside face of Wingwall and outside face of Box Exterior Wall, for SW>90°.
3. Provide 152 mm chamfer when angle 'A' is greater than 45°. Maintain minimum wall thickness. Field adjust reinforcing to maintain cover.
4. Wingwall Skew Angles (SW) are measured from the adjacent box exterior wall to the wingwall.
5. Turn or extend Wingwall Cutoff Wall as necessary to meet Box Cutoff Wall.
6. Provide additional reinforcement in the top of the top slab below traffic railings to ensure a minimum area of 0.80 sq. in./ft. transverse reinforcing.
7. See sheet 94 of 96 for referenced dimensions.

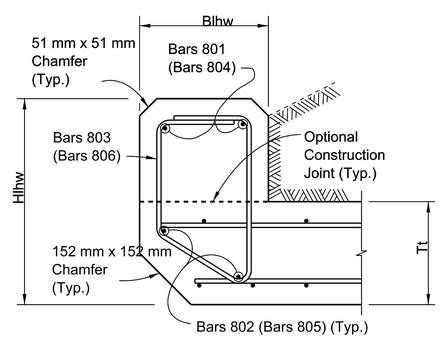


DETAIL "B"
UNDERDRAIN DETAIL
(Similar to Type II)

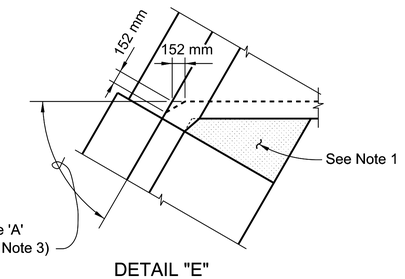


SECTION D-D
C-I-P TOE SLAB & CUTOFF WALL DETAILS
AND CONNECTION TO PRECAST BOX

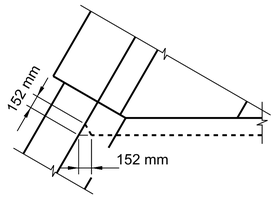
* Provide additional 152 mm depth of cutoff wall at no additional cost.



DETAIL "J"
LEFT HEADWALL SECTION
(Right Headwall similar)

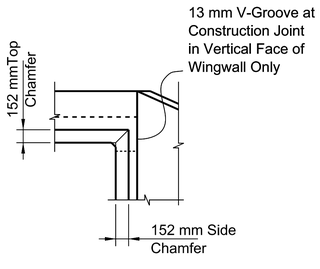


DETAIL "E"



DETAIL "D"

CROSS REFERENCE:
See Sheet 96 for locations of Details "C" "D", "E", "J" & "K".



DETAIL "F"

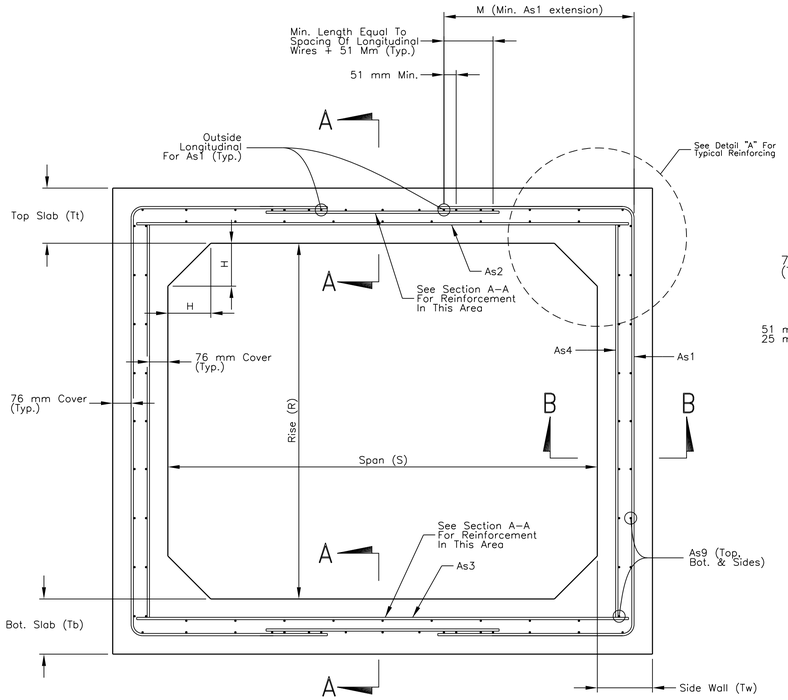
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

BOX HEADWALL, CAP & CUTOFF WALL DETAILS

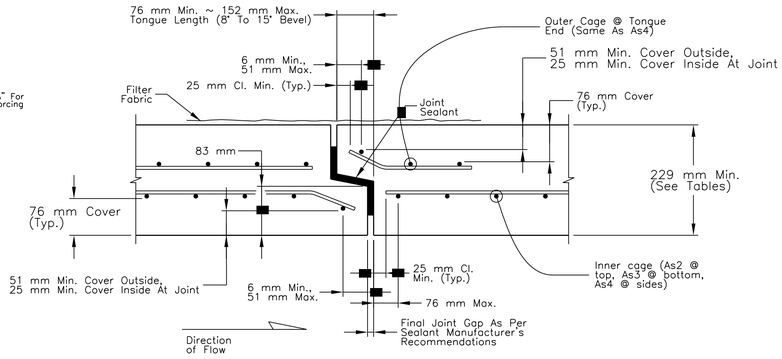
DRAWN BY: NRDOT	DATE: 11/15/2017
DESIGNED BY: NRDOT	DATE: 11/15/2017
REVISED: 11/15/2017	BY: Peterson.Yazzie
Sht_90 Box Headwall Cap & Cutoff Wall Details 111517.dgn	

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_90 Box Headwall Cap & Cutoff Wall Details 111517.dgn

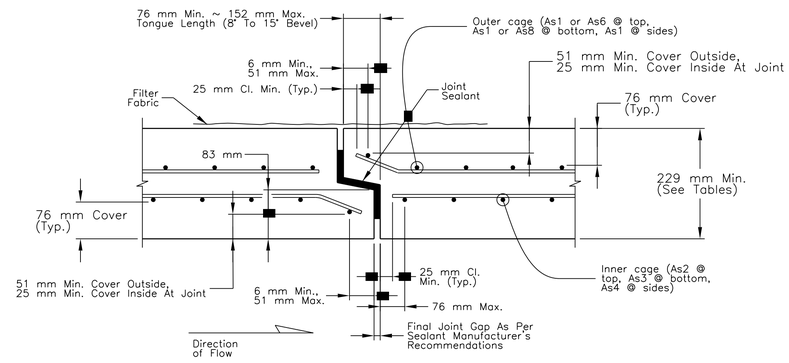
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(2)1,2&4	91	96



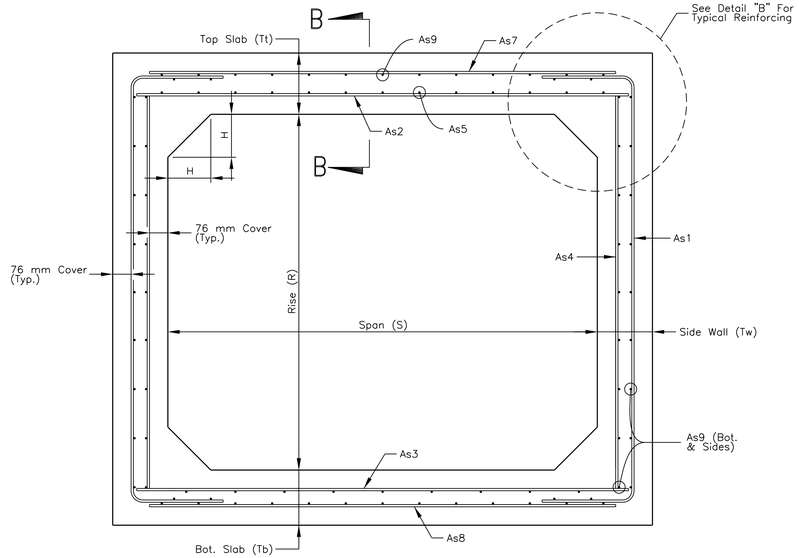
TYPICAL BOX SECTION (TYPE 2)
DESIGN EARTH COVER 51 mm OR GREATER
(Option 1 Reinforcing Configuration Shown)



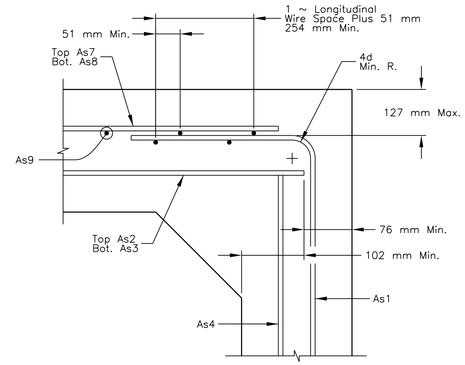
SECTION A-A



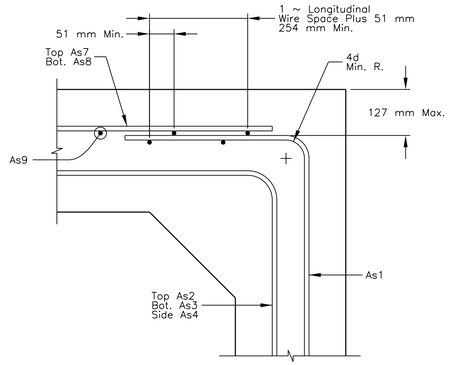
SECTION B-B
TYPICAL SECTION THRU JOINT



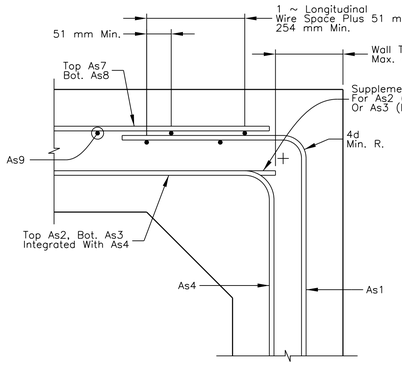
TYPICAL BOX SECTION (TYPE 1)
DESIGN EARTH COVER LESS THAN 51 mm
(Option 1 Reinforcing Configuration Shown)



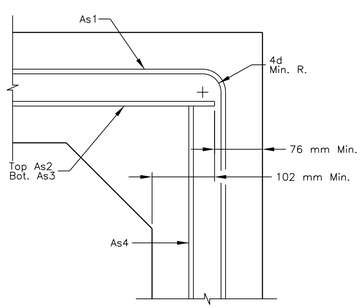
DETAIL "B"
(OPTION 1)



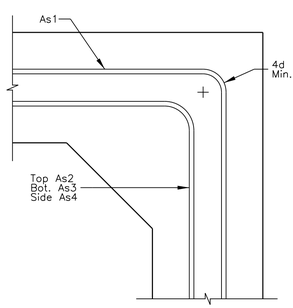
DETAIL "B"
(OPTION 2)



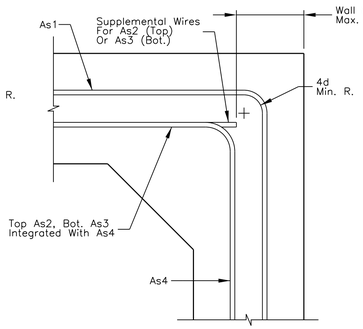
DETAIL "B"
(OPTION 3)



DETAIL "A"
(OPTION 1)



DETAIL "A"
(OPTION 2)



DETAIL "A"
(OPTION 3)

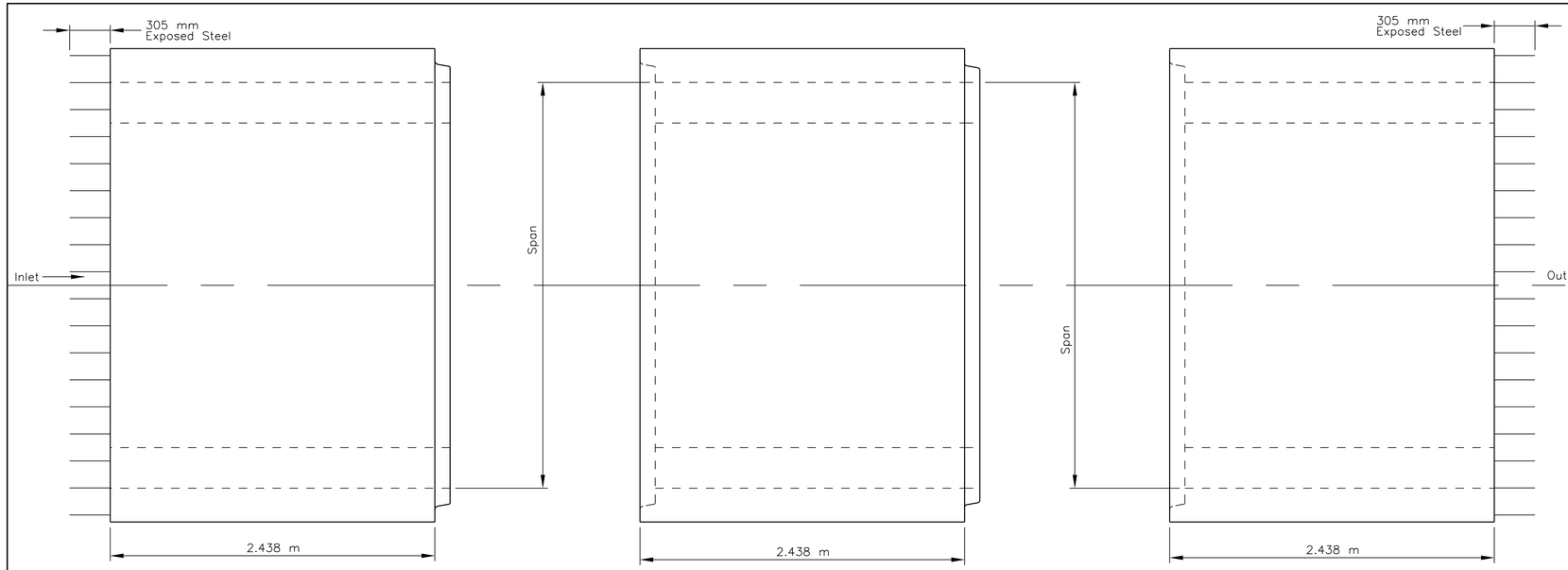
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD PRECAST BOX CULVERT
REBAR LAYOUT
WITH 76 mm CONCRETE COVER

DRAWN BY: NRDOT	DATE: 11/15/2017
DESIGNED BY: NRDOT	DATE: 11/15/2017
REVISED: 11/15/2017	BY: Peterson.Yazzie
Sht_91 Standard PBC Rebar Layout w-76mm Conc. Cover 111517.dgn	

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_91 Standard PBC Rebar Layout w-76mm Conc. Cover 111517.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(2)1,2&4	92	96



PLAN VIEW–BOX CULVERT
SECTION A 1

PLAN VIEW–BOX CULVERT
SECTION A 2

PLAN VIEW–BOX CULVERT
SECTION A 3

Note: Protect Exposed Steel From Damage Or Bending In Fabrication Yard And During Transport To Project Site.

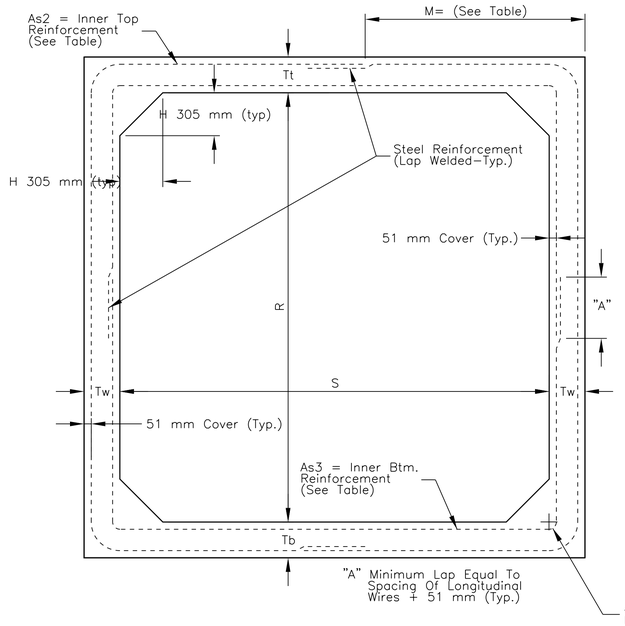
GENERAL NOTES

1. ONLY ONE DESIGN OF PRECAST BOX CULVERT IS TO BE USED FOR ANY INSTALLATION.
2. REINFORCING STEEL MUST CONSIST OF SMOOTH OR DEFORMED WELDED WIRE REINFORCEMENT (WWR) MEETING THE REQUIREMENTS OF SPECIFICATION SECTION 931. LONGITUDINAL REINFORCEMENT MAY CONSIST OF REINFORCING BARS MEETING THE REQUIREMENTS OF SPECIFICATION SECTION 931. MINIMUM COVER MUST BE 51 mm FOR SLIGHTLY AGGRESSIVE ENVIRONMENTS OR 76 mm FOR MODERATELY TO EXTREMELY AGGRESSIVE ENVIRONMENTS, UNLESS OTHERWISE SHOWN. THE SPACING OF CIRCUMFERENTIAL WIRES MUST NOT BE LESS THAN 51 mm NOR MORE THAN 102 mm. THE SPACING OF LONGITUDINAL WIRES OR BARS MUST NOT BE MORE THAN 203 mm.
3. AS9 LONGITUDINAL WIRES MUST HAVE A MINIMUM CROSS–SECTIONAL AREA OF 40% OF THE CIRCUMFERENTIAL WIRES, BUT NOT LESS THAN A W2.5 OR D2.5 FOR WWR, OR #3 BARS FOR DEFORMED BARS.
4. WELDING OF REINFORCEMENT MUST BE LIMITED TO THE LOCATIONS SHOWN IN ASTM C1577 AND IN ACCORDANCE WITH ANSI/AWS D1.4 "STRUCTURAL WELDING CODE – REINFORCING STEEL".
5. FOR ALTERNATE REINFORCING CONFIGURATION OPTIONS 2 AND 3 SHOWN IN DETAIL "A" AND "B" (SHEET 1), AS1 MAY BE EXTENDED TO THE MIDDLE OF EITHER SLAB AND LAP SPLICED WITH AS7 AND AS8. AS4 MAY BE LAP SPLICED AT ANY LOCATION OR CONNECTED TO AS2 OR AS3 AT CORNERS BY WELDING.
6. HAUNCH DIMENSIONS MAY VARY BETWEEN THE MINIMUM AND MAXIMUM DIMENSIONS SHOWN IN THE DESIGN TABLES BUT ONLY ONE HAUNCH DIMENSION MUST BE USED WITHIN THE FULL LENGTH OF THE BOX CULVERT INSTALLATION.
7. SUBMITTAL OF REDESIGN CALCULATIONS ARE NOT REQUIRED FOR ANY INCREASE TO THE SLAB AND/OR WALL THICKNESS WHEN THE MINIMUM REINFORCEMENT AREAS SHOWN IN THE DESIGN TABLES ARE PROVIDED.
8. FOR DESIGN EARTH COVER GREATER THAN 3 m, THE CONTRACTOR MAY INTERPOLATE THE REQUIRED AREAS OF REINFORCEMENT AND SLAB OR WALL THICKNESS. INTERPOLATED AREAS OF REINFORCEMENT SLAB OR WALL THICKNESS MUST BE APPROVED BY THE ENGINEER.
9. MINIMUM LENGTH OF PRECAST BOX SEGMENTS IS 1.22 m AND MAXIMUM LENGTH IS 4.88 m.
10. SEE INDEX NO. 291 FOR CONNECTIONS TO WING WALLS, HEADWALLS AND OTHER GENERAL DETAIL

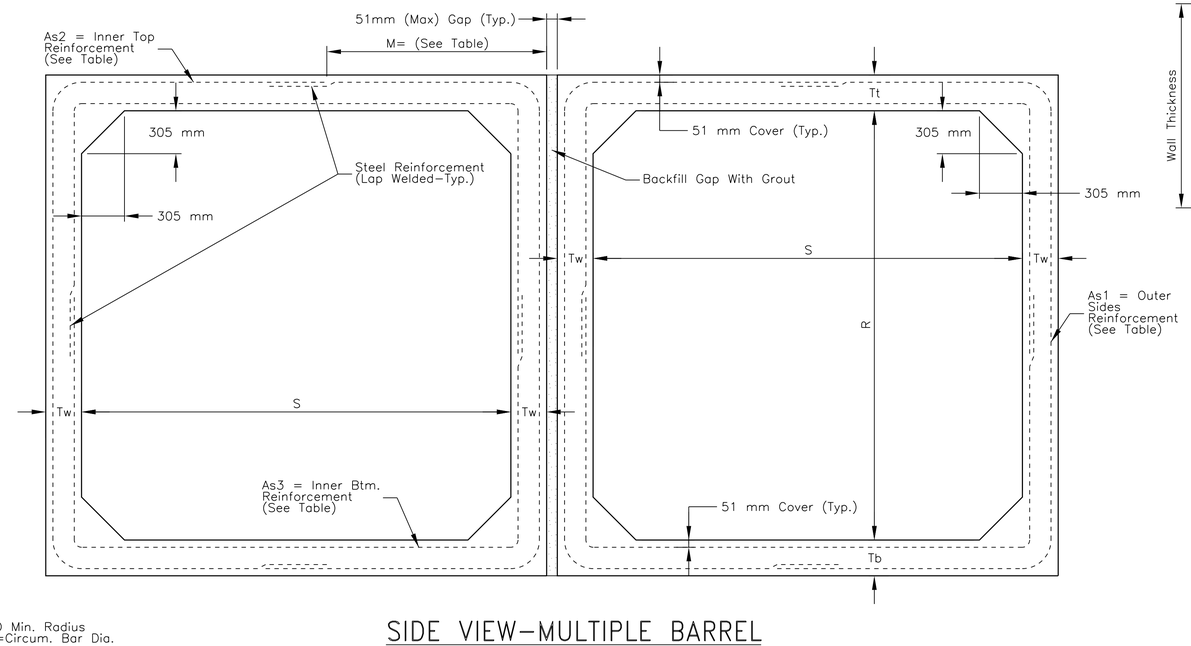
STANDARD PRECAST BOX CULVERT DESIGNS (51 mm COVER) – 2.438 m Spans

STATION	SPAN x RISE (S) x (R) (m)	SLAB/WALL THICKNESS TOP (Tt) (mm)	BOT, (Tb) (mm)	SIDE (Tw) (mm)	HAUNCH (H) (mm)	DESIGIN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq mm/per meter) As1	As2	As3	As4	As5	As6	As7	As8	As9	As1 EXT. LENGTH (M) (mm)
1+104.668	2.438 x 1.829	203	203	203	102 to 305	1.02mm to 3.05m	783.22	1143.22	1185.35	211.61	–	–	–	–	See General Note 5	1270

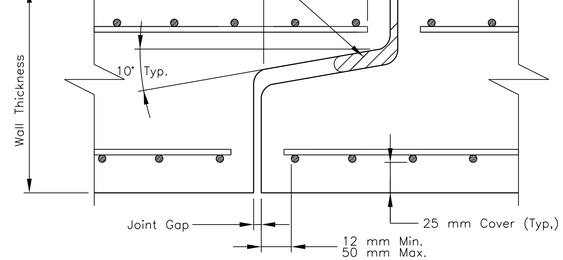
Note: CONTRACTOR IS RESPONSIBLE FOR DETERMIMING ALL BAR LENGTHS, SIZE, AND DIMENSIONS FOR THE BARREL, WINGWALL AND CONCRETE APRON REINFORCEMENT IN ACCORDANCE WITH TABLES ON THESE PLANS.



SIDE VIEW–SINGE BARREL



SIDE VIEW–MULTIPLE BARREL
2 OF MORE BARRELS



BOX CULVERT
JOINT DETAIL

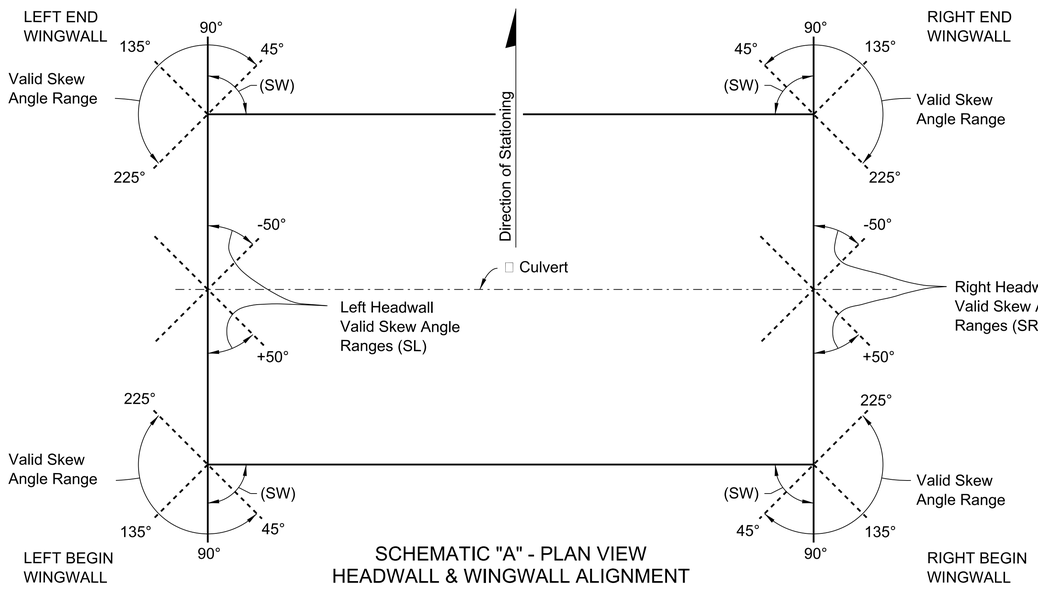
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRECAST CONCRETE
BOX CULVERT DETAIL–1

DRAWN BY: NRDOT	DATE: 11/15/2017
DESIGNED BY: NRDOT	DATE: 11/15/2017
REVISED: 11/16/2017	BY: Peterson.Yazzie
Sht_92 PC CBC Dtl 1 REV 111517.dgn	

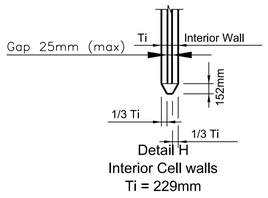
E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_92 PC CBC Dtl 1 REV 111517.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(2)1,2&4	93	96



SCHEMATIC "A" - PLAN VIEW
HEADWALL & WINGWALL ALIGNMENT

NOTE: All headwall and culvert skew angles are measured in degrees from a line perpendicular to the centerline of culvert (counter-clockwise positive), see Schematic "B".



GENERAL NOTES:

LIVE LOAD: HL-93.

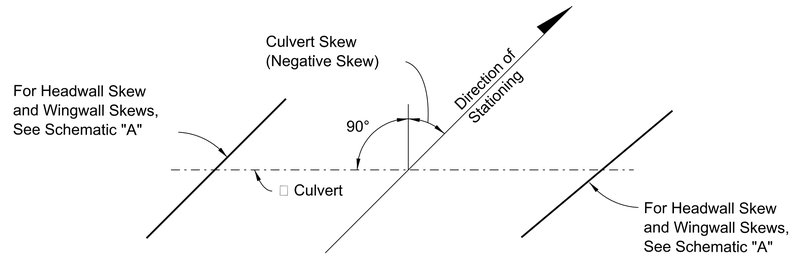
CONSTRUCTION LOADING: It is the construction Contractor's responsibility to provide for supporting construction loads that exceed AASHTO HL-93, and any construction load applied prior to 610 mm of compacted fill placed above the top slab.

SURFACE FINISH: All concrete surfaces shall receive a Class I finish per Section 552.16(a)

SKEWED CONSTRUCTION JOINTS: Construction joints in barrels of culverts with skewed wingwalls may be placed parallel to the headwalls and the reinforcing steel, and the slabs may be cut provided that the cut reinforcing steel extends beyond the construction joint enough for splices to be made in accordance with Table 1 on this sheet. The cost of construction joints and additional reinforcing shall be at the expense of the Contractor.

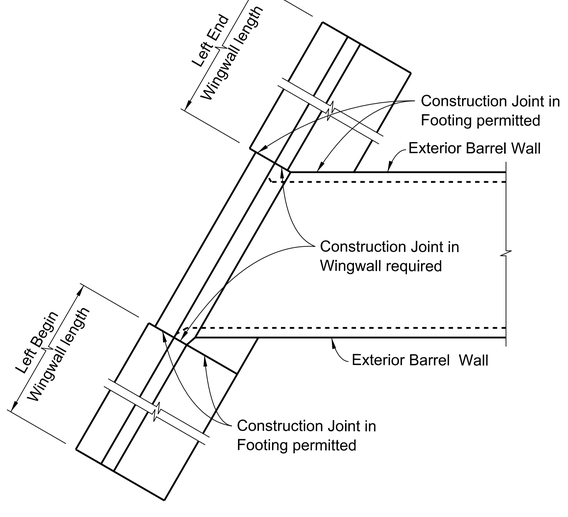
REINFORCING STEEL: See Sheet 94 for type, size, number, and reinforcing per meter requirements for wingwall .

For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less then 90 degrees, field bend wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this work.



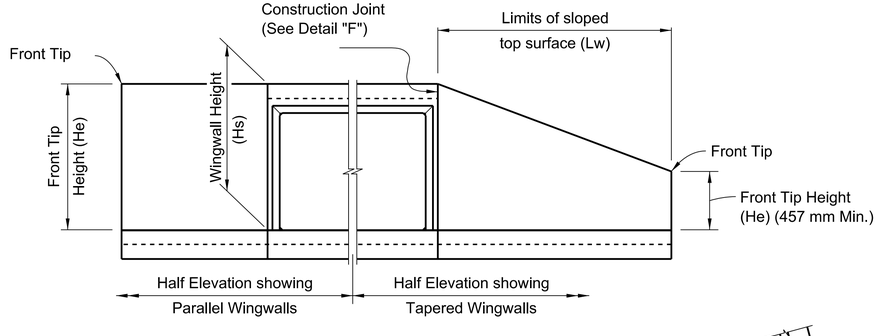
SCHEMATIC "B" - PLAN VIEW
CULVERT ALIGNMENT

NOTE: For Culvert Skew see Contract Plans.



PART PLAN SHOWING PARALLEL WINGWALLS
AND LOCATION OF CONSTRUCTION JOINTS

NOTE:
Construction Joints in wingwalls and footings are located as follows: For non-skewed wingwalls they are located adjacent to the exterior face of the exterior barrel wall; when the CL of wingwall and CL of exterior barrel wall results in an acute angle see Left End Wingwall above, and when the angle is obtuse see Left Begin Wingwall above and Detail C.

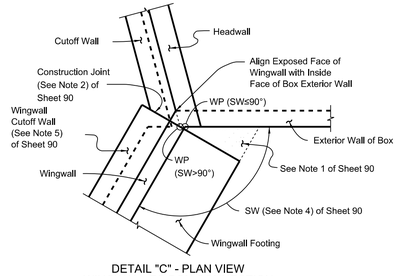


END ELEVATION
OF CULVERT

TABLE 1 - MINIMUM BAR SPLICE LENGTHS FOR LONGITUDINAL REINFORCING

BAR SIZE	SPLICE (CLASS A/AE) CLASS A(AE) (2344 mPa)	SPLICE (CLASS A/AE) CLASS A(AE) (3792 mPa)	BAR SIZE	SPLICE (CLASS B) CLASS A(AE) (2344 mPa)	SPLICE (CLASS B) CLASS A(AE) (3792 mPa)
#10M	305 mm	305 mm	#25M	1.067 m	838 mm
#13M	406 mm	406 mm	#29M	1.346 m	1.067 m
#16M	508 mm	508 mm	#32M	2.006 m	1.346 m
#19M	584 mm	584 mm	#36M	2.388 m	1.956 m
#22M	813 mm	686 mm			

TABLE 1 NOTE: Splice lengths are based on an AASHTO Class B tension lap splice for the Specification Section 552 concrete class shown.



DETAIL "C" - PLAN VIEW
WINGWALL TO BOX CONNECTION
(Left Begin Corner Shown, Other Corners Similar)

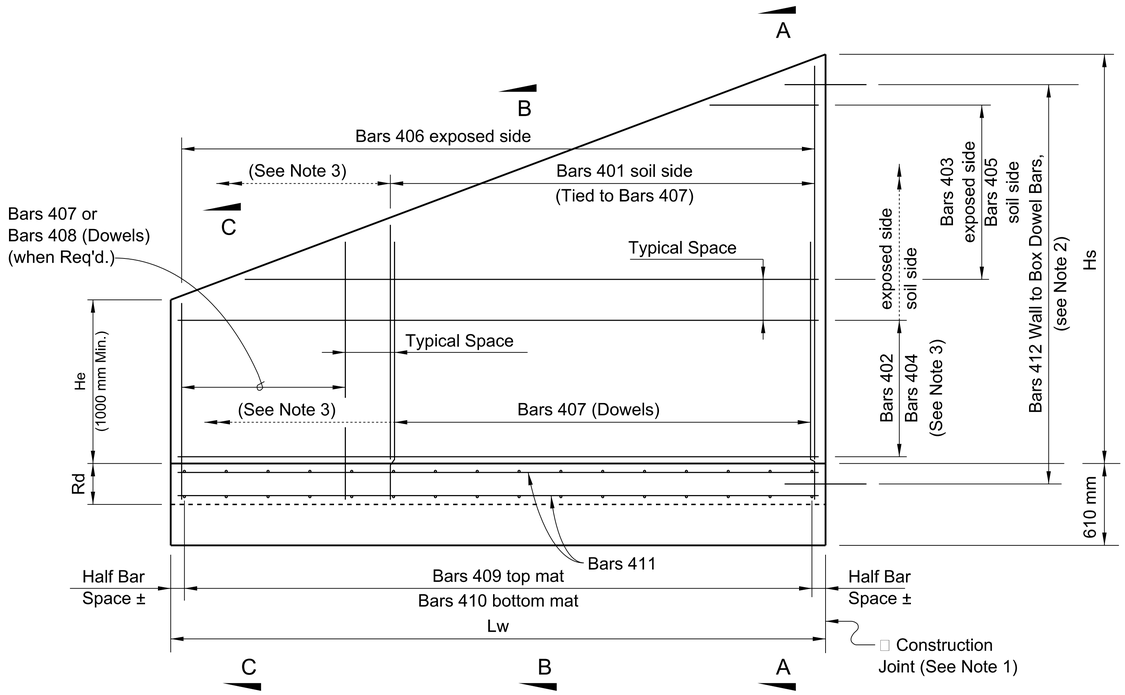
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRECAST CONCRETE BOX CULVERT DETAIL-4

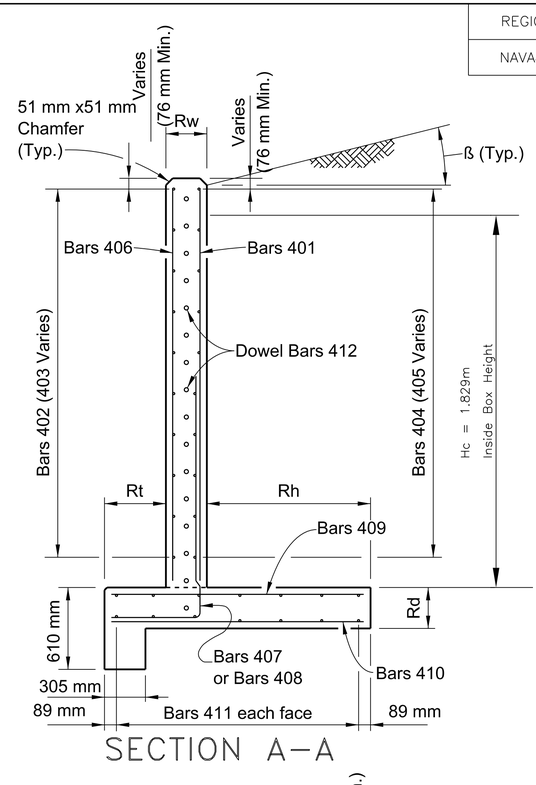
DRAWN BY: NRDOT	DATE: 11/15/2017
DESIGNED BY: NRDOT	DATE: 11/15/2017
REVISED: 11/15/2017	BY: Peterson.Yazzie
Sht_93 PC CBC Dtl 4 rev 111517.dgn	

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_93 PC CBC Dtl 4 rev 111517.dgn

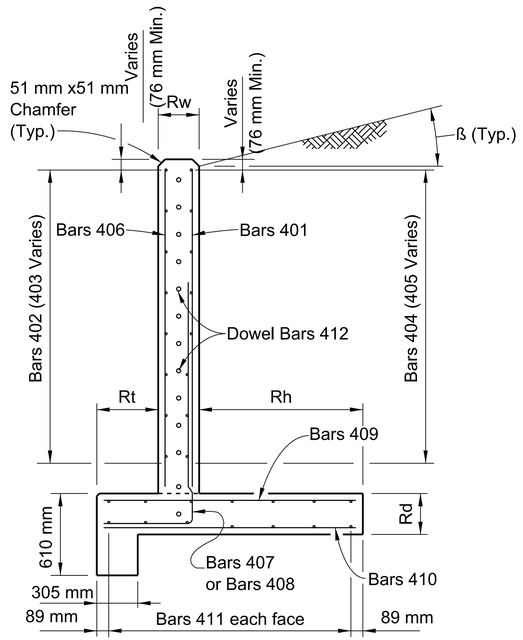
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(2)1,2&4	94	96



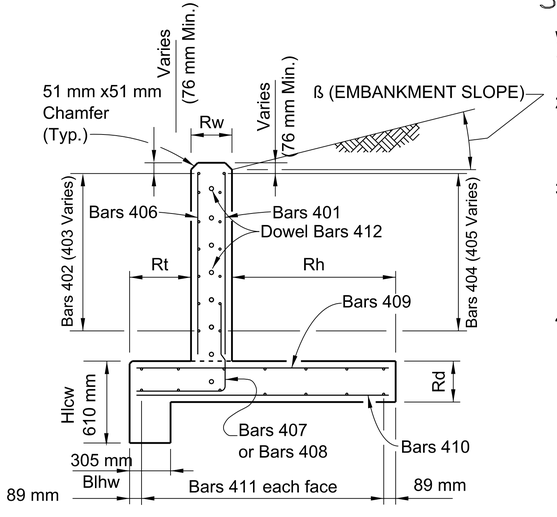
WINGWALL ELEVATION - Variable Height
(Left End shown - other corners similar)



SECTION A–A



SECTION B–B



SECTION C–C

WINGWALL NOTES:

1. Align construction joint perpendicular to wingwall.
2. In the vicinity of the construction joint, field bend reinforcement as necessary to maintain minimum reinforcement cover.
3. For constant height wingwalls, variable length Bars 403, 405 & 408 are not required, and as such the limits of Bars 401 & 407 extend the full length of the wingwall, and the limits of Bars 402 & 404 extend to the full height of the wingwall.
4. Contractor is responsible for determining all bar lengths dimensions for the barrels, wingwall and concrete apron reinforcement in accordance with table on drawing, using the bar designations shown or their own and provide shop plans for review.

BOX, HEADWALL AND CUTOFF WALL DATA TABLE (mm unless shown otherwise)

LOCATION:	STRUCTURE / BRIDGE NUMBER	BOX								HEADWALL AND CUTOFF WALL			
		# Cells	S (m)	R (m)	Tt(mm)	Tw(mm)	Tb(mm)	Ti(mm)	Lc (m)	Cover	Blhw(mm)	Hlhw(mm)	Blcw(mm)	Hlcw(mm)
1+104.668		56	2.439	1.829	203	251	216	527	21.032	76mm	305	610	356	610

LEFT SIDE WINGWALLS DATA TABLE (mm unless shown otherwise)

STRUCTURE / BRIDGE NUMBER	LEFT END WINGWALL							LEFT BEGINNING OF WINGWALL @ BOX						
	Rt	Rw	Rh	Rd	He (m)	Hs (m)	Lw (m)	Rt	Rw	Rh	Rd	He (m)	Hs (m)	Lw (m)
1+104.668	548	254	1105	292	1.936	2.439	6.858	548	254	1105	292	1.936	24.39	6.858

RIGHT SIDE WINGWALLS DATA TABLE (mm unless shown otherwise)

STRUCTURE / BRIDGE NUMBER	RIGHT END WINGWALL							RIGHT BEGINNING OF WINGWALL @ BOX						
	Rt	Rw	Rh	Rd	He (m)	Hs (m)	Lw (m)	Rt	Rw	Rh	Rd	He (m)	Hs (m)	Lw (m)
1+104.668	548	254	1105	292	1.936	2.439	6.858	548	254	1105	292	1.936	24.39	6.858

WINGWALL REINFORCEMENT AREA (mm^2 per linear meter) minimum

Wall Height (m)	Stem Wall (back face)	Stem Wall T&S (back face)	Stem Wall (front face)	Stem Wall T&S (front face)	Footing (top mat)	Footing T&S (top mat)	Footing (bottom mat)	Footing T&S (bottom mat)
4.267	1968	423	423	423	1968	423	423	423
3.048	1312	423	423	423	1312	423	423	423
2.439	1318	423	423	423	1318	423	423	423
2.134	847	423	423	423	847	423	423	423
1.936	755	423	423	423	755	423	423	423
1.219	423	423	423	423	423	423	423	423
0.610	423	423	423	423	423	423	423	423

Wingwall Note: Bar designations in "( )" are only required for variable height wingwalls. (T&S)= temperature & Shrinkage steel

BAR DESIGNATIONS SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL PROVIDE THEIR OWN DETAIL BAR SCHEDULE AND DRAWINGS USING THEIR OWN BAR DESIGNATIONS.

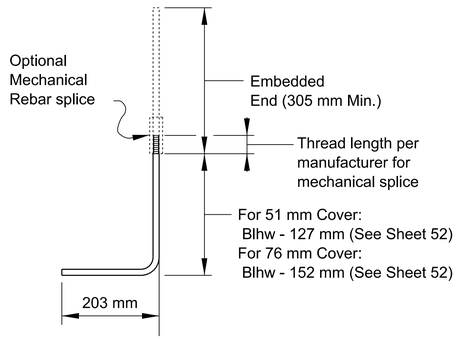
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE BOX CULVERT AND WIND WALL DETAIL

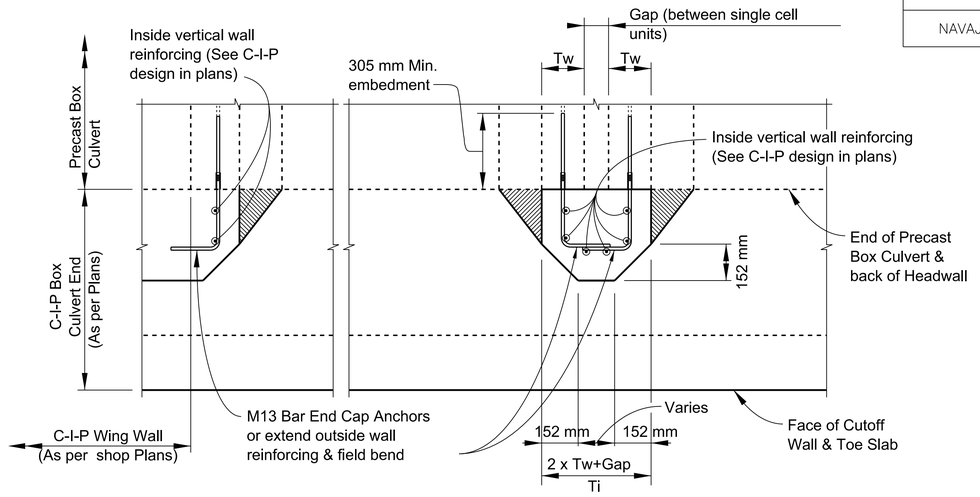
DRAWN BY: NRDOT	DATE: 11/15/2017
DESIGNED BY: NRDOT	DATE: 11/15/2017
REVISED: 11/15/2017	BY: Peterson.Yazzie
Sht_94 Conc. Box Culvert & Wingwall Detail	111517.dgn

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_94 Conc. Box Culvert & Wingwall Detail 111517.dgn

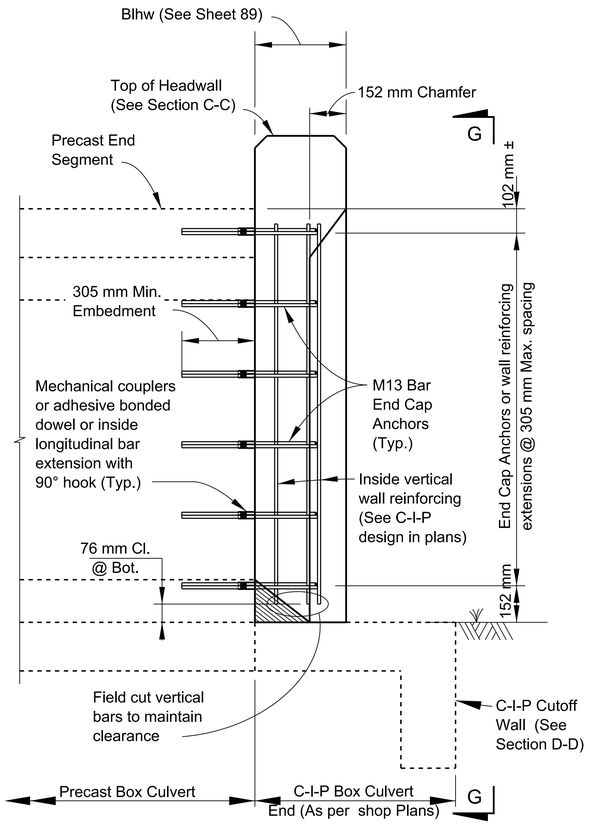
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(1)1,2&4	95	96



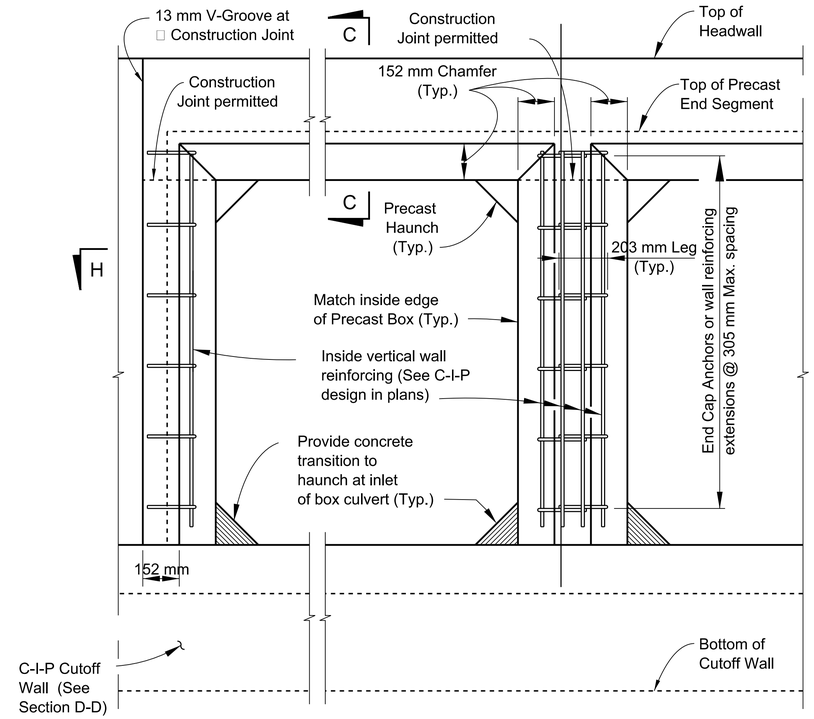
M13 BAR END CAP ANCHOR
BAR BEND DIAGRAM



SECTION H-H



SECTION F-F



VIEW G-G
(Headwall, Toe Slab and Cutoff Wall Reinforcing not shown for clarity)

ELEVATION VIEW

PIPE BLOCKOUT DETAILS

C-I-P END CAP DETAILS AND CONNECTION TO PRECAST BOX

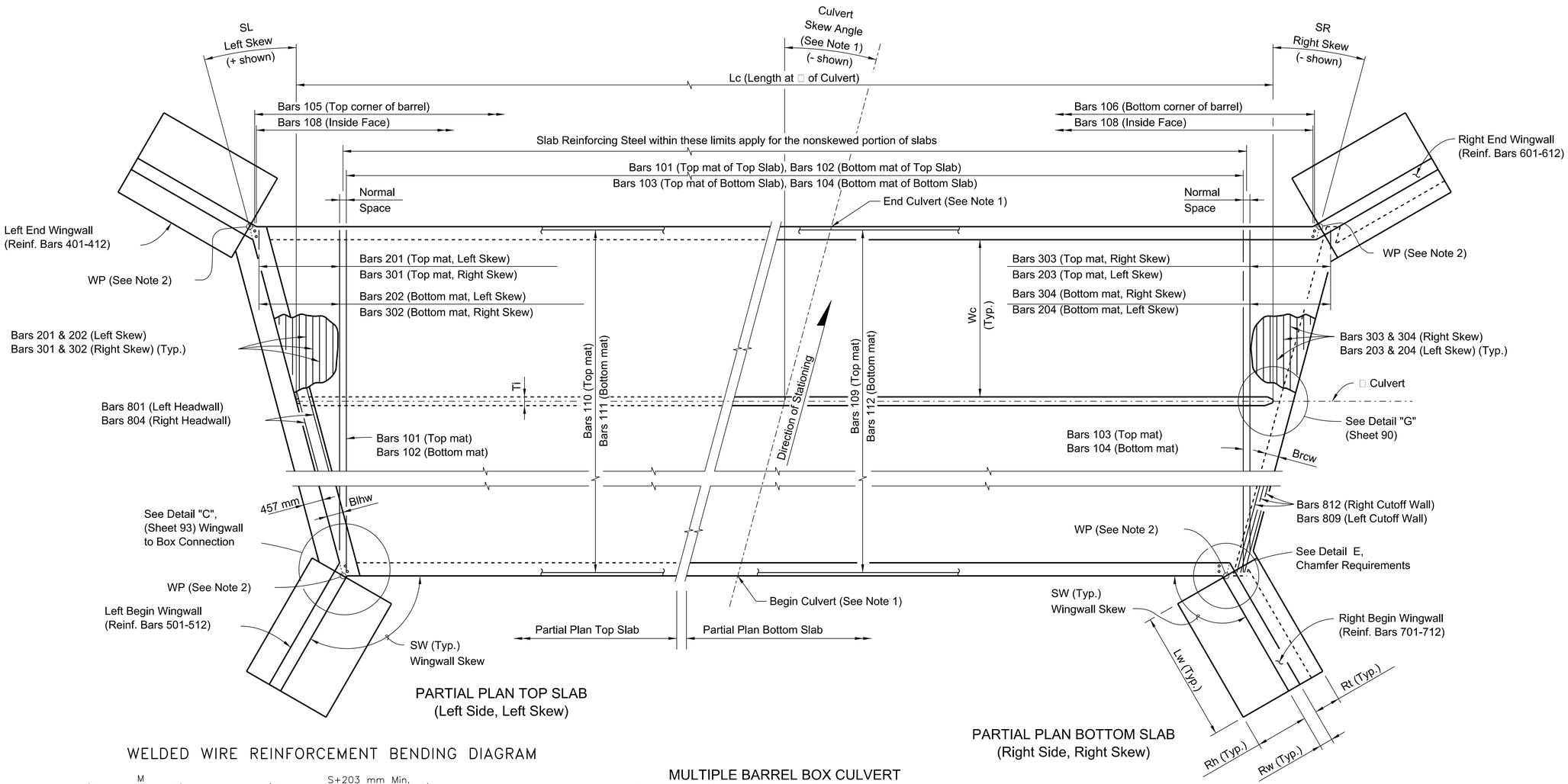
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

HEADWALL & CUTOFF WALL
& END CAP DETAILS

DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 7/29/2015	BY: Design 2
Sht_95 N6630 Box Headwall cutoff wall Details 50514.dgn	

Sht_95 N6630 Box Headwall cutoff wall Details 50514.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N6330	N6330(2)1,2&4	96	96

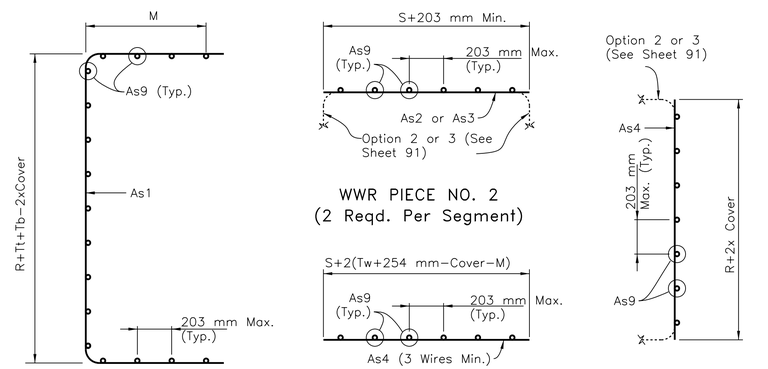


PARTIAL PLAN TOP SLAB
(Left Side, Left Skew)

PARTIAL PLAN BOTTOM SLAB
(Right Side, Right Skew)

MULTIPLE BARREL BOX CULVERT
(Skewed Culvert With Skewed Wingwalls Shown)

WELDED WIRE REINFORCEMENT BENDING DIAGRAM



WWR PIECE NO. 1
(2 Reqd. Per Segment)

WWR PIECE NO. 2
(2 Reqd. Per Segment)

WWR PIECE NO. 4
(Tongue Reinforcement)
(4 Reqd. Per Segment)

WWR PIECE NO. 3
(2 Reqd. Per Segment)

TYPE 2 BOX SECTION (DESIGN EARTH COVER 610 mm OR GREATER)

NOTES:
1. See Contract Plans Sht 12 & 41 for Culvert Location, Culvert Skew Angle and Roadway Cross Section.
2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail C.

REINFORCEMENT NOTES:

1. Reinforcement Bending Dimensions Are Out-To-Out.
2. See General Notes 4, 5 And 6 On Sheet 93.
3. See Table 6 For Dimensions M, R, S, Tb, Tt And Tw.
4. Dimension "A" Is Determined By The Manufacturer In Accordance With The Requirements Of Detail "B" On Sheets 92.

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

MULTIPLE BARREL BOX CULVERT DETAIL

DRAWN BY: NRDOT	DATE: 11/15/2017
DESIGNED BY: NRDOT	DATE: 11/15/2017
REVISED: 11/15/2017	BY: Peterson.Yazzie
Sht_96 Multiple Barrel Box Culvert Detail 111517.dgn	

E:\N6330_N6331_N21\Design Plans\Final Project Plans 06152016\Sht_96 Multiple Barrel Box Culvert Detail 111517.dgn