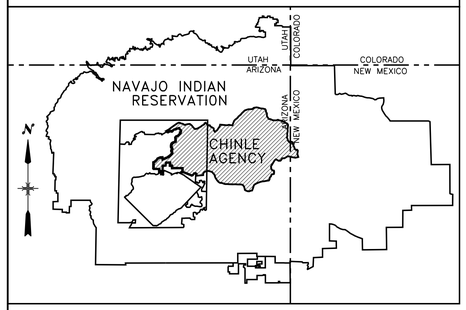
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGION D.O.T.
ROUTES

27 105 7

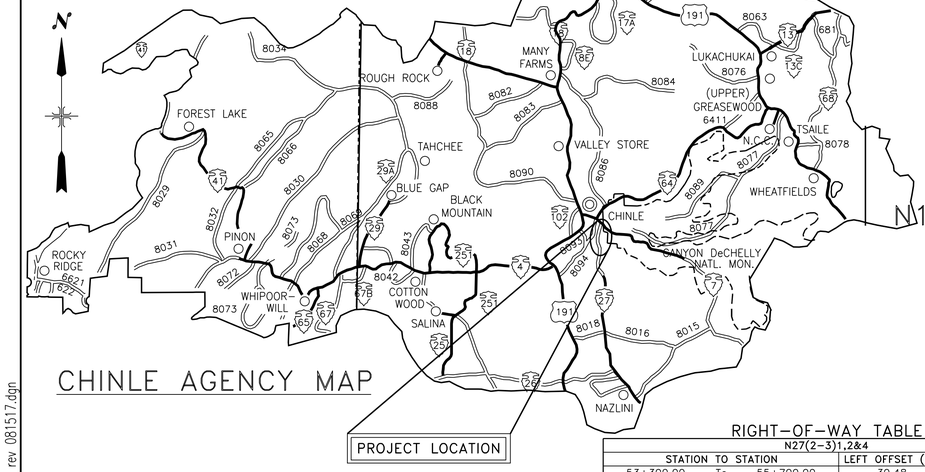
APPROVED
By Harold Riley-PE at 4:38 pm, Sep 26, 2017

PROJECT N27(2-3)1,2&4, N27(4-2)2&4, N105(1)2&4, & N7(1)4 N7(2-3)2&4 w/Roundabout
GRADE, DRAIN & AGGREGATE BASE COURSE, BRIDGE, HOT ASPHALTIC CONCRETE PAVEMENT AND MISCELLANEOUS CONSTRUCTION
N7(1) PAVEMENT MARKING ONLY
8.46 km ID. NO. N35275

INDEX MAP



CHINLE AGENCY MAP



ALIGNMENT TABLE

PROJECT: N27(2-3)1,2&4			
LOCATION	STATION	LENGTH (m)	LENGTH (km)
BOP	53+300.000		
		526.198	0.526
BRIDGE: BOP	53+826.198		
		39.283	0.039
BRIDGE: EOP	53+865.481		
		6,298.905	6.299
EOP	60+164.386		
	Sub-Total:	**6,864.386**	**6.864**

PROJECT: N27(4-2)2&4			
LOCATION	STATION	LENGTH (m)	LENGTH (km)
BOP	60+164.386		
		681.614	0.682
EOP	60+846.00		
	Sub-Total:	**681.614**	**0.682**

PROJECT: N105(1)2&4			
LOCATION	STATION	LENGTH (m)	LENGTH (km)
BOP	0+006.30		
		603.700	0.604
EOP	0+610.00		
	Sub-Total:	**603.700**	**0.604**

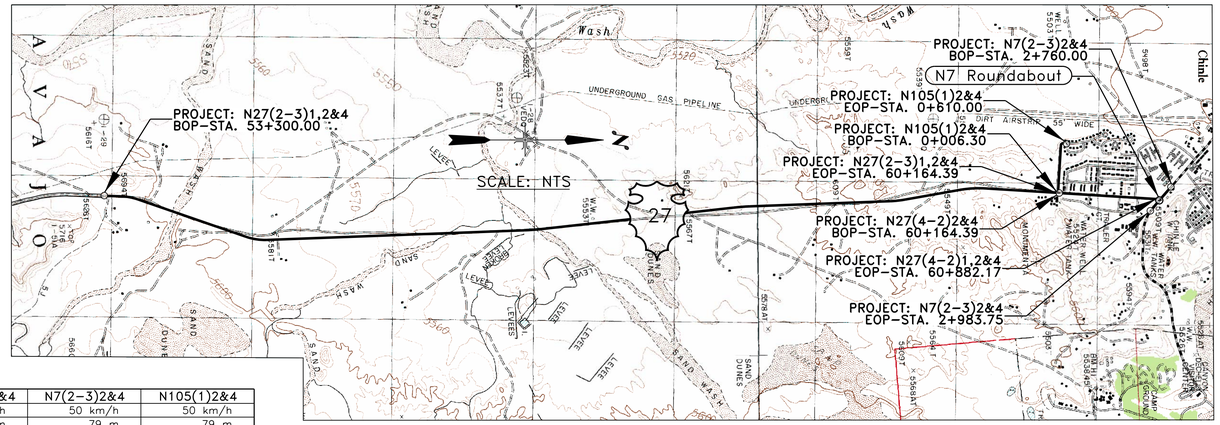
PROJECT: N7(2-3)2&4			
LOCATION	STATION	LENGTH (m)	LENGTH (km)
BOP/APPROACH-W	2+747.899		
		96.236	0.096
POI/APPROACH-W	2+844.135		
RAB-BEGIN	0+000.00		
		160.221	0.160
RAB-END	0+160.221		
POI/APPROACH-E	2+904.135		
		67.517	0.068
EOP/APPROACH-E	2+971.652		
	Sub-Total:	**323.974**	**0.324**
	GRAND TOTAL:	**8,473.674**	**8.474**

RIGHT-OF-WAY TABLE

N27(2-3)1,2&4				
STATION TO STATION			LEFT OFFSET (m)	RIGHT OFFSET (m)
53+300.00	To	55+700.00	30.48	30.48
55+700.00	To	56+210.00	30.48	40.00
56+210.00	To	56+250.00	55.00	40.00
56+250.00	To	56+920.00	30.48	40.00
56+920.00	To	58+580.00	30.48	30.48
58+580.00	To	58+640.00	30.48	40.00
58+640.00	To	59+920.00	30.48	30.48
59+920.00	To	59+960.00	30.48	60.00
59+960.00	To	60+000.00	30.48	30.48
60+000.00	To	60+164.39	30.48	15.00
N27(4-2)1,2&4				
STATION TO STATION			LEFT OFFSET (m)	RIGHT OFFSET (m)
60+164.39	To	60+838.45	12.19	
60+164.39	To	60+833.06		12.19

RIGHT-OF-WAY TABLE

N105(1)2&4				
STATION TO STATION			LEFT OFFSET (m)	RIGHT OFFSET (m)
0+030.766	to	0+340.000	41.91	
0+030.416	to	0+340.000		9.45
0+340.000	to	0+368.329	11.19	41.91
0+368.329	to	0+455.606	11.19	19.05
0+455.606	to	0+610.000	11.19	11.19
N7(2-3)2&4 (Approaches + Roundabout)				
STATION TO STATION			LEFT OFFSET (m)	RIGHT OFFSET (m)
2+747.899	To	2+864.135	15.24	15.24
N7(2-3) -- Roundabout			SEE SHEET 91 OF 95	
2+864.135	To	2+971.652	12.19	12.19
N7(1)4				
STATION TO STATION			LEFT OFFSET (m)	RIGHT OFFSET (m)
0+017.54	To	3+910.501	15.24	15.24



27 INDIAN SERVICE COUNTY 191 STATE 491 FEDERAL

EXISTING PROPOSED GRADED UNIMPROVED

DESIGN DATA:

DESIGN DATA:	N27(2-3)1,2&4	N27(4-2)2&4	N7(2-3)2&4	N105(1)2&4
DESIGN SPEED	100 km/h	50 km/h	50 km/h	50 km/h
MINIMUM RADIUS	394 m	79 m	79 m	79 m
MAXIMUM GRADIENT (%)	5%	5%	7%	7%
MINIMUM STOPPING SIGHT DISTANCE	185 m	65 m	65 m	65 m
MINIMUM PASSING SIGHT DISTANCE	320 m	160 m	160 m	160 m
CURRENT AVERAGE DAILY TRAFFIC-ADT (2014)	746 vpd	2851 vpd	6956 vpd	832 vpd
FUTURE AVERAGE DAILY TRAFFIC-ADT (2034)	1109 vpd	4236 vpd	10336 vpd	1261 vpd
DESIGN HOURLY VOLUME$_{DH}$ (2034)	175 vph	177 vph	461 vph	115 vph
PERCENT OF TRUCKS (%)	2%	3%	3%	1%
MAXIMUM SUPERELEVATION (e max)	8.0%	6.0%	6.0%	6.0%

INDEX OF SHEETS

LEGEND

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

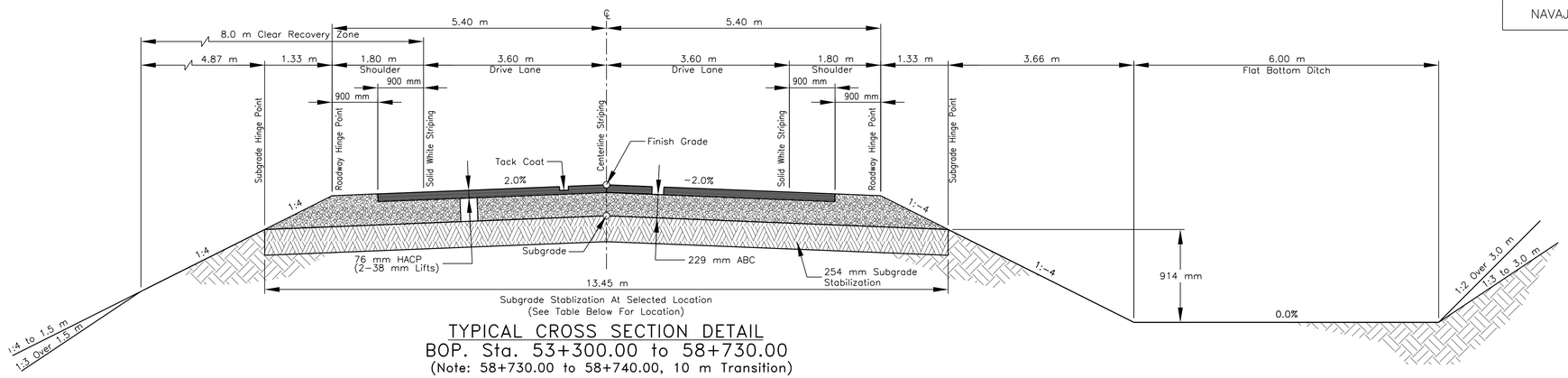
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

RECOMMENDED APPROVAL		APPROVAL	
AGENCY ROAD ENGINEER	DATE 9/5/17		
DIVISION MANAGER	DATE 8/29/17		
PLANNING & DESIGN BRANCH CHIEF	DATE	REGIONAL DIRECTOR (Acting)	DATE 9-7-17

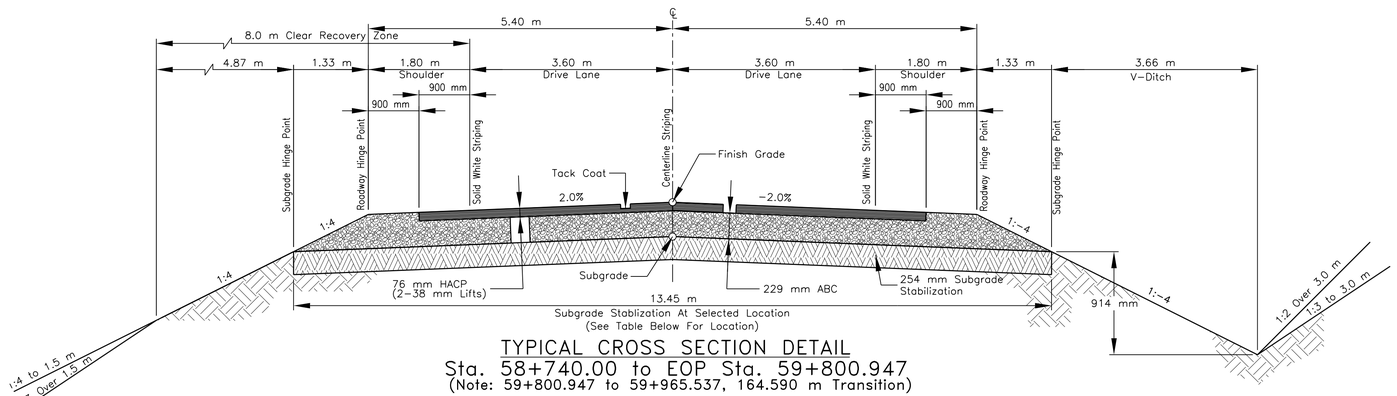
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 01_N27 TitleSht rev 081517.dgn

PROJECT: N27(2-3)1,2&4

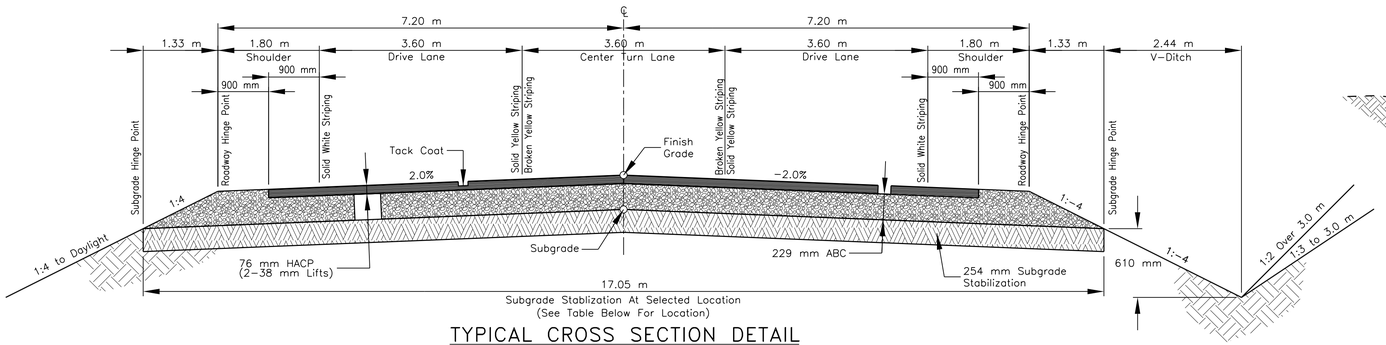
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	2	105



TYPICAL CROSS SECTION DETAIL
BOP. Sta. 53+300.00 to 58+730.00
(Note: 58+730.00 to 58+740.00, 10 m Transition)



TYPICAL CROSS SECTION DETAIL
Sta. 58+740.00 to EOP Sta. 59+800.947
(Note: 59+800.947 to 59+965.537, 164.590 m Transition)



TYPICAL CROSS SECTION DETAIL
Sta. 59+965.537 to EOP Sta. 60+164.39

N27(2-3)1,2&4
21301-4000 SUBGRADE STABILIZATION With ROADBOND, 254 mm DEPTH *

STATION TO STATION			AREA (m^2)	REMARKS
53+300.00	To	55+205.00	25,234.72	Stabilize top 254 mm of Subgrd. w/ RoadBond EN-1
56+105.00	To	56+555.00	6,613.67	Stabilize top 254 mm of Subgrd. w/ RoadBond EN-1
57+005.00	To	59+800.95	37,776.89	Stabilize top 254 mm of Subgrd. w/ RoadBond EN-1
59+800.95	To	59+965.54	2,524.26	Stabilize top 254 mm of Subgrd. w/ RoadBond EN-1 (Transition Between Typicals)
59+965.59	To	60+164.39	3,407.84	Stabilize top 254 mm of Subgrd. w/ RoadBond EN-1
		Total:	75,557.38	

* See Note 39 on Sheet 5 of 101 For Requirements.

TYPICAL TURNOUT

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 5.00 METERS. THIS WORK SHALL BE INCLUDED IN THE EARTHWORK, GRAVEL, ASPHALT, ETC. BID ITEMS AS APPROPRIATE.

TURNOUT EXTENSION NOTE:

THE TURNOUTS LISTED BELOW WILL REQUIRE EARTHWORK AND GRADING OUTSIDE OF THE ROAD RIGHT-OF-WAY. THIS WORK IS NECESSARY TO OBTAIN ACCEPTABLE TURNOUT GRADES OF± 8.00% MAXIMUM OR TO CREATE SMOOTH TIE-INS TO EXISTING TURNOUTS. THE SPECIFIC LENGTH OF EXTENSIONS REQUI RED TO MEET ACCEPTABLE GRADES SHALL BE DETERMINED BY THE 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 RELATED ROAD CONSTRUCTION ITEMS. NO EARTHWORK OR OTHER MEASUREMENTS SHALL BE TAKEN. SPECIFIED AGGREGATE, ASPHALT, CONCRETE OR OTHER PAVEMENT RELATED STRUCTURAL MATERIALS WILL BE MEASURED AND PAID UNDER THE APPROPRIATED BID ITEMS.

N27(2-3)1,2&4- Mainline

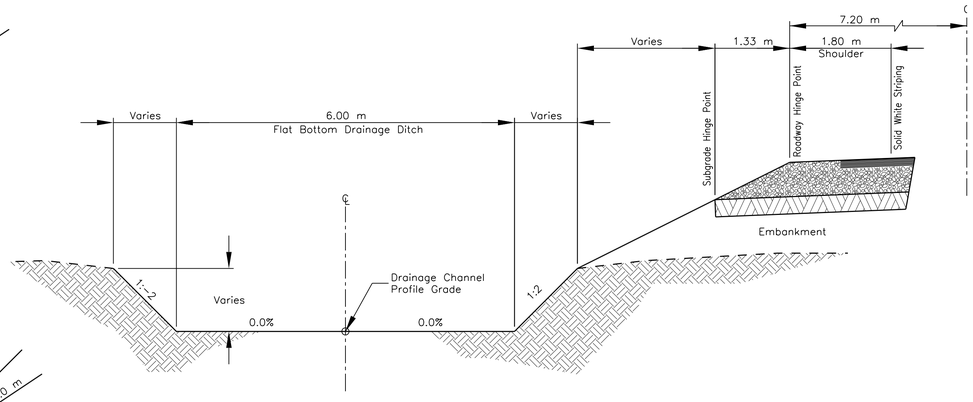
STA 56+140, Right
STA 56+713, Left
STA 56+836, Left
STA 58+586/58+632, Right

FLAT BOTTOM DITCH LOCATION

Station To Station			Location	Remarks
N27(2-3)1,2&4				
53+300.00	to	53+750.00	Lt. & Rt.	Flat Bottom Ditch
53+760.00	to	54+280.00	Lt.	Flat Bottom Borrow Ditch
54+280.00	to	54+360.00	Rt.	Flat Bottom Borrow Ditch
54+280.00	to	55+530.00	Lt.	Flat Bottom Ditch
54+570.00	to	55+530.00	Rt.	Flat Bottom Ditch
55+860.00	to	56+240.00	Rt.	Flat Bottom Borrow Ditch
56+560.00	to	57+050.00	Rt.	Flat Bottom Borrow Ditch
57+060.00	to	58+730.00	Rt.	Flat Bottom Ditch
57+080.00	to	57+710.00	Lt.	Flat Bottom Ditch
59+700.00	to	60+116.00	Lt.	Side Drainage Channel

See Plan & Profile (Sht 15-25)
For Ditch Locations

See Sheet 78 of 105
For Check Dam Details.



TYPICAL CROSS SECTION DETAIL
SIDE DRAINAGE CHANNEL
Sta. 59+700.00 to 60+112.00, Left

BASIS OF ESTIMATED QUANTITIES

ITEM No.	DESCRIPTION	GRADE	UNIT WT.	APPLICATION
21301-4000	Road Bond EN-1			Mix Ratio: 1:200, EN-1:Water
30103-2000	Untreated Aggregate Base Course	"Special"	2164 kg/m^3	Main Roadway: 229 mm, Turnouts: 152 mm
40201-0500	Hot Asphaltic Concrete Pavement, Class "B", Grade B	"B"	2324 kg/m^3	Main Roadway and Turnouts: 76 mm (2-38 mm Lifts), Turnouts 51 mm
40502-0800	Asphalt Cement	PG 58-28		6.0% By Weight of Total Weight of Mixture
41101-5000	Prime Coat, PEP	PEP	993 L/t	Unit Weight: 1.36 L/sq m Apply on top of ABC
41201-1000	Asphalt Emulsion Tack Coat	SS-1	1.001 L/kg	0.23 L/m^2 Application Rate

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

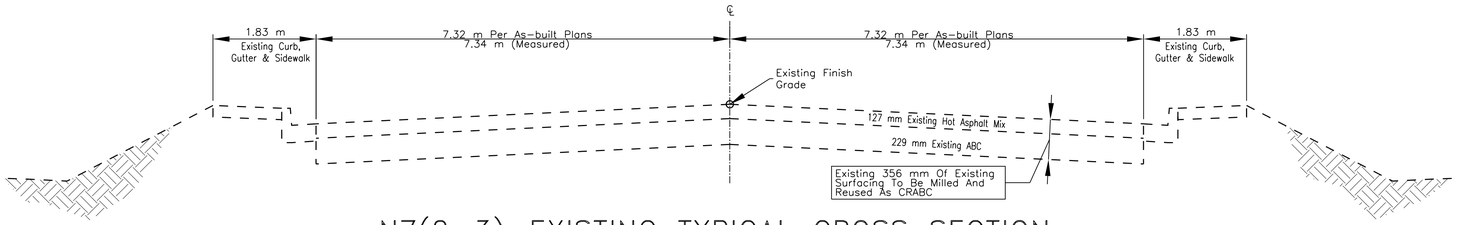
TYPICAL CROSS SECTION DETAILS

DRAWN BY: NRDOT DATE: 6/18/2015
DESIGNED BY: NRDOT DATE: 6/18/2015
REVISED: 9/22/2017 BY: Gerald.Hood
Sht 02 N27 Typ Sec 1.dgn

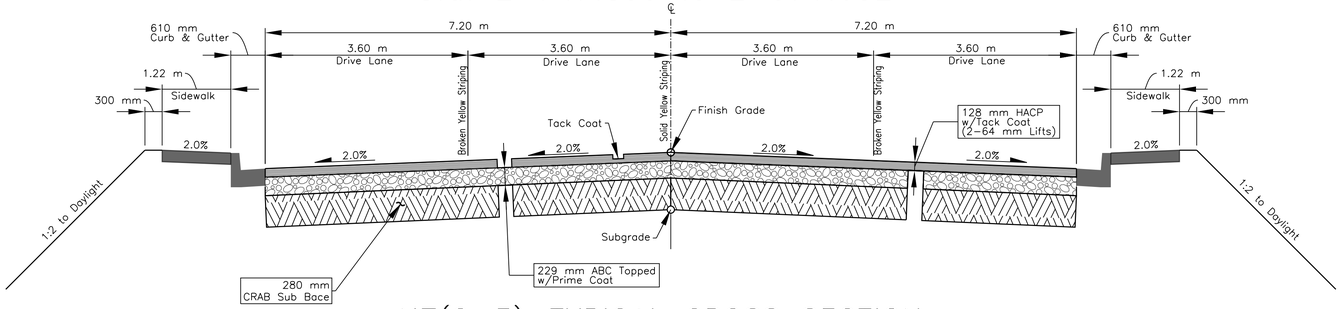
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 02 N27 Typ Sec 1.dgn

PROJECT N7 & N27 TYPICALS

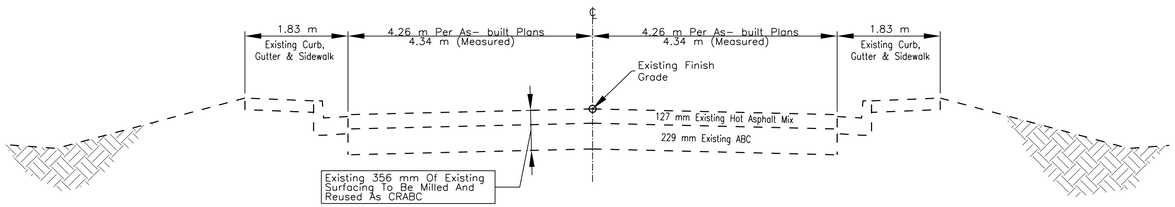
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(2-3)2&4	3	105
			N27	N27(4-2)2&4		



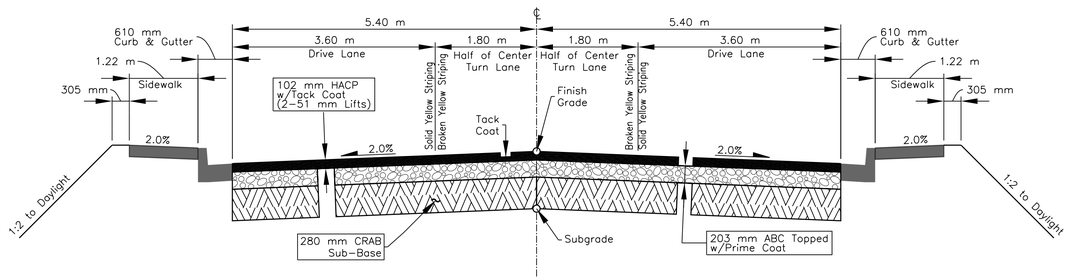
N7(2-3)-EXISTING TYPICAL CROSS SECTION
Sta. 2+747.899 to 2+971.652



N7(2-3)-TYPICAL CROSS SECTION
Sta. 2+747.899 to 2+844.135
Sta. 2+904.135 to 2+971.652



N27(4-2) EXISTNG STREET-TYPICAL CROSS SECTION
Sta. 60+164.386 to 60+846.000



SEQUENCE OF PAVEMENT RECONSTRUCTION

1. ON BIA ROUTE N27(4-2), N7(2-3) AND N105(1) THE CONTRACTOR SHALL MILL EXISTING PAVEMENT, BASE COURSE (TO THE DEPTH OF 356mm) TO MINUS 37.5 mm IN ACCORDANCE WITH SECTION 408 & 413 OF FP-03, INCLUDING ALL EXISTING PAVED TURNOUTS. THE CONTRACTOR HAS THE OPTION TO UTILIZE COLD MILLING MACHINE OR OTHER CONSTRUCTION METHOD TO BREAK UP THE EXISTING PAVEMENT STRUCTURE.
2. THE CONTRACTOR SHALL BUILD UP THE SUBGRADE ALONG WITH ADDITIONAL BORROW WITH MOISTURE AND DENSITY CONTROL PER SECTION 204 OF FP-03.
3. AFTER PROCESSING THE EXISTING PAVEMENT, STOCKPILE AND REUSE AS CRABC FOR PART OF THE NEW BASE COURSE FOR THESE SECTIONS SHOWN HAVING MOISTURE & COMPACTION CONTROL PER SECTION 301. NO SUBGRADE TREATMENT REQUIRED.
4. AT ALL NEW AND RECONSTRUCTED TURNOUTS, MAINLINE, AND ON ROUTE N27(4-2), N7(2-3) AND N105(1), THE CONTRACTOR SHALL FURNISH AND PLACE NEW AGGREGATE BASE COURSE MATERIAL ON THE FINISHED AND APPROVED SUB-BASE.
5. THE CONTRACTOR SHALL THEN PLACE HOT ASPHALTIC CONCRETE PAVEMENT ON ALL ROUTE AND ALL TURNOUTS.
6. THE CONTRACTOR SHALL PROVIDE FOR A SAFE AND RELATIVELY DUST FREE DRIVING SURFACE THROUGHOUT THE RECONSTRUCTION PROCESS FOR ALL SCHOOL, GENERAL TRAVELING PUBLIC, AND LOCAL TRAFFIC USE DAY AND NIGHT. THE CONTRACTOR'S TRAFFIC CONTROL AND CONSTRUCTION SEQUENCING PLAN SHALL INCLUDE THESE REQUIREMENTS AND BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO ANY GROUND DISTURBING ACTIVITIES TAKING PLACE.

BASIS OF ESTIMATED QUANTITIES

ITEM No.	DESCRIPTION	GRADE	UNIT WT.	APPLICATION
30101-2000	Untreated Aggregate Base Course	"Special"	2164 kg/m³	N7(2-2) Roadway: 229 mm , N27(4-2) Roadway & Turnouts: 203 mm Turnouts
40201-0500	Hot Asphaltic Concrete Pavement, Class "B", Grade B	"B"	2324 kg/m³	N7(2-2) Roadway: 128 mm (2-64 mm Lifts), N27(4-2) Roadway & Turnouts: 102 mm (2-51 mm Lifts)
40502-0800	Asphalt Cement	PG 58-28		6.0% By Weight of Total Weight of Mixture
40802-0900	Cold Recycked Asphalt Base Course Sub-Base, 280 mm Depth	--	--	To be Place as Sub-Base for ABC to Depth of 280 mm above the Subgrade
41101-5000	Prime Coat, PEP	PEP	993 L/t	Unit Weight: 1.36 L/sq m Apply on top of ABC
41201-1000	Asphalt Emulsion Tack Coat	SS-1	1.001 L/kg	0.23 L/m² Application Rate

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

TYPICAL CROSS-SECTION DETAILS

DRAWN BY: NRDOT	DATE: 5/7/2014
DESIGNED BY: NRDOT	DATE: 5/7/2014
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 03 N27 Typ Sec 2.dgn	

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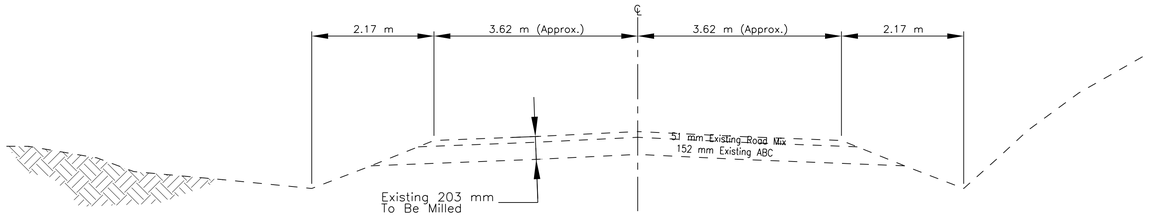
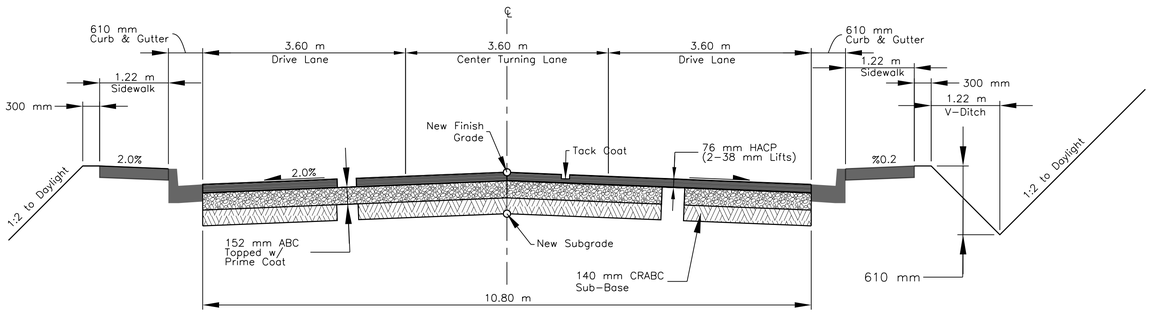
PROJECT N105(1)2&4

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N105	N105(1)2&4	4	105

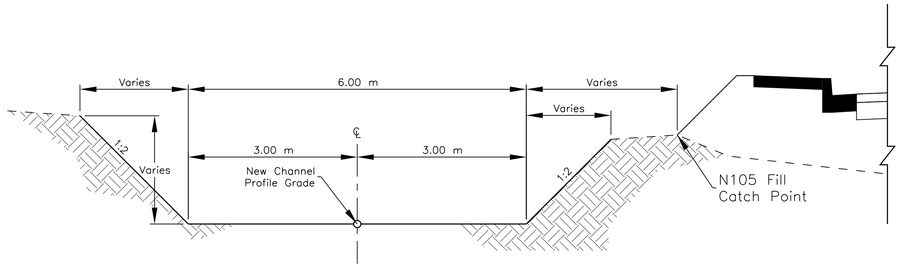


N105(1)–EXISTING TYPICAL CROSS SECTION
Sta. 0+006.30 to Sta. 0+366.00

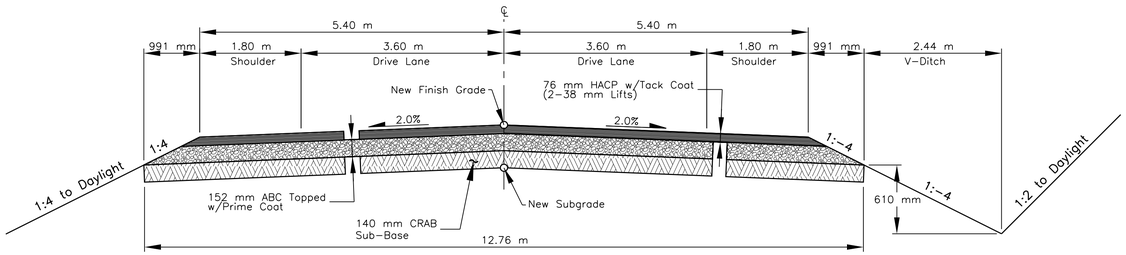
NOTE: SEE SEQUENCING OF PAVEMENT RECONSTRUCTION NOTES ON SHEET 3.



N105(1)–TYPICAL CROSS SECTION
Sta. 0+006.30 to Sta. 0+366.00
Sta. 0+366.00 to 0+400.00
Tapered To 2–Lane Driving Lane



N105(1)–TYPICAL CROSS SECTION
SIDE DRAINAGE CHANNEL
Sta. 0+018.25 to Sta. 0+289.44, Left



N105(1)–TYPICAL CROSS SECTION
Sta. 0+366.00 to Sta. 0+610.00

BASIS OF ESTIMATED QUANTITIES for N105(1)2&4

ITEM No.	DESCRIPTION	GRADE	UNIT WT.	APPLICATION
21301–4000	Road Bond EN–1			Mix Ratio: 1:200, EN–1:Water
30101–2000	Untreated Aggregate Base Course	"Special"	2164 kg/m³	Main Roadway: 152 mm, Turnouts: 152 mm
40201–0500	Hot Asphaltic Concrete Pavement, Class "B", Grade B	"B"	2324 kg/m³	Main Roadway and Turnouts: 76 mm (2–38 mm Lifts), Turnouts 76 mm
40502–0800	Asphalt Cement	PG 58–28		6.0% By Weight of Total Weight of Mixture
40802–0902	Cold Recycled Asphalt Base Course, Sub–Base, 140 mm Depth	---	---	To be Place as Sub–Base for ABC to Depth of 140 mm above the Subgrade
41101–5000	Prime Coat, PEP	PEP	993 L/t	Unit Weight: 1.36 L/sq m Apply on top of ABC
41201–1000	Asphalt Emulsion Tack Coat	SS–1	1.001 L/kg	0.23 L/m² Application Rate

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

N105 TYPICAL CROSS SECTION

DRAWN BY: NRDOT	DATE: 2/12/2015
DESIGNED BY: NRDOT	DATE: 2/12/2015
REVISED: 6/17/2016	BY: Leroy.Toledo
Sht 04 N27 Typ Sec 3.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	5	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

GENERAL NOTE

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

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

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

4. THE DESIGN FEATURES INCLUDING HORIZONTAL AND VERTICAL ALIGNMENTS, TYPICAL SECTIONS, AND OTHER DESIGN DETAILS SHOWN SHALL NOT BE ALTERED OR MODIFIED IN ANYWAY DURING CONSTRUCTION WITHOUT THE EXPRESSED WRITTEN DIRECTION AND WRITTEN APPROVAL OF THE NAVAJO REGION OFFICE-DIVISION OF TRANSPORTATION (NRDOT) DIVISION MANAGER THROUGH THE AWARDING OFFICIAL (A 0), UNLESS OTHERWISE NOTED IN THESE PLANS OR SPECIFICATIONS. DRAINAGE STRUCTURES AND TURNOUTS SHALL BE INSTALLED AS SHOWN WITH ONLY MINOR CORRECTIONS IN LOCATION, SKEW, AND/OR INVERT ELEVATIONS AS NEEDED TO FIT FIELD CONDITIONS. TURNOUTS MAY NOT BE SHIFTED MORE THAN 5.0 METERS FROM THE LOCATIONS SHOWN ON THE PLANS WITHOUT THE WRITTEN APPROVAL OF THE NRDOT DIVISION MANAGER THROUGH THE AO.

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

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

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

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

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

10. THE QUANTITIES SHOWN ARE FOR ESTIMATING PURPOSES ONLY AND TO COMPARE AND CANVAS BIDS. ACTUAL PAY QUANTITIES WILL BE DETERMINED IN THE FIELD FOR AUTHORIZED CHANGES THAT AFFECT THE QUANTITIES.

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 4.5 METERS WIDE TURNOUTS; PLACE AGGREGATE AND HOT ASPHALTIC CONCRETE FOR TURNOUTS WIDER THAN 4.5 METERS TO MATCH THE STRUCTURAL SECTION. REQUIRED GRADING, SHAPING, AND EARTH COMPACTION OUTSIDE OF THE RIGHT-OF-WAY, TO CONNECT NEW TURNOUTS TO THE EXISTING ROADWAY/DRIVEWAY (AS SHOWN ON THE PLANS OR AS DIRECTED BY THE AOTR SHALL BE INCIDENTAL TO BID ITEM 20401-0000. ANY REQUIRED AGGREGATE BASE AND/OR ASPHALT MATERIAL SHALL BE PAID FOR UNDER THE APPROPRIATE BID ITEMS FOR THIS WORK AS SHOWN IN THE BID SCHEDULE.

12. THE CONTRACTOR SHALL BE REQUIRED TO OBLITERATE ALL EXISTING ABANDONED TURNOUTS AND ROADWAY WITHIN THE RIGHT-OF-WAY LIMITS, AND ANY EXISTING TURNOUTS/ROADWAY OUTSIDE OF THE RIGHT-OF-WAY THAT ARE DESIGNATED ON THE PLANS FOR OBLITERATION. OBLITERATION SHALL BE AS PER FP-03, METHOD 2. SCARIFICATION SHALL BE TO A DEPTH OF 300 MILLIMETERS. THE SCARIFIED SURFACE SHALL BE LEFT ROUGH, WITH 100 MILLIMETERS TO 300 MILLIMETERS HIGH RIDGES PERPENDICULAR TO THE EXISTING ROAD CENTERLINE. ROADWAY OBLITERATION INCLUDES GRADING DRAINAGE CHANNELS ACROSS THE OLD ROADBED, TO RE-ESTABLISH NATURAL DRAINAGE CHANNELS AND/OR TO OPEN CHANNELS FOR THE NEWLY INSTALLED (IN NEW ROADWAY) DRAINAGE STRUCTURES. THIS WORK TO BE INCLUDED IN THE BID ITEM 21102-2000. PERMANENT SEEDING AND STRAW MULCHING SHALL BE APPLIED TO ALL OBLITERATION AREAS, WITHIN THE CONSTRUCTION LIMITS. SEEDING AND MULCHING TO BE PAID UNDER ITEM 15708-1000 AND 62510-1000.

13. THE CONTRACTOR SHALL BE REQUIRED TO OBLITERATE ALL EXISTING ABANDONED TURNOUTS AND ROADWAYS WITHIN THE WORKING LIMITS AND/OR AS SHOWN IN THE PLANS. FP-03, SECTION 211, METHOD 2, SHALL BE USED FOR THE OBLITERATION METHOD. ALL OBLITERATION WORK SHALL BE APPROVED BY THE AO AND CONSIDERED INCIDENTAL TO BID ITEM 21102-1000. 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 AOTR. THE DIKES SHALL BE 1.0 METER IN HEIGHT AND PAID FOR UNDER BID ITEM 20443-2 000. ALL OBLITERATED AREAS SHALL BE SEEDED AND MULCHED AS PER SPECIFICATIONS AND PAID FOR UNDER BID ITEM 15708-1000 AND 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, EARTHEN DITCH BLOCKS, AND/OR PLACED ALONG ROADWAY SHOULDERS AS EMBANKMENT IN AREAS ADJACENT TO THE REMOVAL AND AS DIRECTED BY THE COR/COTR.

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 AOTR. ALL DITCH BLOCKS, DIKES AND FURROW DITCHES SHALL BE PAID FOR UNDER THE APPROPRIATE BID ITEMS FOR THIS WORK AS SHOWN IN THE BID SCHEDULE. AT ALL DRAINAGE PIPE REPLACEMENTS, INSTALLATIONS, EXTENSIONS, AND IN-PLACE PIPE CLEANING LOCATIONS, THE CONTRACTOR SHALL CLEAN, REGRADE, AND RESHAPE THE INLET AND OUTLET CHANNELS TO THE RIGHT-OF-WAY LINE AS DIRECTED BY THE AOTR. THIS WORK SHALL BE INCIDENTAL TO BID ITEMS FOR SECTIONS 602, 603, AND/OR 607.

GENERAL NOTE (Continued)

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

17. THE EARTHWORK TABLE SHOWN ON SHEET 10 IS TO ASSIST THE CONTRACTOR IN ESTABLISHING A BID UNDER THE EARTHWORK ITEMS SHOWN IN THE BID SCHEDULE. ANY BORROW MATERIAL CALLED FOR ON THE PLANS SHALL BE TAKEN FROM CONTRACTOR IDENTIFIED SOURCES OUTSIDE THE RIGHT-OF-WAY LIMITS. IT IS THE SOLE RESPONSIBILITY AND EXPENSE OF THE CONTRACTOR TO PROVIDE ANY NECESSARY BORROW MATERIAL FOR THIS PROJECT INCLUDING ALL NECESSARY PERMITS. ALL EXCAVATION, BORROW, AND EMBANKMENT MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 20401-0000.

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 AS DETERMINED BY THE AOTR, MAY BECOME LOOSE WITHIN 5.0 METER OF THE TOP 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 THE NAVAJO TRIBAL UTILITY AUTHORITY (NTUA) AT (928) 729-5721 AND FRONTIER COMMUNICATION COMPANY AT (928) 871-3748, PRIOR TO STARTING ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITIES AND THEIR LOCATIONS WITH THE UTILITY OWNERS PRIOR TO CONSTRUCTION. ANY UTILITIES DAMAGED DUE TO NEGLIGENCE OF THE CONTRACTOR SHALL BE RESTORED TO CODE REQUIREMENTS AT THE CONTRACTOR'S EXPENSE.

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

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. IN THIS CASE, THE NRDOT PLANNING & DESIGN BRANCH CHIEF, THROUGH THE AOTR, SHALL BE CONSULTED FOR CHANGES IN THE TYPICAL SECTIONS, DESIGN SLOPES, AND/OR OTHER ADJUSTMENTS BEFORE PROCEEDING WITH THE WORK UNLESS NOTED OTHERWISE ON THE PLANS. THE FINAL CONSTRUCTED ROAD SECTION SHALL BE BASED ON THE GOVERNMENT FURNISHED COMPUTERIZED STAKING REPORT AS ADJUSTED TO FIT FIELD CONDITIONS. THE CONTRACTOR SHALL STAY WITHIN THE LIMITS OF CONSTRUCTION, UNLESS OTHERWISE APPROVED. IN NO CASE SHALL THE CUT AND FILL BACK SLOPES BE BUILT STEEPER THAN THE MAXIMUM ALLOWED IN THE ROADWAY TYPICAL SECTION SHOWN.

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

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 WORK REQUIRING SAID FENCE REMOVAL/RE-ATTACHMENT, FENCING REPAIRS, TEMPORARY FENCING AND/OR REMOVAL AND RE-ATTACHMENT OF FENCING, SHALL BE COMPLETED IN THE SAME WORK DAY SO AS NOT TO ALLOW LIVESTOCK ONTO THE PROJECT. IF WIRE TENSION IS LOST IN THE EXISTING FENCE, THE CONTRACTOR SHALL RE-TIGHTEN THE FENCE AS DIRECTED BY THE AOTR.

25. THE CONTRACTOR SHALL REMOVE BIA ROUTE N27 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 AOTR AT LEAST THREE (3) WORKING DAYS IN ADVANCE OF SUCH SIGN REMOVAL. THESE ROADSIDE SIGNS SHALL BE SALVAGED AND TAKEN TO THE CHINLE AGENCY MAINTENANCE YARD. SIGNS NEEDED FOR SAFETY/INFORMATION SHALL BE TEMPORARILY RESET AS DIRECTED BY THE COR/COTR. ALL REMAINING SIGNS ALONG THE EXISTING N27 ROADWAY, NOT SPECIFICALLY DESIGNATED ON THE PLANS TO REMAIN, SHALL BE REMOVED. THIS WORK SHALL BE CONSIDERED AN INCIDENTAL OBLIGATION OF THE CONTRACTOR.

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

27. AT MAJOR DRAINAGE STRUCTURES AND LIVESTOCK PASS LOCATIONS, THE CONTRACTOR SHALL EITHER TIE THE WING ROW FENCES TO STRUCTURES IN ACCORDANCE WITH THE DETAILS ON SHEET 81 OF 95 OR INSTALL FENCE OVER THE STRUCTURE AT THE CLEAR RECOVERY ZONE AS NOTED ON THE PLANS. IF NO CORNER FENCE POST/BRACE/STRAIN EXISTS AT TIE-IN TO RIGHT-OF-WAY FENCE, THE CONTRACTOR SHALL INSTALL A STRAIN POST ASSEMBLY AS PER PLAN SHEET 87 OF 100. ANY EXISTING CATTLE PASS CLOSURES ARE TO BE REMOVED. THIS WORK TO BE INCIDENTAL TO BID ITEM 61901-1000 AND NO ADDITIONAL PAYMENT SHALL BE MADE.

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

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

GENERAL NOTE (Continued)

30. AS-BUILTS PLAN AND PROFILE SHEETS [OF PROJECT N27(2-4), N27(2-3), & N7(2-3)] SHALL BE PROVIDED (IF AVAILABLE) UPON WRITTEN REQUEST TO THE CO . HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEYING AND CHECKING THE EXISTING ROADWAY (HORIZONTAL AND VERTICAL) CENTERLINE ALIGNMENT TO INSURE THE PREVIOUS PROJECT ALIGNMENT MATCHES THE NEW ROADWAY ALIGNMENT AT THE BOP. REGRADE AND RESHAPE THE EXISTING ROADSIDE DITCHES AS NEEDED TO MATCH THE NEW DITCH LINES. THE CONTRACTOR IS ADVISED THAT MUCH OF THE INFORMATION FOUND ON THE AS-BUILT PLANS HAS BEEN REVISED/ UPDATED/CORRECTED FOR THE CURRENT PROJECT. THE AS-BUILT PLANS ARE PROVIDED FOR BACKGROUND INFORMATION ONLY. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEMS 15201-0000, 20401-000, AND 40201-0500.

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

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

33. ANY EXISTING MAIL BOXES, ADVERTISING BILLBOARDS, OR HOUSE ADDRESS SIGNS CALLED OUT ON THESE PLANS OR FOUND TO BE LOCATED ALONG THE ROADWAY PRISM SHALL BE REMOVED AND RE-INSTALLED OUTSIDE OF THE RIGHT-OF-WAY LIMIT OR AS DIRECTED BY THE AOTR. THE CONTRACTOR SHALL NOTIFY THE CHAPTER OFFICIALS 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.

34. AT BRIDGE N537, GUARDRAIL REPLACEMENT WORK INCLUDES REPLACEMENT OF THE BRIDGE APPROACH GUARDRAIL AND BRIDGE TRANSITION GUARDRAIL. DETAILS FOR BOTH OF THESE GUARDRAIL TYPES ARE INCLUDED IN THESE PLANS. THE CONTRACTOR SHALL NOT REMOVE THE EXISTING APPROACH AND/OR TRANSITION GUARDRAILS UNTIL COR/COTR APPROVED PROVISIONS ARE IN-PLACE TO INSTALL PERMANENT OR TEMPORARY GUARDRAILS.

35. AT THE COMPLETION OF THE CONSTRUCTION, THE CONTRACTOR SHALL INSPECT THE INTERIOR OF ALL NEWLY INSTALLED 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.

36. 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 (I.E. POST SPACING, VERTICAL ALIGNMENT, POST INSTALLATIONS THROUGH RIPRAP, RIGHT-OF-WAY MONUMENT/MARKER ADJUSTMENTS, ETC.) AS DIRECTED BY THE COR/COTR. THIS WORK TO BE INCIDENTAL TO BID ITEMS 61901-1000, 62101-0000, AND 62102-0000, AND NO ADDITIONAL PAYMENT WILL BE MADE.

37. IT IS EXPECTED A REVISED/ FINAL RIGHTS-OF-WAY GRANT OF EASEMENT BE DEVELOPED DURING THE CONSTRUCTION OF THE N27 PROJECT. THE CONTRACTOR SHALL NOT SURVEY FOR OR INSTALL R.O.W. MONUMENTS AND MARKERS OR FENCINGS UNTIL EXPRESSLY APPROVED BY THE NRDOT DIVISION MANAGER THROUGH THE AOTR. FENCING CAN BE PLACED AT ALL ARCHAEOLOGICAL SITES IF SPECIFIED ON THE PLANS.

38. THE FINISHED SUBGRADE SOIL CLASSIFICATION AND PI'S WILL BE DETERMINED PRIOR TO SUBGRADE TREATMENT WITH ROADBOND EN-1. THE FINAL LOCATIONS (BY STATION) FOR SUBGRADE TREATMENT WILL BE DETERMINED BY THE COTR AND PROVIDED TO THE CONTRACTOR BEFORE THE WORK CAN PROCEED.

NTUA NATURAL GAS DISTRIBUTION CONSTRUCTION REQUIREMENTS (SEE SHT 30 OF 105):

1. CONTRACTOR TO PROVIDE MINIMUM 90 DAYS NOTICE TO NTUA PROR TO NTUA COMMENCING WITH UTILITY RELOCATIONS. NOTICE SHALL BE MADE VIA LETTER TO THE. NATURAL GAS MANAGER ADDRESSED AS FOLLOW:

   NTUA
   ATTN: NATURAL GAS MANAGER
   POST OFFICE BOX 170
   FORT DEFIANCE, ARIZONA 86504

2. MINIMUM 30 DAYS NOTICE IS REQUIRED FOR ANY PROPOSED DESIGN CHANGES BY GOVERNMENT THAT MAY IMPACT THE GASLINE. NTUA SHALL APPROVE OF SUCH CHANGES IN WRITING.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INCLUDING TRAFFIC CONTROL FOR WORK OVER THE GASLINES IN THEIR TRAFFIC CONTROL PLAN. THE TRAFFIC CONTROL PLAN SHALL BE SUBMITTED TO NTUA AND THE GOVERNMENT FOR REVIEW AND APPROVAL PRIOR TO ANY CONSTRUCTION.

4. ALL CONSTRUCTION OVER AN NEAR THE GASLINES SHALL COMPLY WITH THE APPLICABLE SECTIONS OF NTUA'S*TECHNICAL SPECIFICATIONS FOR WORKMANSHIP AND MATERIALS FOR NATURAL GAS FACILITIES (2004)*.

5. FUEL GAS PIPING SHALL BE IN ACCORDANCE WITH THE MOST RECENT VERSION OF THE UNIFORM PLUMBING CODE (2015) AS APPLICABLE AND THE*UNIFORM MECHANICAL CODE (2015)*.

6. CONTRACTOR SHALL CONTACT THE NTUA NATURAL GAS DEPARTMENT AT (928) 729-6275 REGARDING NTUA SCHEDULING, ENGINEERING, CONSTRUCTION, AND PROJECT MANAGEMENT FOR THE GASLINE ADJUSTMENTS.

7. CONTRACTOR SHALL CALL 811 AND NTUA CHINLE DISTRICT OFFICE BEFORE ANY DIGGING OR PLACEMENT OF EMBANKMENT MATERIALS (MINIMUM 72 HOUR NOTICE REQUIRED). LOCATION/STAKING OF THE GASLINES SHALL BE COMPLETED PRIOR TO DIGGING.

8. DIGGING IN VICINITY OF ANY EXISTING NTUA NATURAL GAS FACILTIES SHALL BE MONITORED BY NTUA WITH A MINIMUM OF 72 HOUR NOTICE REQUIRED.

9. STOP WORK IF EXPOSURE, CONTACT, OR DAMAGE OF NTUA GASLINE FACILITIES OCCURS. NTUA SHALL INSPECT FACILITIES, PROVIDE INSTRUCTION, AND NOTICE TO PROCEED WITH CONSTRUCTION WORK IN THE AREA.

10. NTUA CONSTRUCTION MATERIALS AND EQUIPMENT TO BE STORED ON SITE. LOCATION TO BE COORDINATED WITH GOVERNMENT AND CONTRACTOR.

11. NTUA NATURAL GAS LINES REQUIRE EASEMENTS OF 30 FEET (9.14 m), 15 FEET (4.57 m) ON EACH SIDE FROM THE CENTER OF THE PIPELINE.

12. NO BUILDING, STRUCTURE, SLAB, PARKING LOT OR OTHER FIXED EQUIPMENT OR FACILTIES SHALL BE CONSTRUCTED OVER NTUAS UTILITES WITHOUT FIRST GETTING THE CONSENT OF NTUA'S NATURAL GAS MANAGER IN WRITING.

13. A NATURAL GAS PIPEL NE CROSSING AN ARROYO OR WASH SHALL HAVE A MINIMUM BURY DEPTH OF 5 FEET (1.524 m).

14. A NATURAL GAS PIPELINE CROSS ING OR UNDER AN UNPAVED ROAD SHALL HAVE A MINIMUM BURY DEPTH OF 5 FEET (1.524 m). GOVERNMENT SHALL MONITOR DEPTH AND MAINTAIN COVER.

15. IN THE EVENT WHERE THE EXISTING UNDERGROUND NATURAL GASLINE IS IN CONFLICT WITH A PERMANENT STRUCTURE (i.e. WITHIN 5') THE NTUA NATURAL GAS DEPARTMENT SHALL APPROVE OF SUCH CONSTRUCTION BEFORE ANY CONSTRUCTION OVER THE EXISTING NATURAL GASLINE IS STARTED.

16. FOR TEMPORARY ROADS THE BURIED NATURAL GASLINE SHOULD BE CROSSED CAREFULLY, AND ONLY WHEN THE NTUA REPRESENTATIVE IS ON SITE AND ABLE TO OBSERVE THE WORK. THE CROSSING SHOULD BE AS NEAR TO PERPENDICULAR (NINETY 90 DEGREES) AS MUCH AS POSSBLE AND HAVE A MINIMUM COVER OF 3 FEET (0.914 m) OVER THE TOP OF THE GASLINE.

17. WHEN CUTTING DITCH GRADES ABOVE THE BURIED NATURAL GASLINE IS NOT PERMISSIBLE UNLESS THE LINE HAS THE MINIMUM COVER DEPTH AND PROTECTION AS REQUIRED.

18. ALL NTUA UTILITIES SHALL BE PROTECTED IN PLACE UNLESS OTHERWISE SPECIFIED IN THE DESIGN PLANS. NTUA SHALL INSPECT PROTECTION IN PLACE AND APPROVE ANY INSTALLATION PRIOR TO SUBJECTING FACLITIES TO LOADING, SUCH AS CONSTRUCTION EQUIPMENT AND VEHICLE TRAFFIC.

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

GENERAL NOTES

DRAWN BY: NRDOT	DATE: 12/19/2013
DESIGNED BY: NRDOT	DATE: 12/19/2013
REVISED: 3/19/2014	BY: Allen.Nakaidinae

Sht 05 N27 GenNotes REV 081017.dgn

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 05 N27 GenNotes REV 081017.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	6	105

PROJECT: N27(2-3)1,2&4/N27(4-2)2&4
HORIZONTAL ALIGNMENT TABLE

POINT	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
POB	53+300.00			564,095.302	268,516.372
		Linear= 133.843 (m)	N 1°34'12"E		
PC	53+433.84			564,229.095	268,520.039
PI	53+494.38	**CURVE DATA**		564,289.610	268,521.698
		Delta = 17°28'13.33"Rt.			
		Deg. = 4°25'56.73"			
		R = 394.000 (m)			
		L = 120.137 (m)			
		T = 60.538 (m)			
		e = 4.624 (m)			
PT	53+553.98			564,346.836	268,541.448
		Linear= 818.366 (m)	N 19°02'26"E		
PC	54+372.35			565,120.428	268,808.428
PI	54+445.96	**CURVE DATA**		565,190.019	268,832.445
		Delta = 2°10'02.08"Lt.			
		Deg. = 4°25'56.73"			
		R = 394.000 (m)			
		L = 145.559 (m)			
		T = 73.619 (m)			
		e = 6.819 (m)			
PT	54+517.90			565,263.587	268,829.713
		Linear= 1831.656 (m)	N 2°07'36"W		
PC	56+349.56			567,093.981	268,761.738
PI	56+408.07	**CURVE DATA**		567,152.454	268,759.567
		Delta = 4°15'09.16"Lt.			
		Deg. = 1°06'29.18"			
		R = 1576.000 (m)			
		L = 116.972 (m)			
		T = 58.513 (m)			
		e = 1.086 (m)			
PT	56+466.53			567,210.605	268,753.066
		Linear= 1375.160 (m)	N 6°22'46"W		
PC	57+841.69			568,577.250	268,600.271
PI	57+900.04	**CURVE DATA**		568,635.235	268,593.788
		Delta = 4°14'25.61"Rt.			
		Deg. = 1°06'29.18"			
		R = 1576.000 (m)			
		L = 116.639 (m)			
		T = 58.346 (m)			
		e = 1.080 (m)			
PT	57+958.33			568,693.541	268,591.610
		Linear= 998.135 (m)	N 2°08'20"W		
PC	58+956.47			569,690.981	268,554.358
PI	59+010.81	**CURVE DATA**		569,745.282	268,552.330
		Delta = 7°53'22.38"Lt.			
		Deg. = 2°12'58.36"			
		R = 788.000 (m)			
		L = 108.507 (m)			
		T = 54.339 (m)			
		e = 1.871 (m)			
PT	59+064.97			569,798.791	268,542.868
		Linear= 392.444 (m)	N 10°01'42"W		
PC	59+457.42			570,185.239	268,474.528
PI	59+551.42	**CURVE DATA**		570,277.801	268,458.160
		Delta = 13°36'17.79"Rt.			
		Deg. = 2°12'58.36"			
		R = 788.000 (m)			
		L = 187.111 (m)			
		T = 93.998 (m)			
		e = 5.587 (m)			
PT	59+644.53			570,371.616	268,464.024
		Linear= 519.856 (m)	N 3°34'35"E		
PI	60+164.39			570,890.459	268,496.453
		Linear= 717.785 (m)	N 3°34'35"E		
EOP	60+882.171			571,606.846	268,541.229

PROJECT: N105(1)2&4
HORIZONTAL ALIGNMENT TABLE

POINT	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
POB	0+000.00			570881.116	268495.869
		Linear= 455.61 (m)	N 86°48'51"W		
PC	0+455.61			570,906.436	268,040.967
PI	0+531.28	CURVE DATA		570,910.641	267,965.413
		Delta = 86°48'51.00"Rt.			
		Deg. = 21°49'46.89"			
		R = 80.00 (m)			
		L = 121.22 (m)			
		T = 75.67 (m)			
		e = 30.12 (m)			
PT	0+576.82			570,986.312	267,965.413
		Linear= 33.18 (m)	N 0°00'00"E		
POE	0+610.00			571,019.491	267,965.413

Note: Coordinates are Modified (Ground)
Arizona State Plane Coordinates System,
East Zone, NAD83, Meters
Combine Grid to Ground Scale Factor =0.999668489

PROJECT: N7(2-3)2&4
HORIZONTAL ALIGNMENT TABLE

POINT	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
POB	2+747.899			571,682.808	268,453.249
		Linear= 116.236 (m)	S 49°11'34"E		
PI	2+864.135			571,606.846	268,541.229
		Linear= 10.000 (m)	S 49°11'34"E		
PI	2+874.135			571,600.310	268,548.798
		Linear= 97.517 (m)	S 49°11'34"E		
POE	2+971.652			571,536.582	268,622.610

PROJECT: N27(2-3)1,2&4
VERTICAL ALIGNMENT TABLE

Point Type	Start Station	Start Elevation	Start Gradient	Point Type	End Station	End Elevation	End Gradient	Length (m)	Remarks
POB	53+300.00	1711.826	-0.870%	PVC	53+360.00	1711.30	-0.870%	60.00	Linear
PVC	53+360.00	1711.305	-0.870%	PVT	53+420.00	1710.36	-2.260%	60.00	Parabola
PVT	53+420.00	1710.367	-2.260%	PVC	53+572.50	1706.921	-2.260%	152.50	Linear
PVC	53+572.50	1706.921	-2.260%	PVT	53+667.50	1705.73	-0.240%	95.00	Parabola
PVT	53+667.50	1705.735	-0.240%	PVI	53+826.03	1705.36	-0.240%	158.53	Linear
PVI	53+826.03	1705.360	-0.240%	PVI	53+865.65	1705.26	-0.240%	39.62	Linear
PVI	53+865.65	1705.267	-0.210%	PVC	54+435.00	1704.09	-0.210%	569.35	Linear
PVC	54+435.00	1704.099	-0.210%	PVT	54+485.00	1703.78	-1.070%	50.00	Parabola
PVT	54+485.00	1703.780	-1.070%	PVI	54+900.00	1699.33	-1.070%	415.00	Linear
PVI	54+900.00	1699.336	-0.640%	PVI	55+500.00	1695.47	-0.640%	600.00	Linear
PVI	55+500.00	1695.470	0.000%	PVC	57+076.00	1695.47	0.000%	1576.00	Linear
PVC	57+076.00	1695.470	0.000%	PVT	57+124.00	1695.712	1.010%	48.00	Parabola
PVT	57+124.00	1695.712	1.010%	PVC	57+517.50	1699.68	1.010%	393.50	Linear
PVC	57+517.50	1699.687	1.010%	PVT	57+562.50	1699.95	0.190%	45.00	Parabola
PVT	57+562.50	1699.957	0.190%	PVC	57+970.00	1700.73	0.190%	407.50	Linear
PVC	57+970.00	1700.734	0.190%	PVT	58+030.00	1701.22	1.440%	60.00	Parabola
PVT	58+030.00	1701.224	1.440%	PVC	58+510.00	1708.14	1.440%	480.00	Linear
PVC	58+510.00	1708.146	1.440%	PVT	58+770.00	1705.501	-3.480%	260.00	Parabola
PVT	58+770.00	1705.501	-3.480%	PVC	58+905.00	1700.80	-3.480%	135.00	Linear
PVC	58+905.00	1700.806	-3.480%	PVT	59+015.00	1698.32	-1.030%	110.00	Parabola
PVT	59+015.00	1698.326	-1.030%	PVC	59+274.00	1695.651	-1.030%	259.00	Linear
PVC	59+274.00	1695.651	-1.030%	PVT	59+326.00	1694.85	-2.030%	52.00	Parabola
PVT	59+326.00	1694.855	-2.030%	PVC	59+520.00	1690.92	-2.030%	194.00	Linear
PVC	59+520.00	1690.925	-2.030%	PVT	59+580.00	1690.09	-0.730%	60.00	Parabola
PVT	59+580.00	1690.099	-0.730%	PVC	59+985.00	1687.15	-0.730%	405.00	Linear
PVC	59+985.00	1687.154	-0.730%	PVT	60+015.00	1686.86	-1.230%	30.00	Parabola
PVT	60+015.00	1686.860	-1.230%	PVI	60+200.00	1684.57	-1.230%	185.00	Linear
PVI	60+200.00	1684.576	-0.870%	PVI	60+500.00	1681.95	-0.870%	300.00	Linear
PVI	60+500.00	1681.955	-0.090%	POE	60+846.00	1681.62	-0.090%	346.00	Linear

PROJECT: N105(1)2&4
VERTICAL ALIGNMENT TABLE

POB	0+006.300	1685.005	-0.150%	POE	0+366.000	1684.465	-0.150%	359.70	Linear
POB	0+006.30	1685.005	-0.110%	PVC	0+345.00	1684.626	-0.110%	338.70	Linear
PVC	0+345.00	1684.626	-0.110%	PVT	0+375.00	1684.027	-3.880%	30.00	Parabola
PVT	0+375.00	1684.027	-3.880%	PVC	0+457.50	1680.822	-3.880%	82.50	Linear
PVC	0+457.50	1680.822	-3.880%	PVT	0+502.50	1679.877	-0.320%	45.00	Parabola
PVT	0+502.50	1679.877	-0.320%	POE	0+610.00	1679.536	-0.320%	107.50	Linear

PROJECT: N7(2-3)2&4
VERTICAL ALIGNMENT TABLE

POB	2+474.899	1679.397	2.320%	POE	2+844.135	1681.62	2.320%	96.24	Linear
POB	2+904.135	1681.628	-0.850%	POE	2+971.652	1681.05	-0.850%	67.52	Linear

PROJECT: N27(2-3)1,2&4
SUPERELEVATION TABLE

Station	Lt Rate	Rt Rate	Point Type
CURVE 6			
53+378.593	-2.00%	-2.00%	Runout
53+394.843	0.00%	-2.00%	Runoff
53+411.093	2.00%	-2.00%	Reverse Crown
53+459.843	8.00%	-8.00%	Full Super
53+527.979	8.00%	-8.00%	Full Super
53+576.729	2.00%	-2.00%	Reverse Crown
53+592.979	0.00%	-2.00%	Runoff
53+609.229	-2.00%	-2.00%	Runout
CURVE 7			
54+317.096	-2.00%	-2.00%	Runout
54+333.346	-2.00%	0.00%	Runoff
54+349.596	-2.00%	2.00%	Reverse Crown
54+398.346	-8.00%	8.00%	Full Super
54+491.904	-8.00%	8.00%	Full Super
54+540.654	-2.00%	2.00%	Reverse Crown
54+556.904	-2.00%	0.00%	Runoff
54+573.154	-2.00%	-2.00%	Runout
CURVE 8			
56+316.290	-2.00%	-2.00%	Runout
56+332.761	-2.00%	0.00%	Runoff
56+349.231	-2.00%	2.00%	Reverse Crown
56+360.761	-3.40%	3.40%	Full Super
56+455.333	-3.40%	3.40%	Full Super
56+466.862	-2.00%	2.00%	Reverse Crown
56+483.333	-2.00%	0.00%	Runoff
56+499.803	-2.00%	-2.00%	Runout
CURVE 9			
57+808.422	-2.00%	-2.00%	Runout
57+824.893	0.00%	-2.00%	Runoff
57+841.364	2.00%	-2.00%	Reverse Crown
57+852.893	3.40%	-3.40%	Full Super
57+947.132	3.40%	-3.40%	Full Super
57+958.662	2.00%	-2.00%	Reverse Crown
57+975.132	0.00%	-2.00%	Runoff
57+991.603	-2.00%	-2.00%	Runout

PROJECT: N27(2-3)1,2&4
SUPERELEVATION TABLE

CURVE 10			
58+912.061	-2.00%	-2.00%	Runout
58+928.268	-2.00%	0.00%	Runoff
58+944.475	-2.00%	2.00%	Reverse Crown
58+975.268	-5.80%	5.80%	Full Super
59+046.174	-5.80%	5.80%	Full Super
59+076.968	-2.00%	2.00%	Reverse Crown
59+093.174	-2.00%	0.00%	Runoff
59+109.381	-2.00%	-2.00%	Runout
CURVE 11			
59+413.012	-2.00%	-2.00%	Runout
59+429.219	0.00%	-2.00%	Runoff
59+445.426	2.00%	-2.00%	Reverse Crown
59+476.219	5.80%	-5.80%	Full Super
59+625.730	5.80%	-5.80%	Full Super
59+656.523	2.00%	-2.00%	Reverse Crown
59+672.730	0.00%	-2.00%	Runoff
59+688.937	-2.00%	-2.00%	Runout

PROJECT: N105(1)2&4
SUPERELEVATION TABLE

Station	Lt Rate	Rt Rate	Point Type
CURVE 1			
0+424.806	-2.00%	-2.00%	Runout
0+435.806	0.00%	-2.00%	Runoff
0+446.806	2.00%	-2.00%	Reverse Crown
0+468.806	6.00%	-6.00%	Full Super
0+563.622	6.00%	-6.00%	Full Super
0+585.622	2.00%	-2.00%	Reverse Crown
0+596.622	0.00%	-2.00%	Runoff
0+607.622	-2.00%	-2.00%	Runout

N27 (2-2)(2-3) CONTROL POINTS

Point	Northing	Easting	Elev.	Feature	Remarks
262	564,096.465	268,481.587	1,713.789	SCP 262	Rebar w/cap
263	564,244.771	268,550.320	1,708.988	SCP 263	Rebar w/cap
264	564,407.289	268,530.089	1,706.533	SCP 264	Rebar w/cap
265	564,531.329	268,637.498	1,705.358	SCP 265	Rebar w/cap
266	564,586.629	268,569.143	1,706.133	SCP 265A	Rebar w/cap
267	564,701.346	268,629.416	1,703.667	SCP 266	Rebar w/cap
268	564,668.252	268,686.028	1,706.621	SCP 266A	Rebar w/cap
269	564,820.277	268,737.619	1,705.828	SCP 267	Rebar w/cap
270	564,983.749	268,729.133	1,704.589	SCP 268	Rebar w/cap
271	565,112.549	268,833.244	1,703.660	SCP 269	Rebar w/cap
272	565,290.373	268,783.252	1,701.862	SCP 270	Rebar w/cap
273	565,423.569	268,854.390	1,700.925	SCP 271	Rebar w/cap
274	565,573.612	268,787.625	1,699.587	SCP 272	Rebar w/cap
275	565,728.445	268,843.063	1,698.854	SCP 273	Rebar w/cap
276	565,882.499	268,765.747	1,697.637	SCP 274	Rebar w/cap
277	566,032.772	268,831.782	1,696.587	SCP 275	Rebar w/cap
278	566,182.941	268,764.999	1,695.539	SCP 276	Rebar w/cap
279	566,337.893	268,820.347	1,695.934	SCP 277	Rebar w/cap
280	566,412.428	268,756.453	1,693.655	SCP 278	Rebar w/cap
281	566,572.057	268,813.919	1,693.836	SCP 279	Rebar w/cap
282	566,640.565	268,747.816	1,693.031	SCP 280	Rebar w/cap
283	566,795.918	268,803.228	1,691.988	SCP 281	Rebar w/cap
284	566,944.779	268,736.680	1,691.064	SCP 282	Rebar w/cap
285	567,098.955	268,792.147	1,691.418	SCP 283	Rebar w/cap
286	567,246.614	268,717.979	1,691.845	SCP 284	Rebar w/cap
287	567,406.049	268,761.755	1,693.456	SCP 285	Rebar w/cap
288	567,549.996	268,684.457	1,693.385	SCP 286	Rebar w/cap
289	567,708.596	268,727.955	1,693.976	SCP 287	Rebar w/cap
290	567,852.964	268,650.418	1,694.820	SCP 288	Rebar w/cap
291	568,009.665	268,694.438	1,696.816	SCP 289	Rebar w/cap
292	568,155.767	268,616.659	1,699.833	SCP 290	Rebar w/cap
293	568,314.406	268,660.569	1,699.568	SCP 291	Rebar w/cap
294	568,458.496	268,582.753	1,702.598	SCP 292	Rebar w/cap
295	568,615.226	268,627.284	1,701.657	SCP 293	Rebar w/cap
296	568,761.933	268,548.915	1,700.929	SCP 294	Rebar w/cap
297	568,915.576	268,628.920	1,704.268	SCP 295	Rebar w/cap
298	569,063.963	268,515.283	1,708.033	SCP 296	Rebar w/cap
299	569,234.318	268,608.066	1,709.091	SCP 297	Rebar w/cap
300	569,314.661	268,534.456	1,713.847	SCP 298	Rebar w/cap
301	569,528.390	268,607.252	1,711.667	SCP 299	Rebar w/cap
302	569,666.645	268,512.151	1,698.937	SCP 300	Rebar w/cap
303	569,826.305	268,571.970	1,699.306	SCP 301	Rebar w/cap
304	569,975.263	268,417.982	1,692.336	SCP 302	Rebar w/cap
305	570,084.299	268,566.677	1,696.112	SCP 303	Rebar w/cap
306	570,263.773	268,396.380	1,693.387	SCP 304	Rebar w/cap
307	570,433.172	268,498.420	1,688.153	SCP 305	Rebar w/cap
308	570,587.975	268,447.172	1,686.138	SCP 306	Rebar w/cap
309	570,717.099	268,525.251	1,687.140	SCP 307	Rebar w/cap
310	570,890.996	268,465.848	1,683.830	SCP 308	Rebar w/cap
311	570,983.454	268,513.251	1,683.335	SCP 309	Rebar w/cap

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

SUPERELEVATION, HORIZONTAL, AND VERTICAL ALIGNMENT TABLES

DRAWN BY: NRDOT DATE: 11/4/2013
DESIGNED BY: NRDOT DATE: 11/4/2013
REVISED: 9/22/2017 BY: Gerald.Hood
Sht 06 N27 AlignTbl.dgn

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 06 N27 AlignTbl.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
REGION	STATE	NAVAJO	N27	N27(2-3)1,2&4	7	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

ESTIMATED QUANTITIES: N27(2-3), N27(4-2), N7(2-3), N105(1) & N7(1)

ITEM	DESCRIPTION	N27(2-3)/Bridge Qty	N27(4-2) Qty	N7(2-3) Qty	N105(1) Qty	N7(1) Qty	Total Qty	Units
10901-0000	Extra & Miscellaneous Work Under Section 109.02(m)	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	Lump Sum
15201-0000	Construction survey and staking	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum
15301-0020	Contractor Quality Control	5,800.00	200.00	200.00	100.00	100.00	6,400.00	Man Hr
15701-0000	Temporary Erosion Control	All Required	All Required	All Required	All Required		All Required	Lump Sum
15708-1000	Temporary Straw Mulching	16.64	0.33	0.20	0.44		17.61	ha
20102-0000	Clearing and Grubbing	All Required	All Required	All Required	All Required		All Required	Lump Sum
20304-1000	Removal of Structures & Obstructions	All Required	All Required	All Required	All Required		All Required	Lump Sum
20401-0000	Roadway Excavation	192,036.00	2,069.00	302.00	4,202.00		198,609.00	m^3
20425-2000	Furrow Ditches	300.00					300.00	m
20443-1000	Earthen dike & berms, type A	100.00					100.00	m
20443-2000	Earthen dike & berms, type B	50.00					50.00	m
20601-0000	Development of Water Supply	29.96	3.03	3.05	2.21		38.25	M-Liter
21101-2000	Roadway obliteration, method 2	38,500.00					38,500.00	m^2
21301-4000	Subgrade Stabilization with RoadBond EN-1, 152mm depth	75,556.00					75,556.00	m^2
25101-2000	Placed Riprap, Class 2	216.74	99.49	24.88	16.59		357.70	m^3
25101-3000	Placed Riprap, Class 3	70.53					70.53	m^3
25112-2000	Wire enclosed Riprap, Class 2	1,123.45		0.00	27.46		1,150.91	m^3
25327-1000	CC20; Articulated Concrete Revetment Mat, 64mm depth				500.00		500.00	m^2
25327-1020	CC45; Articulated Concrete Revetment Mat, 140mm depth		5,001.00				5,001.00	m^2
30101-2000	Untreated Aggregate Base, Grade "Special"	47,479.00	3,782.00	2,031.00	2,575.00		55,867.00	t
40201-0500	Hot Asphaltic Concrete Pavement, Class B, Grade "B"	12,069.68	2,041.00	1,224.00	1,245.00		16,579.68	t
40502-0800	Asphalt Cement, Grade PG 58-28	724.18	123.00	74.00	75.00		996.18	t
40802-0902	Cold Recycled Asphalt Base Course, various Thickness		4,460.41	2,302.48	2,099.98		8,862.87	t
41101-5000	Asphalt Prime Coat, Penetrating Emulsified Prime- PEP	100.02	11.79	5.64	9.70		127.15	t
41201-1000	Asphalt Tack Coat, Grade SS-1	15.63	1.98	0.95	1.59		20.15	t
41301-0000	Asphalt Milling, 203 mm depth for N105(1) and 356 mm depth for N27(4-2) & N7(2-3)		5,807.32	3,275.70	2,604.20		11,687.22	m^2
55201-0200	Structural Concrete Class A(AE)	32.00					32.00	m^3
55207-0000	Repair Concrete, Epoxy Injection and Patching	All Required					All Required	Lump Sum
55210-0000	Seal Concrete surface	366.00					366.00	m^2
55401-2000	Epoxy Coated, Reinforcing Steel, grade 420	2,928.00					2,928.00	kg
60101-0000	Minor Concrete Class A(AE)	189.74	70.97	160.00	28.31		449.02	m^3
60101-1000	Concrete, Truck Apron, Class A(AE) rough broom finish on PCCP brown colored with Chevron (38 each) symbol.			106.84			106.84	m^2
60201-0810	610 mm Corrugated Steel Pipe Culvert- Aluminized	289.26					289.26	m
60201-0910	762 mm Corrugated Steel Pipe Culvert- Aluminized	40.84					40.84	m
60201-1010	914 mm Corrugated Steel Pipe Culvert- Aluminized	17.07					17.07	m
60201-1810	2134 mm Corrugated Steel Pipe Culvert- Aluminized	97.54					97.54	m
60202-0510	711mm x 508mm Corrugated Steel Pipe Arch- Aluminized		147.72	30.48			178.20	m
60202-0610	889mm x 610mm Corrugated Steel Pipe Arch- Aluminized	146.30					146.30	m
60202-0710	1067mm x 737mm Corrugated Steel Pipe Arch- Aluminized	99.98					99.98	m
60202-0910	1448mm x 965mm Corrugated Steel Pipe Arch- Aluminized	54.86					54.86	m
60202-1010	1626mm x 1092mm Corrugated Steel Pipe Arch- Aluminized	59.21					59.21	m
60202-1110	1803mm x 1194mm Corrugated Steel Pipe Arch- Aluminized				54.84		54.84	m
60202-5010	2235mm x 1372mm Reinforced Concrete Pipe-Arch		242.12				242.12	m
60210-0810	End Section for 610 mm Pipe Culvert- Aluminized	41					41	Each
60210-0910	End Section for 762 mm Pipe Culvert- Aluminized	8					8	Each
60210-1010	End Section for 914 mm Pipe Culvert- Aluminized	4					4	Each
60211-0910	End Section for 711mm x 508mm CSPA - Aluminized		16	4			20	Each
60211-1010	End Section for 889mm x 610mm CSPA - Aluminized	6					6	Each
60211-1110	End Section for 1067mm x 737mm CSPA - Aluminized	8					8	Each
60211-1310	End Section for 1448mm x 965mm CSPA - Aluminized	2					2	Each
60212-5010	Elbow, 2235mm x 1372mm Reinforced Concrete Pipe-Arch		8				8	Each
60222-2000	2.44m span x 2.44m rise precastCBC, 2-barrel w/wingwalls & concrete apron	34.140					34.14	m
60224-2000	2.44m span x 2.44m rise precastCBC, 4-barrel w/wingwalls & concrete apron	31.700					31.70	m
60401-0000	Manhole Installation			2			2	Each
60701-1000	Removing, Cleaning, Stockpiling CSPC	73.98	267.73	66.68	24.42		432.81	m
60812-0300	Concrete Spillway, Type 3		14	9	6		29	Each
60812-0400	Concrete Spillway, Type IV-1, for concrete curb	4					4	Each
60902-1000	Curb & gutter, concrete, 305mm depth		1,470.62	575.70	752.12	134.56	2,933.00	m
61501-0100	Sidewalk, concrete, 1.22m width		1,668.83	610.18	913.29	157.95	3,350.25	m^2
61502-1000	Drive pad, concrete			3			3	Each
61505-1000	Handicap ramp, concrete w/ Tactile ADA PAD		19	4	8	2	33	Each
61701-5000	Guardrail System, SGR04b, Type PDE02 w/ SKT-350 end treatment	547.02					547.02	m
61707-0000	Structure Transition Railing	31.00					31.00	m
61801-0000	Concrete jersey barrier	97.58					97.58	m
61901-1000	Fence, 5-strand barbed wire	14,024.16			579.52		14,603.68	m
61903-0310	Cattle guard, 4900 mm with gate	19					19	Each
61903-0710	Cattle guard, 7190 mm with gate	5			1		6	Each
61903-1010	Cattle guard, 9480 mm with gate			1			1	Each
61903-1210	Cattle guard, 11770 mm with gate				1		1	Each
61921-1000	Remove and reset fence		1,300.43	65.37	333.01		1,698.81	m
62101-0000	Right-of-way monument	43	12	12			67	Each
62102-0000	Reference Marker	43	12	12			67	Each
62510-1000	Seeding, Dry Method	16.64	0.33	0.20	0.44		17.61	ha
62901-1100	Rolled erosion control product, Type IV	10,768.00					10,768.00	m^2
63302-2001	Sign Installation, 1 Post - 38mm x 38mm square steel tube		0.35		3.63		3.98	m^2
63302-2002	Sign Installation, 1 Post - 44mm x 44mm square steel tube	16.01	5.71	0.93	7.15	0.92	30.72	m^2
63302-2003	Sign Installation, 1 Post - 50mm x 50mm square steel tube		4.48				4.48	m^2
63302-2006	Sign Installation, 2 Post - 50mm x 50mm square steel tube	1.55	13.13	10.27	0.84		25.79	m^2
63302-2007	Sign Installation, 2 Post - 57mm x 57mm square steel tube		2.74	3.07	1.60	7.68	15.09	m^2
63308-2000	Object Marker, type 2, 38mm x 38mm steel square tube	16					16	Each
63308-3010	Object Marker, type 3, 38mm x 38mm steel square tube	4					4	Each
63309-0030	Delineator, type "1a", 38mm x 38mm steel square tube	8					8	Each
63309-0040	Delineator, type "1b", 38mm x 38mm steel square tube	50					50	Each
63318-1020	Milepost marker, 38mm x 38mm steel square tube	10					10	Each
63401-1510	Pavement Markings, Type "H", Solid Yellow, 102mm	2,028.33	1,329.67	304.90	1,301.24	7,143.85	12,107.99	m
63401-1520	Pavement Markings, Type "H", Solid White, 102mm	13,172.24		128.18	545.40	149.66	13,995.48	m
63401-1610	Pavement Markings, Type "H", Broken Yellow, 102mm	7,257.00	1,314.55		478.98	1,122.79	10,173.32	m
63401-1620	Pavement Markings, Type "H", Broken White, 102mm			180.28		7,222.82	7,403.10	m
63401-1621	Pavement Markings, Type "H", Broken White, 203mm			82.03			82.03	m
63401-1622	Pavement Markings, Type "H", Broken White, 457mm			36.27			36.27	m
63405-2900	Pavement Markings, Type "H", turn arrow	3	20		8	22	53	Each
63405-2950	Pavement Markings, Type "H", straight arrow			4			4	Each
63405-3000	Pavement Markings, Type "H", straight/turn arrow combination	4		8			12	Each
63405-3050	Pavement Markings, Type "H", "ONLY" word message	1			2	3	6	Each
63405-3260	Pavement Markings, Type "H", "STOP" bar, solid white	6	9	2	4	10	31	Each
63405-3280	Pavement Markings, Type "H", zebra crosswalk, solid white		1	2		7	10	Each
63405-3290	Pavement Markings, Type "H", Diagonal striping, solid yellow	2			2		4	Each
63502-3000	Raised Pavement Markers, type MS200 "solarmarkers" Yellow Flashing with shaft			96			96	Each
63501-0000	Temporary Traffic Control	All Required	All Required	All Required	All Required	All Required	All Required	Lump Sum
63502-3000	Temporary traffic control, Raised Pavement Marker	3,051	303	144	268	3,555	7,321	Each
63509-1000	Flagger	6,020.00	160.00	120.00	120.00	80.00	6,500.00	Man Hr
63600-1100	Pedestrian Crossing LED Programable Flashing Beacon, Solar Powered					2	2	Each
63612-1300	Luminaire, Solar led street light with 9.14m pole			5			5	Each
63621-1000	Utility box, pullbox			1			1	Each

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

ESTIMATED QUANTITY
TABLES-SHEET 1

DRAWN BY: NRDOT	DATE: 3/21/2014
DESIGNED BY: NRDOT	DATE: 3/21/2014
REVISED: 12/18/2014	BY: Leroy.Toledo
Sht 07 N27 QtyTbls_1 rev 081417.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 07 N27 QtyTbls_1 rev 081417.dgn

PROJECT: N27(2-3), N27(4-2). N7(1)(2-3), & N105(1)

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	8	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

N27(2-3)1,2&4
20304-1000: REMOVAL OF STRUCTURES AND OBSTRUCTIONS

STATION	LOCATION	REMARKS
53+799.50 - 53+818.50	Lt.	Remove Existing W-Beam Guardrail At Existing Bridge Approach--South
53+787.85 - 53+818.50	Rt.	Remove Existing W-Beam Guardrail At Existing Bridge Approach--South
53+873.18 - 53+904.02	Lt.	Remove Existing W-Beam Guardrail At Existing Bridge Approach--North
53+873.18 - 53+885.07	Rt.	Remove Existing W-Beam Guardrail At Existing Bridge Approach--North
56+454.00	CL	Remove Existing 2-2.44 m x 2.44m Barrel CBC.

N27(4-2)2&4
20304-1000: REMOVAL OF STRUCTURES AND OBSTRUCTIONS

STATION and LOCATION		REMARKS
60+159.99 (-13.19 m) - 60+208.00 (-11.29 m)		Remove Existing Curb, Gutter, & Sidewalk- Left Side
60+219.95 (-12.13 m) - 60+433.41 (-11.06 m)		Remove Existing Curb, Gutter, & Sidewalk- Left Side
60+445.33 (-12.04 m) - 60+564.58 (-11.57 m)		Remove Existing Curb, Gutter, & Sidewalk- Left Side
60+576.56 (-11.60 m) - 60+698.27 (-14.97 m)		Remove Existing Curb, Gutter, & Sidewalk- Left Side
60+710.20 (-14.95 m) - 60+872.38 (-7.27 m)		Remove Existing Curb, Gutter, & Sidewalk- Left Side
60+175.90 (13.27 m) - 60+371.08 (12.36 m)		Remove Existing Curb, Gutter, & Sidewalk- Right Side
60+383.10 (12.15 m) - 60+452.55 (11.24 m)		Remove Existing Curb, Gutter, & Sidewalk- Right Side
60+464.47 (10.70 m) - 60+508.26 (12.74 m)		Remove Existing Curb, Gutter, & Sidewalk- Right Side
60+517.93 (12.89 m) - 60+711.56 (12.59 m)		Remove Existing Curb, Gutter, & Sidewalk- Right Side
60+721.23 (13.32 m) - 60+854.32 (16.50 m)		Remove Existing Curb, Gutter, & Sidewalk- Right Side
STATION	LOCATION	REMARKS
60+213.99	Lt.	Remove Existing Cattleguard w/Wing Brace
60+376.99	Rt.	Remove Existing Cattleguard w/Wing Brace
60+439.40	Lt.	Remove Existing Cattleguard w/Wing Brace
60+458.23	Rt.	Remove Existing Concrete Headwall & Existing Cattleguard w/Wing Brace
60+513.70	Rt.	Remove Existing Concrete Headwall & Existing Cattleguard w/Wing Brace
60+550.00	Rt.	Remove Existing Concrete Headwall.& Existing Cattleguard w/Wing Brace
60+570.80	Lt.	Remove Existing Cattleguard w/Wing Brace
60+704.23	Lt.	Remove Existing Cattleguard w/Wing Brace
60+716.35	Rt.	Remove Existing Concrete Headwalls.
60+861.44	CL	Remove Existing Concrete Headwalls.
60+844.40	Lt. & Rt.	Remove Existing Concrete Spillway @ Sidewalk

N7(2-3)2&4
20304-1000: REMOVAL OF STRUCTURES AND OBSTRUCTIONS

STATION AND LOCATION		REMARKS
2+747.90 (-7.92 m) - 2+971.65 (-7.94 m)		Remove Existing Curb, Gutter, & Sidewalk- Left Side
2+747.90 (7.98 m) - 2+864.269 (12.19 m)		Remove Existing Curb, Gutter, & Sidewalk- Right Side
2+894.13 (12.19 m) - 2+971.65 (8.01 m)		Remove Existing Curb, Gutter, & Sidewalk- Right Side
STATION	LOCATION	REMARKS
2+800.57	Rt.	Remove Existing Concrete Headwall & Existing Cattleguard w/Wing Brace.
2+846.22	-16.50 m Lt.	Remove Existing Concrete Pad.

N27(2-3)1,2&4
ITEM No. 21101-2000: ROADWAY OBLITERATION - METHOD 2

STATION			LENGTH	LOCATION	AREA (m2)	REMARKS
54+340.00	To	55+480.00	1140	Left	15,960	Existing roadbed
57+530.00	To	58+360.00	850	Right	11,900	Existing roadbed
58+940.00	To	59+700.00	760	Left	10,640	Existing roadbed
				TOTAL	38,500	

N7(2-3)1,2&4
ITEM No. 63612-1300: Luminares, Solar LED Street Light w/8m Pole

STATION	OFFSET (m)	LOCATION	EACH	REMARKS
2+840.25	-17.15	Lt.	1	with 8 m Pole
2+841.22	17.96	Rt.	1	with 8 m Pole
2+874.14	0.00	CL	1	with 8 m Pole
2+905.06	-19.32	Lt.	1	with 8 m Pole
2+905.41	20.60	Rt.	1	with 8 m Pole
		TOTAL	5	

ITEM No. 61701-5000
GUARDRAIL SYSTEM, SGR04b, TYPE PDE02 w/SKT-350

STATION	To	STATION	LOCATION	* LENGTH (m)	DESCRIPTION	REMARKS
53+749.842	To	53+818.408	Right	68.566	1-15.24m STK-350 End Treatment & 7-7.62m Standard Guardrail Section, Bridge Structure Transition Railings Excluded	South; SKT-350 to Bridge Transition
53+780.322	To	53+818.408	Left	38.086	1-15.24m STK-350 End Treatment & 3-7.62m Standard Guardrail Section, Bridge Structure Transition Railings Excluded	South; SKT-350 to Bridge Transition
53+873.272	To	53+911.272	Right	38.086	1-15.24m STK-350 End Treatment & 3-7.62m Standard Guardrail Section, Bridge Structure Transition Railings Excluded	North; bridge transition to SKT-350
53+873.272	To	53+9451.838	Left	68.556	1-15.24m STK-350 End Treatment & 7-7.62m Standard Guardrail Section, Bridge Structure Transition Railings Excluded	North; bridge transition to SKT-350
55+739.551	To	55+790.788	Right	51.237	1-15.24m STK-350 End Treatment, 4-7.62m Standard Guardrail Section & 1 Thrie Beam Section	South; SKT-350 to Jersey barrier
55+782.051	To	55+802.808	Left	20.757	1-15.24m STK-350 End Treatment & 1 Thrie Beam Section	South; SKT-350 to Jersey barrier
55+815.184	To	55+835.941	Right	20.757	1-15.24m STK-350 End Treatment & 1 Thrie Beam Section	North; Jersey barrier to SKT-350
55+827.204	To	55+878.441	Left	51.237	1-15.24m STK-350 End Treatment, 4-7.62m Standard Guardrail Section & 1 Thrie Beam Section	North; Jersey barrier to SKT-350
56+394.966	To	56+438.766	Left	43.617	1-15.24m STK-350 End Treatment, 3-7.62m Standard Guardrail Section & 1 Thrie Beam Section	South; SKT-350 to Jersey barrier
56+402.358	To	56+445.803	Right	43.632	1-15.24m STK-350 End Treatment, 3-7.62m Standard Guardrail Section & 1 Thrie Beam Section	South; SKT-350 to Jersey barrier
56+463.263	To	56+499.279	Left	36.002	1-15.24m STK-350 End Treatment, 2-7.62m Standard Guardrail Section & 1 Thrie Beam Section	North; Jersey barrier to SKT-350
56+470.120	To	56+536.602	Right	66.482	1-15.24m STK-350 End Treatment, 6-7.62m Standard Guardrail Section & 1 Thrie Beam Section	North; Jersey barrier to SKT-350
			TOTAL	547.015		

* Note: Length given are Station-To-Station Length and does not reflect actual length of the railings & beams

ITEM No. 61801-0000
CONCRETE BARRIER

STATION	To	STATION	LOCATION	* LENGTH (m)	DESCRIPTION	REMARKS
55+802.808	To	55+827.204	Left	24.396	2-3.048m Tansiton Barrier and 3-6.096m Jersey Barriers	Guardrail Thrie-Beam excluded
55+790.788	To	55+815.184	Right	24.384	2-3.048m Tansiton Barrier and 3-6.096m Jersey Barriers	Guardrail Thrie-Beam excluded
56+438.766	To	56+463.263	Left	24.398	2-3.048m Tansiton Barrier and 3-6.096m Jersey Barriers	Guardrail Thrie-Beam excluded
56+445.803	To	56+470.120	Right	24.398	2-3.048m Tansiton Barrier and 3-6.096m Jersey Barriers	Guardrail Thrie-Beam excluded
			TOTAL	97.576		

* Note: Length given are Station-To-Station Length and does not reflect actual length of the barriers

ITEM No. 63308-3010
OBJECT MARKERS, TYPE 3

DESCRIPTION		Qty. (Ea.)	Type	REMARKS
Object Markers		4	3	38mm x 38mm Steel Square Tube

N27(2-3)1,2&4
ITEM No. 61903-0310:
CATTLEGUARD, 4900 mm (2-Unit) With TYPE 2 GATE

STATION	LOCATION	EACH	REMARKS
53+340.00	Rt.	1	4.50 m Turnout To Residence
53+510.00	Rt.	1	4.50 m Turnout To Residence
53+585.00	Lt.	1	4.50 m Turnout To Residence
53+709.00	Rt.	1	4.50 m Turnout To Residence
53+938.00	Rt.	1	4.50 m Turnout To Residence
53+955.00	Lt.	1	4.50 m Turnout To Residence
54+890.00	Lt.	1	4.50 m Turnout To Residence
55+673.00	Lt.	1	4.50 m Turnout To Residence
56+140.00	Rt.	1	4.50 m Turnout To Residence
56+713.00	Lt.	1	4.50 m Turnout To Residence
56+836.00	Lt.	1	4.50 m Turnout To Residence
57+153.00	Lt.	1	4.50 m Turnout To Residence
57+438.00	Lt.	1	4.50 m Turnout To Residence
58+586.00	Rt.	1	4.50 m Turnout To Residence
59+520.00	Lt.	1	4.50 m Turnout To Residence
59+752.00	Rt.	1	4.50 m Turnout To Residence
59+928.00	Lt.	1	4.50 m Turnout To Residence
60+058.00	Lt.	1	4.50 m Turnout To Residence
60+058.00	Rt.	1	4.50 m Turnout To Residence
60+138.00	Rt.	1	4.50 m Turnout To Residence
	TOTAL	19	

N27(2-3)1,2&4
ITEM No. 61903-0710:
CATTLEGUARD, 7190 mm (3-Unit) With TYPE 2 GATE

STATION	LOC.	EACH	REMARKS
54+120.00	Rt.	1	7.00 m Turnout To CR 461/ Bus Route
54+582.00	Lt.	1	7.00 m Turnout To Residence
54+582.00	Rt.	1	7.00 m Turnout To Residence
55+371.00	Lt.	1	7.00 m Turnout To Residence
58+283.00	Rt.	1	7.00 m Turnout To CR 520/ Fair Grounds
	TOTAL	5	

N7(2-3)2&4
ITEM No. 61903-1010:
CATTLEGUARD, 9480 mm (4-Unit) No GATE

STATION	LOC.	EACH	REMARKS
2+800.57	Rt.	1	9.00 Driveway
	TOTAL	1	

N105(1)2&4
ITEM No. 61903-0710:
CATTLEGUARD, 7190 mm (3-Unit) With TYPE 2 GATE

STATION	LOC.	EACH	REMARKS
0+265.00	Lt.	1	7.00 m Turnout To Residence
	TOTAL	1	

N105(1)2&4
ITEM No. 61903-1210:
CATTLEGUARD, 11770 mm (5-Unit) With TYPE 2 GATE

STATION	LOC.	EACH	REMARKS
0+610.00	CL	1	At End Of Project (EOP)
	TOTAL	1	

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ESTIMATED QUANTITY
TABLES-SHEET 2

DRAWN BY: NRDOT DATE: 5/5/2016
DESIGNED BY: NRDOT DATE: 5/5/2016
REVISED: 10/18/2016 BY: Gerald.Hood
Sht 08 N27 QtyTbls_2.dgn

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 08 N27 QtyTbls_2.dgn

PROJECTS: N27(4-2)2&4, N105(1)2&4 & N7(2-3)2&4

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	9	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

N27(4-2)2&4-Street
BID ITEM: 60902-1000 CURB & GUTTER, 300 mm Depth

LEFT SIDE						
Start Station	Location		End Station	Location	* Length (m)	Section
60+164.386	10.10 m Lt.	to	60+263.350	14.40 m Lt.	104.676	1
60+270.056	14.40 m Lt.	to	60+364.466	14.40 m Lt.	103.727	2
60+371.171	14.40 m Lt.	to	60+450.782	14.40 m Lt.	88.928	3
60+462.974	14.40 m Lt.	to	60+699.958	30.00 m Lt.	261.9	4
60+708.492	30.00 m Lt.	to	60+846.000	8.58 m Lt.	158.022	5
RIGHT SIDE						
60+157.227	5.40 m Rt.	to	60+166.227	14.40 m Rt.	13.66	6
60+175.227	14.40 m Rt.	to	60+372.488	14.40 m Rt.	206.58	7
60+381.488	14.40 m Rt.	to	60+453.977	14.40 m Rt.	81.81	8
60+462.977	14.40 m Rt.	to	60+546.500	14.40 m Rt.	92.84	9
60+553.500	14.40 m Rt.	to	60+712.845	20.00 m Rt.	174.26	10
60+719.845	20.00 m Rt.	to	60+846.000	14.27 m Rt.	138.88	11
				Sub-Total:	1425.27	
SPLITTER ISLAND ROLL CURB & GUTTER					Perimeter	Island
60+828.95	CL	to	60+837.95	CL	22.62	N27-C
60+841.01	CL	to	60+847.20	CL	22.73	N27-C
				Sub-Total:	45.35	
				Grand-Total:	1470.62	

* NOTE: Length Measured About CL of Curb & Gutter

N27(4-2)2&4-Street
BID ITEM: 61501-0100 SIDEWALK, CONCRETE

LEFT SIDE								
Start Station	Loc (m)		End Station	Loc (m)	Length (m)	Width (m)	Area (m^2)	Section
60+164.829	10.51 m Lt.	to	60+262.740	14.40 m Lt.	102.43	1.22	124.96	1
60+270.665	14.40 m Lt.	to	60+363.856	14.40 m Lt.	100.79	1.22	122.96	2
60+371.781	14.40 m Lt.	to	60+450.173	14.40 m Lt.	86.00	1.22	104.92	3
60+463.584	14.40 m Lt.	to	60+699.348	30.00 m Lt.	258.86	1.22	315.81	4
60+709.102	30.00 m Lt.	to	60+845.775	9.15 m Lt.	156.14	1.22	190.49	5
RIGHT SIDE								
60+175.836	14.40 m Rt.	to	60+371.878	14.40 m Rt.	203.57	1.22	248.36	6
60+382.097	14.40 m Rt.	to	60+453.368	14.40 m Rt.	78.88	1.22	96.24	7
60+463.587	14.40 m Rt.	to	60+545.890	14.40 m Rt.	89.91	1.22	109.69	8
60+554.110	14.40 m Rt.	to	60+712.235	20.00 m Rt.	171.28	1.22	208.96	9
60+720.455	20.00 m Rt.	to	60+845.488	14.60 m Rt.	136.44	1.22	166.45	10
						Total:	1688.83	

N27(4-2)2&4-Roundabout/Splitter Island
BID ITEM: 60101-1000 MINOR CONCRETE, CLASS A(AE)

SPLITTER ISLAND-South Approach (N7-C)								
Start Station	Loc		End Station	Loc	Area (m^2)	Island	Thickness (m)	Vol. (m^3)
60+828.95	CL	to	60+837.95	CL	25.10	N27-C	0.102	2.56
60+841.01	CL	to	60+847.20	CL	29.12	N27-C	0.102	2.97
				Grand-Total:	54.22			5.53

N105(1)2&4
BID ITEM: 60902-1000 CURB & GUTTER, 300mm Depth

LEFT SIDE						
Start Station	Loc (m)		End Station	Loc (m)	Length (m)	Section
0+006.44	-20.50	To	0+271.50	-14.40	278.86	1
0+278.50	-14.40	To	0+366.00	-5.40	92.64	2
				Sub-Total:	371.50	
RIGHT SIDE						
0+006.44	20.50	To	0+138.50	14.40	146.84	3
0+145.50	14.50	To	0+348.02	14.40	212.80	4
0+355.02	14.50	To	0+366.00	5.40	16.12	5
				Sub-Total:	375.76	
				Grand-Total:	747.26	

N105(1)2&4
BID ITEM: 61501-0100 SIDEWALK, CONCRETE

LEFT SIDE								
Start Station	Loc (m)		End Station	Loc (m)	Length (m)	Width (m)	Area (m^2)	Section
0+007.05	-20.50	To	0+270.89	-14.40	276.94	1.22	337.87	1
0+279.11	-14.40	To	0+366.00	-6.01	91.68	1.22	111.85	2
				Sub-Total:	368.62		449.72	
RIGHT SIDE								
0+007.05	20.50	To	0+137.89	14.40	144.92	1.22	176.80	3
0+146.11	14.40	To	0+347.41	14.40	210.88	1.22	257.27	4
0+355.63	14.40	To	0+366.00	6.01	15.16	1.22	18.50	5
				Sub-Total:	370.96		452.57	
				Grand-Total:	739.58		902.29	

N7(1)4
ITEM: 60902-1000 CURB & GUTTER, 300mm Depth

LEFT SIDE						
Start Station	Loc (m)		End Station	Loc (m)	Length (m)	Section
0+244.76	-22.86	To	0+253.76	-10.30	17.69	1
0+253.76	-10.30	To	0+296.94	-10.30	43.18	2
0+296.94	-10.30	To	0+305.94	-22.86	17.69	3
				Sub-Total:	78.56	
RIGHT SIDE						
0+250.00	10.30	To	0+284.40	10.30	34.40	1
0+284.41	10.30	To	0+300.42	22.86	21.60	2
				Sub-Total:	56.00	
				Grand-Total:	134.56	

N7(1)4
ITEM: 61501-0100 SIDEWALK, CONCRETE

LEFT SIDE								
Start Station	Loc (m)		End Station	Loc (m)	Length (m)	Width (m)	Area (m^2)	Section
0+245.37	-22.86	To	0+305.33	-22.86	74.73	1.22	91.17	1
				Sub-Total:	74.73		91.17	
RIGHT SIDE								
0+250.00	22.86	To	0+299.90	22.86	54.74	1.22	66.78	3
						Sub-Total:	66.78	
						Grand-Total:	157.95	

N7(2-3)2&4-Roundabout
BID ITEM: 60902-1000 ROLL CURB & GUTTER, 300 mm Depth

LEFT SIDE						
Start Station	Loc (m)		End Station	Loc (m)	Length (m)	Section
2+747.90	-7.20	to	2+971.78	-7.20	236.65	1
				Sub-Total:	236.65	
RIGHT SIDE						
2+747.90	7.20	to	2+894.24	48.54	159.65	2
----	---		=60+285.31 (N27)	=5.40 (N27)	---	---
2+906.38	46.66	to	2+971.77	7.20	106.00	3
=60+819.46 (N27)	=5.40 (N27)		---	---	---	---
				Sub-Total:	265.65	
SPLITTER ISLAND-Roll Curb & Gutter					Perimeter (m)	Splitter Is.
2+828.22	CL	to	2+835.11	CL	16.22	N7-A
2+838.14	CL	to	2+844.14	CL	20.86	N7-A
2+904.13	CL	to	2+910.14	CL	20.17	N7-B
2+913.14	CL	to	2+920.05	CL	16.15	N7-B
				Sub-Total:	73.40	
				Grand-Total:	575.70	

N7(2-3)2&4-Roundabout
BID ITEM: 61501-0100 SIDEWALK, CONCRETE

LEFT SIDE								
Start Station	Loc (m)		End Station	Loc (m)	Length (m)	Width (m)	Area (m^2)	Section
2+747.90	-7.81	to	2+971.78	-7.81	236.76	1.22	288.85	1
				Sub-Total:	236.76		288.85	
RIGHT SIDE								
2+747.90	7.81	to	2+893.75	48.91	159.08	1.22	194.08	2
---	---		=60+825.31 (N27)	=6.01 (N27)	---	---	---	---
2+906.86	46.29	to	2+971.77	7.81	104.31	1.22	127.26	3
=60+819.46 (N27)	=6.01(N27)		---	---	---	---	---	
				Sub-Total:	263.39		321.34	
				Grand-Total:	500.15		610.18	

N7(2-3)2&4-Roundabout/Splitter Island/Center Island
BID ITEM: 60101-1000 MINOR CONCRETE, CLASS A(AE)

SPLITTER ISLAND - West (N7-A) & East (N7-B) Approaches							
Start Station	Loc (m)		End Station	thickness (m)	Area (m^2)	Perimeter (m)	Vol. (m3)
2+828.22	CL	to	2+835.14	0.102	10.14	14.71	1.03
2+838.14	CL	to	2+844.14	0.102	24.71	19.48	2.52
2+904.13	CL	to	2+910.14	0.102	23.07	18.79	2.35
2+913.14	CL	to	2+920.05	0.102	9.98	14.64	1.02
				Sub-Total:	67.90	67.62	6.93
CENTER ISLAND - Interior (Dome)							
2+856.22	CL	to	2+892.05	0.102	1007.94	112.55	102.81
				Sub-Total:	1007.94	112.55	102.81
CENTER ISLAND - Outside Edge (Truck Apron)							
Start Station	Loc (m)		End Station	thickness (m)	Area (m^2)	Perimeter (m)	Vol. (m3)
2+853.75	CL	to	2+894.52	0.102	258.62	128.11	26.38
				Sub-Total:	258.62	128.11	26.38
CENTER ISLAND - Conc. Barrier Wall							
Start Station	Loc (m)		End Station		Sectional Area	Longitudinal	Vol. (m^3)
2+856.05	CL	to	2+892.22		0.210	113.63	23.86
				Sub-Total:	0.210	113.63	23.86
						Grand-Total:	159.98

40802-0902 COLD RECYCLE ASPHALT BASE COURSE VARIOUS mm THICKNESS

Project	STATION	TO	STATION	WIDTH (m)	LENGTH (m)	Thickness (mm)	AREA (m^2)	Unit Wt. (kg/m^3)	t	REMARKS
N105(1)	0+006.30	To	0+400.00	10.80	393.70	140	4,251.96	2,164.00	1,288.17	
N105(1)	0+400.00	To	0+610.00	12.76	210.00	140	2,679.60	2,164.00	811.81	
N7(2-3) West of Roundabou	2+747.90	To	2+844.14	14.40	96.24	280	1,385.86	2,164.00	839.72	
N7(2-3) Roundabout	0+000.00	To	0+160.22	9.00	160.22	280	1,441.98	2,164.00	873.72	
N7(2-3) East of Roundabou	2+904.14	To	2+971.65	14.40	67.51	280	972.14	2,164.00	589.04	
N27(4-2)	60+164.39	To	60+846.00	10.80	681.61	280	7,361.39	2,164.00	4,460.41	
						Total	18,092.93		8,862.88	

41301-0000 ASPHALT MILLING 356mm Depth

Project	STATION	TO	STATION	WIDTH (m)	LENGTH	Depth	AREA (m^2)	REMARKS
N105(1)	0+006.30	To	0+366.00	7.24	359.70	203	2,604.23	
N7(2-3)	2+747.90	To	2+971.65	14.64	223.75	356	3,275.70	
N27(4-2)	60+164.39	To	60+846.00	8.52	681.61	356	5,807.32	
						Total	11,687.25	

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

ESTIMATED QUANTITY
TABLES-SHEET 3

DRAWN BY: NRDOT DATE: 8/14/2017
DESIGNED BY: NRDOT DATE: 8/14/2017
REVISED: 8/15/2017 BY: Leroy.Toledo
Sht 09 N27 QtyTbls_3 REV 081417.dgn

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 09 N27 QtyTbls_3 REV 081417.dgn

PROJECTS: N27(2-3), N27(4-2), N7(1)(2-3), & N105(1)

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
REGION	STATE	RESERVATION	N27	N27(2-3)1,2&4	10	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

NEW TURNOUT LOCATIONS

N27(2-3)1,2&4

STATION	LOC.	DESCRIPTION	Remarks
53+340.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 14.630 m CSPC With End Section at Inlet & Outlet
53+510.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 14.630 m CSPC With End Section at Inlet & Outlet
53+585.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 15.850 m CSPC With End Section at Inlet & Outlet
53+709.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 12.802 m CSPC With End Section at Inlet & Outlet
53+938.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 17.069 m CSPC With End Section at Inlet & Outlet
53+938.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 17.069 m CSPC With End Section at Inlet & Outlet
54+120.00	Rt.	7.0 m Wide Turnout w/ 3 Unit CG & Type 2 Gate	Install 1-610 mm x 15.240 m CSPC With End Section at Inlet & Outlet
54+582.00	Rt.	7.0 m Wide Turnout w/ 3 Unit CG & Type 2 Gate	Install 1-610 mm x 14.630 m CSPC With End Section at Inlet & Outlet
54+582.00	Lt.	7.0 m Wide Turnout w/ 3 Unit CG & Type 2 Gate	Install 1-610 mm x 14.021 m CSPC With End Section at Inlet & Outlet
54+890.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 10.668 m CSPC With End Section at Inlet & Outlet
55+371.00	Lt.	7.0 m Wide Turnout w/ 3 Unit CG & Type 2 Gate	Install 1-610 mm x 14.630 m CSPC With End Section at Inlet & Outlet
55+673.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 8.534 m CSPC With End Section at Inlet & Outlet
56+140.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 28.651 m CSPC With End Section at Inlet & Outlet
56+713.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 22.555 m CSPC With End Section at Inlet & Outlet
56+836.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 18.288 m CSPC With End Section at Inlet & Outlet
57+153.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 9.754 m CSPC With End Section at Inlet & Outlet
57+438.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 16.459 m CSPC With End Section at Inlet & Outlet
58+020.00	Rt.	7.0 m Wide Turnout w/ 3 Unit CG & Type 2 Gate	Install 1-610 mm x 13.411 m CSPC With End Section at Inlet & Outlet
58+283.00	Rt.	7.0 m Wide Turnout w/ 3 Unit CG & Type 2 Gate	Install 1-610 mm x 18.288 m CSPC With End Section at Inlet & Outlet
58+586.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	No pipe
59+520.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 12.802 m CSPC With End Section at Inlet & Outlet
59+752.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	No pipe
59+928.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	No pipe
60+058.00	Lt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 10.973 m CSPC With End Section at Inlet & Outlet
60+058.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	Install 1-610 mm x 11.582 m CSPC With End Section at Inlet & Outlet
60+138.00	Rt.	4.5 m Wide Turnout w/ 2-Unit CG & Type 2 Gate	No pipe

N27(4-2)2&4

STATION	LOC.	DESCRIPTION	Remarks
60+170.73	Rt.	9.48 m Wide Turnout With Curb, Gutter & Sidewalk	No Cattleguard, Pipe & Gate Required
60+266.89	Lt.	6.71 m Wide Turnout With Curb, Gutter & Sidewalk	No Cattleguard, Pipe & Gate Required
60+367.98	Lt.	6.71 m Wide Turnout With Curb, Gutter & Sidewalk	No Cattleguard, Pipe & Gate Required
60+376.99	Rt.	9.00 m Wide Turnout With Curb, Gutter & Sidewalk	With New Pipe, Remove Existing Cattleguard, Wing Brace, & Pipe
60+457.01	Lt.	12.19 m Wide Turnout With Curb, Gutter & Sidewalk	No Cattleguard, Pipe & Gate Required
60+458.23	Rt.	9.00 m Wide Turnout With Curb, Gutter & Sidewalk	With New Pipe, Remove Existing Cattleguard, Wing Brace, Pipe & Concrete Headwall
60+550.00	Rt.	7.00 m Wide Turnout With Curb, Gutter & Sidewalk	With New Pipe, Remove Existing Cattleguard, Wing Brace, Pipe & Concrete Headwall
60+704.23	Lt.	9.48 m Wide Turnout With Curb, Gutter & Sidewalk	With New Pipe, Remove Existing Cattleguard, Wing Brace, & Pipe
60+716.35	Rt.	7.19 m Wide Turnout With Curb, Gutter & Sidewalk	With New Pipe, Remove Existing Cattleguard, Wing Brace, Pipe & Concrete Headwall

N7(2-3)2&4

STATION	LOC.	DESCRIPTION	Remarks
2+791.17	Lt.	9.0 m Wide Driveway	With New Pipe, No Cattleguard, Pipe & Gate Required
2+800.57	Rt.	9.0 m Wide Driveway	With New Pipe, No Cattleguard, Pipe & Gate Required, Remove Existing Pipe & Headwall
2+950.90	Lt.	9.0 m Wide Driveway	With New Pipe, No Cattleguard, Pipe & Gate Required

N105(1)2&4

STATION	LOC.	DESCRIPTION	Remarks
0+142.00	Rt.	7.0 m Wide Turnout	Entrance to Chinle Justice Center, No Cattleguard, Pipe & Gate Required
0+265.00	Lt.	7.0 m Wide Turnout With 3-Unit Cattleguard & Type 2 Gate	With New Pipe, Remove, Clean & Stockpile Existing Pipe
0+351.52	Rt.	7.0 m Wide Turnout	Entrance to NHA REnd Sectionidential Area, No Cattleguard, Pipe & Gate Required

ITEM: 60701-1000-REMOVE, CLEAN, SALVAGE & STOCKPILE EXISTING CULVERTS

STATION	LOCATION	DESCRIPTION	LENGTH (m)	REMARKS
N27(2-3)1,2&4 Mainline				
53+701.61	36.10 m Rt.	1-457 mm x 5.35 m CSP	5.35	Existing CSP, Inlet, Outlet Damaged
56+250.32	CL	1-1829 mm x 21.07 m CSP	21.07	Existing CSP, Patched Up 4m from Inlet
57+456.84	5.66 m Rt.	1-610 mm x 5.25 m CSP	5.25	Existing CSP, Inlet, Outlet damaged
59+957.77	CL	1-610 mm x 10.82 m CSP	10.82	Existing CSP, Inlet, Outlet damaged, Hole on top
60+059.21	10.20 m Rt.	1-610 mm x 6.49 m CSP	6.49	Existing CSP, Buried-Diameter Unknown
60+109.33	CL	1-610 mm x 10.61 m CSP	10.62	Existing CSP, Buried-Diameter Unknown
60+114.09	18.38 m Rt.	1-610 mm x 14.38 m CSP	14.38	Existing CSP, Good Condition
		Sub-Total	73.98	
N27(4-2)2&4 Street				
60+213.99	-8.27m Lt.	1-610 mm x 24.44 m CSP	24.44	Existing CSP
60+376.99	8.23m Rt.	1-762 mm 24.22 m CSP	24.22	Existing CSP
60+439.10	-8.73m Lt.	1-610 mm x 24.33 m CSP	24.33	Existing CSP
60+458.23	8.88m Rt.	2-889 mm S x 610 m R x 20.76 m CSPA	20.76	Existing 2-Barrel CSPA With Concrete Headwall At Inlet & Outlet
60+513.00	9.94m Rt.	2-889 mm S x 610 m R x 17.02 m CSPA	17.02	Existing 2-Barrel CSPA With Concrete Headwall At Inlet & Outlet
60+550.00	8.36m Rt.	2-889 mm S x 610 m R x 12.20 m CSPA	12.20	Existing 2-Barrel CSPA With Concrete Headwall At Inlet & Outlet
60+570.80	-8.33m Lt.	1-610 mm x 24.35 m CSP	24.35	Existing CSP
60+648.05	-8.10m Lt.	1-610 mm x 12.08 m CSP	12.08	Existing CSP
60+704.23	-8.06m Lt.	1-610 mm x 31.09 m CSP	31.09	Existing CSP
60+716.35	8.36m Rt.	2-889 mm S x 610 m R x 21.92 m CSPA	21.92	Existing 2-Barrel CSPA With Concrete Headwall At Inlet & Outlet
60+860.33	CL	1-1067 mm S x 737 m R x 27.00 m CSPA	27.00	Existing CSPA With Concrete Headwall At Inlet & Outlet
60+862.57	CL	1-1067 mm S x 737 m R x 28.32 m CSPA	28.32	Existing CSPA With Concrete Headwall At Inlet & Outlet
		Sub-Total	267.72	
N7(2-3)1,2&4 Street				
2+791.33	-11.22m Lt.	1-889 mm x 610 mm x 14.64m CSPA	14.64	Existing CSPA
2+800.79	10.60m Rt.	2-889 mm x 610 mm x 15.38m CSPA	15.38	Existing 2-Barrel CSPA With Concrete Headwall At Inlet & Outlet
2+817.23	-11.37m Lt.	1-889 mm x 610 mm x 9.11m CSPA	9.11	Existing CSPA
2+872.80	-11.39m Lt.	1-889 mm x 610 mm x 11.14m CSPA	11.14	Existing CSPA
2+925.10	-11.22m Lt.	Existing CSP (Size Unknown)	12.16	Existing CSP
2+929.05	11.41m Rt.	Existing CSP (Size Unknown)	4.26	Existing CSP
		Sub-Total	66.68	
N105(1)2&4				
0+272.89	34.97 m Lt.	1-1829 mm x 12.16 m CSP	12.16	Existing CSP
0+317.17	CL	1-762 mm x 12.26 m CSP	12.26	Existing CSP
		Sub-Total	24.42	
		Grand Total	432.80	

N27(2-3)1,2&4 EXISTING UTILITY LINES

STATION	LOCATION	DESCRIPTION	REMARKS
53+606.84	C/L	Existing Powerline X-ing	Protect-in-Place
53+681.18	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
54+689.86	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
54+726.82	C/L	Existing Powerline X-ing	Protect-in-Place
55+263.74	C/L	Existing 102 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
55+386.21	C/L	Existing Powerline X-ing	Protect-in-Place
57+551.09	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
59+883.05	C/L	Existing Powerline X-ing	To Be Raised By Owner
59+883.17	C/L	Existing Telephone Line X-ing	To Be Raised By Owner
59+884.53	17.10 m Rt.	Existing Power Pole	To be relocated by Owner
59+939.89	14.65 m Rt.	Existing Power Pole	To be relocated by Owner
60+000.91	11.72 m Rt.	Existing Power Pole	To be relocated by Owner
60+008.38	C/L	Existing 102 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
60+123.33	11.56 m Rt.	Existing Power Pole	To be relocated by Owner
60+164.33	11.74 m Rt.	Existing Power Pole	To be relocated by Owner
60+166.24	C/L	Existing 102 mm High Pressure Gasline X-ing	To Be Lowered By Owner
60+164.55	C/L	Existing Powerline X-ing	Protect-in-Place

N27(4-2)2&4 EXISTING UTILITY LINES

STATION	LOCATION	DESCRIPTION	REMARKS
53+606.84	C/L	Existing Powerline X-ing	Protect-in-Place
53+681.18	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
54+689.86	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
54+726.82	C/L	Existing Powerline X-ing	Protect-in-Place
55+263.74	C/L	Existing 102 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
55+386.21	C/L	Existing Powerline X-ing	Protect-in-Place
57+551.09	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
59+883.05	C/L	Existing Powerline X-ing	To Be Raised By Owner
59+883.17	C/L	Existing Telephone Line X-ing	To Be Raised By Owner
59+884.53	17.10 m Rt.	Existing Power Pole	To be relocated by Owner
59+939.89	14.65 m Rt.	Existing Power Pole	To be relocated by Owner
60+000.91	11.72 m Rt.	Existing Power Pole	To be relocated by Owner

N105(1)2&4 EXISTING UTILITY LINES

STATION	LOCATION	DESCRIPTION	REMARKS
53+606.84	C/L	Existing Powerline X-ing	Protect-in-Place
53+681.18	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
54+689.86	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
54+726.82	C/L	Existing Powerline X-ing	Protect-in-Place
55+263.74	C/L	Existing 102 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place
55+386.21	C/L	Existing Powerline X-ing	Protect-in-Place
57+551.09	C/L	Existing 152 mm Waterline X-ing	With 355 mm Diam. Steel Casing, Protect-in-Place

NOTE: Protection/Relocate REMARKS are assumed and based on the Best The Actual Work Required/Performed By The Utility Owner May Vary.

N27(2-3)1,2&4 EARTHWORK QUANTITY

Sta. to Sta.	Cut (m^3)	Fill (m^3)	Borrow (m^3)	Waste (m^3)
53+300.000 to 56+301.946	68,427.00	68,427.00	0.00	0.00
56+301.946 to 58+059.458	54,803.00	54,803.00	0.00	0.00
58+059.458 to 60+164.380	67,206.00	23,508.00	0.00	43,698.00
Turnouts	1,600.00	7,080.00	5,480.00	0.00
Sub-Total:	192,036.00	153,818.00	5,480.00	43,698.00

N27(4-2)2&4 EARTHWORK QUANTITY

Sta. to Sta.	Cut (m^3)	Fill (m^3)	Borrow (m^3)	Waste (m^3)
60+164.38 to 60+846.00	5.00	12,464.00	12,459.00	0.00
Plus Existing Pavement Milling, 356 mm Depth	0.00	2,117.00	2,117.00	0.00
Open Channel EW (0+141.064 to 0+550.00)	2,064.00	3,567.00	1,503.00	0.00
Minus Roadway Component Volume (HACP, ABC, CRABC, Curb, Gutter	0.00	-5,051.00	-5,051.00	0.00
Sub-Total:	2,069.00	13,097.00	11,028.00	0.00

N105(1)2&4 EARTHWORK QUANTITY

Sta. to Sta.	Cut (m^3)	Fill (m^3)	Borrow (m^3)	Waste (m^3)
0+006.440 to 0+366.000	1,076.00	1,920.00	844.00	0.00
0+366.000 to 0+610.000	83.00	5,715.00	5,632.00	0.00
0+416.03 to 0+707.39, Side Drainage Channel	3,043.00	0.00	0.00	3,043.00
Sub-Total:	4,202.00	7,635.00	844.00	3,043.00

N7(2-3)2&4 EARTHWORK QUANTITY

Sta. to Sta.	Cut (m^3)	Fill (m^3)	Borrow (m^3)	Waste (m^3) **
2+747.90 to 2+844.14 (N7A)	153.00	1,681.00	1,528.00	0.00
0+000.00 to 0+160.00 (N7A RAB)	0.00	6,825.00	6,825.00	0.00
2+904.14 to 2+971.65 (N7B)	149.00	730.00	581.00	0.00
Sub-Total:	302.00	9,236.00	8,934.00	0.00
* GRAND TOTAL	198,609.00	183,786.00	0.00	14,823.00

15% Shinkage Factor Applied to Fill * = See Note #17 of Sheet 5 of 106.

** Note: All waste material shall be hauled over to the the N27(2-2)(2-3) South Project and used as part of the earthwork borrow needs. This work shall be included in the earthwork bid items shown in the bid schedule.

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

ESTIMATED QUANTITY
TABLES-SHEET 4

DRAWN BY: NRDOT DATE: 2/12/2015
DESIGNED BY: NRDOT DATE: 2/12/2015
REVISED: 10/5/2016 BY: Leroy.Toledo
$FILES$

$FILES$

PROJECTS: N27(2-3), N27(4-2), N7(1)(2-3), & N105(1)

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	11	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

N27(2-3)1,2&4
ITEM No. 61901-1000 5-STRAND BARB WIRE FENCING

STATION	To	STATION	LOC.	LENGTH	SIZE	REMARKS
53+300.00	To	60+155.03	Lt.	6855.03	-	Entire Length of Project-Left ROW
53+300.00	To	60+155.03	Rt.	6855.03	-	Entire Length of Project-Right ROW
53+340.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
53+340.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
53+340.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
53+340.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
53+709.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
53+826.20	To	53+865.48	Rt.	-18.96	Bridge	Fence Bridge to ROW, Forward & Back Approach
53+826.20	To	53+865.48	Lt.	-19.06	Bridge	Fence Bridge to ROW, Forward & Back Approach
53+938.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
54+120.00			Rt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
54+372.346			Rt.	10.00	ROW Offset	Add 10 m ROW Offset Fence Rt.at PC 54+372.346
54+582.00			Rt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
54+582.00			Lt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
54+890.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
55+371.00			Lt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
55+673.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
55+700.00			Rt.	10.00	ROW Offset	Add 10 m ROW Offset Fence Rt.at PC 54+372.346
55+809.00			Lt.	-11.26	CBC & Wingwall	Fence Add Forward & Back, Rt, ROW to Wingwall
55+809.00			Rt.	-3.20	CBC & Wingwall	Fence Add Forward & Back, Rt, ROW to Wingwall
55+860.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
56+140.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
56+247.00			Rt.	19.21	Inlet Slope Paving	Fence Add Forward & Back, Rt, Edge of Pavement
56+247.00			Lt.	11.60	Outlet Ground	Fence Add Forward & Back, Rt, Edge of Pavement
56+445.00			Rt.	25.74	CBC & Wingwall	Fence Add Forward & Back, Rt, ROW to Wingwall
56+445.00			Lt.	-8.46	CBC & Wingwall	Fence Add Forward & Back, Rt, ROW to Wingwall
56+713.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
56+836.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
57+153.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
57+438.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
58+283.00			Rt.	-6.20	7.00 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 7190 mm With Gate
58+586.00/58+632.00			Rt.	-8.38	4.50 m Turnout	Extended Access Turnout Offset Fence, ROW to Cattleguard, 4900 mm No Gate
59+520.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
59+752.00			Rt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
59+910.00			Rt.	10.00	ROW Offset	Add 10 m ROW Offset Fence Rt.
59+928.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
60+058.00			Rt.	-7.00	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
60+058.00			Lt.	-3.70	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
60+138.00			Rt.	-7.00	4.50 m Turnout	Diagonal Offset Fence, ROW to Cattleguard, 4900 mm With Gate
		Sub-Total:		13,615.69		
		GRAND TOTAL:		14,024.16	** 3% Added to Account for Terrain Slope/Special Fencing/Arch Sites	

N7(2-3)2&4
ITEM No. 61921-1000 REMOVE & RESET FENCING

STATION	OFFSET (m)		STATION	OFFSET (m)	LENGTH (m)	REMARKS
2+737.90	12.12	to	2+793.56	15.64	55.69	Remove & Reset Existing Barb Wire Fence from beyond BOP to T/O.
2+806.48	15.59	to	2+857.50	13.70	51.02	Remove & Reset Existing Barb Wire Fence from T/O to corner.
2+906.56	17.86	to	2+984.03	12.69	65.37	Remove & Reset Existing Wrought Iron Fence-School Property--??
				TOTAL:	65.37	

Note: No Cattleguard shall be installed on this corridor at Driveway Locations--Fencing shall be terminated Lt. & Rt. of Driveway.

N105(1)2&4
ITEM No. 61921-1000 REMOVE & RESET FENCING

STATION	OFFSET (m)		STATION	OFFSET (m)	LENGTH (m)	REMARKS
0+012.21	9.45	to	0+136.12	9.45	123.91	Rt--Remove & Reset Existing Barb Wire Fence.
0+148.68	9.45	to	0+173.64	9.45	24.96	Rt--Remove & Reset Existing Barb Wire Fence.
0+173.64	9.00	to	0+340.75	9.00	167.11	Rt--Remove & Reset Existing Chain Link Fence--To POT/PC.
0+340.75	9.00	to	0+357.78	9.00	17.03	Rt--Remove & Reset Existing Chain Link Fence--To POT/PC.
				TOTAL:	333.01	

Note: No Cattleguards shall be installed on this corridor at Turnout Locations.

N105(1)2&4
ITEM No. 61901-1000 5-STRAND BARB WIRE FENCING

STATION	OFFSET (m)		STATION	OFFSET (m)	LENGTH (m)	REMARKS
0+030.48	-41.91	to	0+368.33	-41.91	337.85	Lt--Install New Barb Wire Fence. Connect to 3-Unit CG/Braces Lt. at Turnout.
0+368.33	-19.05	to	0+455.61	-19.05	87.28	Lt--Install New Barb Wire Fence.
0+455.61	-11.19	to	0+610.00	-11.19	154.39	Lt--Install New Barb Wire Fence. Connect to 3-Unit CG/Braces @ EOP.
				TOTAL:	579.52	

N27(4-2)2&4
ITEM No. 61921-1000 REMOVE & RESET FENCING

STATION	OFFSET		STATION	OFFSET	LENGTH	REMARKS
60+164.39	-12.26	to	60+209.00	-12.26	44.61	Lt--Remove & Reset Existing Barb Wire Fence
60+221.09	-12.26	to	60+433.50	-12.45	212.41	Lt--Remove & Reset Existing Barb Wire Fence
60+444.50	-12.47	to	60+482.69	-12.47	38.19	Lt--Remove & Reset Existing Barb Wire Fence
60+482.69	-12.47	to	60+563.58	-10.54	80.89	Lt--Remove & Reset Existing Barb Wire Fence
60+576.53	-11.70	to	60+579.98	-12.74	3.45	Lt--Remove & Reset Existing Barb Wire Fence
60+579.98	-12.74	to	60+644.24	-12.70	64.26	Lt--Remove & Reset Existing Chain Link Fence
60+651.64	-12.82	to	60+686.12	-12.85	34.48	Lt--Remove & Reset Existing Chain Link Fence
60+693.56	-12.81	to	60+696.99	-12.66	3.43	Lt--Remove & Reset Existing Barb Wire Fence
60+696.99	-12.66	to	60+696.99	-38.00	25.34	Lt--Remove & Reset Existing Chain Link Fence/Lt. Side of Hopi Dr.
60+711.84	-38.00	to	60+711.84	-12.66	25.34	Lt--Remove & Reset Existing Barb Wire Fence/Rt. Side of Hopi Dr.
60+711.84	-12.66	to	60+875.28	-13.58	163.44	Lt--Remove & Reset Existing Barb Wire Fence To Intersection/N7
60+177.16	12.17	to	60+369.89	12.50	192.73	Rt--Remove & Reset Existing Barb Wire Fence
60+390.59	12.37	to	60+451.32	13.11	60.73	Rt--Remove & Reset Existing Barb Wire Fence
60+465.57	13.03	to	60+507.26	14.80	41.69	Rt--Remove & Reset Existing Barb Wire Fence
60+518.33	15.15	to	60+546.29	15.34	27.96	Rt--Remove & Reset Existing Barb Wire Fence
60+554.77	14.19	to	60+710.36	13.92	155.59	Rt--Remove & Reset Existing Barb Wire Fence
60+728.37	12.80	to	60+834.26	12.80	105.89	Rt--Remove & Reset Existing Wrougt Iron Fence--School Property??
60+834.26	12.80	to	60+846.26	25.99	20.00	Rt--Remove & Reset Existing Wrought Iron Fence--School Property??
				TOTAL:	1,300.43	

Note: No Cattleguards shall be installed on this corridor at Turnout Locations. Fencing shall be terminated Lt. & Rt. of Turnouts at the outside edges of sidewalk.

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

ESTIMATED QUANTITY
TABLES-SHEET 6

DRAWN BY: NRDOT DATE: 8/25/2011
DESIGNED BY: NRDOT DATE: 8/25/2011
REVISED: 10/29/2013 BY: Leroy.Toledo
Sht 11 N27 QtyTbls_6.dgn

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 11 N27 QtyTbls_6.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
REGION	STATE	RESERVATION	N27	N27(2-3)1,2&4	12	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

ESTIMATED DRAINAGE STRUCTURE QUANTITY

			CIRCULAR				PIPE ARCH						CIRCULAR END SECTION			PIPE ARCH END SECTION				PCRCBC	PCRCBC	
			60201-0810	60201-0910	60201-1010	60201-1810	60202-0510	60202-0610	60202-0710	60202-0910	60202-1010	60202-1110	60210-0810	60210-0910	60210-1010	60211-0910	60211-1010	60211-1110	60211-1310	60222-2000	60224-2000	
			610 mm CSPC 68 x 13 mm Corr. 2.77 mm Thickness	762 mm CSPC 68 x 13 mm Corr. 2.77 mm Thickness	914 mm CSPC 68 x 13 mm Corr. 2.77 mm Thickness	2134 mm CSPC 2.77 mm Pipe Culvert, 2.77 mm Thickness	711 mm S x 508 mm R CSPA 68 x 13 mm Corr. 2.77 mm Thickness	889 mm S x 610 mm R CSPA 68 x 13 mm Corr. 2.77 mm Thickness	1067 mm S x 737 mm R CSPA 68 x 13 mm Corr. 2.77 mm Thickness	1448 mm S x 965 mm R CSPA 68 x 13 mm Corr. 2.77 mm Thickness	1626 mm S x 1092 mm R CSPA 68 x 13 mm Corr. 2.77 mm Thickness	1803 mm S x 1194 mm R CSPA 68 x 13 mm Corr. 2.77 mm Thickness	End Section 610 mm CSPC, 2.77 mm Thickness	End Section 762 mm CSPC, 2.77 mm Thickness	End Section 914 m CSPC, 2.77 mm Thickness	711 mm S x 508 mm R CSPA, 2.77 mm Thickness End Section	889 mm S x 610 mm R CSPA, 2.77 mm Thickness End Section	1067 mm S x 737 mm R CSPA, 2.77 mm Thickness End Section	1448 mm S x 965 mm R CSPA, 2.77 mm Thickness End Section	2400 mm x 2400 mm Precast Reinforced Concrete Box Culvert 2-Barrel	2400 mm x 2400 mm Precast Reinforced Concrete Box Culvert 4-Barrel	
Station	N27(2-3)1,2&4-Recommended Structure	Skew No.	m	m	m	m	m	m	m	m	m	m	m	Each	Each	Each	Each	Each	Each	Each	m	m
53+340.00	2-610 mm x 10.363 m CSPC Under T.O. Rt. With End Section at Inlet & Outlet	90.0	20.726											4								
53+510.00	2-762 mm x 10.363 m CSPC Under T.O. Rt. With End Section at Inlet & Outlet			20.726											4							
53+585.00	2-914 mm x 8.535 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet				17.070											4						
53+709.00	2-762 mm x 10.056 m CSPC Under T.O. Rt. With End Section at Inlet & Outlet			20.112											4							
53+938.00	1-610 mm x 17.069 m CSPC Under T.O. Rt. With End Section at Inlet & Outlet	90.0	17.069											2								
53+955.00	1-610 mm x 17.069 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	17.069											2								
54+120.00	1-610 mm x 16.459 m CSPC Under T.O. Rt. With End Section at Inlet & Outlet	90.0	16.459											2								
54+582.00	1-610 mm x 14.630 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	14.630											2								
54+582.00	1-610 mm x 14.630 m CSPC Under T.O. Rt. With End Section at Inlet & Outlet	90.0	14.630											2								
54+890.00	1-610 mm x 9.144 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	9.144											2								
55+371.00	1-610 mm x 14.630 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	14.630											2								
55+673.00	1-610 mm x 8.534 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	8.534											2								
55+809.00	2-Barrel 2400 mm Span x 2400 mm Rise x 34.138 m Precast Reinforced Concrete Box Culvert	135.0																			34.138	
56+140.00	1-610 mm x 28.651 m CSPC With End Section at Inlet & Outlet	90.0	28.651											2								
56+247.00	2-2134 mm x 48.768 m CSPC With Concrete Slope Paving At Inlet	70.0				97.536																
56+454.50	4-Barrel 2400 mm Span x 2400 mm Rise x 31.700 m Precast Reinforced Concrete Box Culvert	60.0																				31.700
56+713.00	1-610 mm x 16.160 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	16.160											1								
56+836.00	1-610 mm x 18.288 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	18.288											2								
57+153.00	1-610 mm x 8.534 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	8.534											2								
57+438.00	1-610 mm x 13.411 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	13.411											2								
58+283.00	1-610 mm x 17.678 m CSPC Under T.O. Rt. With End Section at Inlet & Outlet	90.0	17.678											2								
58+940.00	2-889 mm S x 610 mm R x 24.994 m CSPA With End Section at Each Inlet	120.0							49.988					1				2				
59+010.00	1-889 mm S x 610 mm R x 23.774 m CSPA With End Section at Inlet	120.0							23.774					1				1				
59+073.00	1-610 mm x 29.870 m CSPC With End Section at Inlet	137.0	29.870											1								
59+188.00	2-889 mm S x 610 mm R x 21.336 m CSPA With End Section at Each Inlet	105.0							42.672					1				2				
59+520.00	1-610 mm x 11.582 m CSPC Under T.O. Lt. With End Section at Inlet & Outlet	90.0	11.582											2								
59+747.00	2-1448 S mm x 965 mm R x 27.432 m CSPA With End Section at Inlet	120.0									54.864									2		
59+928.00	2-1626 mm S x 1092 mm R x 14.021 m CSPA Under T.O. Lt. in FBD w/ Concrete Headall at Inlet & Outlet	90.0										28.042										
59+957.50	1-889 mm S x 610 mm R x 29.870 m CSPA With End Section at Inlet	120.0							29.870									1				
60+058.00	2-1626 mm S x 1092 mm R x 15.582 m CSPA Under T.O. Lt. in FBD w/ Concrete Headall at Inlet & Outlet	90.0										31.164		2								
60+058.00	1-610 mm x 12.190 m CSPC Under T.O. Rt. w/ End Sections at Inlet & Outlet	90.0	12.190											2			2					
60+110.00	4-1067 mm S x 737 mm R x 24.994 m CSPA With End Section at Each Inlet	90.0								99.976								8				
	SUB-TOTAL:		289.255	40.838	17.070	97.536		146.304	99.976	54.864	59.206		41	8	4	2	6	8	2	34.138	31.700	
Station	N27(4-2)2&4-Recommended Structure	Skew No.	m	m	m		m	m	m	m	m	m	Each	Each	Each	Each	Each	Each	Each	m	m	
60+266.89	1-711 mm S x 508 mm R x 17.069 m CSPA Under T.O. Lt. With End Section at Inlet & Outlet						17.069									2						
60+367.97	1-711 mm S x 508 mm R x 17.069 m CSPA Under T.O. Lt. With End Section at Inlet & Outlet						17.069									2						
60+376.99	1-711 mm S x 508 mm R x 19.507 m CSPA Under T.O. Rt. With End Section at Inlet & Outlet						19.507									2						
60+457.01	1-711 mm S x 508 mm R x 21.946 m CSPA Under T.O. Lt. With End Section at Inlet & Outlet						21.946									2						
60+458.23	1-711 mm S x 508 mm R x 19.507 m CSPA Under T.O. Rt. With End Section at Inlet & Outlet						19.507									2						
60+550.00	1-711 mm S x 508 mm R x 17.069 m CSPA Under T.O. Rt. With End Section at Inlet & Outlet						17.069									2						
60+704.23	1-711 mm S x 508 mm R x 18.482 m CSPA Under T.O. Lt. With End Section at Inlet & Outlet						18.482									2						
60+716.35	1-711 mm S x 508 mm R x 17.069 m CSPA Under T.O. Rt. With End Section at Inlet & Outlet						17.069									2						
	SUB-TOTAL:						147.718									16						
Station	N7(2-3)2&4-Recommended Structure	Skew No.	m	m	m		m	m	m	m	m	m	Each	Each	Each	Each	Each	Each	Each	m	m	
2+791.17	1-711 mm S x 508 mm R x 14.02 m CSPA Under Driveway Lt. With End Section at Inlet & Outlet						14.020									2						
2+800.57	1-711 mm S x 508 mm R x 16.459 m CSPA Under Driveway Rt. With End Section at Inlet & Outlet						16.459									2						
	SUB-TOTAL:						30.479									4						
Station	N105(1)2&4-Recommended Structure	Skew No.	m	m	m		m	m	m	m	m	m	Each	Each	Each	Each	Each	Each	Each	m	m	
0+275.00	3-1803mm S x 1194mm x 18.28 m CSPA T/O Lt., 0+030.71 Lt. Lateral/Concrete Headwall Inlet/Outlet											54.840										
	SUB-TOTAL:											54.840										
	GRAND-TOTAL:		289.255	40.838	17.070	97.536	178.197	146.304	99.976	54.864	59.206	54.840	41	8	4	22	6	8	2	34.138	31.700	

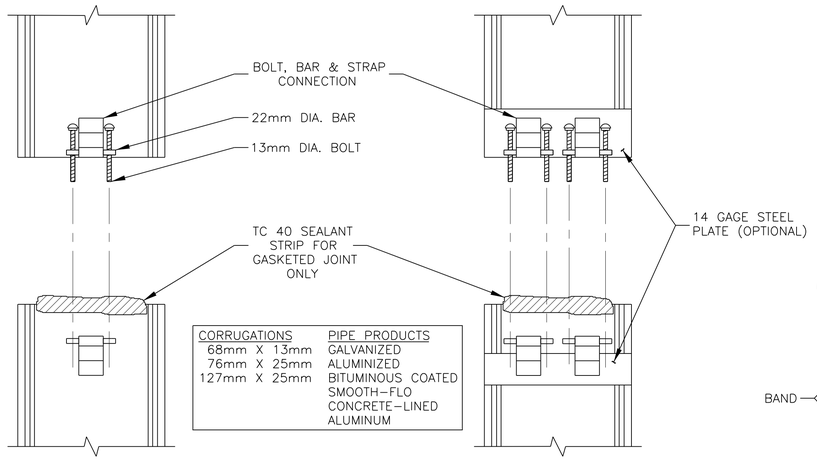
SEE SHEET 13 &14 of 105 FOR END SECTIONS GENERAL NOTES, DETAILS, & TABLES

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

DRAINAGE STRUCTURE
QUANTITY TABLES-SHEET 1

DRAWN BY: NRDOT DATE: 8/14/2017
DESIGNED BY: NRDOT DATE: 8/14/2017
REVISED: 9/22/2017 BY: Gerald.Hood
Sht 12 N27 PipeStruct rev 081417.dgn

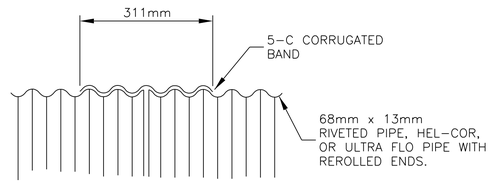
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	13	105
			N27	N27(4-2)2&4		



CONNECTION DETAIL
SINGLE BOLT, BAR & STRAP

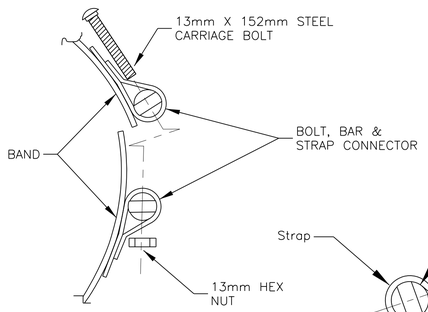
CONNECTION DETAIL
DOUBLE BOLT, BAR & STRAP

H-10 HUGGER BAND

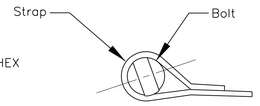


SECTION

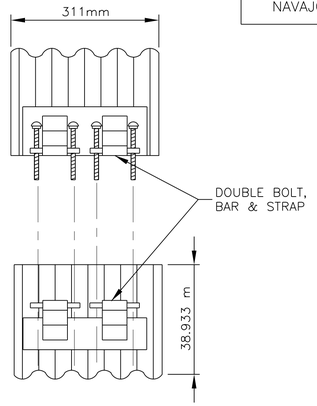
CORRUGATIONS	PIPE PRODUCTS
68mm X 13mm ULTRA FLO	GALVANIZED ALUMINIZED BITUMINOUS COATED FIBER-BONDED



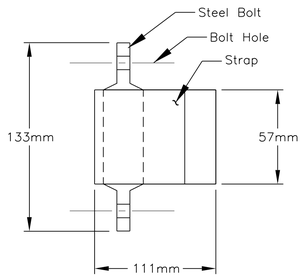
CONNECTION DETAIL
BOLT, BAR & STRAP



BOLT/STRAP DETAIL



CONNECTION DETAIL



TOP VIEW
BAR & STRAP

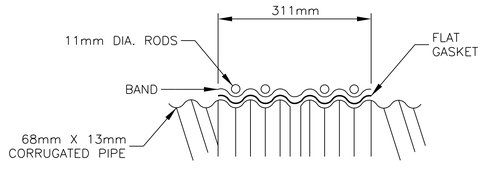
GENERAL NOTES

1. CARE SHALL BE TAKEN THAT NO FOREIGN MATERIAL IS ALLOWED TO ENTER BETWEEN THE OUTER PIPE SURFACE AND THE INSIDE 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 25-30 FT/LBS.
3. BANDS FOR PIPE-ARCH ARE THE SAME AS FOR EQUIVALENT DIAMETER ROUND PIPE.
4. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:

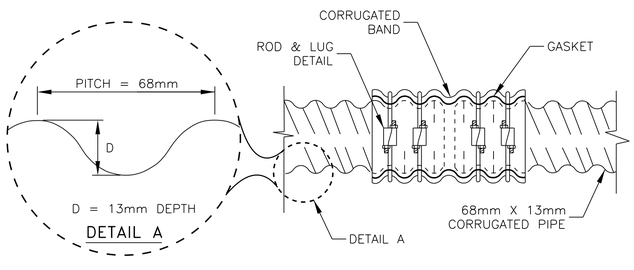
   305mm THRU 1219mm; 1-PIECE
   1372mm THRU 2438mm; 2-PIECE
   2591mm THRU 3658mm; 3-PIECE

5. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS. 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 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.

5-C CORRUGATED BAND



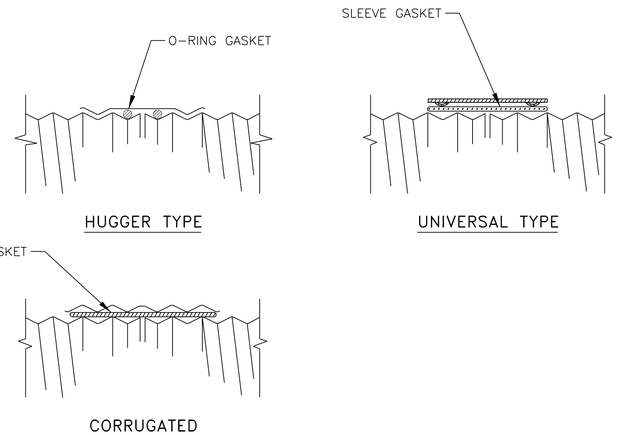
SECTION



5-C CORRUGATED BAND
SIDE VIEW

FLAT GASKET INSTALLATION GUIDELINE

1. CLEAN THE PIPE EDGES.
2. 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 FULL SEATED INTO THE PROPER CORRUGATION ON EACH PIPE END. THIS WILL INSURE THAT THE PIPE LENGTHS ARE POSITIONED PROPERLY FOR THE GASKET.



HUGGER TYPE

UNIVERSAL TYPE

CORRUGATED

TYPICAL GASKET/BAND COUPLERS

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

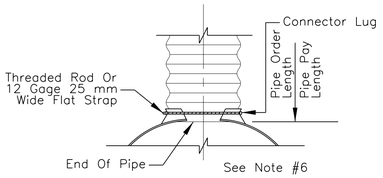
GASKET/HUGGER BAND DETAILS

DRAWN BY: NRDOT	DATE: 3/12/2014
DESIGNED BY: NRDOT	DATE: 3/12/2014
REVISED: 7/16/2015	BY: Leroy.Toledo
Sht 13 N27 Gasket HBand Details_070815.dgn	

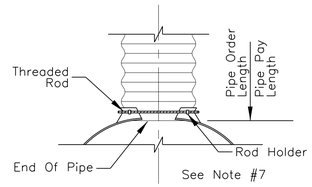
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 13 N27 Gasket HBand Details_070815.dgn

$PENTBL$

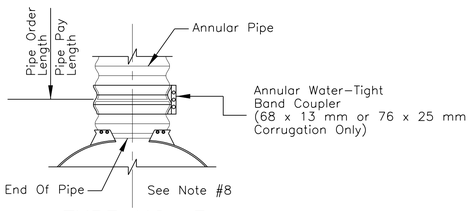
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	14	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		



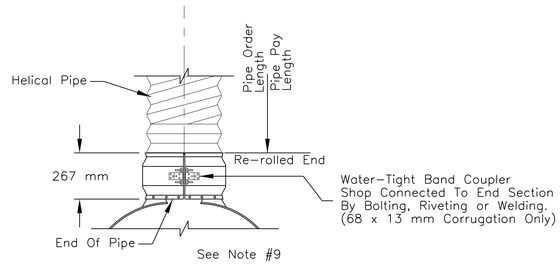
TYPE NO. 1



TYPE NO. 2



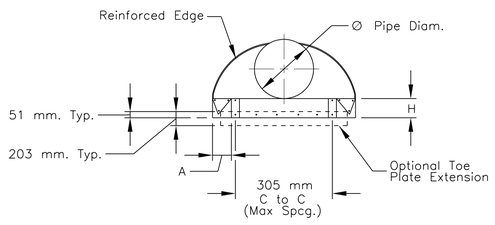
TYPE NO. 3



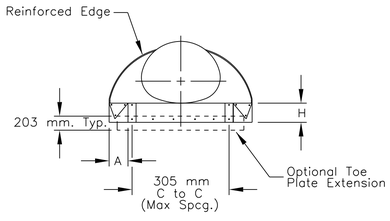
TYPE NO. 5

GENERAL NOTES

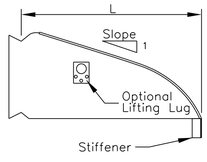
1. FOR MULTIPLE INSTALLATION OF ALL TYPES, A MINIMUM OF A 610 mm SPACING MEASURED ALONG THE HORIZONTAL BETWEEN FLARED END SECTIONS AT THEIR WIDEST CROSS SECTION SHALL BE USED.
2. ALL THREE (3) PIECE BODIES TO HAVE 2.77 mm THICKNESS SIDES AND 3.5 mm THICKNESS CENTER PANELS. WIDTH OF CENTER PANELS TO BE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



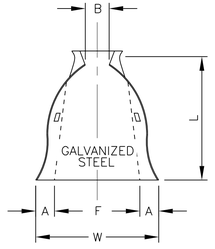
ELEVATION



ELEVATION



SIDE VIEW



PLAN

ROUND PIPE END SECTION – ALUMINUM COATED, TYPE 2

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

ARCH PIPE END SECTION – ALUMINUM COATED, TYPE 2

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

* CORRUGATION DIMENSION

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CULVERT END SECTION DETAILS, GENERAL NOTES AND TABLES

DRAWN BY: NRDOT DATE: 12/8/2009

DESIGNED BY: NRDOT DATE: 12/8/2009

REVISED: 8/14/2017 BY: DESIGN 3

SHEET NAME: Size (24x36) Plot Sheet

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 14 N27 StructEndSec REV 081417.dgn

$PENTBL$

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	15	105

Sta. 53+300.00, Cl. Existing N27 Graded Road Elevation Shall Match New Roadway Elevation At Bop. The Existing Dirt Road Width (5.6 m) Shall Be Widen Out To Match The New Roadway Pavement Width (9.0 m) At The Bop. The Transition Tie-In (Taper) Shall Be A Length Of 30 m. This Work Shall Be Included In Bid Item 20401-0000. The Abc Required For This Work Shall Be Included In Bid Item 30103-2000.

Sta. 53+452.40, Lt. Install Temporary W8-3 "PAVEMENT ENDS" Sign with W16-3 "500 FEET" Supplemtal Plate As Shown. Installation Of These Signs Shall Be Incidental to Bid Item 635001-0000 Temporary Traffic Control And Shall Be Removed When N27(2-2) Project Is Completed.

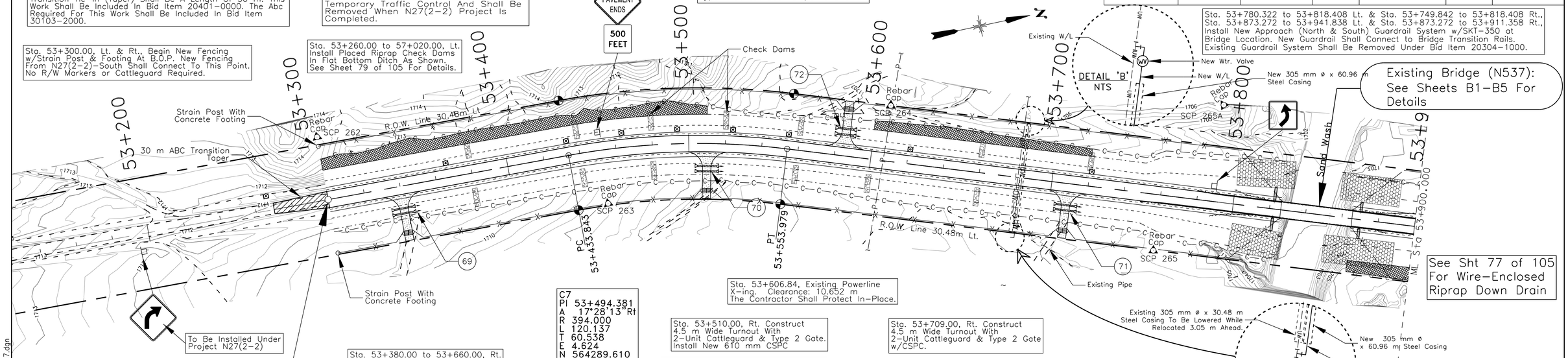
Sta. 53+300.00 to 53+510.00 & Sta. 53+600.00 to 53+720.00, Left Install Rolled Eroscion Control Product, Type 4 at Cut Back Slope As Shown.

Sta. 53+585.00, Lt. Construct 4.5 m Wide Turnout With 2-Unit Cattleguard & Type 2 Gate. Install New 610 mm CSPCs.

Sta. 53+780.322 to 53+818.408 Lt. & Sta. 53+749.842 to 53+818.408 Rt., Sta. 53+873.272 to 53+941.838 Lt. & Sta. 53+873.272 to 53+911.358 Rt., Install New Approach (North & South) Guardrail System w/SKT-350 at Bridge Location. New Guardrail Shall Connect to Bridge Transition Rails. Existing Guardrail System Shall Be Removed Under Bid Item 20304-1000.

Sta. 53+300.00, Lt. & Rt., Begin New Fencing w/Strain Post & Footing At B.O.P. New Fencing From N27(2-2)-South Shall Connect To This Point. No R/W Markers or Cattleguard Required.

Sta. 53+260.00 to 57+020.00, Lt. Install Placed Riprap Check Dams In Flat Bottom Ditch As Shown. See Sheet 79 of 105 For Details.



C7
PI 53+494.381
A 17°28'13"Rt
R 394.000
L 120.137
T 60.538
E 4.624
N 564289.610
E 268521.698

Sta. 53+606.84, Existing Powerline X-ing. Clearance: 10.652 m The Contractor Shall Protect In-Place.

Sta. 53+510.00, Rt. Construct 4.5 m Wide Turnout With 2-Unit Cattleguard & Type 2 Gate. Install New 610 mm CSPC

Sta. 53+709.00, Rt. Construct 4.5 m Wide Turnout With 2-Unit Cattleguard & Type 2 Gate w/CSPC.

Sta. 53+701.61, 36.10 m Rt. Existing 1-457 mm x 5.35 m CSPC, Remove, Clean, Salvage & Stockpile

Sta. 53+681.18, CL, Existing 152mm PVC Waterline w/305 mm ø x 30.48 m Steel Casing. Elev: 1704.44 Depth: -1.60 m. NTUA Shall Relocate/Reroute/Lower Existing 152 mm PVC Waterline To Sta. 53+684.23 (3.05 m Ahead) As Shown With New 305 mm ø x 60.96 m Steel Casing Under Special Work Permit. NTUA Shall Remove, Clean, & Salvage Existing 305 mm ø x 30.48 m Steel Casing. See DETAIL 'A' & 'B' Above.

Sta. 53+380.00 to 53+660.00, Rt. Install Placed Riprap Check Dams In Flat Bottom Ditch As Shown. See Sheet 79 of 105 For Details.

Sta. 53+340.00, Rt. Construct 4.5 m Wide Turnout With 2-Unit Cattleguard & Type 2 Gate

SCALE: Meters
0 20 40 60 80 100

N27(2-3)1,2&4
B.O.P. Sta. 53+300.000
Elev: 1711.596

REVISED
11:00 am, Oct 03, 2018

DELINEATORS		RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	MONUMENTS	MARKERS
⊙	⊙	◕	--NO SYMBOL--
0	9	4	4

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
69	53+340.00	2-610 mm x 10.363 m CSPC Under Turnout Rt.	90.0	DA19b	11.137	1.079	With End Sections at Inlet & Outlet	Under Turnout Rt.
70	53+510.00	2-762 mm x 10.363 m CSPC Under Turnout Rt.	90.0				With End Sections at Inlet & Outlet	Under Turnout Rt.
71	53+709.00	2-762 mm x 10.056 m CSPC Under Turnout Rt.	90.0				With End Sections at Inlet & Outlet	Under Turnout Rt.
72	53+585.00	2-914 mm x 8.535 m CSPC Under Turnout Lt.	90.0	DA 19c	16.706	1.434	With End Sections at Inlet & Outlet	Under Turnout Lt.

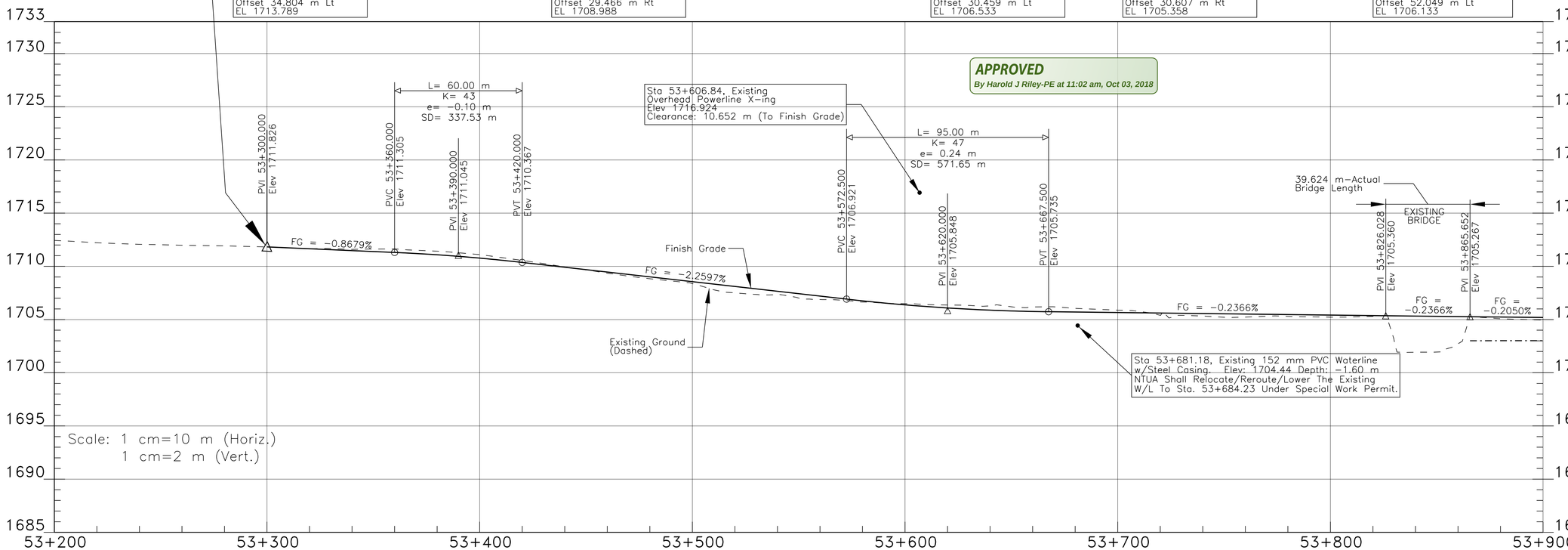
SCP 262, Rebar with Cap
Sta 53+300.209,
Offset 34.804 m Lt
EL 1713.789

SCP 263, Rebar with Cap
Sta 53+451.683,
Offset 29.466 m Rt
EL 1708.988

SCP 264, Rebar with Cap
Sta 53+607.419,
Offset 30.459 m Lt
EL 1706.533

SCP 265, Rebar with Cap
Sta 53+759.714,
Offset 30.607 m Rt
EL 1705.358

SCP 265A, Rebar with Cap
Sta 53+789.688,
Offset 52.049 m Lt
EL 1706.133



APPROVED
By Harold J Riley-PE at 11:02 am, Oct 03, 2018

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Plan & Profile Sheets - North\Sht 15 N27plp15 REV 081417.dgn

$PENTBL1$

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	16	105

C8
PI 54+445.964
A 21°10'02" Lt
R 394.000
L 145.559
T 73.619
E 6.819
N 565190.019
E 268832.445

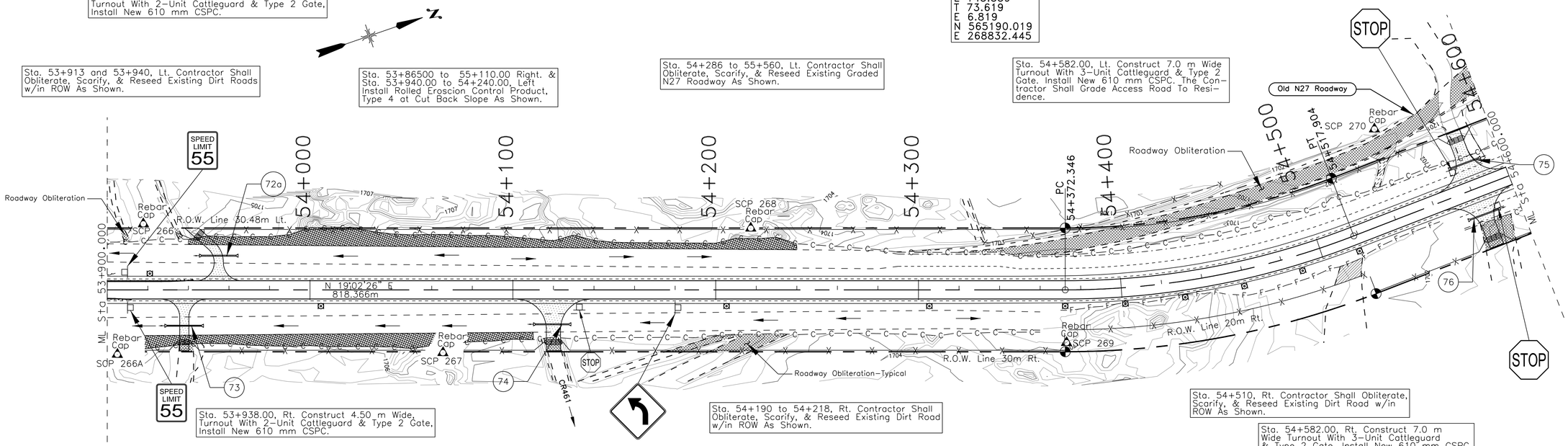
Sta. 53+955.00, Lt. Construct 4.50 m Wide Turnout With 2-Unit Cattleguard & Type 2 Gate, Install New 610 mm CSPC.

Sta. 53+913 and 53+940, Lt. Contractor Shall Obliterate, Scarify, & Reseed Existing Dirt Roads w/in ROW As Shown.

Sta. 53+86500 to 55+110.00 Right. & Sta. 53+940.00 to 54+240.00, Left Install Rolled Erosion Control Product, Type 4 at Cut Back Slope As Shown.

Sta. 54+286 to 55+560, Lt. Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown.

Sta. 54+582.00, Lt. Construct 7.0 m Wide Turnout With 3-Unit Cattleguard & Type 2 Gate. Install New 610 mm CSPC. The Contractor Shall Grade Access Road To Residence.



Sta. 53+938.00, Rt. Construct 4.50 m Wide Turnout With 2-Unit Cattleguard & Type 2 Gate, Install New 610 mm CSPC.

Sta. 54+190 to 54+218, Rt. Contractor Shall Obliterate, Scarify, & Reseed Existing Dirt Road w/in ROW As Shown.

Sta. 54+510, Rt. Contractor Shall Obliterate, Scarify, & Reseed Existing Dirt Road w/in ROW As Shown.

Sta. 54+582.00, Rt. Construct 7.0 m Wide Turnout With 3-Unit Cattleguard & Type 2 Gate. Install New 610 mm CSPC.

Sta. 53+865.20 to 54+000, Rt. Contractor Shall Grade To Drain Flat Bottom Ditch Towards Bridge As Shown.

Sta. 54+120.00, Rt. Construct 7.00 m Wide Turnout With 3-Unit Cattleguard & Type 2 Gate. Install New 610 mm CSPC. (CR461/Bus Rte.)

SCALE: Meters
0 20 40 60 80 100

DELINEATORS		RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	MONUMENTS	MARKERS
⊡	⊡	⊕	--NO SYMBOL--
0	10	6	6

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
72a	53+955.00	1-610 mm x 17.069 m CSPC Under Turnout Lt.	90.0	T/O DA1	0.517	0.030	With End Section at Inlet & Outlet	Under Turnout Lt.
73	53+938.00	1-610 mm x 17.069 m CSPC Under Turnout Rt.	90.0	T/O DA2	0.970	0.031	With End Section at Inlet & Outlet	Under Turnout Rt.
74	54+120.00	1-610 mm x 16.459 m CSPC Under Turnout Rt.	90.0	T/O DA3	0.448	0.051	With End Section at Inlet & Outlet	Under Turnout Rt.
75	54+582.00	1-610 mm x 14.630 m CSPC Under Turnout Lt.	90.0	T/O DA4	0.517	0.042	With End Section at Inlet & Outlet	Under Turnout Lt.
76	54+582.00	1-610 mm x 14.630 m CSPC Under Turnout Rt.	90.0	T/O DA5	0.970	0.105	With End Section at Inlet & Outlet	Under Turnout Rt.

SCP 266A, Rebar with Cap
Sta 53+904.978,
Offset 31.813 m Rt
EL 1706.621

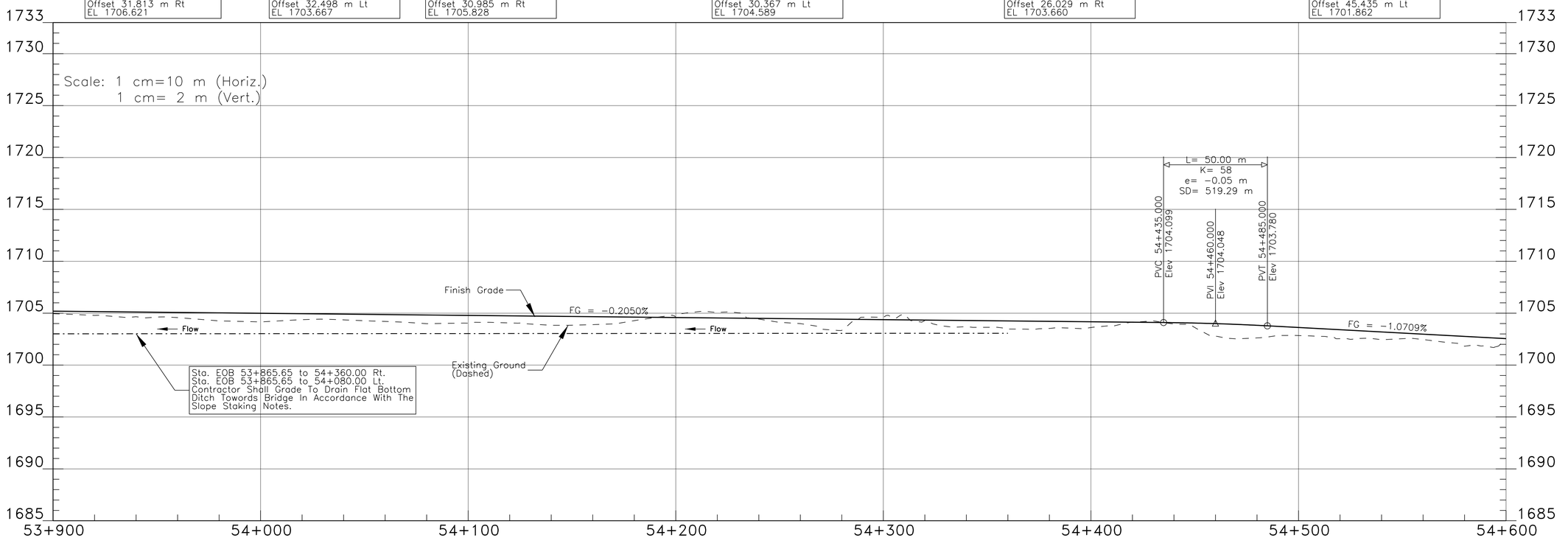
SCP 266, Rebar with Cap
Sta 53+917.792,
Offset 32.498 m Lt
EL 1703.667

SCP 267, Rebar with Cap
Sta 54+065.516,
Offset 30.985 m Rt
EL 1705.828

SCP 268, Rebar with Cap
Sta 54+217.276,
Offset 30.367 m Lt
EL 1704.589

SCP 269, Rebar with Cap
Sta 54+372.953,
Offset 26.029 m Rt
EL 1703.660

SCP 270, Rebar with Cap
Sta 54+546.396,
Offset 45.435 m Lt
EL 1701.862



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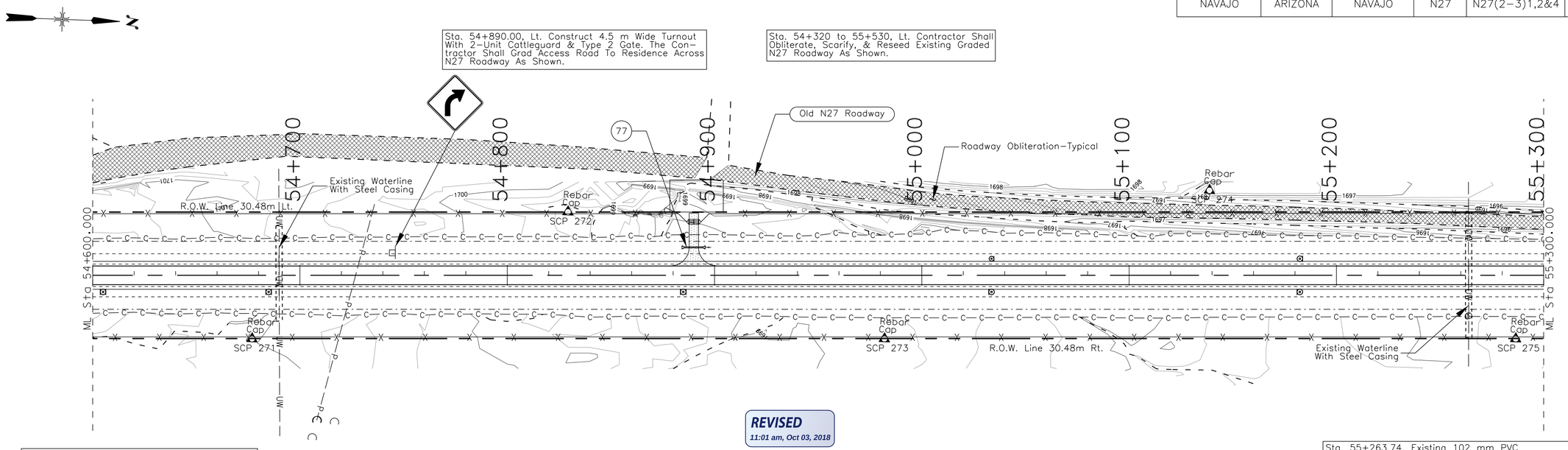
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	17	105

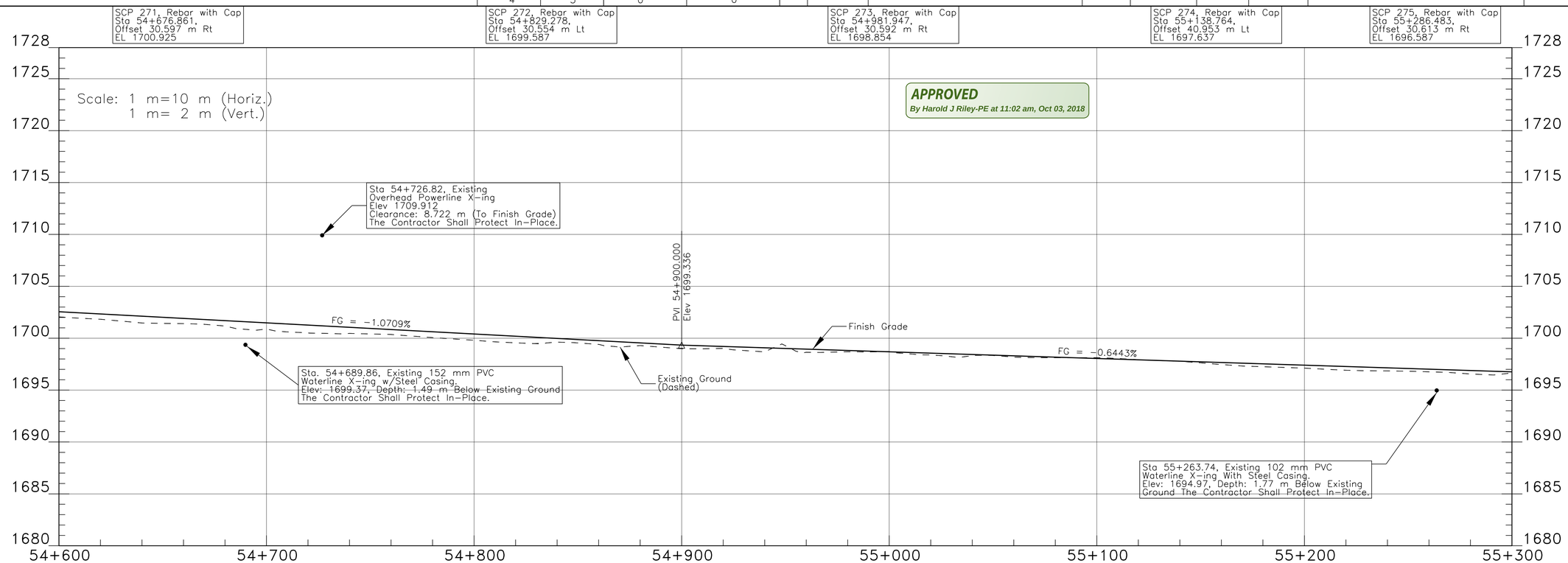


SCALE: Meters
0 20 40 60 80 100

DELINEATORS		RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	MONUMENTS	MARKERS
⊡	⊠	⌖	--NO SYMBOL--
4	3	0	0

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
77	54+890.00	1-610 mm x 9.144 m CSPC Under Turnout Lt.	90.0	T/O DA6	2.111	0.164	With End Section at Inlet & Outlet	Under Turnout Lt.



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$PENTBL$

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	18	105

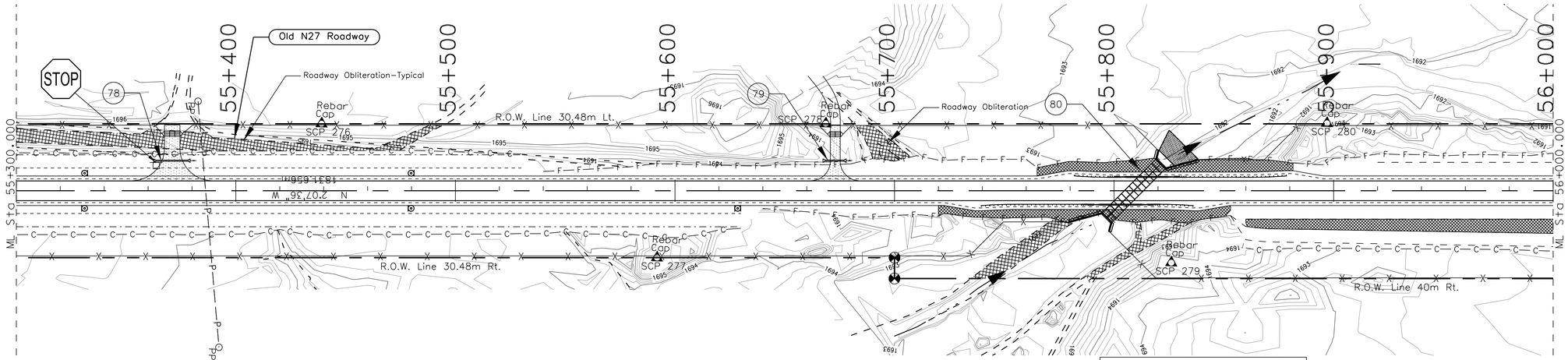
Sta. 54+320 to 55+530, Lt, Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown.

Sta. 55+371.00, Rt. Construct 7.0 m Wide Turnout With 3-Unit Cattleguard & Type 2 Gate. Install New 610 mm CSPC. The Contractor Shall Grade Access Road To Residence As Shown.

Sta. 55+480, Lt., The Contractor Shall Obliterate, Scarify, & Reseed Existing Dirt Road Within ROW As Shown.

Sta. 55+673.00, Lt., Construct 4.5 m Turnout With 2-Unit Cattleguard, Type 2 Gate, & CSPC. The Contractor Shall Grade Access Road To Residence As Shown. The Contractor Shall Obliterate, Scarify, & Reseed Existing Dirt Road Within ROW Adjacent to Turnout As Shown.

Sta. 55+809.00, CL, Contractor Shall Construct 2-Barrel Precast Reinfored CBC See Sheet 63-71 of 105 For Layout, Installation, & Construction Details. Contractor Shall Install Concrete Barrier, Transition, Guardrail System, Lt. & Rt. Per Station Locations--See Table On Sheet 8 of 105. See 70-72 & 82-86 of 105 For Barrier Installation & Construction Details.



Sta 55+386.21, Existing Overhead Powerline X-ing. Clearance: 8.688 m (To Finish Grade). The Contractor Shall Protect In-Place.

Sta. 55+803 to 55+827, Rt. Contractor Shall Obliterate, Scarify, & Reseed Existing Dirt Road Adjacent To Turnout w/in ROW As Shown.

Sta. 55+720.00 to 55+853.00 Right., Sta. 55+765.00 to 55+882.00 Left & Sta. 55+860.00 to 56+000.00 Right, Install Rolled Eroscion Control Product, Type 4 on Fill Slopes As Shown.

SCALE: Meters
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	●	⌖	--NO SYMBOL--
4	1	0	0	0

DRAINAGE STRUCTURE TABLE

Mark	Station	Recommended Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
78	55+371.00	1-610 mm x 14.630 m CSPC Under Turnout Lt.	90.0	T/O DA7	3.414	0.208	With End Section at Inlet & Outlet	Under Turnout Lt.
79	55+673.00	1-610 mm x 8.534 m CSPC Under Turnout Lt.	90.0	T/O DA8	6.312	0.350	With End Section at Inlet & Outlet	Under Turnout Lt.
80	55+809.00	2-Barrel 2400 mm Span x 2400 mm Rise Precast Reinforced CBC	135.0	DA 20	978.014	18.281	With Concrete Headwall, Wingwalls, & cutoff walls at Inlet & Outle	Wire Enclosed Riprap Apron at Outlet

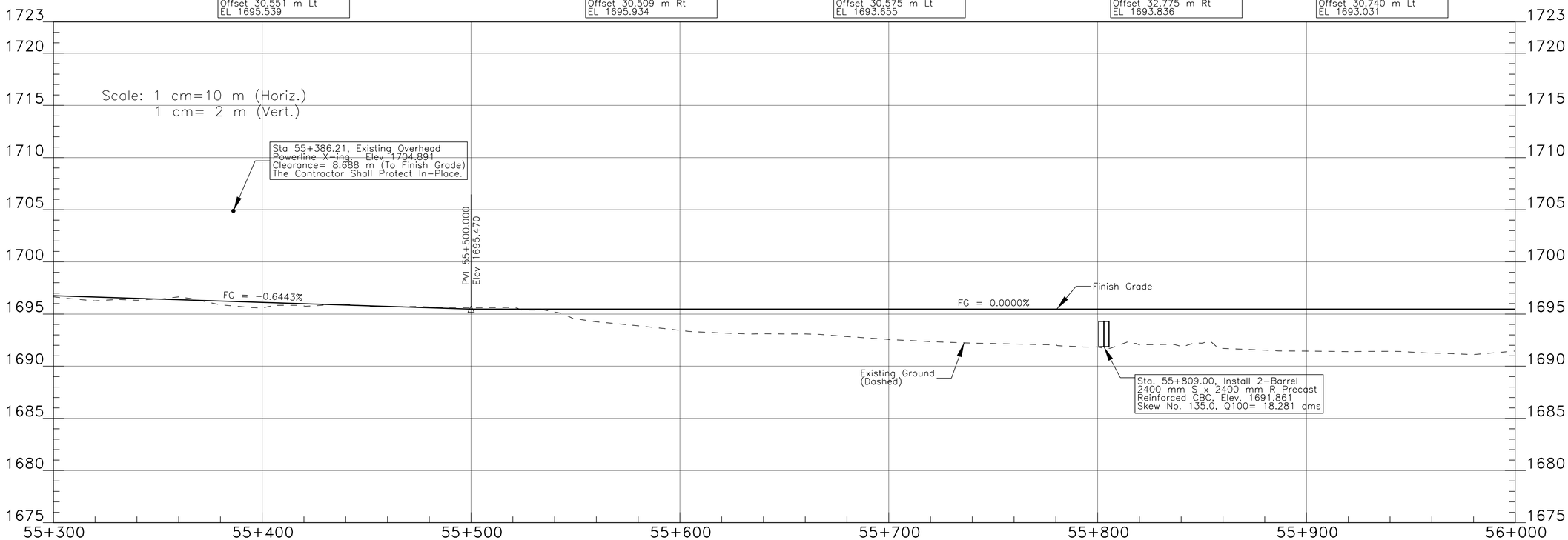
SCP 276, Rebar with Cap
Sta 55+439.027,
Offset 30.551 m Lt
EL 1695.539

SCP 277, Rebar with Cap
Sta 55+591.818,
Offset 30.509 m Rt
EL 1695.934

SCP 278, Rebar with Cap
Sta 55+668.673,
Offset 30.575 m Lt
EL 1693.655

SCP 279, Rebar with Cap
Sta 55+826.059,
Offset 32.775 m Rt
EL 1693.836

SCP 280, Rebar with Cap
Sta 55+896.973,
Offset 30.740 m Lt
EL 1693.031



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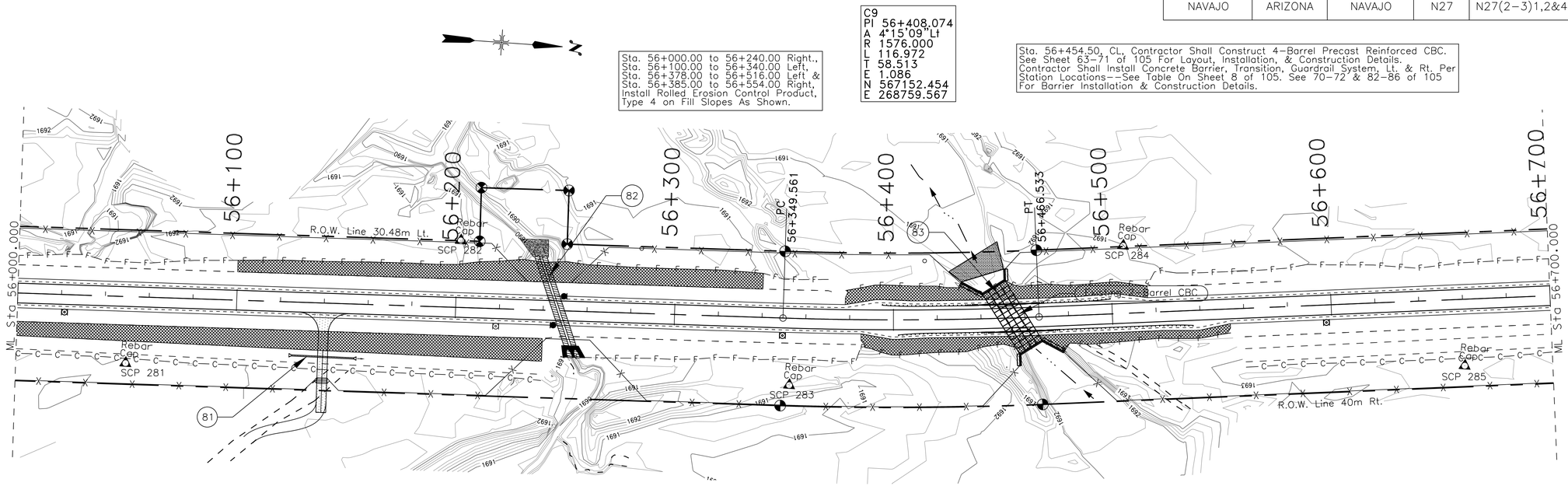
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	19	105



SCALE: Meters
0 20 40 60 80 100

DRAINAGE STRUCTURE TABLE

Mark	Station	Recommended Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
81	56+140.00	1-610 mm x 28.651 m CSPC	90.0	T/O DA9	0.979	0.103	With End Section at Inlet & Outlet	Under Turnout Rt.
82	56+247.00	2-2134 m x 48.768 m CSPC	70.0	DA21	297.859	30.518	With Concrete Slope Paving At Inlet	Install Placed Riprap Apron, Class 3
83	56+454.50	4-Barrel 2400 mm Span x 2400 mm Rise Precast Reinforced CBC	60.0	DA22	5,164.102	92.952	With Concrete Headwall, Wingwalls,&cutoff walls at Inlet & Outlet	Wire Enclosed Riprap Apron at Outlet

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
				--NO SYMBOL--
0	4	4	4	4

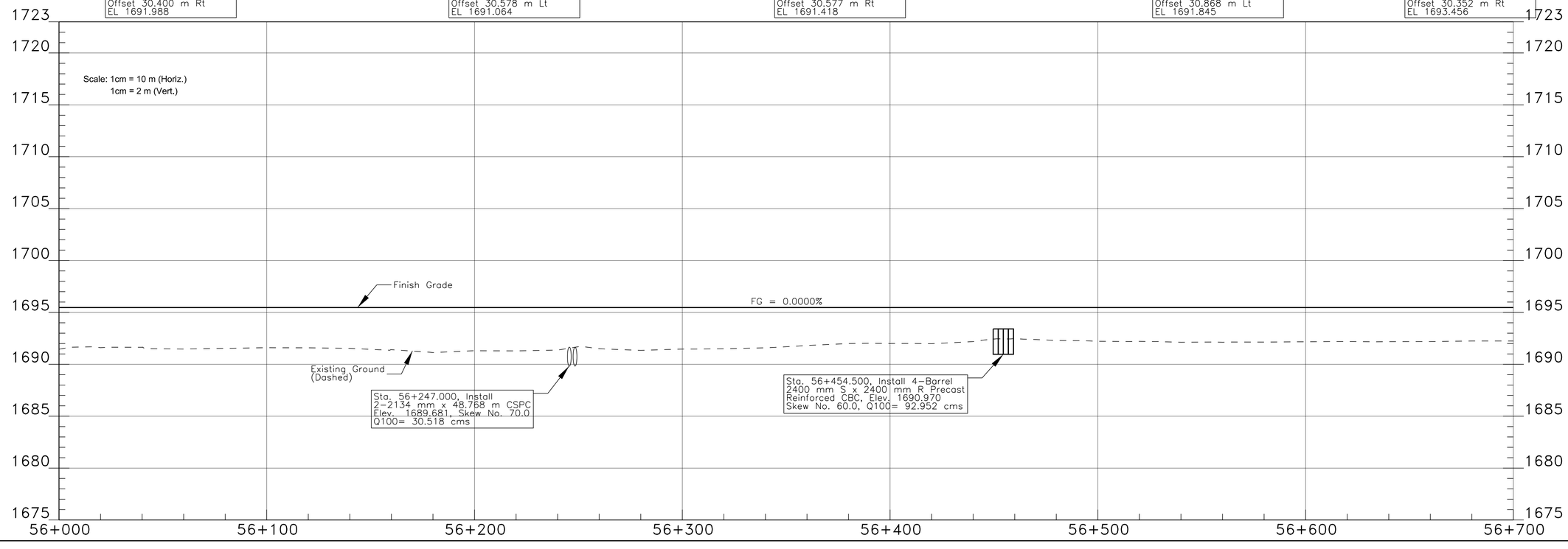
SCP 281, Rebar with Cap
Sta 56+050.163,
Offset 30.400 m Rt
EL 1691.988

SCP 282, Rebar with Cap
Sta 56+201.391,
Offset 30.578 m Lt
EL 1691.064

SCP 283, Rebar with Cap
Sta 56+353.329,
Offset 30.577 m Rt
EL 1691.418

SCP 284, Rebar with Cap
Sta 56+506.218,
Offset 30.868 m Lt
EL 1691.845

SCP 285, Rebar with Cap
Sta 56+659.802,
Offset 30.352 m Rt
EL 1693.456



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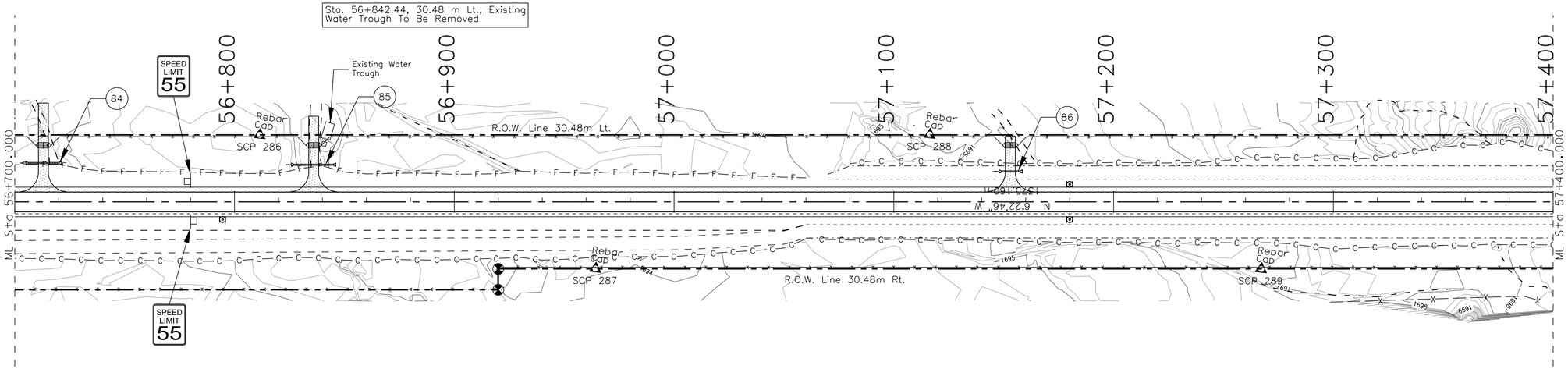
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	20	105

Sta. 56+713.00 , Lt. Construct New 4.50 m Turnout w/ 1-610 mm x 12.19 m CSPC With 2 - End Sections And Install 2-Unit Cattleguard w/ Type 2 Gate.

Sta. 56+836.00 , Lt. Construct New 4.50 m Turnout w/ 1-610 mm x 12.19 m CSPC With 2 - End Sections And Install 2-Unit Cattleguard w/ Type 2 Gate.

Sta. 56+842.44, 30.48 m Lt., Existing Water Trough To Be Removed

Sta. 57+153.00 , Lt. Construct New 4.50 m Turnout w/ 1-610 mm x 12.19 m CSPC With 2 - End Sections And Install 2-Unit Cattleguard w/ Type 2 Gate.



SCALE: Meters

0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	●	⊕	--NO SYMBOL--
0	3	0	2	2

DRAINAGE STRUCTURE TABLE

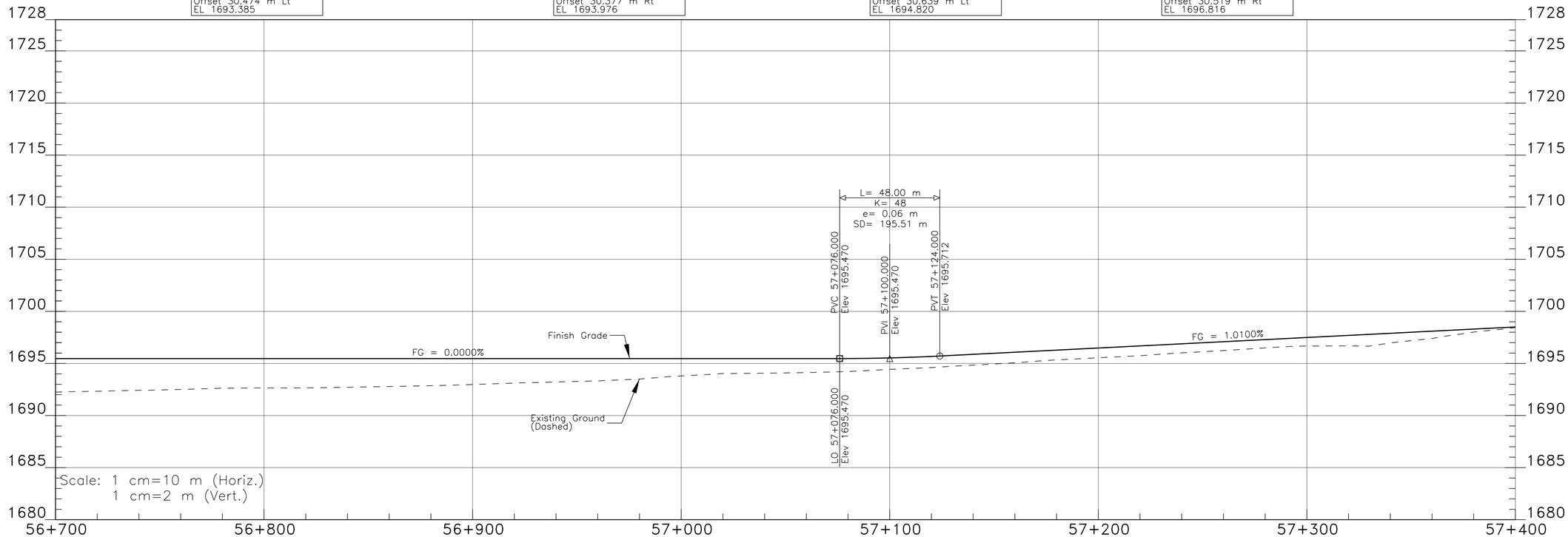
Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
84	56+713.00	1-610 mm x 16.160 m CSPC Under Turnout Lt.	90.0	T/O DA 10	5.537	0.299	With End Section at Inlet & Outlet	Under Turnout Lt.
85	56+836.00	1-610 mm x 18.288 m CSPC Under Turnout Lt.	90.0				With End Section at Inlet & Outlet	Under Turnout Lt.
86	57+153.00	1-610 mm x 8.534 m CSPC Under Turnout Lt.	90.0	T/O DA 11	4.088	0.272	With End Section at Inlet & Outlet	Under Turnout Lt.

SCP 286, Rebar with Cap
Sta 56+811.446,
Offset 30.474 m Lt
EL 1693.385

SCP 287, Rebar with Cap
Sta 56+964.231,
Offset 30.377 m Rt
EL 1693.976

SCP 288, Rebar with Cap
Sta 57+116.320,
Offset 30.639 m Lt
EL 1694.820

SCP 289, Rebar with Cap
Sta 57+267.160,
Offset 30.519 m Rt
EL 1696.816



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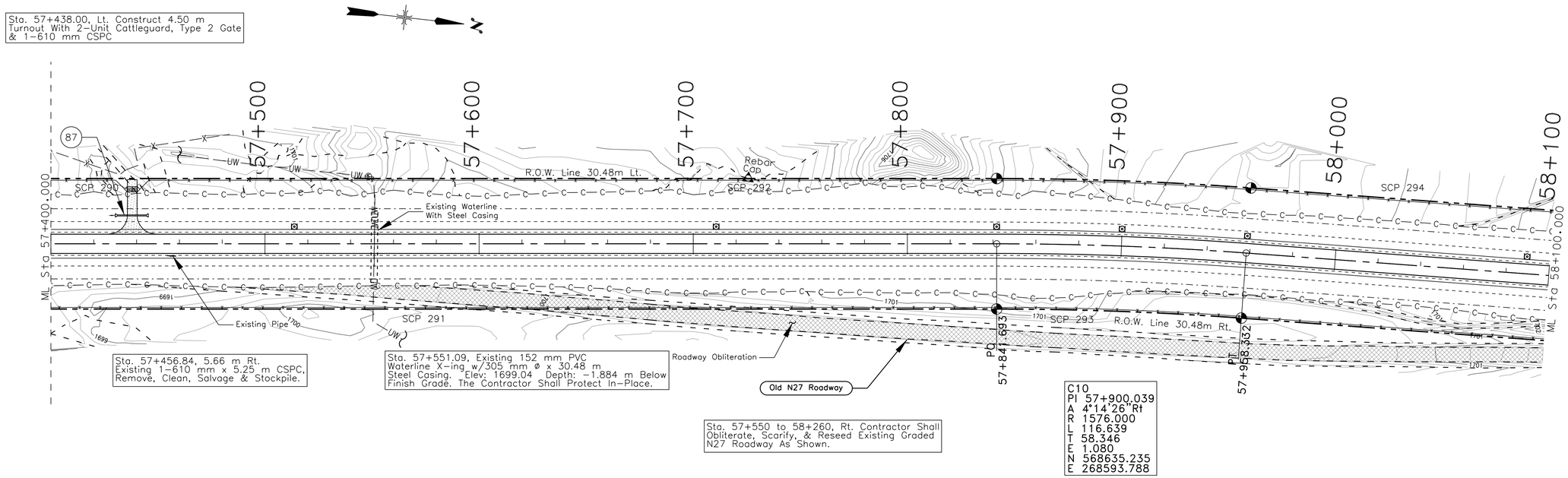
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	21	105

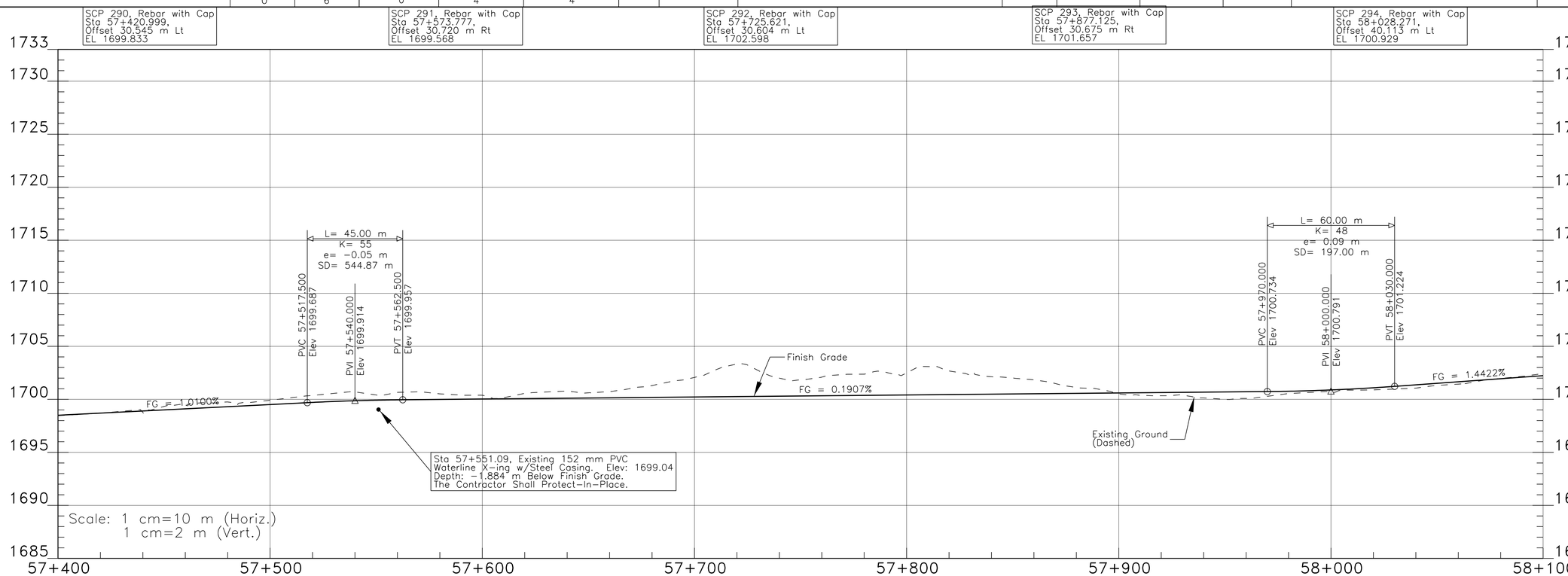


SCALE: Meters
0 20 40 60 80 100

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
				--NO SYMBOL--
0	6	0	4	4

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
87	57+438.00	1-610 mm x 13.411 m CSPC Under Turnout Lt.	90.0	T/O DA 12	3.275	0.245	With End Section at Inlet & Outlet	Under Turnout Lt.



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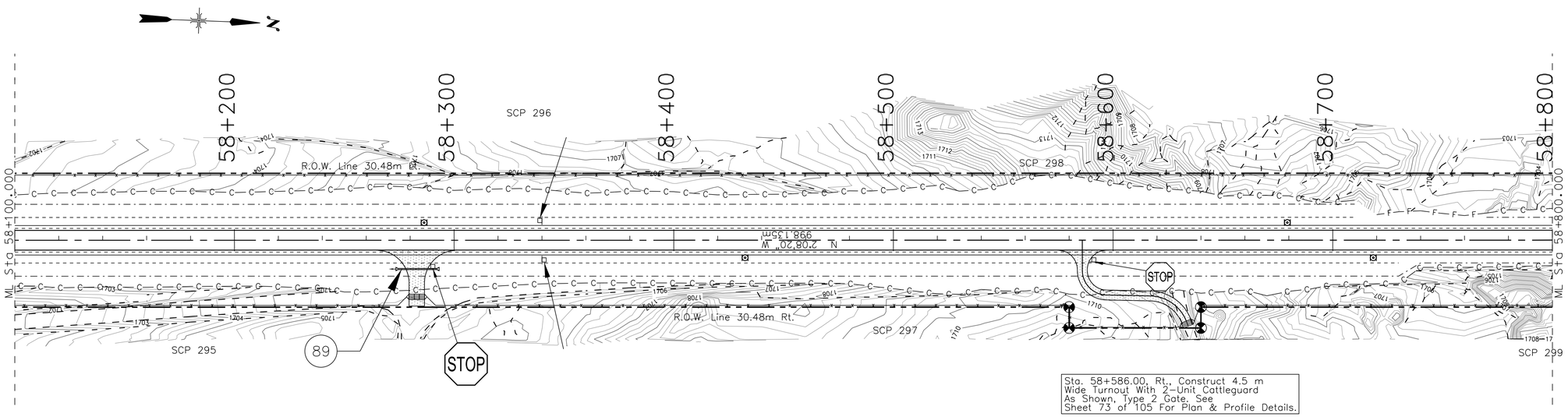
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	22	105



Sta. 57+550 to 58+260, Rt. Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown.

Sta. 58+283.00, Rt., Construct 7.0 m Wide 7190 mm Turnout w/3-Unit Cattleguard, Type 2 Gate. Install New 610 mm CSPC. Contractor Shall Obliterate, Scarify, & Re-seed Existing Turnout Adjacent To New Turnout As Shown. The Contractor Shall Grade Access Road To County Road.

Sta. 58+586.00, Rt., Construct 4.5 m Wide Turnout With 2-Unit Cattleguard As Shown, Type 2 Gate. See Sheet 73 of 105 For Plan & Profile Details.

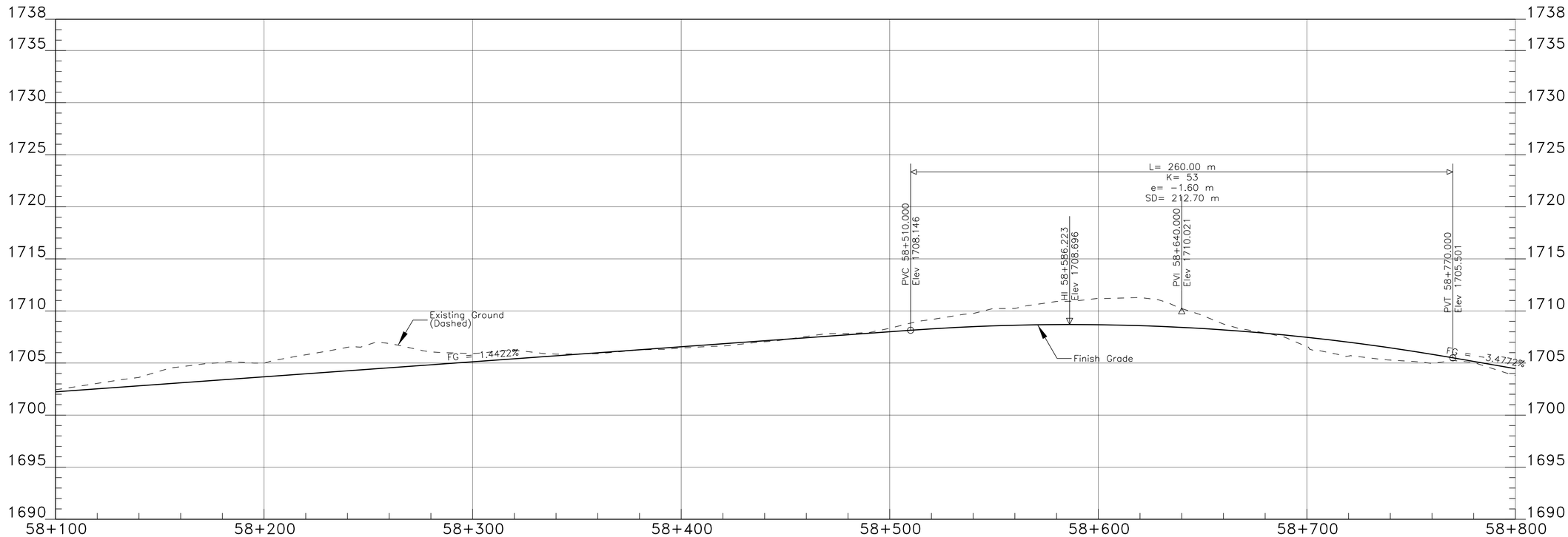
Sta. 58+648.47, 34.66m Rt., Existing Cultural Rock Shrine To Be Protected In-Place. Install Temporary Orange HDPE Fencing During Construction And Shall Be Monitored By NDOT Archaeologist. Contractor Shall Coordinate The Work With The COTR And NDOT.

SCALE: Meters

0 20 40 60 80 100

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
89	58+283.00	1-610 mm x 17.678 m CSPC Under Turnout Rt.	90.0	T/O DA 13	0.929	0.167	With End Section at Inlet & Outlet	Under Turnout Rt.



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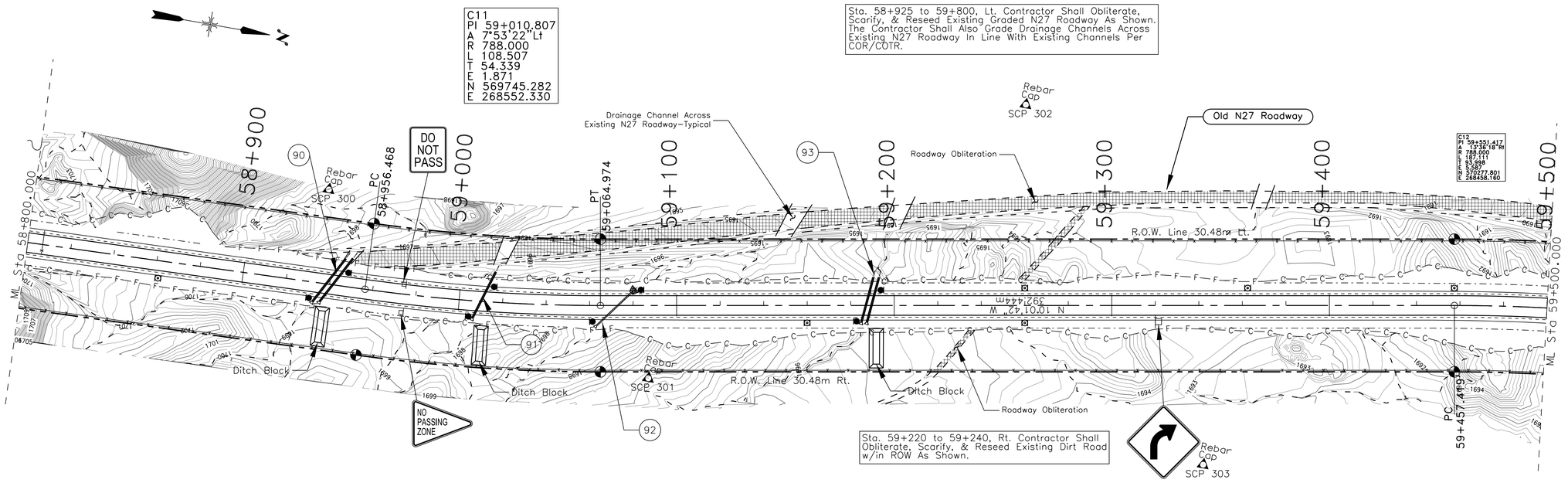
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	23	105



SCALE: Meters

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DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊡	⊡	■	⊕	--NO SYMBOL--
0	6	8	6	6

DRAINAGE STRUCTURE TABLE

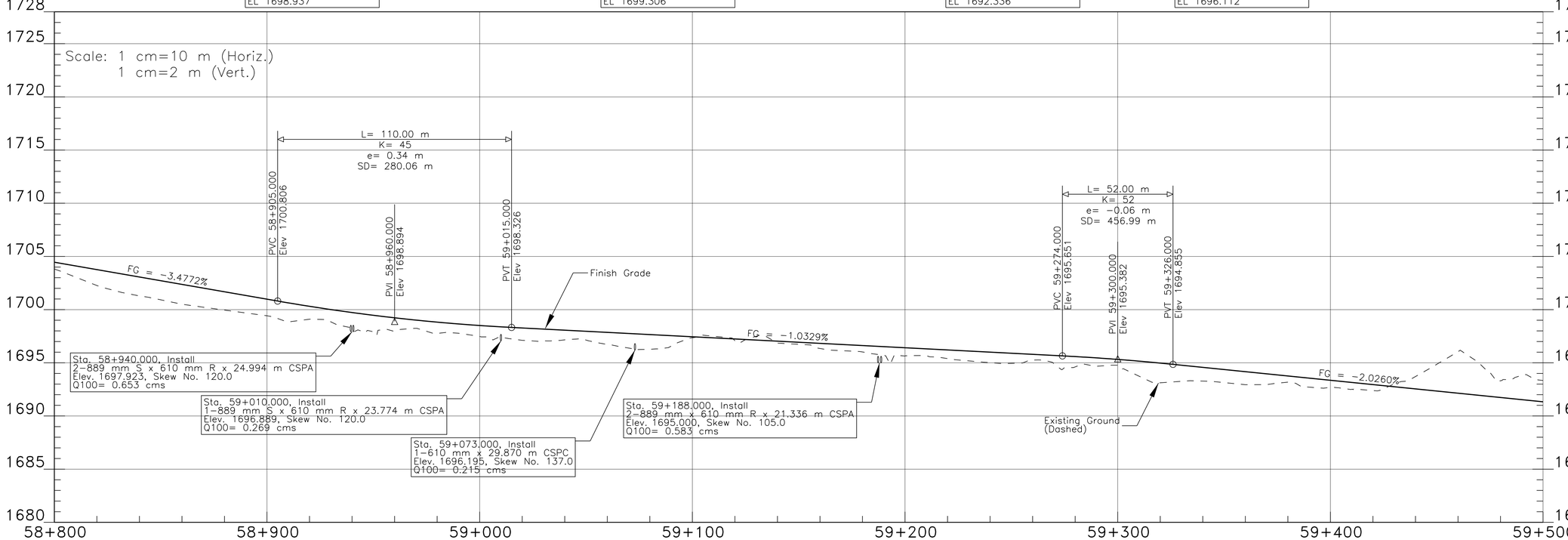
Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
90	58+940.00	2-889 mm S x 610 mm R x 24.994 m CSPA	120.0	DA 23	3.367	0.653	With End Section at Each Inlet	None
91	59+010.00	1-889 mm S x 610 mm R x 23.774 m CSPA	120.0	DA 24	1.295	0.269	With End Section at Inlet	None
92	59+073.00	1-610 mm x 29.870 m CSPC	137.0	DA 25	1.036	0.215	With End Section at Inlet	Install Placed Riprap
93	59+188.00	2-889 mm S x 610 mm R x 21.336 m CSPA	105.0	DA 26	3.367	0.583	With End Section at Each Inlet	None

SCP 300, Rebar with Cap
Sta 58+933.724,
Offset 43.086 m Lt
EL 1698.937

SCP 301, Rebar with Cap
Sta 59+087.000,
Offset 33.449 m Rt
EL 1699.306

SCP 302, Rebar with Cap
Sta 59+260.497,
Offset 92.247 m Lt
EL 1692.336

SCP 303, Rebar with Cap
Sta 59+341.974,
Offset 73.163 m Rt
EL 1696.112



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$PENTBL$

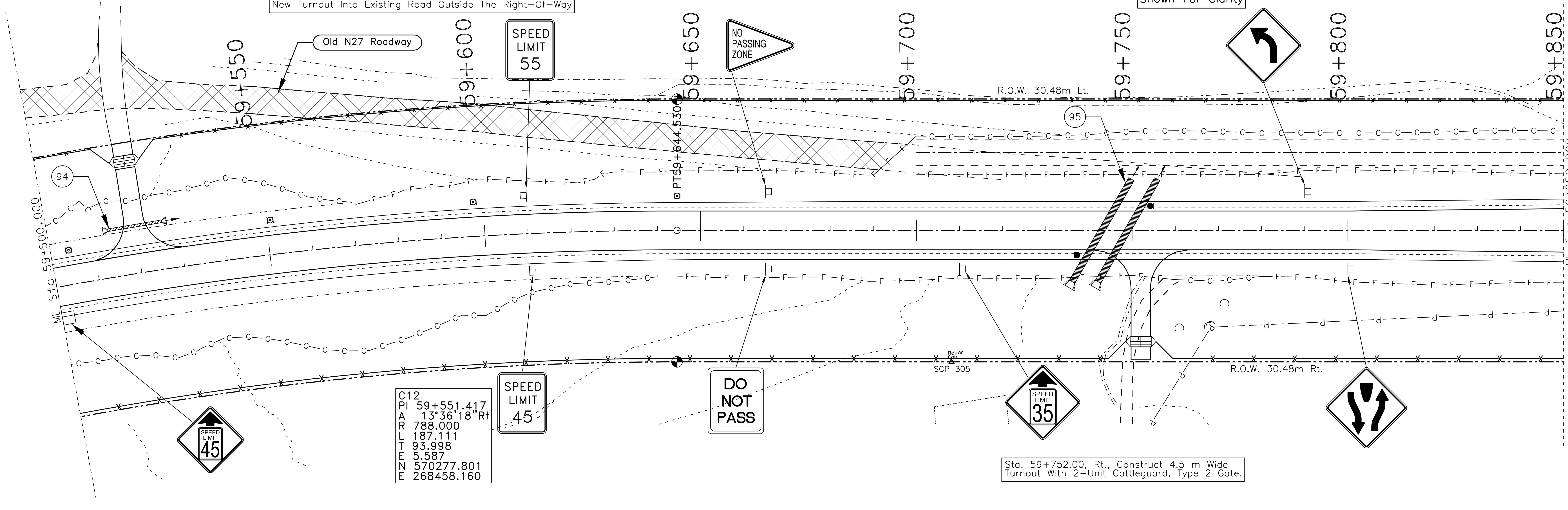
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	24	105

Sta. 58+925 to 59+800, Lt. Contractor Shall Obliterate, Scarify, & Reseed Existing Graded N27 Roadway As Shown.

Sta. 59+520.00, Lt., Construct 4.5 m Wide Turnout With 2-Unit Cattleguard & Type 2 Gate. Install New 610 mm CSPC. Contractor Shall Tie New Turnout Into Existing Road Outside The Right-Of-Way

Sta. 59+700 to 60+112.00, Lt., Construct 6.0 m Wide Flat Bottom Ditch (Drainage Channel) As Shown. See Sheet 2 Of 105 (Typical Section) for Details.

Contours Not Shown For Clarity



Sta. 59+752.00, Rt., Construct 4.5 m Wide Turnout With 2-Unit Cattleguard, Type 2 Gate.

SCALE: Meters 0 10 20 30 40 50

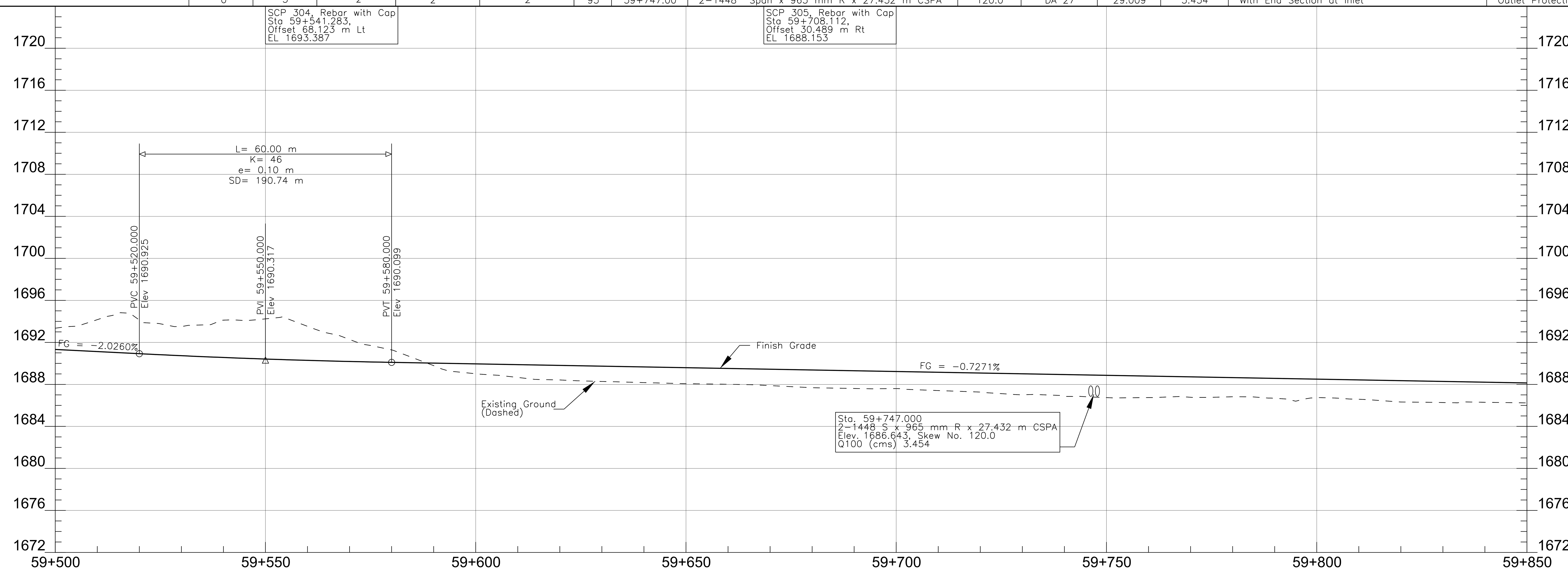
DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
				--NO SYMBOL--
0	5	2	2	2

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
94	59+520.00	1-610 mm x 11.582 m CSPC Under Turnout Lt.	90.0	n/a	n/a	n/a	4.5 m Wide Turnout Lt. With 2-Unit Cattleguard	Outlet Protection Not Req'd
95	59+747.00	2-1448 Span x 965 mm R x 27.432 m CSPA	120.0	DA 27	29.009	3.454	With End Section at Inlet	Outlet Protection Not Req'd

SCP 304, Rebar with Cap Sta 59+541.283, Offset 68.123 m Lt EL 1693.387

SCP 305, Rebar with Cap Sta 59+708.112, Offset 30.489 m Rt EL 1688.153



I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Plan & Profile Sheets - North\1_500 PLPs\Sht 24 N27 1-500 plp1 081417.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)2&4	25	105

FOR TRAFFIC SIGN LOCATIONS AND PAVEMENT MARKINGS FOR THIS SHEET SEE SHEET 39 of 105.

Contours Not Shown For Clarity

Sta. 59+928.00, Lt., Construct 4.5 m Wide Turnout W/2-Unit Cattleguard, Type 2 Gate, & 2-CSPA W/ Headwalls In Flat Btm Ditch.

Sta. 59+957.77, CL Existing 1-610 mm x 10.82 m CSPC, Remove, Clean, Salvage & Stockpile.

Sta. 59+904 to 59+930, Lt. Contractor Shall Obliterate, Scarify, & Reseed Existing Dirt Roads Adjacent To T/O w/in ROW As Shown.

Sta. 60+008.38, Existing 102 mm PVC Waterline X-ing w/356 mm ø x 60.96 m Steel Casing. Elev: 1683.97 Depth: -1.51m Below Existing Ground. The Contractor Shall Protect In-Place.

Sta. 60+058.00, Lt., Construct 4.5 m Wide Turnout W/2-Unit Cattleguard, Type 2 Gate, & 2-CSPA W/ Headwalls In Flat Btm Ditch.

N105(1): FOR PLAN & PROFILE DWG.-SEE SHT. 31 of 105

REVISED
11:01 am, Oct 03, 2018

FOR NEW CURB, GUTTER, & SIDEWALK LOCATIONS SEE TABLE ON SHEET 5. SEE SHT. 75 OF 106 FOR CONSTRUCTION DETAILS.

Sta 60+164.620, Existing Powerline X-ing. Elev: 1692.869 Clearance: 7.857m To Finish Grade. To Be Protected In-Place.

Route: N105

Project: N105(1)2&4 BOP-Sta. 0+000.00 = Project: N27(2-3)1,2&4 POT-Sta. 60+155.03

FOR EXISTING CURB, GUTTER, & SIDEWALK LOCATIONS SEE TABLE ON SHEET 9 of 105. TO BE PAID UNDER BID ITEM 20304-1000.

Sta. 60+190.00, Lt. & Rt. Install Type 3 Spillways. See Sht. 74 of 105 For Construction Details.

Sta. 59+939.89, 14.65 m Rt., Existing Power Pole To Be Protected In-Place.

Construct 50 m Earthen Dike

Sta 59+883.048, Existing Overhead Powerline X-ing Clearance: 5.546 m (To Finish Grade) To Be Raised By Owner.

Sta. 59+884.53, 17.10 m Rt., Existing Power Pole To Be Protected In-Place.

Sta 59+883.174, Existing Overhead Telephone Line X-ing Clearance: 10.334 m (To Finish Grade)

Sta. 60+000.91, 11.72 m Rt., Existing Power Pole To Be Relocated By Owner.

Sta. 60+058.00, Rt., Construct 4.5 m Wide Turnout w/2-Unit Cattleguard, Type 2 Gate, & CSPC.

Sta. 60+058.00, Rt., Construct 4.5 m Wide Turnout w/2-Unit Cattleguard, Type 2 Gate, & CSPC.

Sta. 60+059.21, 10.20 m Rt. Existing CSPC, Size Unknown, Remove, Clean, Salvage & Stockpile.

Sta. 60+123.36, 11.56 m Rt., Existing Power Pole To Be Relocated By Owner.

Sta. 60+138.00 Rt., Construct 4.5 m Wide Turnout W/2-Unit Cattleguard & Type 2 Gate

Sta. 60+164.33, 11.74 m Rt., Existing Power Pole To Be Relocated By Owner.

Sta. 60+109.33, 0.14 m Rt. Existing 610 mm CSPC, Remove, Clean, Salvage & Stockpile.

Sta. 60+114.09, 18.38 m Rt. Existing 1-610 mm x 14.38 m CSPC, Remove, Clean, Salvage & Stockpile.

Sta. 60+166.227 Existing Undergraound Gasline X-ing Elev. 1683.387 Depth -1.093 m From Existing Ground. To Be Lowered By Owner. In incoordination with the contractor during construction.

Sta. 60+164.368 Existing Underground Telephone Line X-ing Elev. 1683.268 Depth -1.235 m From Existing Ground. To Be Lowered By Owner

Sta. 60+170.33 Rt., Construct 9.48 m Wide Turnout w/Curb, Gutter, & Sidewalk w/No Cattleguard-No Gate & No CSPC As Shown.

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	●	✪	--NO SYMBOL--
0	1	4	7	7

SCALE: Meters
0 10 20 30 40 50

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
96a	59+957.50	1-889 mm S x 610 mm R x 29.870 m CSPA	120.0	DA 28	2.849	0.323	With End Section at Inlet	None
96	59+928.00	2-1626 mm S x 1092 mm R x 14.021 m CSPA Under Turnout Lt. in FBD	90.0	DA 29a	77.702	5.810	With Concrete Headwall at Inlet & Outlet	Under Turnout Lt.
98	60+058.00	2-1626 mm S x 1092 mm R x 11.582 m CSPA Under Turnout Lt. in FBD	90.0				With Concrete Headwall at Inlet & Outlet	Under Turnout Lt.
97	60+058.00	1-610 mm x 12.190 m CSPC Under Turnout Rt.	90.0	n/a	n/a	n/a	With End Section at Inlet & Outlet	Under Turnout Rt.
99	60+110.00	4-1067 mm x 737 mm x 24.994 m CSPA	90.0	DA 29	17.354	2.355	With End Section at Each Inlet	None

SCP 306, Rebar with Cap Sta 59+859.417, Offset 30.316 m Lt EL 1686.138

SCP 307, Rebar with Cap Sta 59+993.160, Offset 39.556 m Rt EL 1687.140

SCP 308, Rebar with Cap Sta 60+163.013, Offset 30.579 m Lt EL 1683.830

VERTICAL SCALE: 1 cm = 4 m
VERTICAL EXAGGERATION: 2.5

APPROVED
By Harold J Riley-PE at 11:02 am, Oct 03, 2018

L= 30.00 m
K= 59
e= -0.02 m
SD= 1324.27 m

PVC 59+985.000 Elev 1687.154
PVI 60+000.000 Elev 1687.045
PVT 60+015.000 Elev 1686.860

Sta. 59+883.174 Existing Overhead Telephone Line X-ing Elev: 1698.230 Ht. 10.334 m From Finish Grade

Sta. 59+883.048 Existing Overhead Powerline X-ing Elev: 1693.361 Ht. 5.456 m From Finish Grade

FG = -0.7271%

Finish Grade

FG = -1.2347%

Sta. 59+957.500 1-889 mm S x 610 mm R x 29.870 m CSPA Elev. 1685.700, Skew No. 120.0 Q100 (cms) 0.323

Existing Ground (Dashed)

Sta. 60+008.38, Existing 102 mm PVC Waterline X-ing With Steel Casing. Elev: 1683.97, Depth: 1.51m Below Existing Ground. The Contractor Shall Protect In-Place.

Sta. 60+110.000 4-1067 mm x 737 mm x 24.994 m CSPA Elev. 1684.469, Skew No. 90.0 Q100 (cms) 2.355

Sta. 60+164.620 Existing Powerline X-ing Elev: 1692.869 Ht. 7.857 m From Finish Grade

Project: N105(1)2&4-BOP POT-Sta. 60+155.03

Sta. 60+164.368 Existing Underground Telephone Line X-ing Elev. 1683.268 Depth -1.235 m From Existing Ground. To Be Lowered By Owner

Sta. 60+166.227 Existing Undergraound Gasline X-ing Elev. 1683.387 Depth -1.093 m From Existing Ground. To Be Lowered By Owner

FG = -0.0000% PVI 60+200.000 Elev 1684.576

1720 1716 1712 1708 1704 1700 1696 1692 1688 1684 1680 1676 1672

59+850 59+900 59+950 60+000 60+050 60+100 60+150 60+200

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	26	105

FOR TRAFFIC SIGN LOCATIONS & PAVEMENT MARKINGS FOR THIS SHEET SEE SHEET 38 of 105.

Sta. 60+295.00, Lt. & Rt. Install Type 3 Spillway.

Sta. 60+285.80, 15.9 m Lt., Existing Power Pole To Be Protected In Place

Sta. 60+213.99, Lt, Existing Turnout To Be Eliminated. Existing 4-Unit Cattleguard w/Wing Brace And Existing Curb, Gutter, & Sidewalk To Be Removed Under Bid Item 20304-1000. Install 12.00 m New Barbed Wire Fencing To Close Opening. Remove, Clean, Salvage & Stockpile Existing 1-610 mm x 24.44 m CSPC

Sta. 60+266.89, Lt., Construct New 6.706 m Wide Turnout w/Curb, Gutter, & Sidewalk To Match Proposed Turnout From Justice Center. Install New 1-711 mm S x 508 mm R x 17.07 m CSPA w/2-End Sections At Inlet & Outlet. No Cattleguard To Be Installed.

Sta. 60+367.98, Lt., Construct New 6.706 m Wide Turnout w/Curb, Gutter, & Sidewalk To Match Proposed Turnout From Justice. Install New 1-711 mm S x 508 mm R x 17.07 m CSPA With End Sections At Inlet & Outlet. No Cattleguard To Be Installed.

Sta. 60+400.00, Lt. & Rt. Install Type 3 Spillway.

Sta. 60+415.955 Existing Underground Telephone Line X-ing Elev. 1681.090 Depth -1.133 m From Existing Ground. To Be Lowered By Owner

Sta. 60+439.40, Lt, Existing Turnout To Be Eliminated. Existing 4-Unit Cattleguard w/ Wing Brace And Existing Curb, Gutter, & To Be Removed Under Bid Item 20304-1000. Install 14.32 m New Barbed Wire Fencing To Close Opening. Remove, Clean, Salvage & Stockpile Existing 1-610 mm x 24.33 m CSPC

Sta. 60+416.30, 14.0 m Lt., Existing Telephone Junction Box To Be Protected In Place.

Sta. 60+457.01, Lt., Construct New 12.192 m Wide Turnout w/Curb, Gutter, & Sidewalk To Match Proposed Turnout From Justice Center. Install New 1-711 mm S x 508 mm R x 21.95 m CSPA w/2-End Sections At Inlet & Outlet. No Cattleguard To Be Installed.

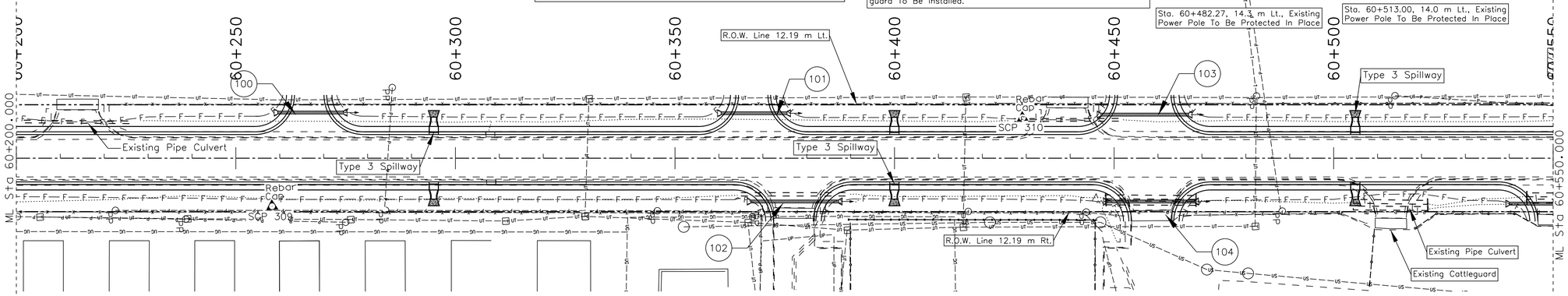
Sta. 60+505.00, Lt. & Rt. Install Type 3 Spillway.

Sta. 60+482.25, 13.5 m Lt., Existing Telephone Junction Box To Be Protected In Place.

Sta. 60+482.27, 14.1 m Lt., Existing Power Pole To Be Protected In Place

Sta. 60+482.266 Existing Underground Telephone Line X-ing Elev. 1680.780 Depth -0.711 m From Existing Ground. To Be Lowered By Owner

Sta. 60+513.00, 14.0 m Lt., Existing Power Pole To Be Protected In Place



Sta. 60+274.85, 14.5 m Rt., Existing Power Pole To Be Protected By Owner.

Sta. 60+283.80, 11.5 m Rt., Existing Power Pole To Be Relocated By Others

Sta. 60+376.99, Rt. Existing 4-Unit Cattleguard w/Wing Brace And Curb, Gutter, & Sidewalk To Be Removed Under Bid Item 20304-1000. Construct New 9.00 m Wide Turnout w/New Curb, Gutter, & Sidewalk As Shown. Install New 1-711 mm S x 508 mm R x 19.51 m CSPA w/2-End Sections At Inlet & Outlet. Remove, Clean, Salvage & Stockpile Existing 1-762 mm x 24.22 m CSPC

Sta. 60+389.30, 16.1 m Rt., Existing Telephone Junction Box To Be Protected In Place.

Sta. 60+488.30, 9.8 m Rt., Existing Power Pole To Be Protected In Place.

Sta. 60+513.70, Rt., Existing Turnout To Be Eliminated. Existing 3-Unit Cattle guard w/Wing Brace, Existing Curb, Gutter, & Sidewalk And Existing Concrete Headwall To Be Removed Under Bid Item 20304-1000. Remove, Salvage & Stockpile Existing 2-889 mm S x 610 mm R x 17.02 m CSPA

Sta. 60+276.00, 13.8 m Rt. Existing Telephone Junction Box To Be Protected In Place.

Sta. 60+311.50, 14.0 m Rt., Existing Telephone Junction Box To Be Protected In Place.

Sta. 60+329.960 Existing Underground Telephone Line X-ing Elev. 1682.110 Depth -0.767 m From Existing Ground. To Be Lowered By Owner

Sta. 60+284.599, CL., Existing Overhead Powerline X-ing. Elev. 1689.06 Height: 5.418 m To Finish Grade

Sta. 60+329.50, 13.0 m Rt., Existing Telephone Junction Box To Be Protected In Place

Sta. 60+346.00, 12.0 m Rt. Existing Power Pole To Be Protected In Place

Sta. 60+415.80, 15.5 m Rt. Existing Telephone Junction Box To Be Protected In Place.

Sta. 60+416.85, 12.2m Rt., Existing Power Pole To Be Protected In Place

Sta. 60+443.70, 12.4 m Rt., Existing Power Pole To Be Protected In Place

Sta. 60+458.23, Rt. Construct New 9.00 m Wide Turnout w/Curb, Gutter, & Sidewalk As Shown. Install New 1-711 mm S x 508 mm R x 17.07 m CSPA w/2-End Sections At Inlet & Outlet. Existing 4-Unit Cattleguard w/Wing Brace, Existing Curb, Gutter, & Sidewalk And Existing Concrete Headwalls To Be Removed Under Bid Item 20304-1000. Remove, Clean, Salvage & Stockpile Existing 2-889 mm S x 610 mm R x 20.76 m CSPA

Sta. 60+482.00, 15.3 m Rt., Existing Telephone Junction Box To Be Protected In Place.

Sta. 60+486.255, CL., Existing Overhead Powerline X-ing. Elev. 1690.713 Height: 8.637 m To Finish Grade

Sta. 60+550.00, Rt. Construct New 7.00m Wide Turnout w/Curb, Gutter, & Sidewalk As Shown. Install New 1-711 mm S x 508 mm R x 17.07 m CSPA w/2-End Sections At Inlet & Outlet. Existing 4-Unit Cattleguard w/Wing Brace, Curb, Gutter, & Sidewalk, And Existing Concrete Headwall To Be Removed Under Bid Item 20304-1000. Remove, Clean, Salvage & Stockpile Existing 2-889 mm S x 610 mm R x 12.20 m CSPA

SCALE: Meters
0 10 20 30 40 50

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
				--NO SYMBOL--
0	0	0	0	0

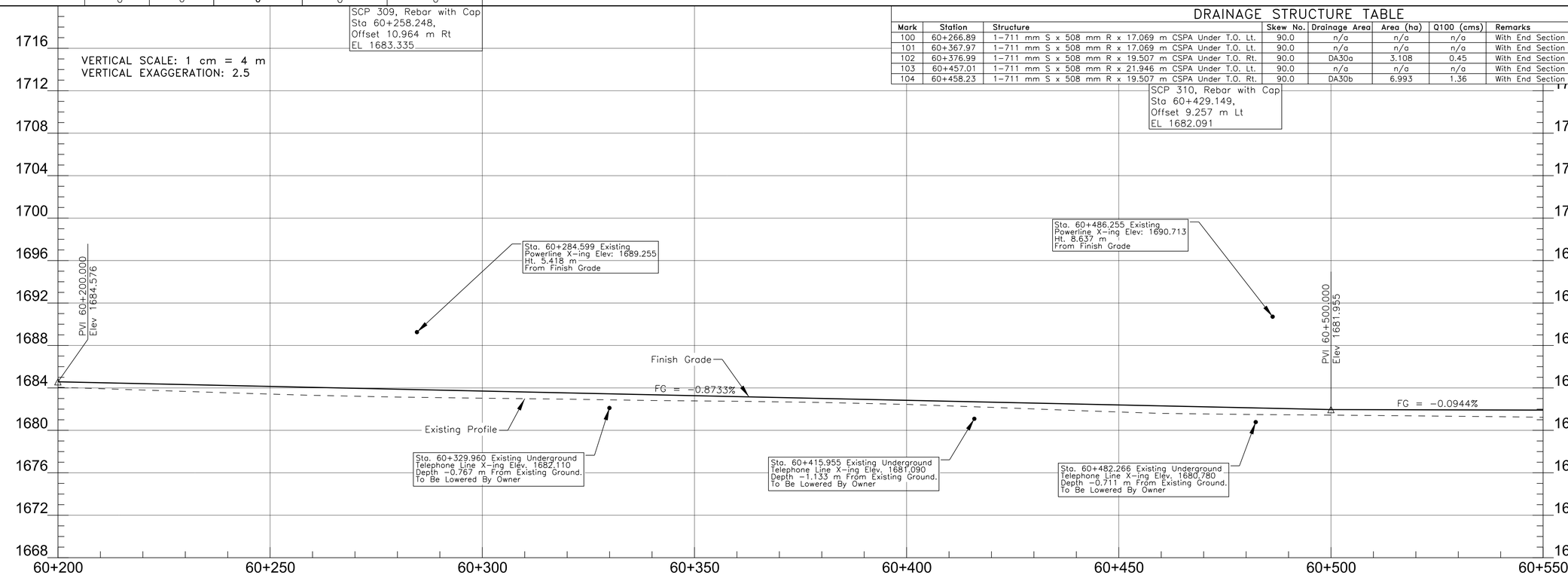
SCP 309, Rebar with Cap
Sta 60+258.248,
Offset 10.964 m Rt
EL 1683.335

SCP 310, Rebar with Cap
Sta 60+429.149,
Offset 9.257 m Lt
EL 1682.091

VERTICAL SCALE: 1 cm = 4 m
VERTICAL EXAGGERATION: 2.5

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
100	60+266.89	1-711 mm S x 508 mm R x 17.069 m CSPA Under T.O. Lt.	90.0	n/a	n/a	n/a	With End Section at Inlet	Under Turnout Lt.
101	60+367.97	1-711 mm S x 508 mm R x 17.069 m CSPA Under T.O. Lt.	90.0	n/a	n/a	n/a	With End Section at Inlet	Under Turnout Lt.
102	60+376.99	1-711 mm S x 508 mm R x 19.507 m CSPA Under T.O. Rt.	90.0	DA30a	3.108	0.45	With End Section at Inlet	Under Turnout Rt.
103	60+457.01	1-711 mm S x 508 mm R x 21.946 m CSPA Under T.O. Lt.	90.0	n/a	n/a	n/a	With End Section at Inlet	Under Turnout Lt.
104	60+458.23	1-711 mm S x 508 mm R x 19.507 m CSPA Under T.O. Rt.	90.0	DA30b	6.993	1.36	With End Section at Inlet	Under Turnout Rt.



I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Plan & Profile Sheets - North\1_500 PLPs\Sht 26 N27 1-500 plp3 rev 081517.dgn

$PENTBL$

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4−2)2&4	27	105

Sta. 60+555.588 Existing Underground Telephone Line X−ing Encased in 102 mm PVC Elev. 1680.220, Depth −0.982 m From Existing Ground To Be Relocated By Owner

Sta. 60+570.80, Lt. Existing Turnout To Be Eliminated. Existing 4−Unit Cattleguard w/Wing Brace, Curb, Gutter, & Sidewalk To Be Removed Under Bid Item 20304−1000. Remove, Clean, Salvage & Stockpile Existing 1−610 mm x 24.35 m CSPC.

Sta. 60+556.940 Existing Underground Gasline X−ing Elev. 1680.038 Depth −1.157 m From Existing Ground. To Be Lowered By Owner

Sta. 60+558.30, 11.3 m Lt., Existing Power Pole To Be Relocated By Owner.

Sta. 60+635.00 11.5 m Lt., Existing Power Pole To Be Relocated By Owner.

Sta. 60+610.00, Lt. & Rt. Install Type 3 Spillway.

Sta. 60+711.80, 11.5 m Lt., Existing Power Pole To Be Relocated By Owner.

Sta. 60+648.052, 8.0 m Lt., Existing 1−610 mm x 12.084 m CSPC Remove, Clean, Salvage & Stockpile.

Sta. 60+720.00, Lt., Install Type 3 Spillway.

Sta. 60+741.20, 11.7 m Lt., Existing Power Pole To Be Protected In Place.

Sta. 60+704.23, Lt., Construct New 9.48 m Wide Turnout. Install New 1−711 mm S x 508 mm R X 18.48 m CSPA w/2−End Sections At Inlet & Outlet. Existing 4−Unit Cattleguard w/Wing Brace To Be Removed Under Bid Item 20304−1000. Remove, Clean, Salvage & Stockpile Existing 1−610 mm 31.09 m CSPC

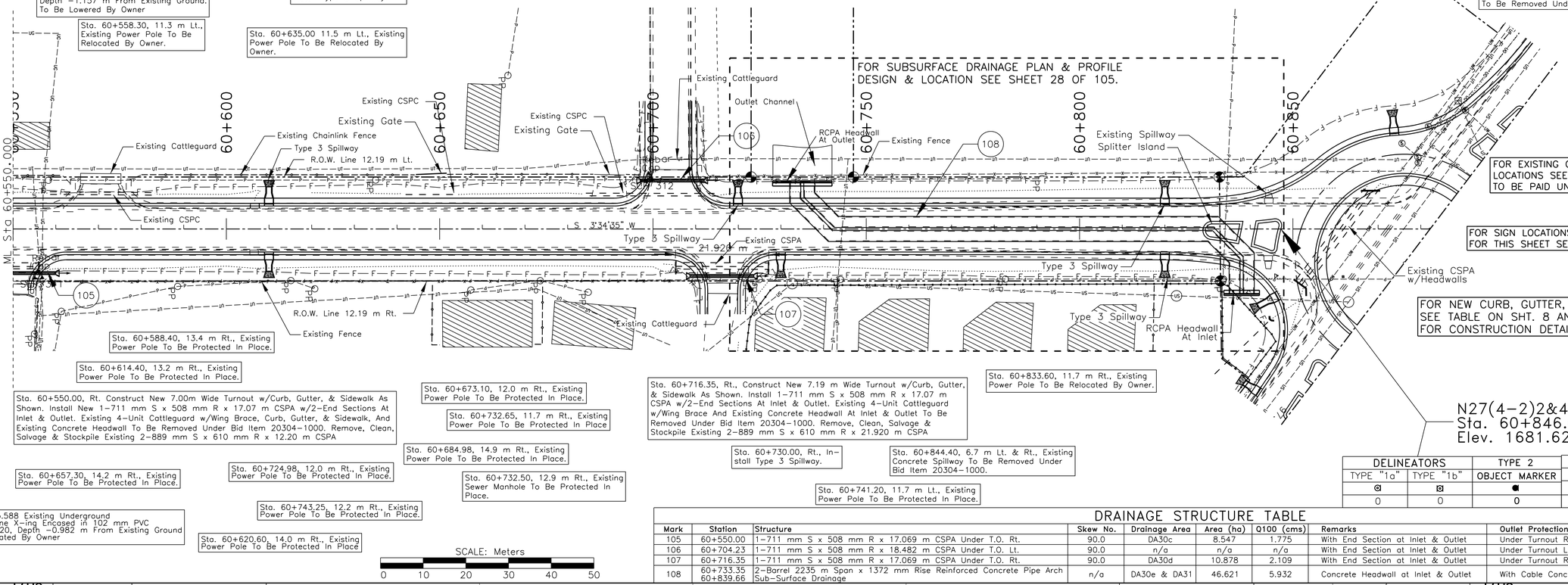
Sta. 60+822.70, 15.7 m Rt., Existing Sewer Manhole To Be Protected In Place.

Sta. 60+820.00, Lt. & Rt., Install Type 3 Spillway.

Sta. 60+834.145, CL., Existing Overhead Powerline X−ing. Elev: 1689.886 Height: 8.268 To Finish Grade

Sta. 60+860.33, CL, Remove, Clean, Salvage Existing 1−1067 mm S x 737 mm R x 27.0 m CSPA. Existing Concrete Headwalls At Inlet & Outlet To Be Removed Under Bid Item 20304−1000.

Sta. 60+862.57, CL, Remove, Clean, Salvage Existing 1−1067 mm S x 737 mm R x 27.318 m CSPA. Existing Concrete Headwalls At Inlet & Outlet To Be Removed Under Bid Item 20304−1000.



FOR EXISTING CURB, GUTTER, & SIDEWALK LOCATIONS SEE TABLE ON SHEET 8 of 105. TO BE PAID UNDER BID ITEM 20304−1000.

FOR SIGN LOCATIONS & PAVEMENT MARKINGS FOR THIS SHEET SEE SHEET 38 of 105

FOR NEW CURB, GUTTER, & SIDEWALK LOCATIONS SEE TABLE ON SHT. 8 AND SEE SHT. 74 of 105 FOR CONSTRUCTION DETAILS.

N27(4−2)2&4 EOP
Sta. 60+846.00
Elev. 1681.629

Sta. 60+588.40, 13.4 m Rt., Existing Power Pole To Be Protected In Place.

Sta. 60+614.40, 13.2 m Rt., Existing Power Pole To Be Protected In Place.

Sta. 60+550.00, Rt. Construct New 7.00m Wide Turnout w/Curb, Gutter, & Sidewalk As Shown. Install New 1−711 mm S x 508 mm R x 17.07 m CSPA w/2−End Sections At Inlet & Outlet. Existing 4−Unit Cattleguard w/Wing Brace, Curb, Gutter, & Sidewalk, And Existing Concrete Headwall To Be Removed Under Bid Item 20304−1000. Remove, Clean, Salvage & Stockpile Existing 2−889 mm S x 610 mm R x 12.20 m CSPA

Sta. 60+673.10, 12.0 m Rt., Existing Power Pole To Be Protected In Place.

Sta. 60+732.65, 11.7 m Rt., Existing Power Pole To Be Protected In Place

Sta. 60+716.35, Rt., Construct New 7.19 m Wide Turnout w/Curb, Gutter, & Sidewalk As Shown. Install 1−711 mm S x 508 mm R x 17.07 m CSPA w/2−End Sections At Inlet & Outlet. Existing 4−Unit Cattleguard w/Wing Brace And Existing Concrete Headwall At Inlet & Outlet To Be Removed Under Bid Item 20304−1000. Remove, Clean, Salvage & Stockpile Existing 2−889 mm S x 610 mm R x 21.920 m CSPA

Sta. 60+833.60, 11.7 m Rt., Existing Power Pole To Be Relocated By Owner.

Sta. 60+684.98, 14.9 m Rt., Existing Power Pole To Be Protected In Place.

Sta. 60+724.98, 12.0 m Rt., Existing Power Pole To Be Protected In Place.

Sta. 60+730.00, Rt., Install Type 3 Spillway.

Sta. 60+844.40, 6.7 m Lt. & Rt., Existing Concrete Spillway To Be Removed Under Bid Item 20304−1000.

Sta. 60+657.30, 14.2 m Rt., Existing Power Pole To Be Protected In Place.

Sta. 60+732.50, 12.9 m Rt., Existing Sewer Manhole To Be Protected In Place.

Sta. 60+741.20, 11.7 m Lt., Existing Power Pole To Be Protected In Place.

Sta. 60+743.25, 12.2 m Rt., Existing Power Pole To Be Protected In Place.

Sta. 60+555.588 Existing Underground Telephone Line X−ing Encased in 102 mm PVC Elev. 1680.220, Depth −0.982 m From Existing Ground To Be Relocated By Owner

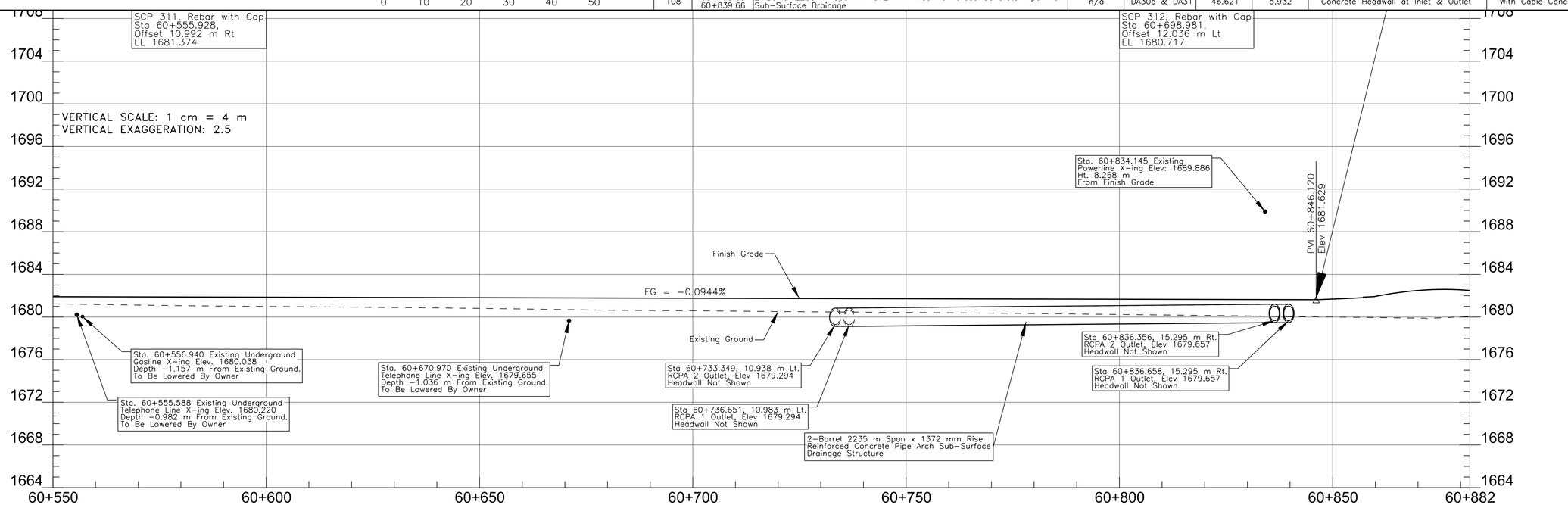
Sta. 60+620.60, 14.0 m Rt., Existing Power Pole To Be Protected In Place

SCALE: Meters
0 10 20 30 40 50

DELINEATORS		TYPE 2	RIGHT−OF−WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊙	⊡	●	⊕	--NO SYMBOL--
0	0	0	2	2

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
105	60+550.00	1−711 mm S x 508 mm R x 17.069 m CSPA Under T.O. Rt.	90.0	DA30c	8.547	1.775	With End Section at Inlet & Outlet	Under Turnout Rt.
106	60+704.23	1−711 mm S x 508 mm R x 18.482 m CSPA Under T.O. Lt.	90.0	n/a	n/a	n/a	With End Section at Inlet & Outlet	Under Turnout Lt.
107	60+716.35	1−711 mm S x 508 mm R x 17.069 m CSPA Under T.O. Rt.	90.0	DA30d	10.878	2.109	With End Section at Inlet & Outlet	Under Turnout Rt.
108	60+733.35 60+839.66	2−Barrel 2235 m Span x 1372 mm Rise Reinforced Concrete Pipe Arch Sub−Surface Drainage	n/a	DA30e & DA31	46.621	5.932	Concrete Headwall at Inlet & Outlet	With Cable Concrete Lined Open Channel on Outlet



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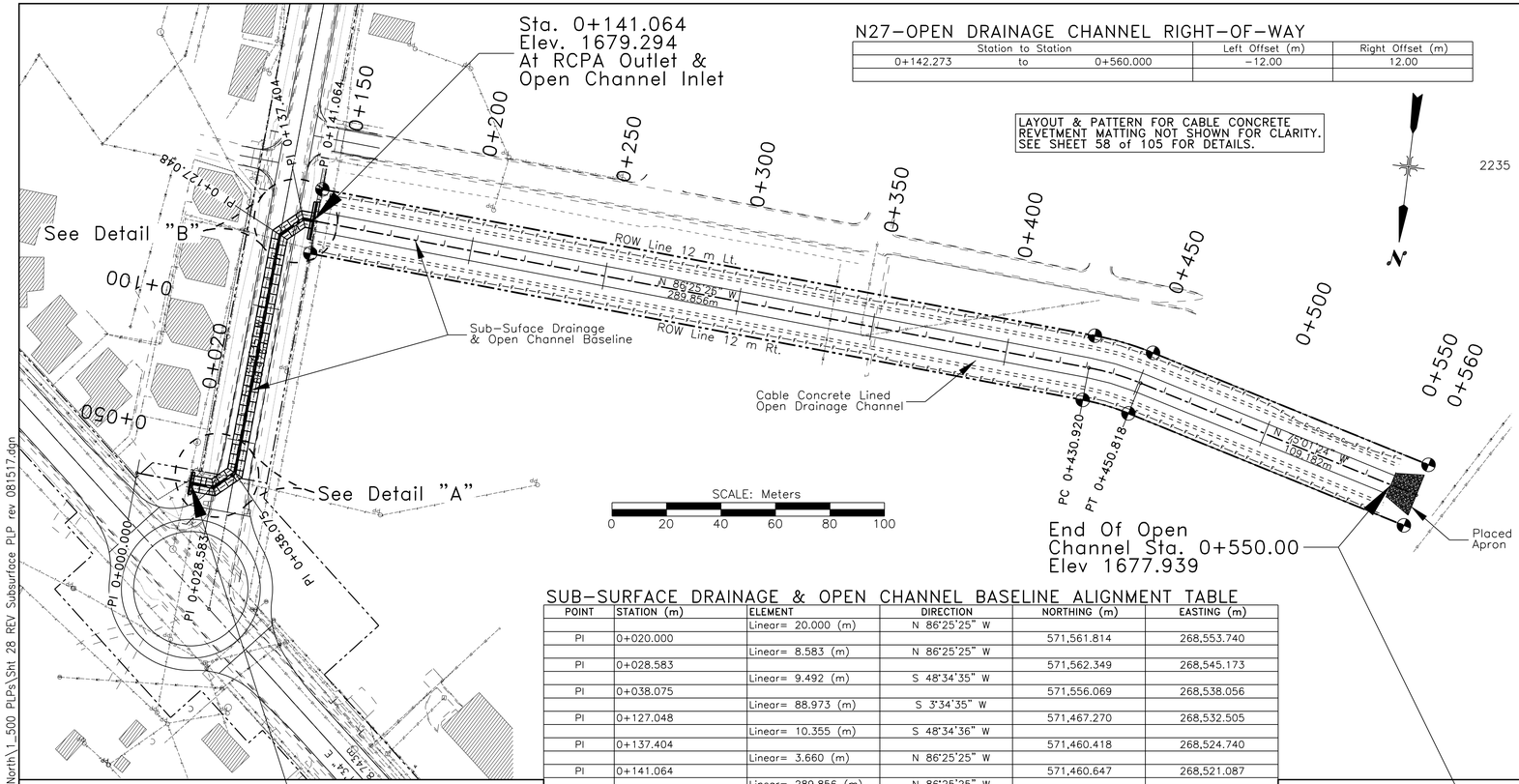
$PENTBL$

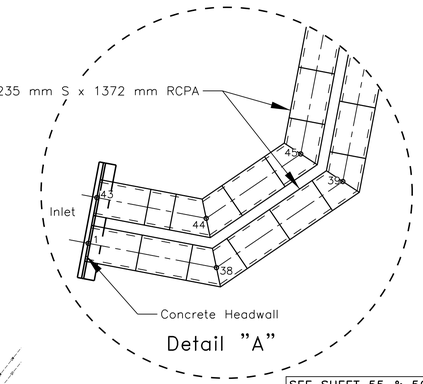
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	28	105

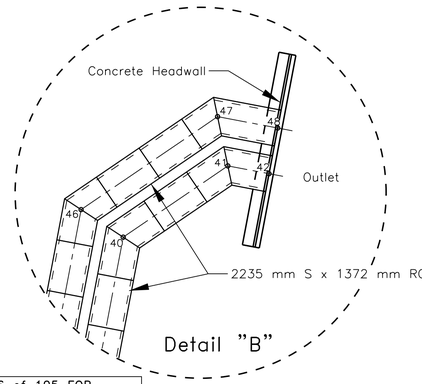


N27-OPEN DRAINAGE CHANNEL RIGHT-OF-WAY

Station to Station			Left Offset (m)	Right Offset (m)
0+142.273	to	0+560.000	-12.00	12.00

LAYOUT & PATTERN FOR CABLE CONCRETE REVETMENT MATTING NOT SHOWN FOR CLARITY. SEE SHEET 58 of 105 FOR DETAILS.





SEE SHEET 55 & 56 of 105 FOR PIPE ELBOW INSTALLATION DETAILS & INLET HEADWALL CONSTRUCTION DETAILS.

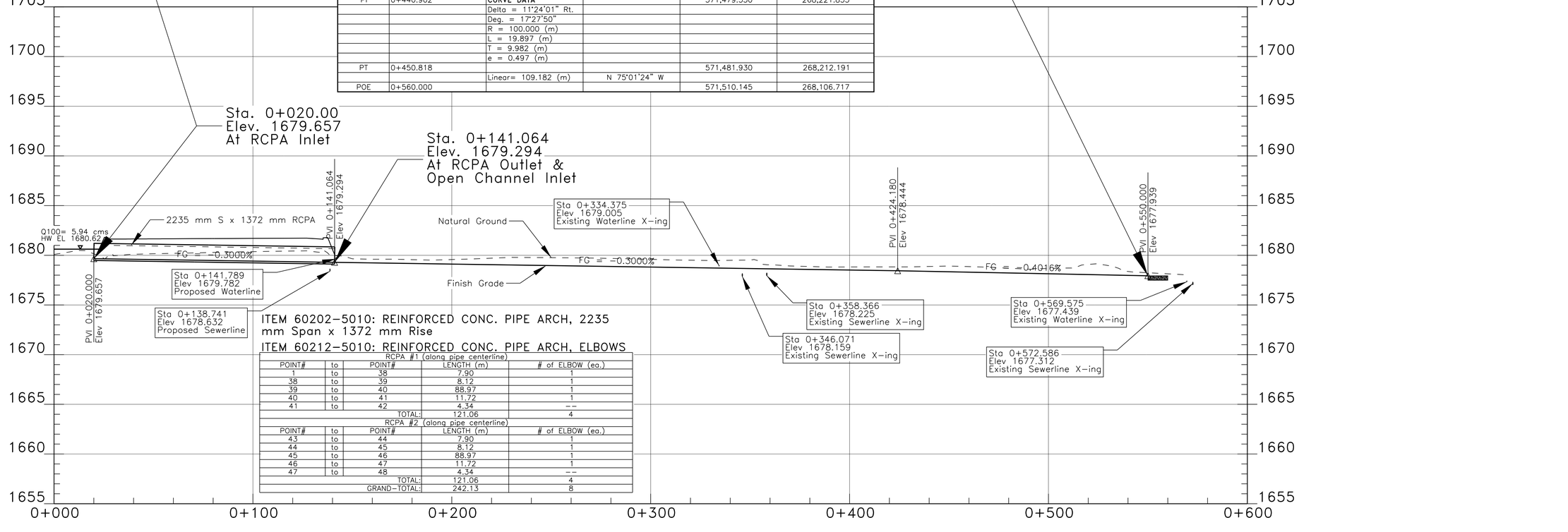
SUB-SURFACE DRAINAGE STRUCTURE TABLE

Point No.	Northing	Easting	Elevation	Desciption
1	571,563.461	268,553.843	1,679.657	RCPA #1 (Inlet)
38	571,564.039	268,544.593	1,679.629	RCPA #1 (Elbow)
39	571,556.855	268,536.451	1,679.597	RCPA #1 (Elbow)
40	571,468.055	268,530.901	1,679.330	RCPA #1 (Elbow)
41	571,462.108	268,524.161	1,679.303	RCPA #1 (Elbow)
42	571,462.294	268,521.190	1,679.294	RCPA #1 (Outlet)
43	571,560.167	268,553.637	1,679.657	RCPA #2 (Inlet)
44	571,560.659	268,545.752	1,679.633	RCPA #2 (Elbow)
45	571,555.284	268,539.660	1,679.609	RCPA #2 (Elbow)
46	571,466.484	268,534.110	1,679.342	RCPA #2 (Elbow)
47	571,458.728	268,525.320	1,679.307	RCPA #2 (Elbow)
48	571,458.999	268,520.984	1,679.294	RCPA #2 (Outlet)

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊡	⊡	■	⊕	--NO SYMBOL--
0	0	0	8	8

SUB-SURFACE DRAINAGE & OPEN CHANNEL BASELINE ALIGNMENT TABLE

POINT	STATION (m)	ELEMENT	DIRECTION	NORTHING (m)	EASTING (m)
		Linear= 20.000 (m)	N 86°25'25" W		
PI	0+020.000			571,561.814	268,553.740
		Linear= 8.583 (m)	N 86°25'25" W		
PI	0+028.583			571,562.349	268,545.173
		Linear= 9.492 (m)	S 48°34'35" W		
PI	0+038.075			571,556.069	268,538.056
		Linear= 88.973 (m)	S 3°34'35" W		
PI	0+127.048			571,467.270	268,532.505
		Linear= 10.355 (m)	S 48°34'36" W		
PI	0+137.404			571,460.418	268,524.740
		Linear= 3.660 (m)	N 86°25'25" W		
PI	0+141.064			571,460.647	268,521.087
		Linear= 289.856 (m)	N 86°25'25" W		
PC	0+430.920			571,478.728	268,231.795
PI	0+440.902	CURVE DATA		571,479.350	268,221.833
		Delta = 11°24'01" Rt.			
		Deg. = 17°27'50"			
		R = 100.000 (m)			
		L = 19.897 (m)			
		T = 9.982 (m)			
		e = 0.497 (m)			
PT	0+450.818			571,481.930	268,212.191
		Linear= 109.182 (m)	N 75°01'24" W		
POE	0+560.000			571,510.145	268,106.717



ITEM 60202-5010: REINFORCED CONC. PIPE ARCH, 2235 mm Span x 1372 mm Rise

ITEM 60212-5010: REINFORCED CONC. PIPE ARCH, ELBOWS

RCPA #1 (along pipe centerline)				
POINT#	to	POINT#	LENGTH (m)	# of ELBOW (ea.)
1	to	38	7.90	1
38	to	39	8.12	1
39	to	40	88.97	1
40	to	41	11.72	1
41	to	42	4.34	--
		TOTAL:	121.06	4
RCPA #2 (along pipe centerline)				
POINT#	to	POINT#	LENGTH (m)	# of ELBOW (ea.)
43	to	44	7.90	1
44	to	45	8.12	1
45	to	46	88.97	1
46	to	47	11.72	1
47	to	48	4.34	--
		TOTAL:	121.06	4
		GRAND-TOTAL:	242.13	8

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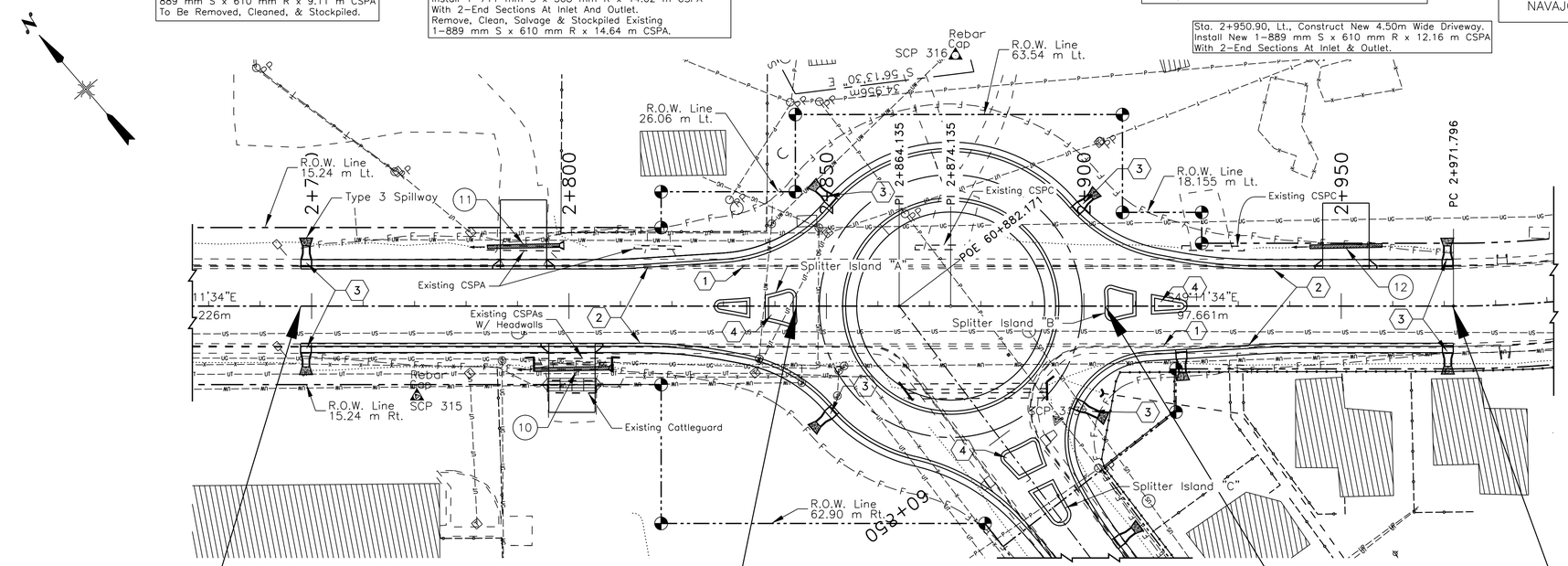
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-4)2&4	29	105
			N7	N7(2-3)2&4		

Sta. 2+817.23, 11.37 m Lt., Existing 1-889 mm S x 610 mm R x 9.11 m CSPA To Be Removed, Cleaned, & Stockpiled.

Sta. 2+791.17, Lt., Construct New 9.00 m Wide Driveway. Install 1-711 mm S x 508 mm R x 14.02 m CSPA With 2-End Sections At Inlet And Outlet. Remove, Clean, Salvage & Stockpiled Existing 1-889 mm S x 610 mm R x 14.64 m CSPA.

Sta. 2+872.80, Lt., Existing Turnout To Be Eliminated. Remove, Clean, Salvage & Stockpile Existing 1-889 mm S x 610 mm R x 11.14 m CSPA

Sta. 2+950.90, Lt., Construct New 4.50m Wide Driveway. Install New 1-889 mm S x 610 mm R x 12.16 m CSPA With 2-End Sections At Inlet & Outlet.



1. FOR EXISTING CURB, GUTTER, & SIDEWALK LOCATIONS SEE TABLE ON SHEET 8 of 105. TO BE PAID UNDER BID ITEM 20304-1000.
2. FOR NEW CURB, GUTTER, & SIDEWALK LOCATIONS SEE TABLE ON SHEET 9 of 105. SEE SHT. 75 of 105 FOR CONSTRUCTION DETAILS.
3. FOR LOCATIONS AND CONSTRUCTION DETAILS OF NEW CONCRETE SPILLWAY (TYPE 3)-SEE TABLE ON SHEET 74 of 105.
4. FOR CENTER ISLAND & SPLITTER DETAILS SEE SHT. 47-48 FOR SPLITTER ISLAND LOCATIONS SEE TABLE ON SHT 9 of 105. SEE SHT. 47-50 of 105 FOR LAYOUT, CONSTRUCTION DETAILS AND GRADING PLAN.

FOR SOLAR LED Markers LUMINARES\LED LIGHTING LOCATIONS SEE TABLE ON SHEET 51 of 105. FOR INSTALLATION DETAILS SEE SHEET 52 & 53 of 105.

FOR TRAFFIC SIGN LOCATIONS & PAVEMENT MARKINGS FOR THIS SHEET SEE SHEET 37-46, 49, & 54 of 105.

EXISTING & PROPOSED UTILITIES NOT SHOWN FOR CLARITY. SEE SHT. 30 of 105 FOR LOCATION, NOTES AND OTHER INFORMATION.

N7(2-3)2&4 BOP
Sta. 2+747.899
Elev. 1679.397

Sta. 2+800.57, Rt., Construct New 9.00 m Wide Driveway With New 4-Unit Cattleguard. Install 1-711 mm S x 508 mm R x 16.46 m CSPA With End Sections At Inlet And Outlet. Remove, Clean, Salvage & Stockpile Existing 2-889 mm x 610 mm R x 15.38 m CSPC. Existing Headwall & Cattleguard To Be Removed Under Bid Item 20304-1000.

N7(2-3)2&4
Sta. 2+844.135
Elev. 1681.628

SCALE: Meters
0 10 20 30 40 50

N7(2-3)2&4
Sta. 2+904.135
Elev. 1681.628

DELINEATORS		TYPE 2	RIGHT-OF-WAY	
TYPE "1a"	TYPE "1b"	OBJECT MARKER	MONUMENTS	MARKERS
⊡	⊡	●	◒	--NO SYMBOL--
0	0	0	13	13

DRAINAGE STRUCTURE TABLE

Mark	Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
10	2+800.58	1-711 mm S x 508 mm R x 16.46 m CSPA	90.0	n/a	n/a	n/a	End Section at Inlet & Outlet	Under Turnout Rt.
11	2+791.17	1-711 mm S x 508 mm R x 14.02 m CSPA	90.0	DA32	6.48	0.825	End Section at Inlet & Outlet	Under Turnout Lt.
12	2+950.90	1-889 mm S x 610 mm R x 12.16 m CSPA	90.0				End Section at Inlet & Outlet	Under Turnout Lt.

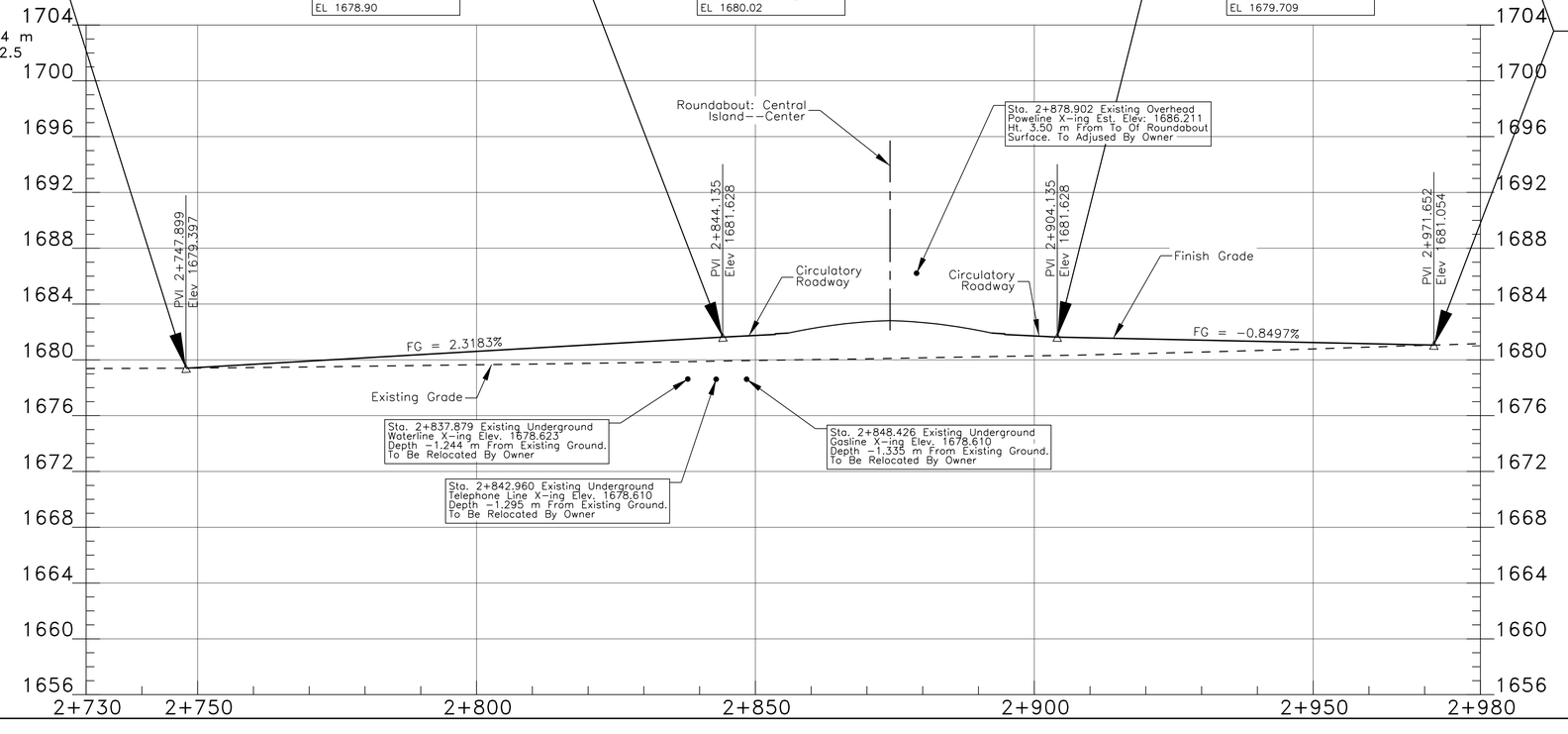
N7(2-3)2&4 EOP
Sta. 2+971.770
Elev. 1681.054

SCP 315, Rebar with Cap Sta 2+770.471, Offset 17.506 m Rt EL 1678.90

SCP 316, Rebar with Cap Sta 2+875.063, Offset 63.54 m Lt EL 1680.02

SCP 313, Rebar with Cap Sta 60+833.942, Offset 10.973 m Rt EL 1679.709

VERTICAL SCALE: 1 cm = 4 m
VERTICAL EXAGGERATION: 2.5



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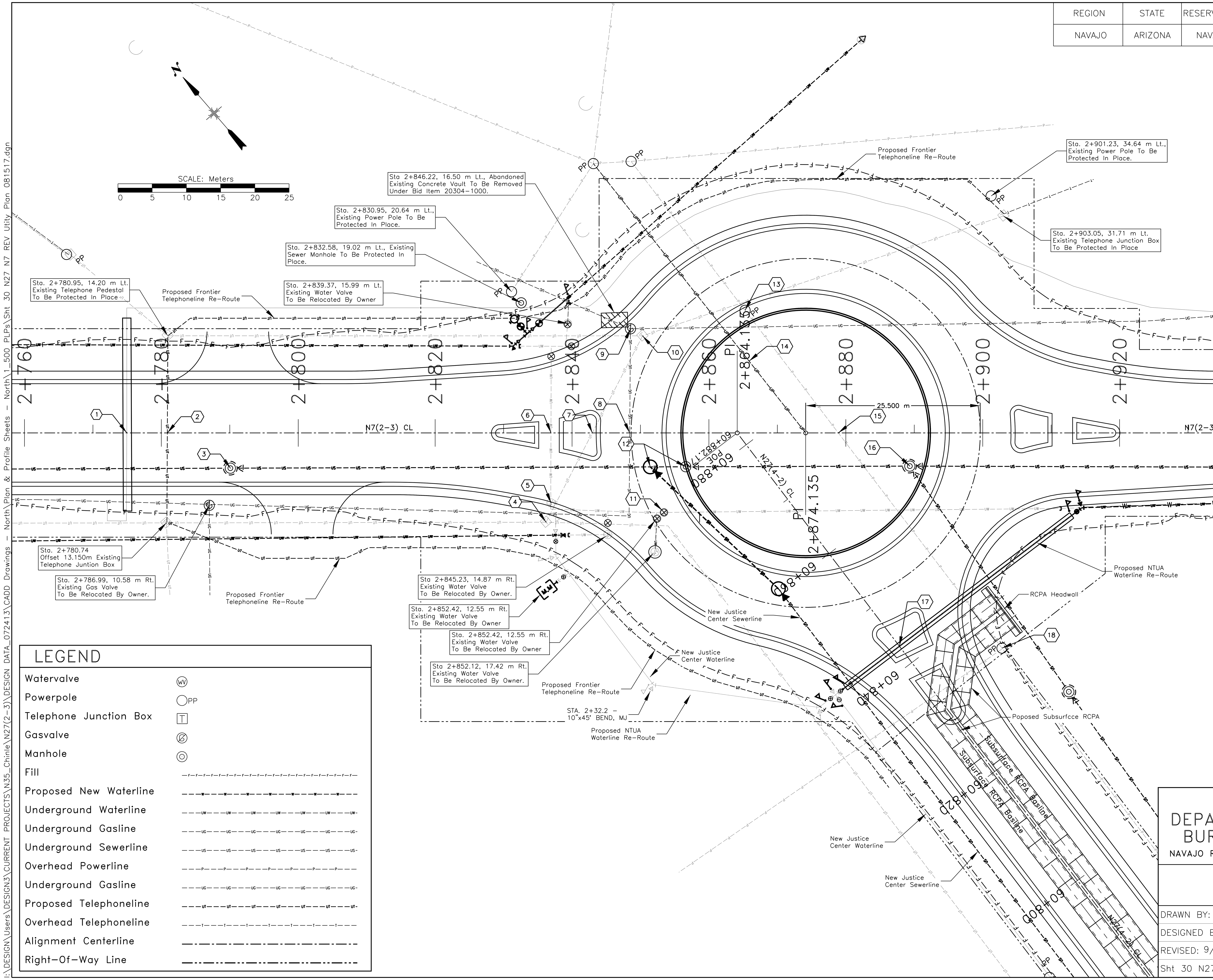
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(2-3)2&4	30	106



1. Sta 2+774.95, CL., Proposed Underground Gasline X-ing With 8" Steel Casing.
2. Sta 2+780.90, CL., Proposed Underground Telephone Line X-ing. To Be Installed By Owner.
3. Sta. 2+790.08, 5.15 m Rt., Existing Sewer Manhole To Be Vertically Field Adjusted To Match Proposed Field Conditions. See Sheet 95 of 105 For Adjustment Details.
4. Sta. 2+836.20, 13.05 m Rt. Existing Telephone Junction Box
5. Sta 2+836.93, 10.23 m Rt. Existing Water Valve To Be Relocated By Owner.
6. Sta 2+837.88, CL, Existing Waterline X-ing To Be Relocated By Owners
7. Sta 2+837.88, CL, Existing Underground Telephoneline X-ing To Be Abandoned In-Place.
8. Sta. 2+848.43, CL, Existing Gasline X-ing To Be Abandoned In-Place.
9. Sta. 2+848.54, 15.22 m Lt. Existing Gas Valve To Be Abandoned In-Place.
10. Sta. 2+850.31, 14.19 m Lt., Existing Telephone Pedestal To Be Relocated By Owner.
11. Sta. 2+853.43, 11.62 m Rt., Existing Water Valve To Be Relocated By Owner.
12. Sta. 2+855.98, 4.94 m Rt., Existing Sewer Manhole To Be Abandoned In-Place. New Manhole Shall Be Installed & Vertically Adjusted To Finish Grade at Sta. 2+251.427 4.94 m Rt. As Tie-In Point For Re-Aligned 8" PVC Sewer Line For N.N.J.C. See Sheet 94 of 105 For Details
13. Sta. 2+865.28, 17.92 m Lt., Existing Power Pole To Be Relocated By Owners.
14. 3-Wire, 15A, 220V, 38mm ø PVC Electric Conduit Under Roadway & Central Island Dome. See Sht. 50 of 105.
15. Sta. 2+878.90, CL Existing, Overhead Power Line X-ing To Be Relocated By Owner. Elev.: 1689.77, (Approx.) Clearance: 7.05 m (To Top of Dome).
16. Sta. 2+889.35, 4.85 m Rt., Existing Cinder Block Sewer Manhole To Be Reconstructed With New Concrete Collar & Vertically Field Adjusted To Match New Finish Grade. See Sheet 94 of 105 For Adjustment Details.
17. New Waterline Crossing @ N27 Sta. 60+830.72 142.2' x 10" PVC-C900 W/ 136.2' x 24" Steel Casing To Be Installed By NTUA Prior to Conctruction.
18. Sta. 2+902.81, Offset 31.460m Existing Powerpole To Relocated By Owner

LEGEND

- Watervalve — WV
- Powerpole — PP
- Telephone Junction Box — T
- Gasvalve
- Manhole
- Fill
- Proposed New Waterline
- Underground Waterline
- Underground Gasline
- Underground Sewerline
- Overhead Powerline
- Underground Gasline
- Proposed Telephoneline
- Overhead Telephoneline
- Alignment Centerline
- Right-Of-Way Line

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

EXISTING AND PROPOSED UTLITY LAYOUT DETAILS

DRAWN BY: NRDOT DATE: 8/15/2017
DESIGNED BY: NRDOT DATE: 8/15/2017
REVISED: 9/12/2017 BY: Leroy.Toledo
Sht 30 N27 N7 REV Utity Plan 081517.dgn

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

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N105	N105(1)2&4	31	105

FOR EXISTING CURB, GUTTER, & SIDEWALK LOCATIONS SEE TABLE ON SHEET 8 of 105.

FOR NEW CURB, GUTTER, & SIDEWALK LOCATIONS SEE TABLE ON SHEET 9 OF 105. FOR CONSTRUCTION DETAILS SEE SHT 75 OF 106.

FOR TRAFFIC SIGN LOCATIONS & PAVEMENT MARKINGS SEE SHEET 43 of 105.

Sta. 0+018.78, m Lt. To 0+048.04 Lt. Install Concrete Cable Revetment Matting As Shown. See Sheet 58 For Details

Sta. 0+018.78, 34.94 m Lt. Begin Concrete Cable Revetment Matting

Sta. 0+048.04, 14.93 m Lt. End of Concrete Cable Revetment Matting

Cable Concrete Revetment Matting

Sta. 0+100.00, Lt. & Rt. Install Type 3 Spillway

Drainage Channel, CL, Offset: 14.933 m Lt.

R.O.W. Line 41.91 m Lt.

Type 3 Spillway

Flat Btm Ditch

177.869m N 86°48'51" W

455.606m N 86°48'51" W

Rebar Cap SCP 308

Pt. 60+164.308

Sta. 0+012.13 to 0+173.87, Rt. Contractor Shall Remove and Reset Existing Barbed Wire Fencing.

Sta. 0+142.00 Rt., Construct 7.0 m Wide Turnout As Shown. The Contractor Shall Make Necessary Field Adjustment To Match New Justice Center Pavement, Curb, Gutter & Sidewalk Elevation.

20.000 m Work Area 20.000 m

40.000 m

Rebar Cap SCP 330

Sta. 0+196.154, Existing Powerline X-ing, Elev: 1691.366 Clearance: 6.974 m To Finish Grade

Sta. 0+200.00, Lt. & Rt. Install Type 3 Spillway

Sta. 0+199.373, Existing Telephone X-ing, Elev: 1690.263 Clearance: 5.880 m To Finish Grade

Sta. 0+247.046, Existing Powerline X-ing, Elev: 1692.392 Clearance: 7.710 m To Finish Grade

Sta. 0+272.89, 37.97 m Lt. Remove, Clean, Salvage& Stockpile Existing 1-1829 mm x 12.16 m CSP

Sta. 0+265.00 Lt., Construct 7.0 m Wide Turnout w/3-Unit Cattleguard and Type-2 Gate As Shown. Install 3-1803 mm x 1194 mm X 18.288 m CSPA Under Turnout In Flat Btm. Ditch With Concrete Headwall At Inlet. See Sht 33 & 60 of 105.

Sta. 0+330.00, Lt. & Rt. Install Type 3 Spillway

Sta. 0+310.00, Install New 1-762 mm x 20.73 m CSPC w/Drop Inlet.

40.000 m Work Area 15.000 m

End of Drainage Channel, CL, Sta 0+289.441, Offset: 44.374 Lt.

Sta. 0+317.17, Remove, Clean, Salvage& Stockpile Existing 1-762 mm x 12.26 m CSP

Existing Pipe

Wire Enclosed Riprap

Sta. 0+368.329 Offset -41.910

Sta. 0+368.329 Offset -19.050

R.O.W. Line 19.05 m Rt.

Type 3 Spillway

Existing Pipe

Sta. 0+351.521 Offset 0.000

R.O.W. 9.45 m Rt.

Grade to Drain V-ditch

R.O.W. Line 9.45 m Rt.

Rebar Cap SCP 331

Sta. 0+340.000 Offset 9.450

Sta. 0+340.000 Offset 11.189

Work Area 12.000 m 6.000 m 6.000 m

R.O.W. Line 11.19 m Rt.

Sta. 0+210.00 to 0+340.00, Rt. Contractor Shall Grade To Drain Right Ditch Bottom & Match The Ditch Bottom Profile Shown Below.

Sta. 0+351.52 Rt., Construct 7.0 m Wide Turnout As Shown. The Contractor Shall Make Necessary Adjustments To Match Existing NHA Access Pavement, Curb, Gutter, & Sidewalk.

Sta. 0+173.87 to 0+345.23 , Rt. Contractor Shall Remove and Reset Existing Chainlink Fencing.

FOR LOCATIONS AND CONSTRUCTION DETAILS FOR CONCRETE SPILLWAY (TYPE 3) SEE SHT. 74 OF 106.

SCALE: Meters

0 10 20 30 40 50

TYPE 2 OBJECT MARKER	RIGHT-OF-WAY MARKER
2	5

ML Sta 0+400.000

N03°34'35"E 519.856 m

60+100 60+150 60+200

0+050 0+100 0+150 0+200 0+250 0+300 0+350 0+400

SCP 308, Rebar with Cap Sta 0+030.524, Offset 8.196 m Rt EL 1683.830

SCP 330, Rebar with Cap Sta 0+125.299, Offset 64.332 m Lt EL 1687.345

SCP 331, Rebar with Cap Sta 0+274.935, Offset 16.449 m Rt EL 1686.624

L= 30.00 m K= 8 e= -0.14 m SD= 191.15 m

Sta. 0+199.912, Existing Telephoneline X-ing Elev: 1696.84 Ht. 5.918 m From Finish Grade

Sta. 0+196.204, Existing Powerline X-ing Elev: 1691.376 Ht. 7.611 m From Finish Grade

Sta. 0+246.886, Existing Powerline X-ing Elev: 1692.422 Ht. 9.180 m From Finish Grade

PVI 0+006.300 Elev 1685.005

Existing Ground

Finish Grade

Slp: -0.4818%

FG = -0.1119%

Sta 0+210.000 Offst 9.92 m Rt. Elev 1683.638

Slp: 0.3381%

Sta 0+340.000 Offset 9.76 m Rt. Elev 1684.074

Slp: -0.4818%

Drainage Channel Sta 0+043.273 Offset 14.933 m Lt. Elev 1683.579

Left Drainage Channel Finish Grade

Right Ditch Bottom Profile

End of Drainage Channel Sta 0+289.441 Offset 44.374 Lt. Elev 1682.347

Daylight to Drain

Sta. 0+357.218, Existing Underground Waterline X-ing Elev. 1684.094 Depth -0.348 m To Existing Ground

PVC 0+345.000 Elev 1684.626

PVI 0+360.000 Elev 1684.610

PVT 0+375.000 Elev 1684.027

FG = -3.8847%

1696 1694 1692 1690 1688 1686 1684 1682 1680 1678 1676 1674 1672

0+000 0+050 0+100 0+150 0+200 0+250 0+300 0+350 0+400

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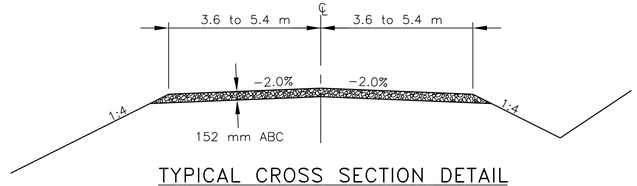
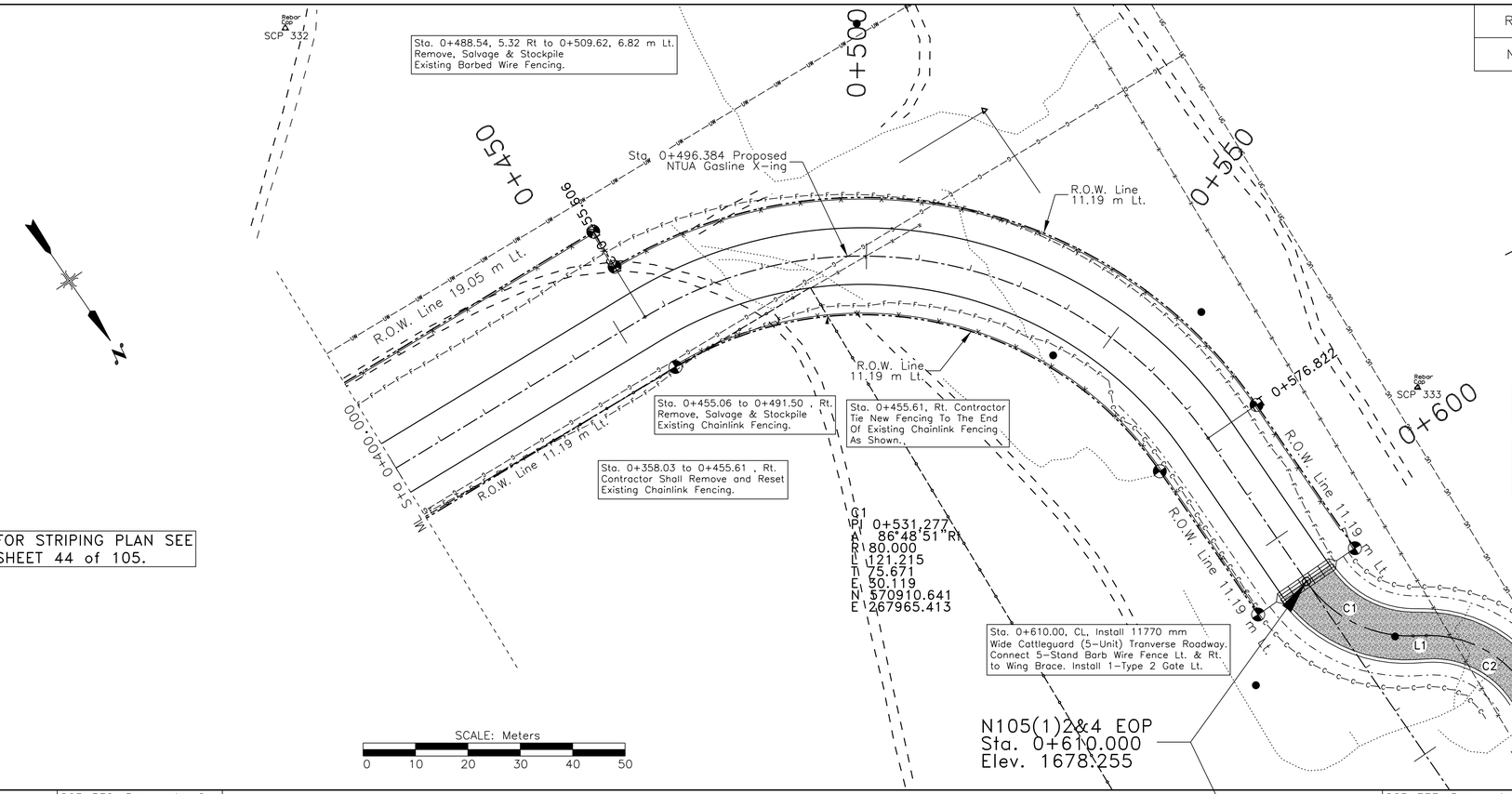
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N105	N105(1)2&4	32	105



TYPICAL CROSS SECTION DETAIL
Sta. 0+610.00 to 0+651.844

Note: Roadway Width For Transition Tapers From 5.4 m Width Down To 3.6 m Width Left & Right.



FOR STRIPING PLAN SEE SHEET 44 of 105.

HORIZONTAL ALIGNMENT ELEMENT TABLE

Line Table		
Name	Length (m)	Direction
L1	2.529	N 56°58'23"W

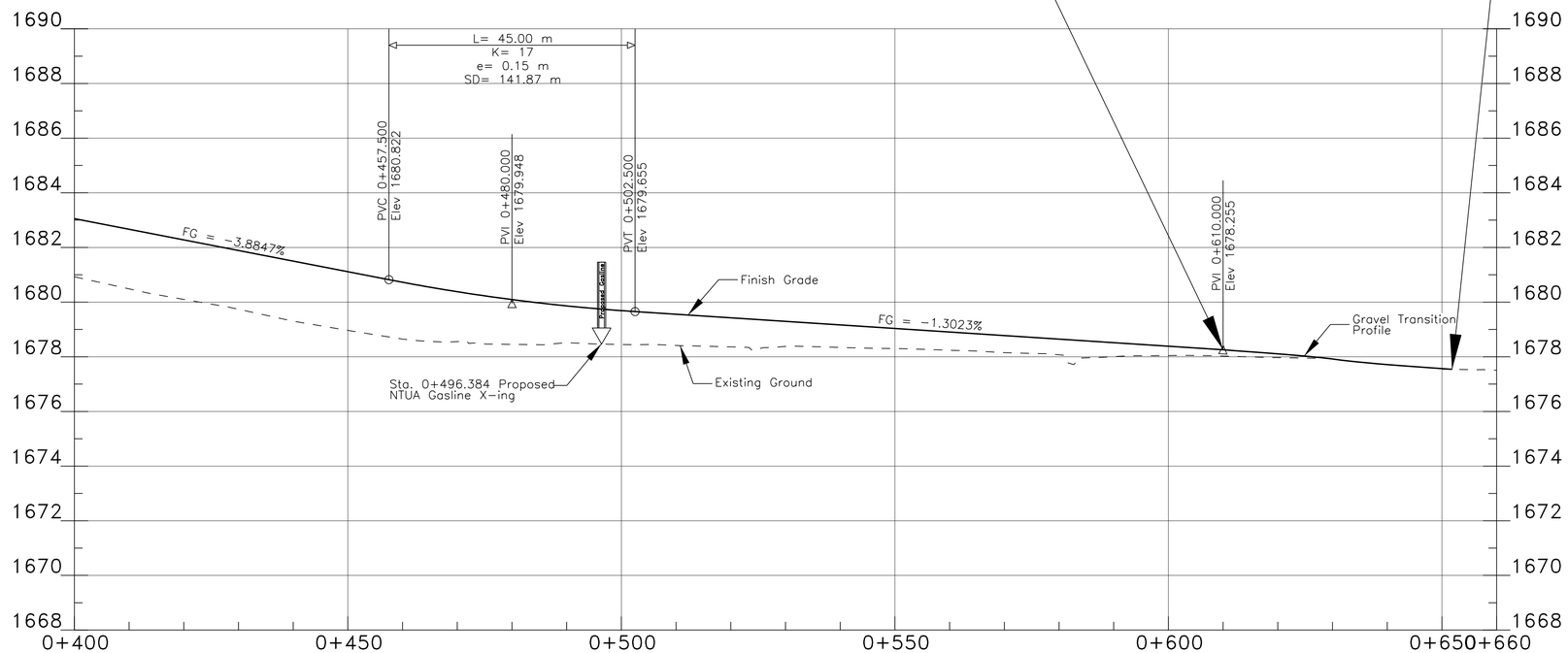
Curve Table						
Name	Radius (m)	Arc Length (m)	Chord Length (m)	Tangent Length (m)	External Distance (m)	Chord Direction
C1	23.956	23.822	22.852	13.000	3.300	N 28°29'12"W
C2	22.000	23.814	22.668	13.224	3.669	N 25°57'47"W

Sta. 0+610.00 To 0+651.844 CL, Contruct Tapered Transition And Tie Into Existing Road As Shown. 152 mm Of ABC Material Shall Be Placed And Compacted (No Asphalt). This Work To Be Included In The Appropriated Bid Item.

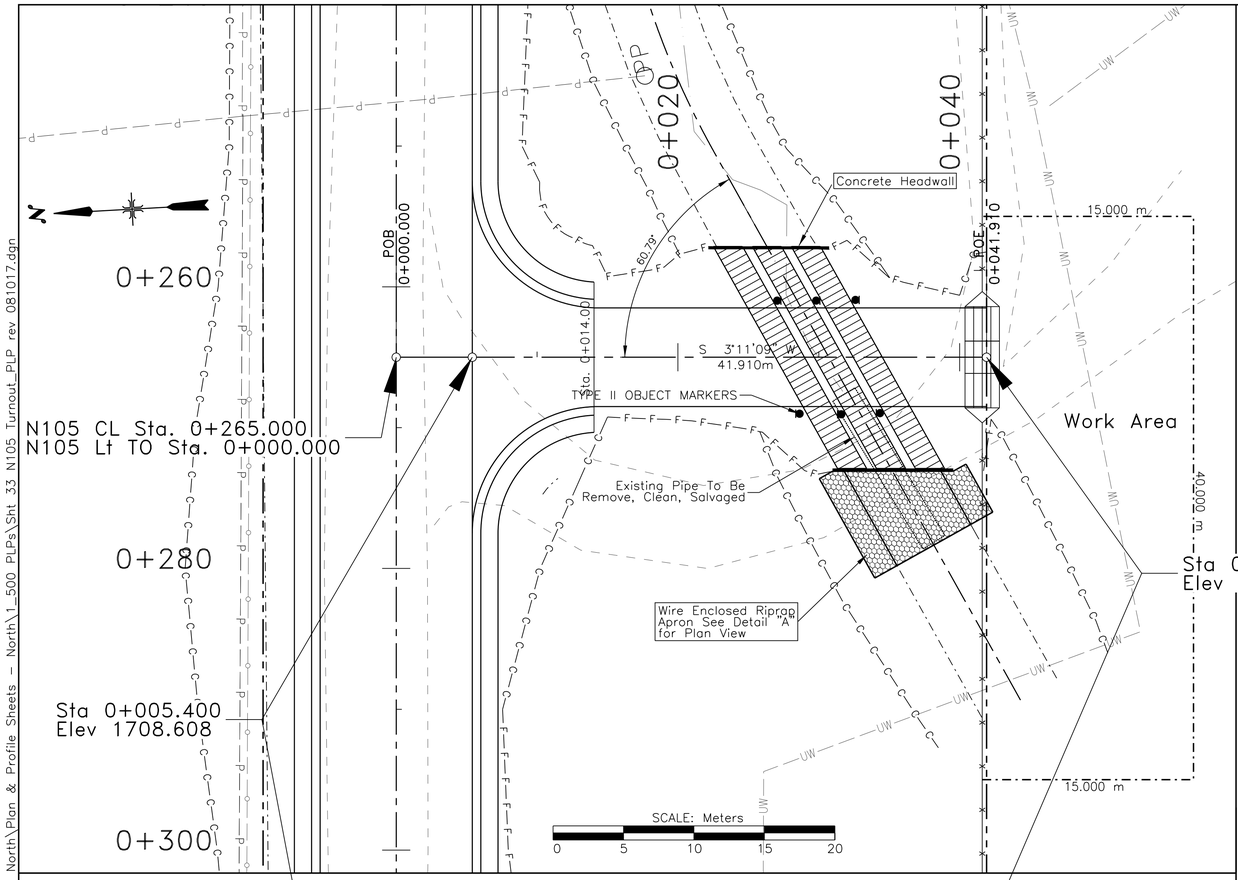
RIGHT-OF-WAY MARKER
7

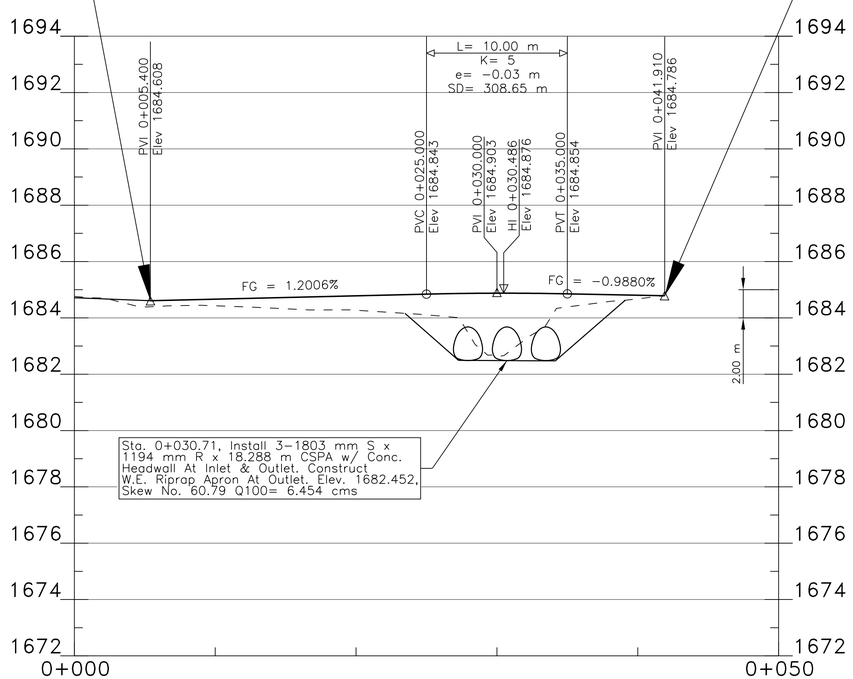
SCP 332, Rebar with Cap
Sta 0+425.508,
Offset 82.766 m Lt
EL 1679.487

SCP 333, Rebar with Cap
Sta 0+591.493,
Offset 38.415 m Lt
EL 1677.522

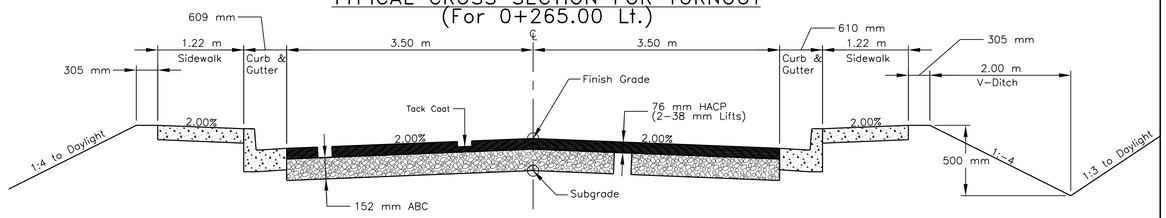


REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N105	N105(1)2&4	33	105



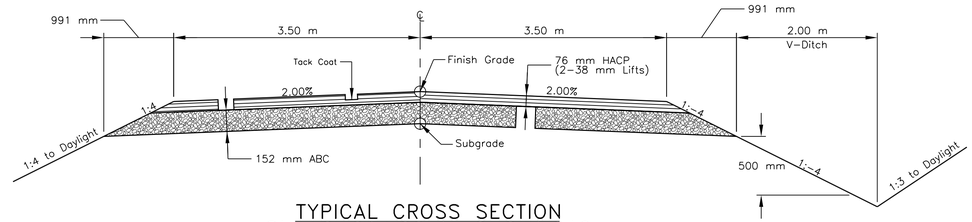


TYPICAL CROSS SECTION FOR TURNOUT
(For 0+265.00 Lt.)



SEE SHEET 101 of 105
FOR PIPE X-SECTION
(STA. 0+030.71)

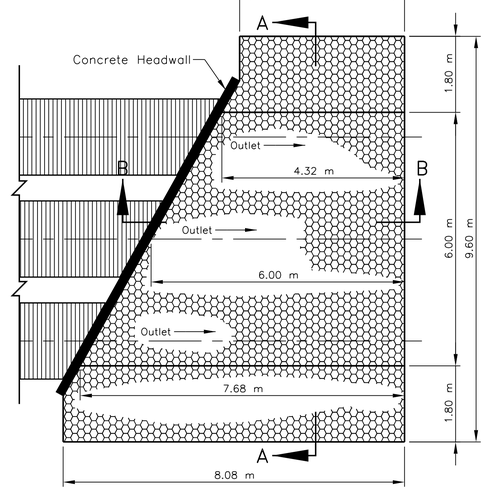
TYPICAL CROSS SECTION
Sta. 0+005.40 to 0+014.00



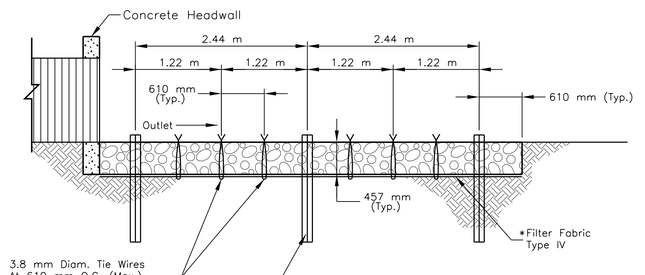
TYPICAL CROSS SECTION
Sta. 0+014.00 to 0+041.910

DRAINAGE STRUCTURE TABLE

Station	Structure	Skew No.	Drainage Area	Area (ha)	Q100 (cms)	Remarks	Outlet Protection
0+030.71 Lt. TO	3-1803 S x 1194 mm R x 18.288 m CSPA	60.79	29b	105.934	6.454	With Concrete Headwall at Inlet & Outlet	Install Wire Enclosed Riprap Apron at Outlet

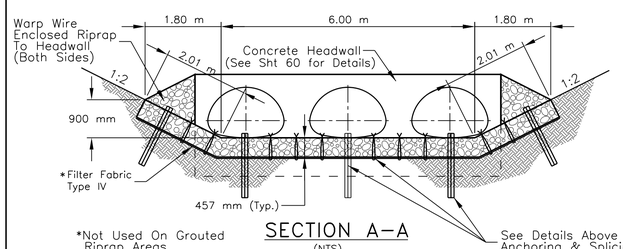


DETAIL "A"
PLAN VIEW
(NTS)



*Not Used On Grouted
Riprap Areas.

SECTION B-B
(NTS)



*Not Used On Grouted
Riprap Areas.

SECTION A-A
(NTS)

See Details Above For
Anchoring & Splicing

UNITED STATES
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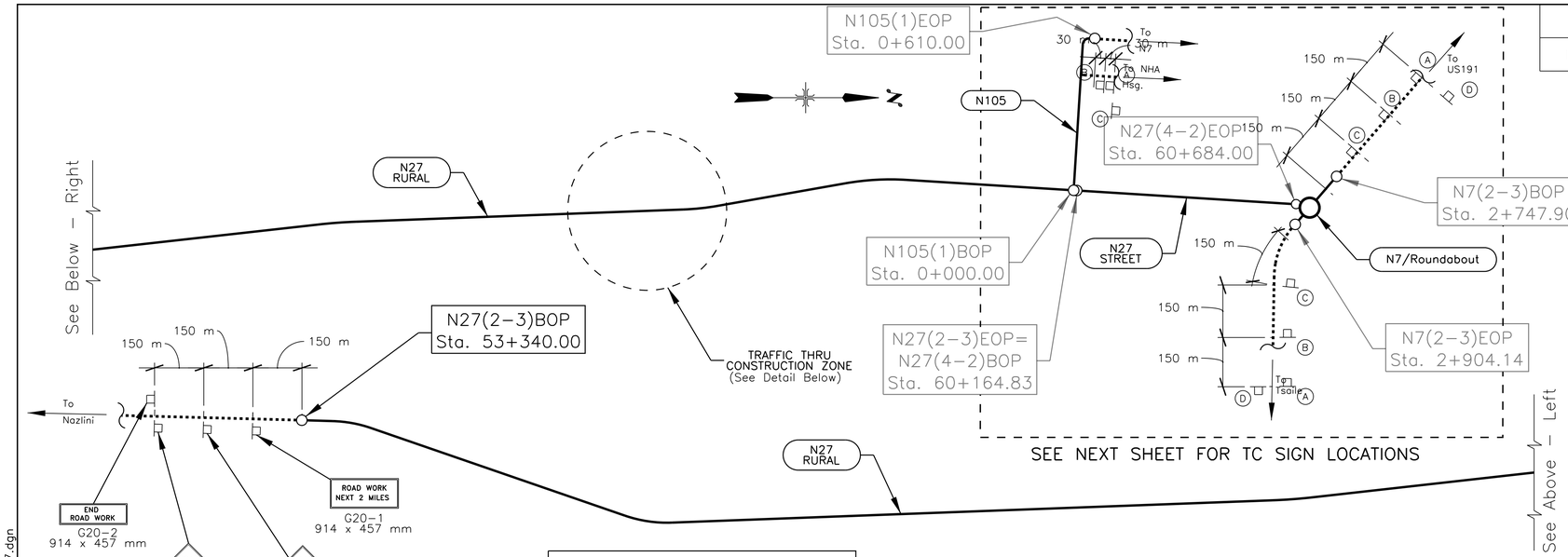
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N105(1) Sta. 0+265.00
LEFT TURNOUT PLAN, PROFILE
AND TYPICAL CROSS SECTION DETAILS

DRAWN BY: NRDOT	DATE: 8/30/2017
DESIGNED BY: NRDOT	DATE: 8/30/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 33 N105 Turnout_PLP rev 081017.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Plan & Profile Sheets - North\1_500 PLPs\Sht 33 N105 Turnout_PLP rev 081017.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	34	105
			N27	N4(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		



LEGEND

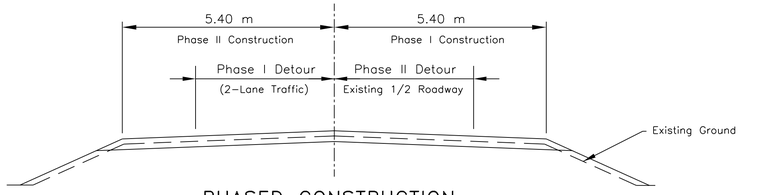
- TC Sign Placement .....
- New Roadway .....
- Existing Roadway .....
- Route No. N105
- Project Begin/End Pts. .....

PHASE CONSTRUCTION NOTES:

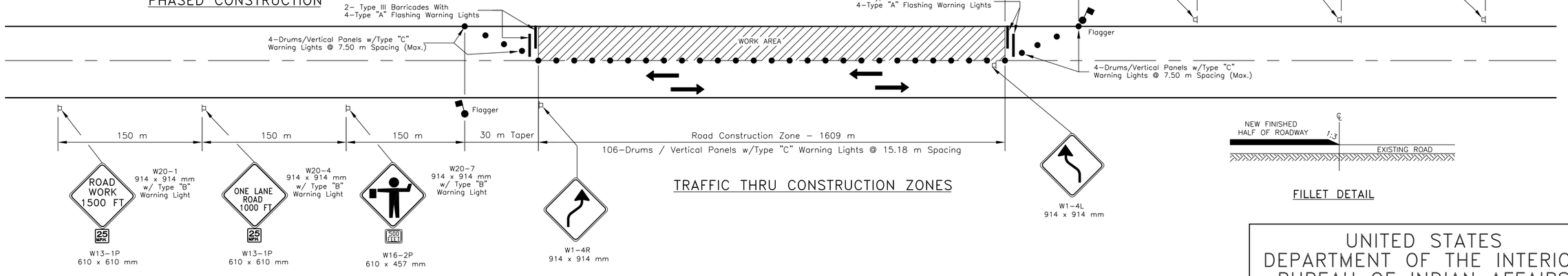
1. THE CONTRACTOR MAY CONSTRUCT 1/2 THE NEW ROADWAY (UNDER THE PHASE CONSTRUCTION PLAN SHOWN) WHILE DETOURING TWO-WAY TRAFFIC ON THE OTHER (EXISTING) HALF ONCE THE FIRST 1/2 OF ROADWAY IS BUILD UP TO THE NEW GRADES; THEN TRAFFIC SHALL BE DIRECTED TO THE NEW HALF OF ROADWAY WHILE THE OTHER (EXISTING) HALF IS CONSTRUCTED.
2. ALL (NEW) DRAINAGE PIPE INSTALLATION SHALL BE IN ACCORDANCE WITH THE PHASED CONSTRUCTION PLAN ABOVE AS WELL AS REMOVAL OF EXISTING PIPES. ALL THIS PIPE INSTALLATION & REMOVAL SHALL BE CONSIDERED INCIDENTAL TO PIPE ITEMS SHOWN AND NO ADDITIONAL PAYMENT SHALL BE MADE.
3. THIS PHASED CONSTRUCTION SHALL BE CONSIDERED INCIDENTAL TO THE TCP AND NO ADDITIONAL PAYMENT SHALL BE MADE.
4. THE CONTRACTOR'S CONSTRUCTION SCHEDULE, CONSTRUCTION SEQUENCING PLAN, AND STORM WATER POLLUTION PREVENTION PLAN SHALL REFLECT THIS PHASED CONSTRUCTION.
5. WHEN PLACING THE BRIDGE DECK SEALANT, OR APPROACH SLABS, CLOSE OFF HALF OF THE DECK WHILE MAINTAINING TRAFFIC ON THE OTHER HALF.

GENERAL NOTES

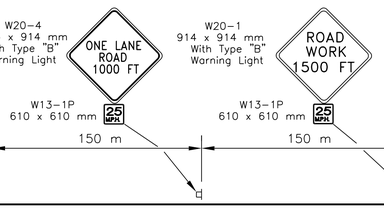
1. ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE MUTCD MANUAL (LATEST EDITION AND AMENDMENTS) AND THE SUPPLEMENTAL SPECIFICATION FOR THIS PROJECT.
2. THE TRAFFIC CONTROL DETAILS SHOWN ARE ONLY A GUIDE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PREPARING AND IMPLEMENTING A TRAFFIC CONTROL PLAN (TCP) IN ACCORDANCE WITH THESE DETAILS, SECTION 635, AND THE MUTCD UNDER CONTRACT ITEM 63501. ANY ADDITIONAL TRAFFIC CONTROL DEVICES CALLED FOR ON THE CONTRACTOR'S TCP WILL NOT BE MEASURED FOR PAYMENT BUT SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEMS FOR TRAFFIC CONTROL SHOWN IN THE BID SCHEDULE SEE SUPPLEMENTAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. SIGNS (G20-1, W20-1, W20-1a, AND G20-2) SHALL BE PLACED AT THE PROJECT LIMITS AND REMAIN IN PLACE THROUGH THE DURATION OF THE PROJECT.
4. FLAGGERS SHALL BE STATIONED LEFT & RIGHT AS SHOWN WHEN EQUIPMENT IS CROSSING OR WORKING WITHIN EXISTING ROADWAY PRISM.
5. IN AREAS OF EXISTING ROADWAY WIDENING, THE CONTRACTOR SHALL ENSURE THAT NO PAVEMENT DROP-OFFS ARE LEFT EXPOSED DURING NON-WORKING HOURS. THE CONTRACTOR SHALL INITIATE CORRECTIVE MEANS TO ACHIEVE A MINIMUM 1:3 SLOPE AS SHOWN OF FILLET DETAIL.
6. AT THE END OF EACH WORKING DAY, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIED A DRIVING SURFACE FREE OF OBSTRUCTIONS AS SHOWN ON THE PHASED AND FILLET CONSTRUCTION DETAILS AS APPLICABLE, ACCESS TO ALL ADJOINING PROPERTIES AND BIA SYSTEM ROUTES SHALL BE MAINTAINED AT ALL TIMES (DAY AND NIGHT).
7. ALL TRAFFIC CONTROL DEVICES (EXCEPT AT DETOUR ROAD LOCATIONS AND AS NOTED IN ABOVE NOTE #3) SUCH AS CONSTRUCTION SIGNS, DRUMS, BARRICADES, ETC. SHALL BE REMOVED TO A LOCATION AT LEAST NINE (9) METERS FROM THE EDGE OF THE SHOULDER WHEN CONSTRUCTION IS NOT IN PROGRESS.
8. DURING CONSTRUCTION OPERATIONS, TRAFFIC SHALL BE MOVED THROUGH THE WORK ZONE USING PILOT CARS (AS REQUIRED). APPLICABLE SIGNS AND OTHER ITEMS (TWO-WAY RADIO CONTACT) RELATED TO THE USE OF THE PILOT CARS AND SHALL BE CONSIDERED INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.
9. THE CONTRACTOR HAS THE OPTION TO EITHER USE DRUMS OR VERTICAL PANELS; BUT SHALL NOT USE A COMBINATION OF BOTH. NO TRAFFI C CONES SHALL BE ALLOWED.
10. THE CONTRACTOR HAS THE OPTION TO UTILIZE DETOUR ROADS IN ACCORDANCE WITH THE MUTCD MANUAL IN CONJUNCTION WITH OR IN LIEU OF THE PHASE CONSTRUCTION DETAILS SHOWN AND IN ACCORDANCE WITH SECTION 107 AND 204, THE COST OF ANY DETOUR ROADS (INCLUDING ALL DETOUR RELATED EARTHWORK AND MAINTENANCE) SHALL BE CONSIDERED INCIDENTAL TO THE TEMPORARY TRAFFIC CONTROL BID ITEM. THE CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY PERMITS AND CLEARANCES FOR ANY DETOUR ROADS.
11. AT LOCATIONS WHERE NEW ROAD CONSTRUCTION CROSSES EXISTING ROADWAY , AT TIE-INS WITH EXISTING ROADS US 191, AND AT THE END OF THE NEW CONSTRUCTION DETAILS SHOWN AND IN ACCORDANCE WITH SECTION 107 AND 204, THE COST OF ANY DETOUR ROADS (INCLUDING ALL DETOUR RELATED EARTHWORK AND MAINTENANCE) SHALL BE CONSIDERED INCIDENTALTO THE TEMPORARY TRAFFIC CONTROL BID ITEMS. THE CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY PERMITS AND CLEARANCES FOR ANY DETOUR ROADS.
12. THE TRAFFIC CONTROL ON THIS PROJECT SHALL BE COORDINATED (INCLUDING ADOT) WITH THE PROJECT CONSTRUCTION SCHEDULE.



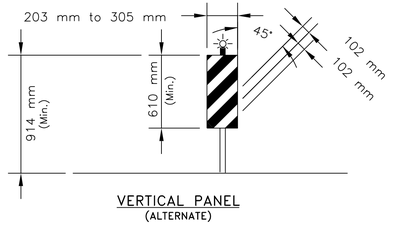
PHASED CONSTRUCTION



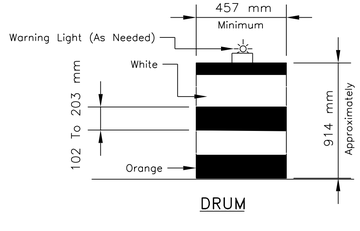
TRAFFIC THRU CONSTRUCTION ZONES



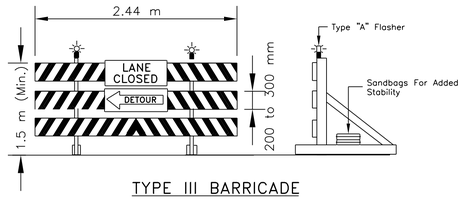
FILLET DETAIL



VERTICAL PANEL
(ALTERNATE)



DRUM



TYPE III BARRICADE

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

TEMPORARY TRAFFIC CONTROL-DETAILS

DRAWN BY: NRDOT	DATE: 12/30/2013
DESIGNED BY: NRDOT	DATE: 12/30/2013
REVISED: 7/15/2016	BY: Leroy.Toledo
Sht 34 N27_tcp_sht1 REV 081017.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 34 N27_tcp_sht1 REV 081017.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	35	105
			N27	N4(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

LEGEND

TC Sign Placement .....
New Roadway .....
Existing Roadway .....
Route No. N27
Project Begin/End Pts. .....
Existing Turnout .....

N105(1): EOP
Sta. 0+610.00

G20-1
914 x 457 mm
ROAD WORK NEXT 2 MILES

30 m
30 m

ROAD WORK 200 FT
W20-1a
914 x 914 mm

To N7
END ROAD WORK
G20-2
914 x 457 mm

G20-1
914 x 457 mm
ROAD WORK NEXT 2 MILES
30 m
30 m
ROAD WORK 200 FT
W20-1a
914 x 914 mm

N105
To NHA HSG.
END ROAD WORK
G20-2
914 x 457 mm

N27(2-3): EOP=
N27(4-2): BOP
Sta. 60+164.39

N27 Rural
To Nazlini
N27 Street
N105(1): BOP
Sta. 0+000.00
SEE DETAIL 'A' BELOW
TRAFFIC THRU
CONSTRUCTION ZONE
(See Previous Sheet for Details)

CHINLE
COMMUNITY

N27(4-2): EOP
Sta. 60+882.17

W20-1
914 x 914 mm
ROAD WORK AHEAD
150 m
W20-1a
914 x 914 mm
ROAD WORK 1000 FT
150 m
G20-1
914 x 457 mm
ROAD WORK NEXT 2 MILES
150 m
END ROAD WORK
G20-2
914 x 457 mm
To US191/Ganado

N7(2-3): BOP
Sta. 2+747.90
N7/Roundabout
N7(2-3): EOP
Sta. 2+971.65

150 m
G20-1
914 x 457 mm
ROAD WORK NEXT 2 MILES
150 m
ROAD WORK 1000 FT
W20-1a
914 x 914 mm
150 m
ROAD WORK AHEAD
W20-1
914 x 914 mm
END ROAD WORK
G20-2
914 x 457 mm
To Tsaile/Lukachukai

N105 STREET
N27 STREET
ROAD WORK AHEAD
W20-1
914 x 914 mm

DETAIL 'A'

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

SUGGESTED TEMPORARY TRAFFIC DETOUR-DETAILS

DRAWN BY: NRDOT	DATE: 11/18/2014
DESIGNED BY: NRDOT	DATE: 11/18/2014
REVISED: 1/27/2016	BY: Paul.Manuelito
Sht 35 N27_tcp_sht2 rev 081517.dgn	

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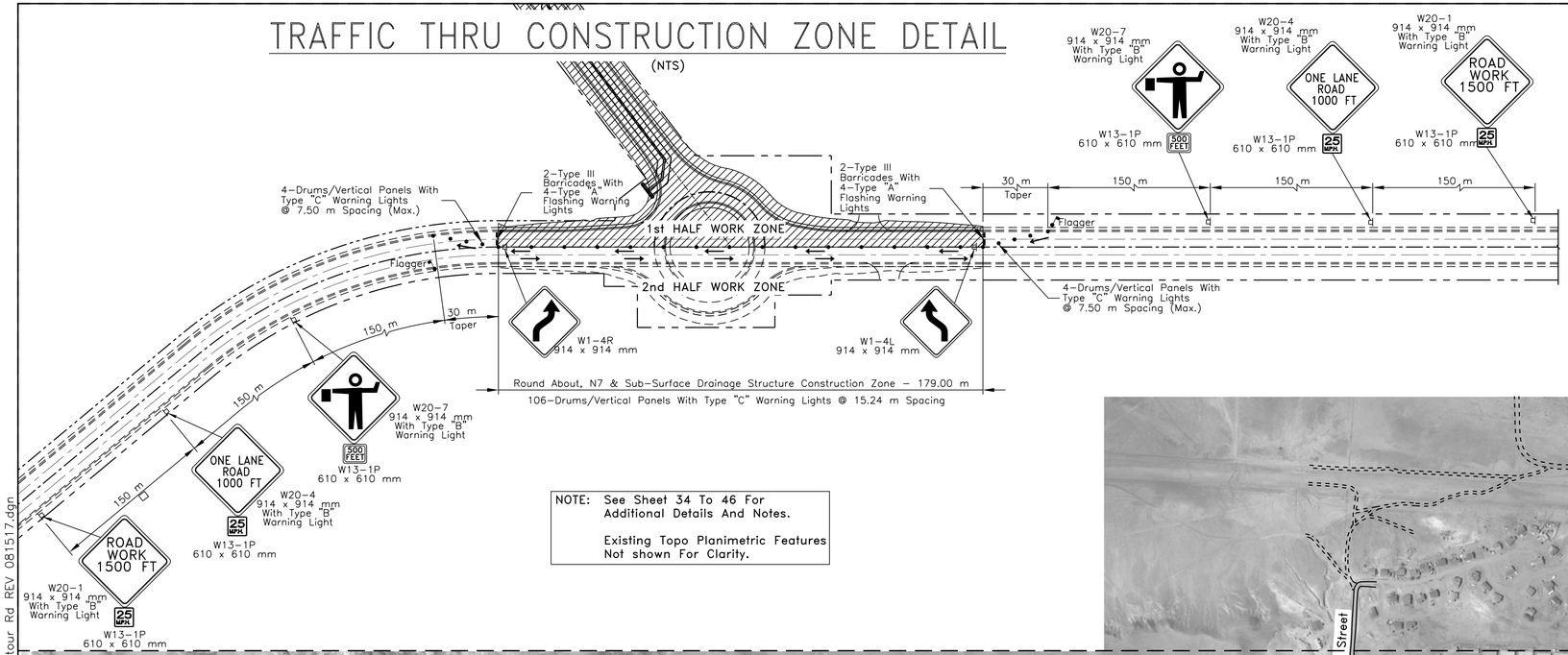
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27 N27(4-2)274	N7 N7(2-3)2&4	36	105

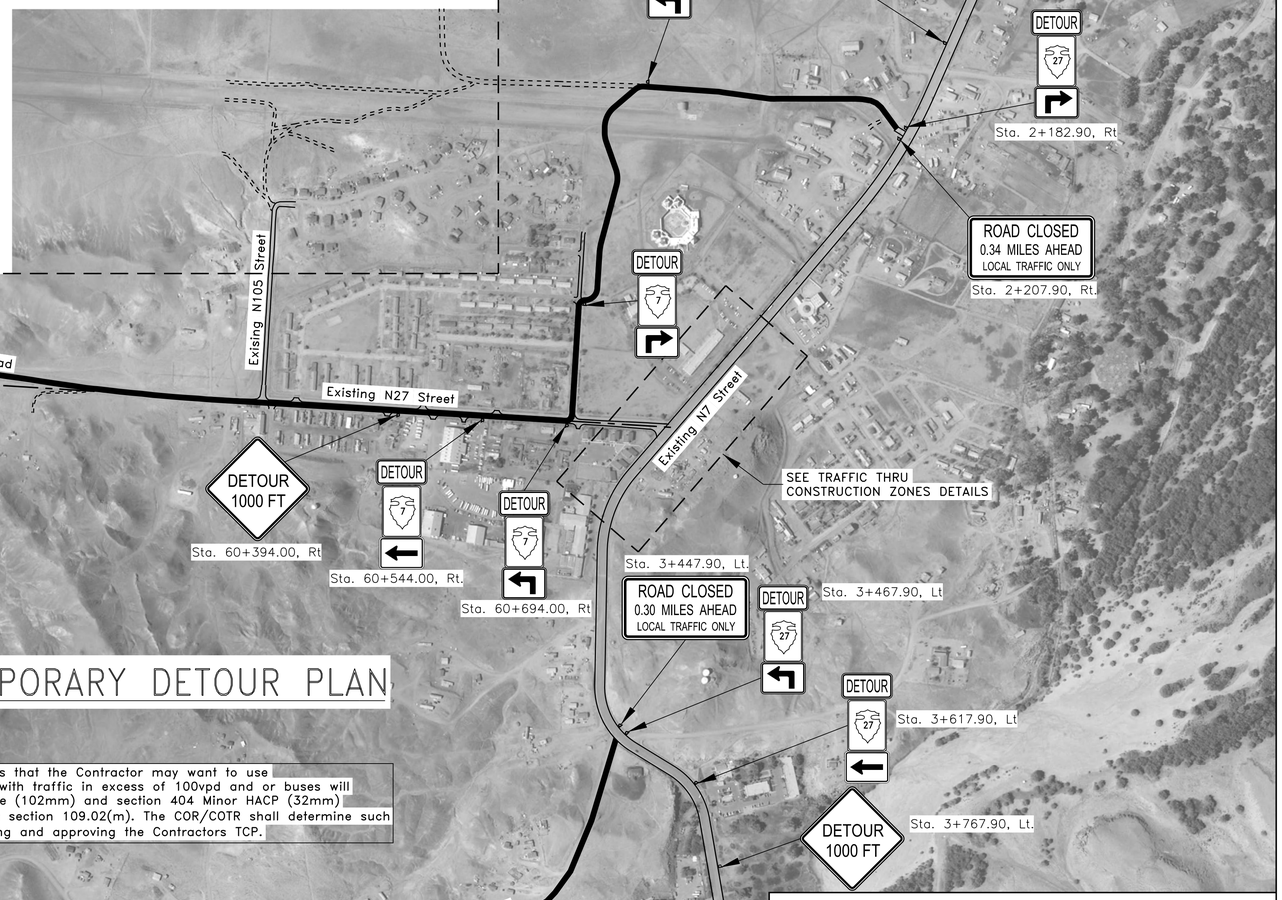
TRAFFIC THRU CONSTRUCTION ZONE DETAIL

(NTS)



NOTE: See Sheet 34 To 46 For Additional Details And Notes.

Existing Topo Planimetric Features Not shown For Clarity.



CHINLE COMMUNITY TEMPORARY DETOUR PLAN

NOTE: Some routes that the Contractor may want to use as a detour road with traffic in excess of 100vpd and or buses will require base course (102mm) and section 404 Minor HACP (32mm) in accordance with section 109.02(m). The COR/COTR shall determine such need when reviewing and approving the Contractors TCP.

TEMPORARY TRAFFIC CONTROL SIGNS (Min.)

TYPE	DESCRIPTION	SIZE (mm)
W20-2	DETOUR 1000 FT	914 x 914
M4-8	DETOUR	610 x 305
Route No.	64	457 x 610
M6-1R or M6-1L		533 x 381
M5-1R or M5-1L		533 x 381
R11-3a	ROAD CLOSED 0.30 MILES AHEAD LOCAL TRAFFIC ONLY	1524 x 762

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SUGGESTED TEMPORARY COMMUNITY DETOUR PLAN

DRAWN BY: NRDOT	DATE: 8/15/2017
DESIGNED BY: NRDOT	DATE: 8/15/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 36 N27 Temp Detour Rd REV 081517.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	37	105

N27(2-3) PERMANENT TRAFFIC CONTROL - Sign, Post, & Hardware

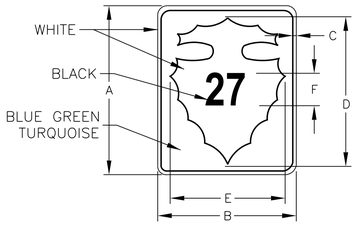
Station	Location	Detail No.	Description	Sign Panel Size	Area of Sign (sq/m)	Number of Square Tube Post	Square Tube Post Size	No. of Panel	Total Area (sq/m)
53+910.00 53+910.00 56+780.00 56+780.00 59+610.00	Lt.. Rt. Rt. Lt. Lt.	R2-1	SPEED LIMIT 55	610 x 762 mm	0.46	1	44 x 44 mm	5	2.324
58+340.00 58+975.00 58+665.00	Lt. Rt. Lt.	W14-3	NO PASSING ZONE	1219 x 1219 x 914	0.52	2	50 x 50 mm	3	1.549
59+710.00	Rt.	W3-5	SPEED LIMIT 25	762 x 762 mm	0.58	1	44 x 44 mm	1	0.580
53+340.00 58+975.00 59+665.00	Rt.. Lt. Rt.	R4-1	DO NOT PASS	610 x 762 mm	0.46	1	44 x 44 mm	3	1.394
53+194.28 54+746.00 59+320.00	Rt. Lt. Rt.	W1-2R		762 x 762 mm	0.58	1	44 x 44 mm	3	1.742
53+790.00 54+180.00 59+790.00	Lt. Rt. Lt.	W1-2L		762 x 762 mm	0.58	1	44 x 44 mm	3	1.742
54+127.00 54+874.70 54+589.30 55+363.69 58+290.32 58+591.26 60+144.91	Rt. Lt. Rt. Lt. Rt. Rt. Rt.	R1-1	STOP	762 x 762 mm	0.58	1	44 x 44 mm	7	4.065
59+500.00	Rt.	W3-5	SPEED LIMIT 45	762 x 762 mm	0.58	1	44 x 44 mm	1	0.581
59+610.00 59+850.00	Rt. Lt.	R2-1	SPEED LIMIT 45	610 x 762 mm	0.46	1	44 x 44 mm	2	0.920
59+800.00	Rt.	W6-1		762 x 762 mm	0.58	1	44 x 44 mm	1	0.581
60+020.00	Lt.	W6-2		762 x 762 mm	0.58	1	44 x 44 mm	1	0.581
59+850.00 60+110.00	Rt. Lt.	R2-1	SPEED LIMIT 25	610 X 762 mm	0.46	1	44 x 44 mm	2	0.920
59+965.54	Rt.	R3-8a	ONLY	762 x 762 mm	0.58	1	44 x 44 mm	1	0.581
								TOTAL AREA	sq/m
63302-2002 - Sign Installation, 1 post - 44 mm x 44 mm Square Steel Tube									16.010
63302-2006 - Sign Installation, 2 post - 50 mm x 50 mm Square Steel Tube									1.549

TEMPORARY TRAFFIC CONTROL SIGNS (MINIMUM)

TYPE	DESCRIPTION	SIZE (mm)
W20-1a	ROAD WORK XXX FT	1219 x 1219
W20-4	ONE LANE ROAD XXX FT	1219 x 1219
W13-1P	25 MPH	610 x 610
W20-7		914 x 914
W16-2P	500 FEET	457 x 610
G20-2	END ROAD WORK	914 x 457
W1-4L		914 x 914
	ROAD WORK AHEAD	
G20-1	ROAD WORK NEXT 5 MILES	914 x 457
W8-12	NO CENTER LINE	914 x 914
W8-3	PAVEMENT ENDS	914 x 914
W16-3	500 FEET	457 x 610

Note: Installation of W8-3 "PAVEMENT ENDS" Temporary Sign with W16-3 "500 FEET" Supplemtal Plate At Sta. 53+452.40, Lt. Shall Be Incidental to Bid Item 635001-0000 Temporary Traffic Control And Shall Be Removed When N27(2-2) Project Is Completed.

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



N27(2-3)1,2&4 PAVEMENT MARKINGS
ITEM No. 63401-1510: SOLID YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH (m)
58+340.000	To	58+684.000	CL, Rt. (NB)	Solid Yellow	344.00
58+586.000	To	58+975.000	CL, Lt. (SB)	Solid Yellow	389.00
59+655.00	To	59+800.947	CL	Double Solid Yellow	291.89
59+800.947	To	59+917.900	Diagonal Striping Perimeter in Taper Section	Double Solid Yellow	471.22
59+938.10	To	60+020.397	Diagonal Striping Perimeter	Double Solid Yellow	333.80
60+020.397	To	60+047.798	1.8 m Left	Double Solid Yellow	54.80
60+068.202	To	60+140.009	1.8 m Left	Double Solid Yellow	143.62
				SUB TOTAL	2,028.33

N27(2-3)1,2&4 PAVEMENT MARKINGS
ITEM No.63401-1610: BROKEN YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH (m)
53+300.000	To	58+340.000	CL	Broken Yellow	5,040.00
58+340.000	To	58+586.000	Lt./CL	Broken Yellow	246.00
58+684.000	To	59+975.000	Rt./CL	Broken Yellow	1,291.00
58+975.000	To	59+655.000	CL	Broken Yellow	680.00
				TOTAL	7,257.00

N27(2-3)1,2&4 PAVEMENT MARKINGS
ITEM No. 63401-1520: SOLID WHITE

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH (m)
53+300.000	To	59+955.000	Rt.	Solid White	6,655.00
53+300.000	To	59+955.000	Lt.	Solid White	6,655.00
Minus (X) 4.50 m Right T.O. @ 20.67 m @ 6 Turnouts					-124.02
Minus (X) 4.50 m Left T.O. @ 20.67 m @ 9 Turnouts					-186.03
Minus (X) 7.00 m Right T.O. @ 35.17 m @ 4 Turnouts					-105.51
Minus (X) 7.00 m Left T.O. @ 35.17 m @ 4 Turnouts					-70.34
				SUB-TOTAL	12,824.10
PAVEMENT WIDENING					
59+955.000	To	60+134.479	Lt.	Solid White	179.48
59+955.000	To	60+127.798	Rt.	Solid White	172.80
Minus (X) 4.50 m Right T.O. @ 20.67 m @ 3 Turnouts					-62.01
Minus (X) 4.50 m Left T.O. @ 20.67 m @ 2 Turnouts					-41.34
60+020.397	To	60+047.798	1.8 m Rt. Of CL	Solid White	27.40
60+068.202	To	60+140.009	1.8 m Rt. Of CL	Solid White	71.81
				SUB-TOTAL	348.14
				GRAND-TOTAL	13,172.24

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

N27(2-3)-PERMANENT & TEMPORARY TRAFFIC CONTROL DETAILS

DRAWN BY: NRDOT DATE: 10/28/2014
DESIGNED BY: NRDOT DATE: 10/28/2014
REVISED: 8/31/2016 BY: Leroy.Toledo
Sht 37 N27 PrmTmp Sign TC 1 rev 081517.dgn

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	38	105
			N7	N7(2-3)2&4		

N27(4-2) PERMANENT TRAFFIC CONTROL - Sign, Post, & Hardware

Station	Location	Detail No.	Description	Sign Panel Size	Area of Sign (sq/m)	Number of Tube	Size	No. of Panel	Total Area (sq/m)
60+180.78 60+258.32 60+359.44 60+386.78 60+445.75 60+466.27 60+558.79 60+694.67 60+725.14	Rt. Lt. Lt. Rt. Lt. Rt. Rt. Lt. Rt.	R1-1	STOP	762 x 762 mm	0.480	1	44 x 44 mm	9	4.320
60+245.00 60+344.00 60+433.00	Rt. Rt. Rt.	D1-2L	← NAVAJO NATION JUSTICE CENTER	2329 x 796 mm	1.850	2	50 x 50 mm	3	5.550
60+288.00 60+390.09 60+479.09	Lt. Lt. Lt.	D1-2R	NAVAJO NATION JUSTICE CENTER →	2329 x 796 mm	1.850	2	50 x 50 mm	3	5.550
60+190.00 60+818.00	Rt. Lt.	R2-1	SPEED LIMIT 35	610 X 762 mm	0.465	1	44 x 44 mm	2	0.930
60+766.00	Lt.	M1-23	27	457 X 762 mm	0.350	1	38 x 38 mm	1	0.350
60+220.00 60+320.00 60+320.00 60+518.00 60+518.00 60+630.00 60+630.00 60+800.00	Rt. Rt. Lt. Rt. Lt. Lt. Rt. Lt.	R3-9b	CENTER LANE ONLY	610 x 914 mm	0.558	1	50 x 50 mm	8	4.480
60+685.00	Rt.	W2-6 W13-1P	15 MPH	914 x 914 mm 610 x 610 mm	0.835 0.372	2	57 x 57 mm	1	1.207
60+795.00	Rt.	W3-2		914 x 914 mm	0.836	2	50 x 50 mm	1	0.835
60+830.00	CL	R4-7		610 X 762 mm	0.465	1	44 x 44 mm	1	0.465
60+835.76 60+841.45	Rt. Lt.	W11-2 W16-7p		762 x 762 mm 610 x 305 mm	0.581 0.186	2	57 x 57 mm	2	1.533
60+750.00	Rt.	R4-8c		914 x 914 mm	0.835	2	50 x 50 mm	1	0.835
60+840.18	Rt.	R1-2	YIELD	914 x 914 x 914 mm	0.362	2	50 x 50 mm	1	0.362

	Area (m^2)
63302-2001 - Sign Installation, 1 Post - 38 x 38 mm	0.350
63302-2002 - Sign Installation, 1 Post - 44 x 44 mm	5.714
63302-2003 - Sign Installation, 1 Post - 50 x 50 mm	4.480
63302-2006 - Sign Installation, 2 Post - 50 x 50 mm	13.132
63302-2007 - Sign Installation, 2 Post - 57 x 57 mm	2.740

N27(4-2)2&4 PAVEMENT MARKINGS

ITEM No. 63401-1510: SOLID YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	* LENGTH (m)
60+173.00	To	60+832.33	1.8 CL, Rt. (NB)	Solid Yellow	664.35
60+173.00	To	60+837.39	1.8 CL, Lt. (SB)	Solid Yellow	665.32
				SUB TOTAL	1,329.67

* Note: Length given are not station difference but actual measured length using CADD

ITEM No. 63401-1610: BROKEN YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	* LENGTH (m)
60+173.00	To	60+830.26	1.8 CL, Rt. (NB)	Broken	657.15
60+173.00	To	60+830.41	1.8 CL, Lt. (SB)	Broken	657.40
				SUB TOTAL	1,314.55

* Note: Length given are not station difference but actual measured length using CADD

N7(2-3) PERMANENT TRAFFIC CONTROL SIGN, POST & HARDWARE

Station	Location	Detail No.	Description	Sign Panel Size (mm)	Area of Sign (sq/m)	Number of Tube	Size	No. of Panel	Total Area of Panel (sq/m)
2+404.90 3+343.90	Rt. Lt.	W2-6 W13-1P	15 MILE	914 X 914 mm 610 X 610 mm	0.835 0.372	2	50 x 50 mm	2	2.414
2+753.90	Rt.	R4-8a		914 X 914 mm	0.835	2	50 x 50 mm	1	0.835
2+791.23 2+947.90	Rt. Lt.	W3-2		914 X 914 mm	0.835	2	50 x 50 mm	2	1.670
2+829.43 2+918.83	CL CL	R4-7		610 x 762 mm	0.465	1	44 x 44 mm	2	0.930
2+834.50 2+837.07 2+911.42 2+913.87	Rt. Lt. Rt. Lt.	W11-2 W16-7P		762 X 762 mm 610 x 305 mm	0.581 0.186	2	50 x 50 mm	4	3.068
2+839.31 2+843.01 2+905.23 2+909.02	Rt. Rt. Lt. Lt.	R1-2	YIELD	914 x 914 x 914 mm	0.362	2	50 x 50 mm	4	1.448
2+859.78 2+886.42 2+886.42	Rt. Rt. Lt.	R6-1R W1-8a	ONE WAY	914 x 305 mm 1219 x 610 mm	0.279 0.744	2	57 x 57 mm	3	3.069
2+988.90	Lt.	R4-8b		914 x 914 mm	0.835	2	50 x 50 mm	1	0.835

	Area (sq/m)
63302-2002, Sign Installation, 1 Post - 44 mm x 44 mm	0.930
63302-2006, Sign Installation, 2 Post - 50 mm x 50 mm	10.270
63302-2007 Sign Installation, 2 Post - 57 mm x 57 mm	3.069

N7(2-3)2&4 PAVEMENT MARKINGS

ITEM No. 63401-1510: SOLID YELLOW

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH (m)
West Approach to Roundabout					
2+747.90	To	2+807.74	CL, Rt. (Dbl)	Solid Yellow	59.84
2+747.90	To	2+807.74	CL, Lt. (Dbl)	Solid Yellow	59.84
2+807.74	To	2+835.14	Rt of Island	Solid Yellow	27.56
2+838.14	To	2+842.64	Rt of Island	Solid Yellow	4.64
2+807.74	To	2+835.14	Lt of Island	Solid Yellow	27.44
2+838.14	To	2+838.11	Lt of Island	Solid Yellow	4.18
East Approach to Roundabout					
2+906.09	To	2+910.14	Rt of Island	Solid Yellow	4.17
2+913.14	To	2+941.36	Rt of Island	Solid Yellow	28.27
2+913.14	To	2+941.36	Lt of Island	Solid Yellow	28.38
2+941.36	To	2+971.65	CL, Lt. (Dbl)	Solid Yellow	30.29
2+941.35	To	2+971.65	CL, Rt. (Dbl)	Solid Yellow	30.29
				SUB TOTAL	304.90

ITEM No. 63401-1520: SOLID WHITE

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH (m)
West Approach to Roundabout					
2+807.74	To	2+835.14	3.6m Rt of Island	Solid White	27.57
2+838.14	To	2+845.77	3.6m Rt of Island	Solid White	8.26
2+807.74	To	2+835.14	3.6m Lt of Island	Solid White	27.44
East Approach to Roundabout					
2+902.52	To	2+910.14	3.6m Lt of Island	Solid White	8.25
2+913.14	To	2+941.36	3.6m Lt of Island	Solid White	28.38
2+913.14	To	2+941.36	3.6m Rt. of Island	Solid White	28.28
				SUB TOTAL	128.18

ITEM No. 63401-1620: BROKEN WHITE

STATION TO STATION			LOCATION	DESCRIPTION	LENGTH (m)
West Approach to Roundabout					
2+747.90	To	2+807.74	3.6m Rt.	Broken White	59.84
2+747.90	To	2+807.74	3.6m Lt.	Broken White	59.84
East Approach to Roundabout					
2+941.36	To	2+971.65	3.6m Rt.	Broken White	30.29
2+941.36	To	2+971.65	3.6m Lt.	Broken White	30.29
				SUB TOTAL	180.26

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N27(4-2)/N7(2-3)-PERMANENT & TEMPORARY TRAFFIC CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 12/31/2013
DESIGNED BY: NRDOT	DATE: 12/31/2013
REVISED: 04/08/2015	BY: Leroy.Toledo
Sht 38 N27 PrmTmp Sign TC 2 rev 081517.dgn	

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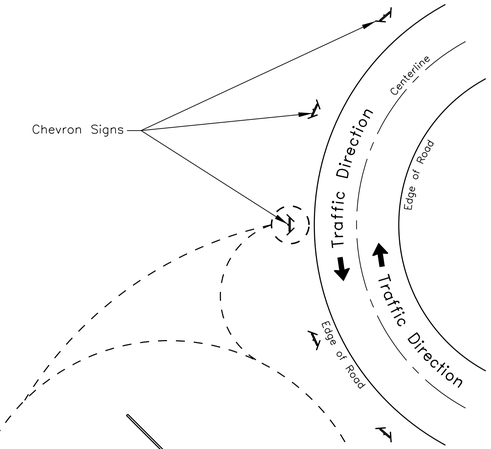
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N105	N105(1)2&4	39	105

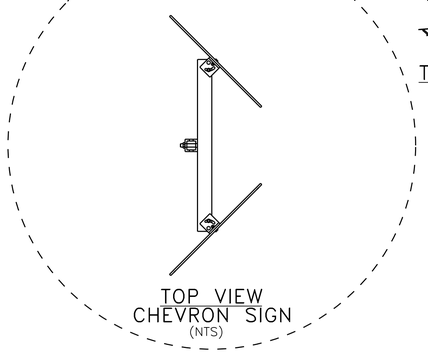
N105(1)4 PERMANENT TRAFFIC CONTROL – Sign, Post & Hardware

Station	Location	Detail No.	Description	Sign Panel Size (mm)	Area of Sign (sq/m)	Number of Tube	Size	No. of Panel	Total Area of Panel (m²)
0+.014.00	Lt.	W1-1	STOP	914 x 914 mm	0.84	2	50 x 50 mm	1	0.84
0+126.50	Lt.	R3-8c	ONLY ONLY	762 x 762 mm	0.58	1	44 x 44 mm	1	0.58
0+100.00	Rt.	D1-3R	CHINLE JUSTICE CENTER →	1142 x 700 mm	0.80	2	57 x 57 mm	1	0.80
0+180.00	Lt.	D1-3L	← CHINLE JUSTICE CENTER	1142 x 700 mm	0.80	2	57 x 57 mm	1	0.80
0+050.00	Rt.	M1-3	105	457 x 610 mm	0.28	1	38 x 38 mm	1	0.28
0+035.00 0+320.00	Rt. Lt.	R2-1	SPEED LIMIT 25	610 x 762 mm	0.46	1	44 x 44 mm	2	0.93
0+151.00 0+256.18 0+360.00	Rt. Lt. Rt.	R1-1	STOP	762 x 762 mm	0.58	1	44 x 44 mm	3	1.74
0+400.00 0+600.00	Rt. Lt.	W1-1R W13-1P	20 MPH	762 x 762 mm 457 x 457 mm	0.58 0.21	1	44 x 44 mm	2	1.58
0+060.00	Lt.	W3-1		762 x 762 mm	0.58	1	44 x 44 mm	1	0.58
0+455.606	Lt.	W1-8L		457 x 610 mm	0.28	1	38 x 38 mm	1	0.28
0+479.489 1+504.093 0+528.336 0+552.579	Lt. Lt. Lt. Lt.	W1-8L & W1-8R		457 x 610 mm	0.28	1	38 x 38 mm	8	2.23
0+576.822	Lt.	W1-8R		457 x 610 mm	0.28	1	38 x 38 mm	1	0.28
0+200.00 0+230.00	Rt. Lt.	R3-9b	CENTER LANE ONLY	457 x 610 mm	0.28	1	38 x 38 mm	2	0.56
0+303.00	Rt.	W2-1R		762 x 762 mm	0.58	1	44 x 44 mm	1	0.58
0+450.00	Lt.	W6-1		762 x 762 mm	0.58	1	44 x 44 mm	1	0.58
0+550.00	Rt.	W8-3	PAVEMENT ENDS	762 x 762 mm	0.58	1	44 x 44 mm	1	0.58

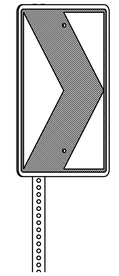
	Area (sq/m)
63302-2001, Sign Installation, 1 Post – 38 mm x 38 mm	3.63
63302-2002, Sign Installation, 1 Post – 44 mm x 44 mm	7.15
63302-2006, Sign Installation, 2 Post – 50 mm x 50 mm	0.84
63302-2007, Sign Installation, 2 Post – 57 mm x 57 mm	1.60



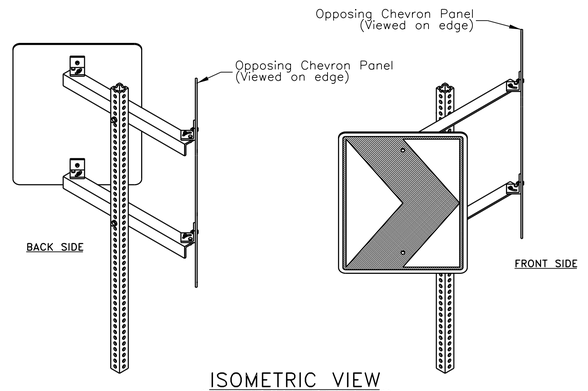
TYPICAL CHEVRON SIGN LAYOUT
(NTS)



TOP VIEW
CHEVRON SIGN
(NTS)



SIDE VIEW
CHEVRON SIGN
(NTS)



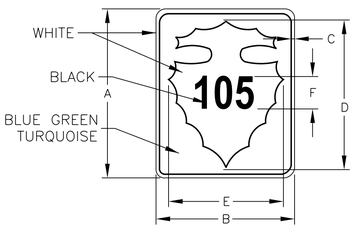
ISOMETRIC VIEW
CHEVRON DETAILS
(NTS)

Note: Each Chevron Symbol/Panel (2 ea.) Shall Face On-Coming Traffic And Shall Follow The Direction Of Curvature.

TEMPORARY TRAFFIC CONTROL SIGNS (MINIMUM)

TYPE	DESCRIPTION	SIZE (mm)
W20-1a	ROAD WORK XXX FT	1219 x 1219
W20-4	ONE LANE ROAD XXX FT	1219 x 1219
W13-1P	25 MPH	610 x 610
W20-7		914 x 914
W16-2P	500 FEET	457 x 610
G20-2	END ROAD WORK	914 x 457
W1-4L		914 x 914
	ROAD WORK AHEAD	
G20-1	ROAD WORK NEXT 8 MILES	914 x 457
W8-12	NO CENTER LINE	914 x 914

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



UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N105(1)-PERMANENT & TEMPORARY TRAFFIC CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 4/29/2015
DESIGNED BY: NRDOT	DATE: 4/29/2015
REVISED: 8/26/2015	BY: Leroy.Toledo
Sht 39 N27 PrmTmp Sign TC 3 rev 081517.dgn	

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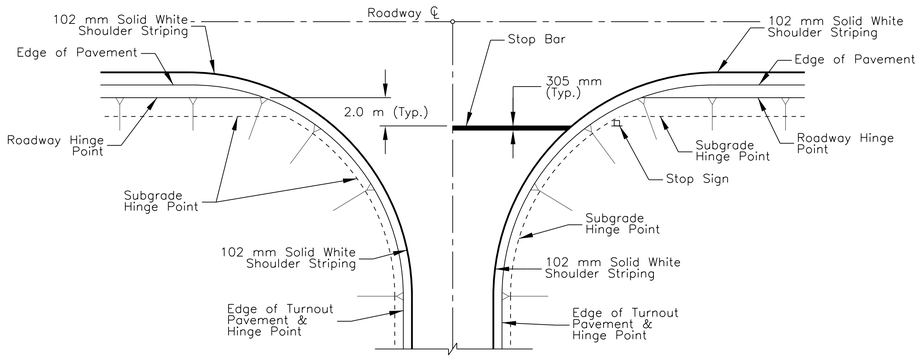
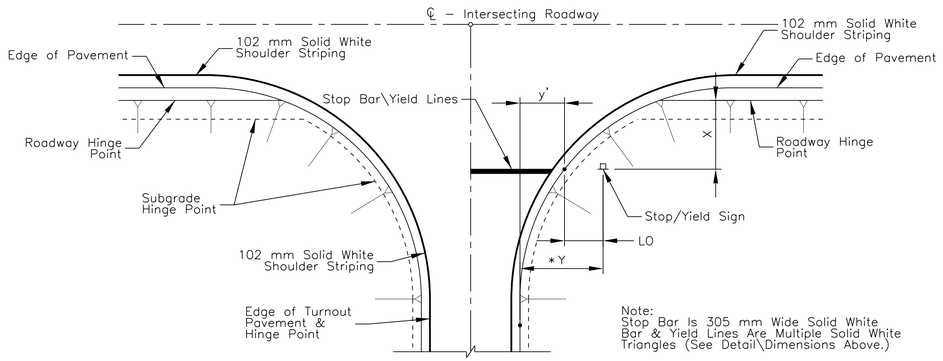
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	40	105
			N27	N27(4-2)2&4		
			N105	N105(1)2&4		



TYPICAL PAVEMENT MARKING LAYOUT & STOP BAR PLACEMENT TURNOUTS 7.0 m OR GREATER



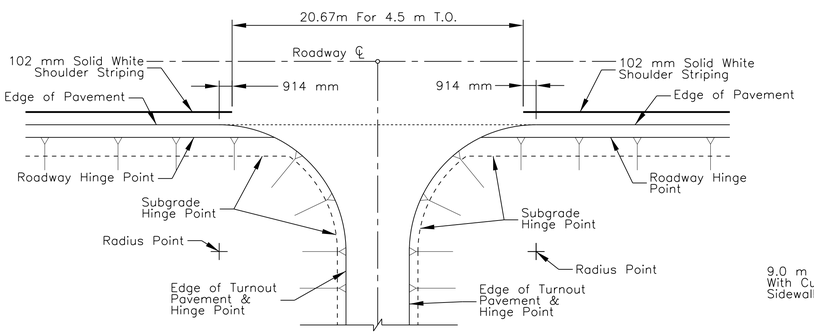
Note:
Stop Bar Is 305 mm Wide Solid White Bar & Yield Lines Are Multiple Solid White Triangles (See Detail\Dimensions Above.)

TYPICAL PAVEMENT MARKING LAYOUT AND STOP\YIELD SIGN PLACEMENT AT MAJOR INTERSECTION

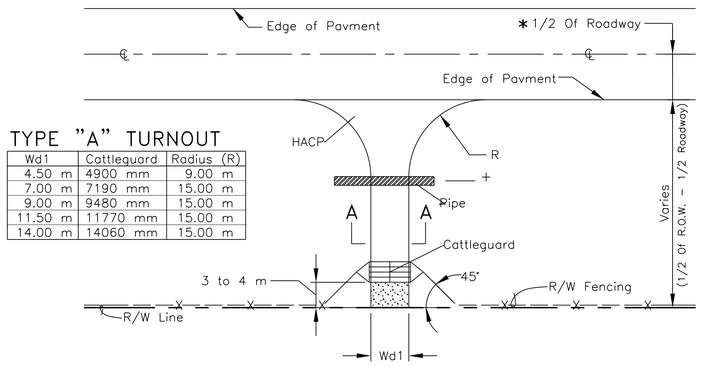
STOP\YIELD SIGN LOCATION TABLE

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

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



TYPICAL PAVEMENT MARKING LAYOUT At 4.5 m TURNOUTS

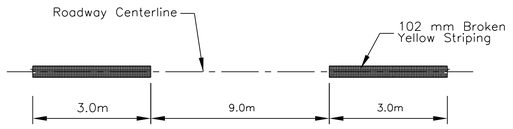


TYPE "A" TURNOUT

Wd1	Cattleguard	Radius (R)
4.50 m	4900 mm	9.00 m
7.00 m	7190 mm	15.00 m
9.00 m	9480 mm	15.00 m
11.50 m	11770 mm	15.00 m
14.00 m	14060 mm	15.00 m

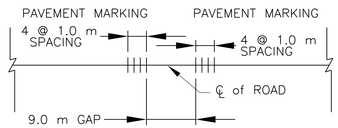
TYPICAL* TYPE "A" TURNOUT LAYOUT DETAIL

See Typical Section Detail For Roadway Width

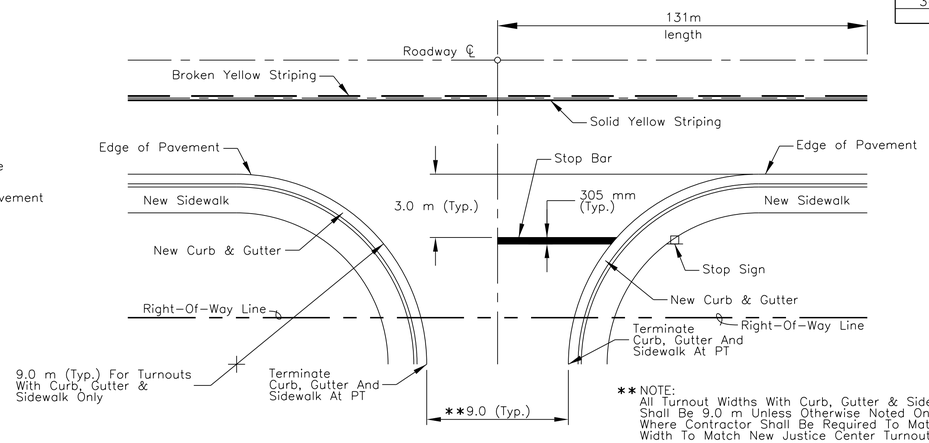


TYPICAL PAVEMENT MARKING "BROKEN YELLOW"

Roadway Centerline Striping



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

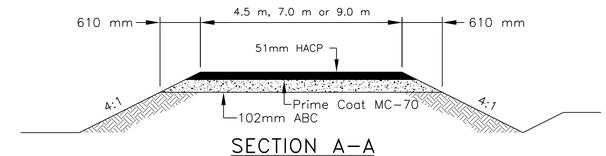


** NOTE:
All Turnout Widths With Curb, Gutter & Sidewalk Shall Be 9.0 m Unless Otherwise Noted On Plans Where Contractor Shall Be Required To Match The Width To Match New Justice Center Turnouts.

TYPICAL TURNOUT LAYOUT DETAIL WITH CURB, GUTTER & SIDEWALK

GENERAL NOTES

1. SEE SHEETS 34, 35, 44, 48, 49 of 105 FOR SIGN DETAILS, DIMENSION, PLACEMENT/LOCATION, MARKINGS, TURNOUT TYPICALS, STOP BARS, ETC.



SECTION A-A

N27(2-3)1,2&4 PERMANENT PAVING MARKINGS
ITEM No. 63405-3260: STOP BAR

STATION	LOCATION	EACH	REMARKS
54+120.00	Rt.	1	7.00 m Turnout To Residence
54+582.00	Lt.	1	7.00 m Turnout To Residence
54+582.00	Rt.	1	7.00 m Turnout To Residence
55+371.00	Lt.	1	7.00 m Turnout To Residence
58+020.00	Rt.	1	7.00 m Turnout To Residence
58+283.00	Rt.	1	7.00 m Turnout To Residence
	TOTAL	6	

N27(4-2)2&4 PERMANENT PAVING MARKINGS
ITEM No. 63405-3260: STOP BAR

STATION	LOCATION	EACH	REMARKS
60+173.23	Rt.	1	9.48 m Wide Turnout To Residence
60+266.89	Lt.	1	6.71 m Wide Turnout To Chinle Justice Center
60+367.98	Lt.	1	6.71 m Wide Turnout To Chinle Justice Center
60+376.99	Rt.	1	9.00 m Wide Turnout To Residence
60+457.01	Lt.	1	12.192 m Wide Turnout To Chinle Justice Center
60+458..23	Rt.	1	9.00 m Wide Turnout To Residence
60+550.00	Rt.	1	7.00 m Wide Turnout To Residence
60+704.23	Lt.	1	9.48 m Wide Turnout To Residence
60+716.35	Rt.	1	7.19 m Wide Turnout To Residence
	TOTAL	9	

N7(1)2&4 PERMANENT PAVING MARKINGS
ITEM No. 63405-3260: STOP BAR

STATION	LOCATION	EACH	REMARKS
2+791.14	Rt.	1	9.00 m Wide Turnout To DINEH CORP. INC.
2+800.57	Lt.	1	9.00 m Wide Turnout To BIA Facility
	TOTAL:	2	

N7(1)4 PERMANENT MARKINGS
ITEM No. 63405-3260: STOP BAR

STATION	LOCATION	EACH	REMARKS
0+017.54	CL	1	At Crosswalk Location
0+272.32	CL	1	At Crosswalk Location
0+277.32	CL	1	At Crosswalk Location
0+587.18	CL	1	At Crosswalk Location
0+592.18	CL	1	At Crosswalk Location
2+547.56	CL	1	At Turnout
2+606.55	CL	1	At Crosswalk Location
2+611.55	CL	1	At Crosswalk Location
3+027.50	CL	1	At Crosswalk Location
3+032.50	CL	1	At Crosswalk Location
	TOTAL	10	

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

TURNOUTS AND PERMANENT PAVEMENT MARKING LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 8/26/2015
DESIGNED BY: NRDOT	DATE: 8/26/2015
REVISED: 8/26/2015	BY: Leroy.Toledo
Sht 40 N27 PrmTmpTC_4.dgn	

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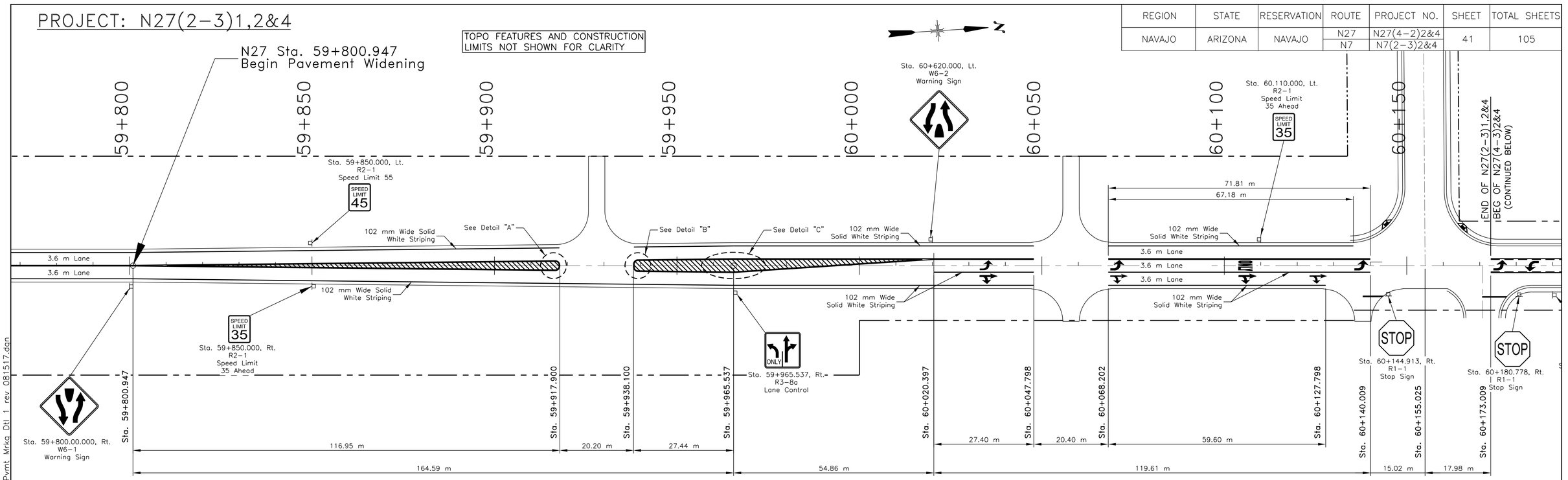
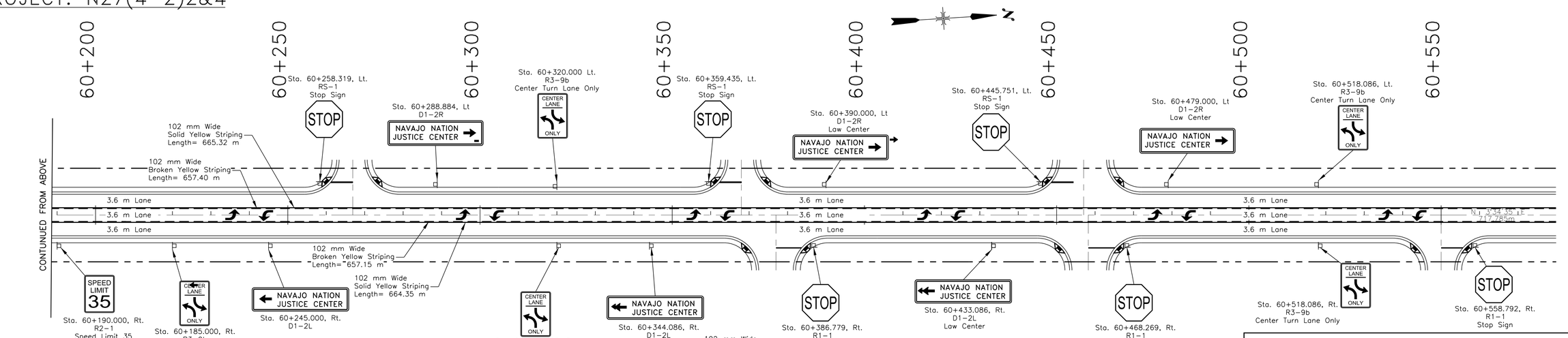
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	41	105
			N7	N7(2-3)2&4		

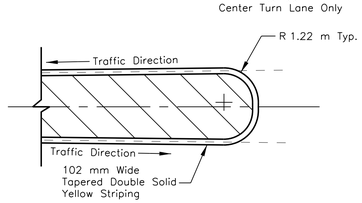
PROJECT: N27(2-3)1,2&4

TOPO FEATURES AND CONSTRUCTION LIMITS NOT SHOWN FOR CLARITY

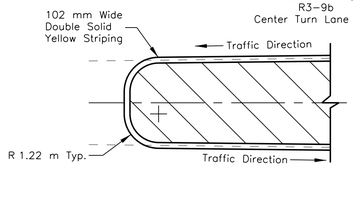


PROJECT: N27(4-2)2&4

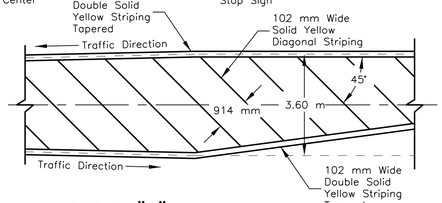




DETAIL "A"
ITEM: 63405-3290: Pavement Marking, "Diagonal Striping", Type "H", 1 Each
Sta. 59+810.270 To 59+917.900



DETAIL "B"
ITEM: 63405-3290: Pavement Marking, "Diagonal Striping", Type "H", 1 Each
Sta. 59+938.100 To 60+017.285



DETAIL "C"
ITEM: 63405-3290: Pavement Marking, "Diagonal Striping", Type "H", 1 Each
Sta. 59+938.100 To 60+017.285

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

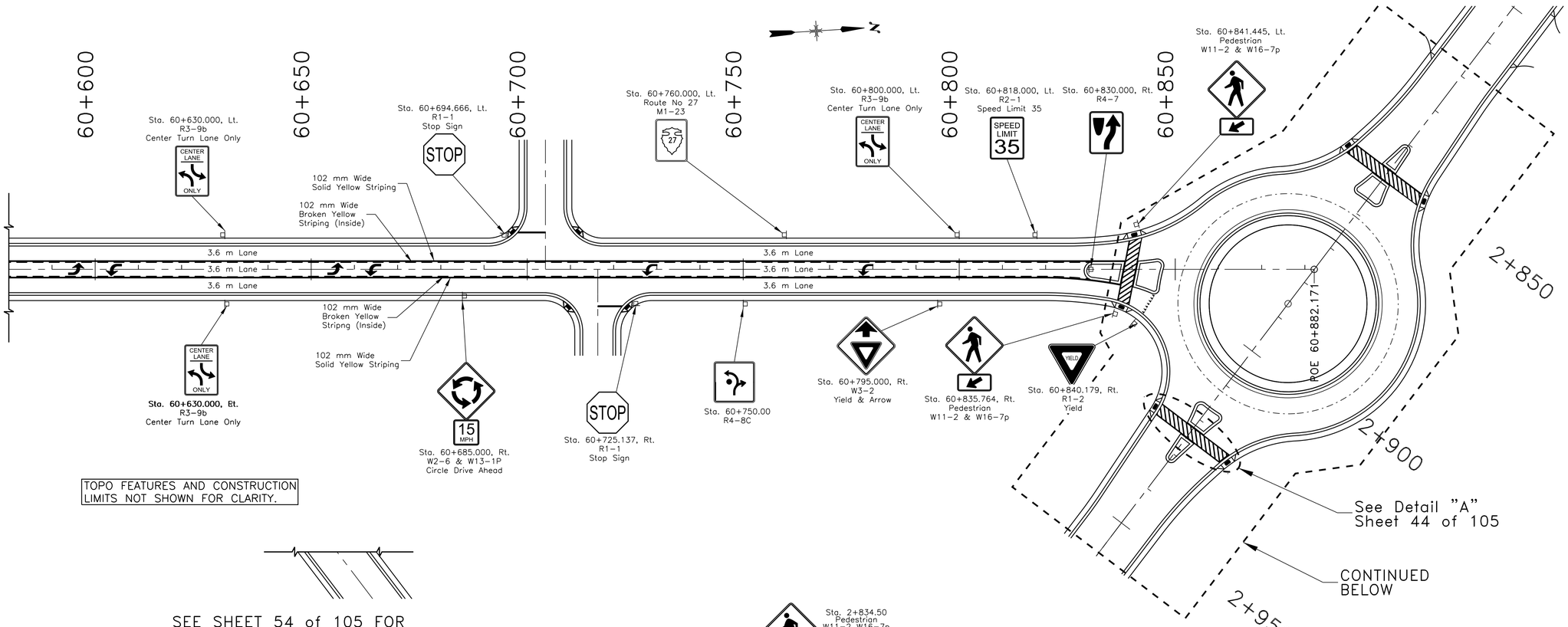
N27(2-3) ROADWAY WIDENING AND N27(4-2) PAVEMENT MARKING LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 8/15/2017
DESIGNED BY: NRDOT	DATE: 8/15/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 41 N27 Pvmt Mrkg Dtl 1 rev 081517.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 41 N27 Pvmt Mrkg Dtl 1 rev 081517.dgn

PROJECT N27(4-2) & N7(2-3)-ROUNDABOUT

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	42	105



UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

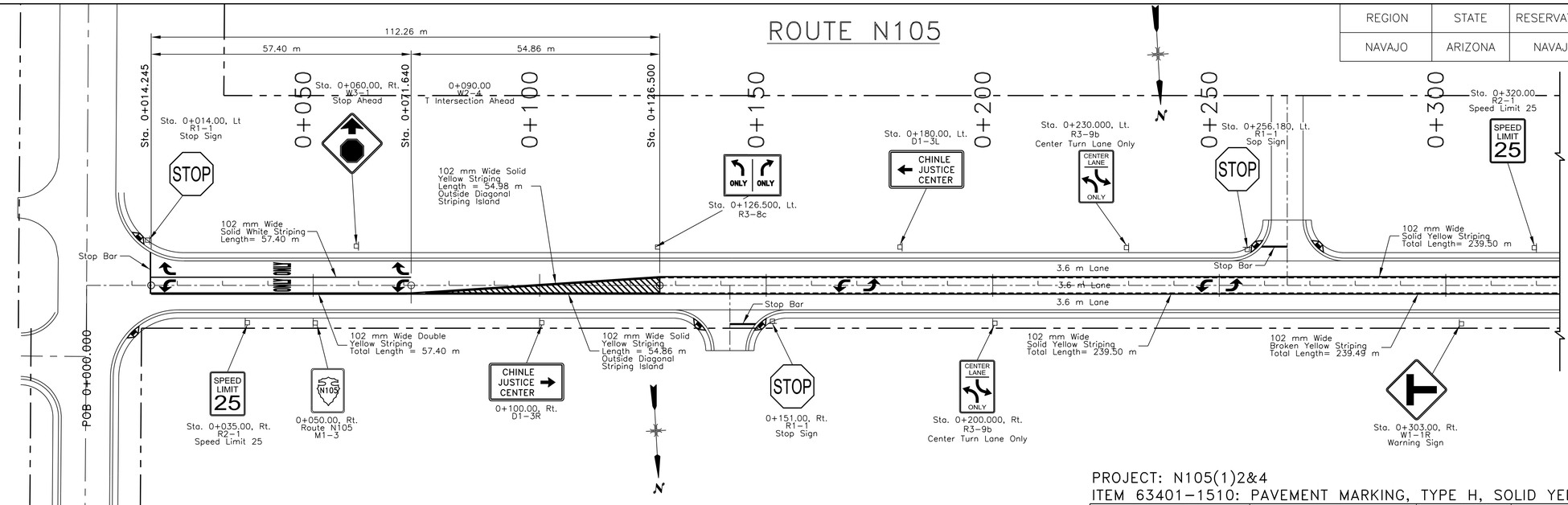
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

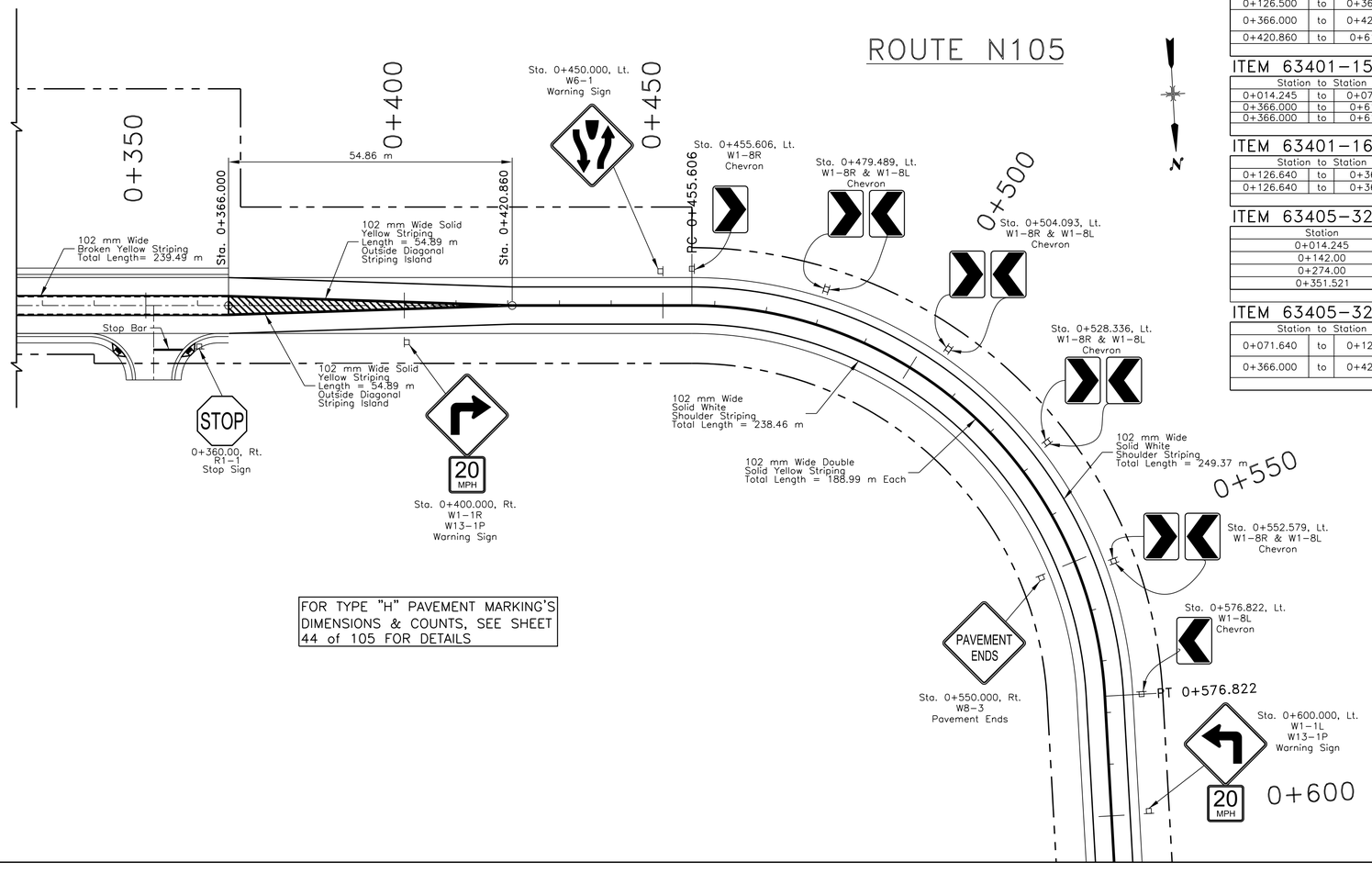
N27(4-2) & N7(2-3) PAVEMENT MARKING AND PERMANENT TRAFFIC SIGN LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 8/16/2017
DESIGNED BY: NRDOT	DATE: 8/16/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 42 N27_N7 REV Pvmt Mrkg Dtl 2 081617.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 42 N27_N7 REV Pvmt Mrkg Dtl 2 081617.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N105	N105(1)2&4	43	105





PROJECT: N105(1)2&4

ITEM 63401-1510: PAVEMENT MARKING, TYPE H, SOLID YELLOW

Station	to	Station	Location	Length (m)	Description	Remarks
0+014.245	to	0+071.640	1.80 m Rt.	114.800	Double Solid Yellow Striping	
0+071.640	to	0+126.500	1.80 m Lt to 1.80 m Rt.	219.440	Solid Yellow Striping	Outside Diagonal Striping Island
0+126.500	to	0+366.000	1.80 m Rt./Lt.	479.000	Solid Yellow Striping	
0+366.000	to	0+420.860	1.80 m Rt./Lt.	109.720	Solid Yellow Striping	Outside Diagonal Striping Island-Length Not Determined by Sta. to Sta. Difference
0+420.860	to	0+610.00	CL	378.280	Double Solid Yellow Striping	
			Total:	1,301.240		

ITEM 63401-1520: PAVEMENT MARKING, TYPE H, SOLID WHITE

Station	to	Station	Location	Length (m)	Description	Remarks
0+014.245	to	0+071.640	1.80 m Lt.	57.400	Solid White Striping	
0+366.000	to	0+610.00	5.4 - 3.60 m Lt.	244.000	Solid White Striping	At the Shoulders
0+366.000	to	0+610.00	5.4 - 3.60 m Rt.	244.000	Solid White Striping	At the Shoulders
			Total:	545.400		

ITEM 63401-1610: PAVEMENT MARKING, TYPE H, BROKEN YELLOW

Station	to	Station	Location	Length (m)	Description	Remarks
0+126.640	to	0+366.00	1.59 m Lt.	239.490	Broken Yellow Striping	
0+126.640	to	0+366.00	1.59 m Lt.	239.490	Broken Yellow Striping	
			Total:	478.980		

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

Station	Location	Each	Description	Remarks
0+014.245	Lt.	1	Stop Bar	305 mm Wide
0+142.00	Rt. Turnout	1	Stop Bar	305 mm Wide
0+274.00	Lt. Turnout	1	Stop Bar	305 mm Wide
0+351.521	Rt. Turnout	1	Stop Bar	305 mm Wide
	Total:	4		

ITEM 63405-3290: PAVEMENT MARKING, TYPE H, DIAGONAL STRIPING, SOLID YELLOW

Station	to	Station	Location	Each	Description	Remarks
0+071.640	to	0+126.500	CL	1	Diagonal Striping	102 mm Wide Solid White @ 914 mm Spacing
0+366.000	to	0+420.860	CL	1	Diagonal Striping	102 mm Wide Solid White @ 914 mm Spacing
			Total:	2		

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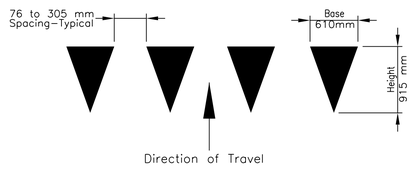
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N105(1) PAVEMENT MARKING AND PERMANENT TRAFFIC SIGN LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 8/16/2017
DESIGNED BY: NRDOT	DATE: 8/16/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 43 N105 Pvmt Mrkg Dtl 3 081617.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 43 N105 Pvmt Mrkg Dtl 3 081617.dgn

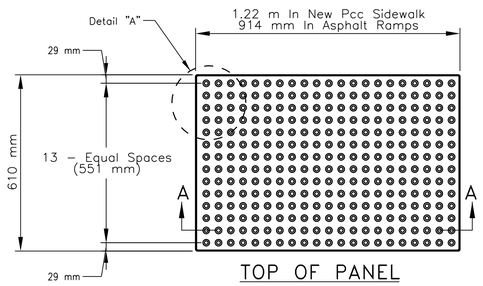
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	44	105



Pavement Marking, White Yield Symbols-Large, Type "H". To Be Included With Bid Item 63405-3280, Crosswalks.

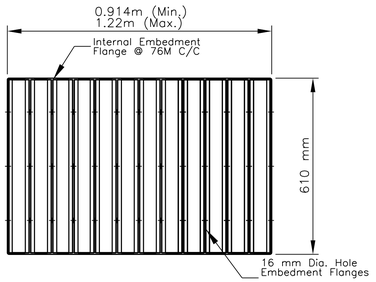
NOTE: YIELD LINE SYMBOLS ARE ISOSCELES THE BASE DIMENSION. A SMALL YIELD LINE SYMBOL SHALL HAVE A BASE DIMENSION OF 305 mm. A LARGE YIELD LINE SYMBOL SHALL HAVE A BASE DIMENSION OF 610 mm. YIELD LINE SYMBOLS ARE TO BE INSTALLED WITH THE APEX OF THE TRIANGLE ORIENTED TOWARDS ON-COMING TRAFFIC.

YIELD LINES SHALL BE PLACED A MINIMUM OF 1.22 m FROM THE NEAREST EDGE IN ADVANCE OF THE NEAREST INTERSECTING TRAVEL WAY.

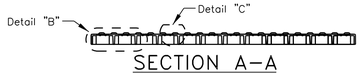


TOP OF PANEL

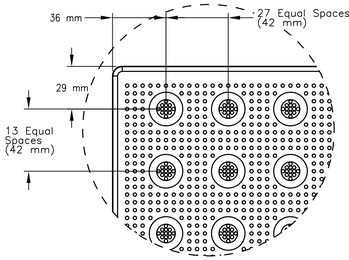
Tactile ADA PAD



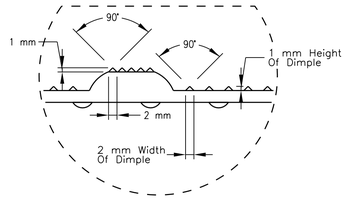
BOTTOM OF PANEL



SECTION A-A



RAISED TRUNCATED DOME
PLAN VIEW DETAIL "A"



RAISED TRUNCATED DOME
DETAIL "C"

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 ADA PAD, AS FOLLOWS:

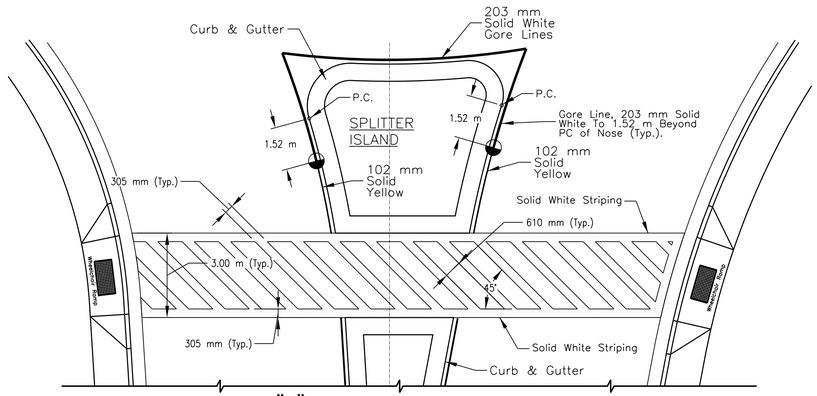
a) THE CONCRETE SHALL BE POURED AND FINISHED LEVEL, TRUE AND SMOOTH TO THE REQUIRED DIMENSIONS PRIOR TO THE PLACEMENT OF THE TACTILE ADA PAD.

b) PLACE THE TACTILE ADA PAD 152 - 203mm FROM THE CURB LINE. WORKING IN A GRID PATTERN, TAMP THE TACTILE ADA PAD 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 ADA PAD SURFACE IS FLUSH WITH THE SURROUNDING AREA.

c) FOLLOWING THE PLACEMENT, THE TACTILE UNIT 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 ADA PAD INSTALLATION, AS WELL AS THE CONCRETE CURING STAGE, NO WALKING OR EXTERNAL FORCES BE PLACED ON THE TACTILE ADA PAD. THE AREA MUST BE PROTECTED FROM PEDESTRIAN TRAFFIC UNTIL CONCRETE IS CURED.

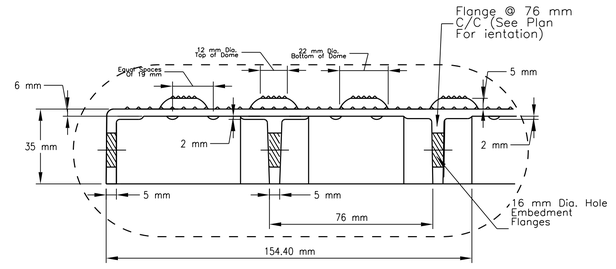
3. THE COST OF SUPPLYING ALL MATERIALS AND INSTALLATION OF THE TACTILE UNIT SHALL BE INCLUDED IN THE UNIT PRICE BID UNDER ITEM 61505-1000.
4. THE CONTRACTOR SHALL BE REQUIRED TO MAKE ANY NECESSARY FIELD ADJUSTMENTS TO MATCH IN-PLACED SIDEWALK, CURB AND GUTTER ACTUAL CONDITIONS. THESE FIELD ADJUSTMENTS ARE INCIDENTAL OBLIGATIONS OF THE CONTRACTOR.



DETAIL "A" TYPICAL CROSS WALK DETAIL

= CHANGE OF LINE WIDTH & COLOR, 1.52 M BEYOND THE P.C.

ITEM 63405-3280
Pavement Marking, Type "H", Crosswalk, Solid White



SIDE VIEW DETAIL "B"

ITEM 61505-1000: HANDICAP RAMP, PC CONCRETE

N27(4-2)2&4

STATION	LOCATION	EACH	REMARKS
60+178.31	Rt.	1	Handicap Ramp with Dimple Pads
60+260.28	Lt..	1	Handicap Ramp with Dimple Pads
60+273.12	Lt..	1	Handicap Ramp with Dimple Pads
60+361.38	Lt.	1	Handicap Ramp with Dimple Pads
60+369.42	Rt.	1	Handicap Ramp with Dimple Pads
60+374.24	Lt.	1	Handicap Ramp with Dimple Pads
60+384.56	Rt.	1	Handicap Ramp with Dimple Pads
60+447.72	Lt.	1	Handicap Ramp with Dimple Pads
60+450.91	Rt.	1	Handicap Ramp with Dimple Pads
60+465.83	Lt.	1	Handicap Ramp with Dimple Pads
60+466.04	Rt.	1	Handicap Ramp with Dimple Pads
60+543.43	Rt.	1	Handicap Ramp with Dimple Pads
60+556.57	Rt.	1	Handicap Ramp with Dimple Pads
60+696.89	Lt.	1	Handicap Ramp with Dimple Pads
60+709.78	Rt.	1	Handicap Ramp with Dimple Pads
60+711.60	Lt.	1	Handicap Ramp with Dimple Pads
60+722.91	Rt.	1	Handicap Ramp with Dimple Pads
60+837.74	Rt.	1	Handicap Ramp with Dimple Pads
60+840.64	Lt.	1	Handicap Ramp with Dimple Pads
	Sub-Total:	19	

N7(2-3)2&4

STATION	LOCATION	EACH	REMARKS
2+836.64	Lt, & Rt.	2	Handicap Ramp with Dimple Pads
2+911.64	Lt. & Rt.	2	Handicap Ramp with Dimple Pads
	Sub-Total:	4	

N7(1)4

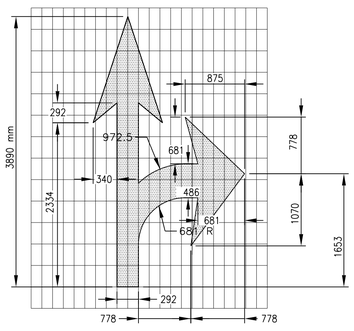
STATION	LOCATION	EACH	REMARKS
0+274.82	Lt. & Rt.	2	Handicap Ramp with Dimple Pads
	Sub-Total:	2	

N105(1)2&4

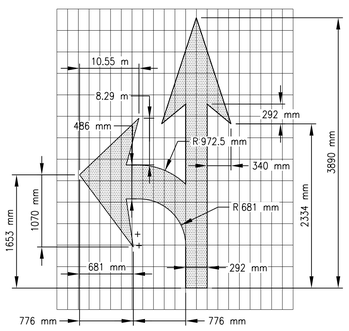
STATION	LOCATION	EACH	REMARKS
0+010.14	Rt.	1	Handicap Ramp with Dimple Pads
0+011.24	Lt..	1	Handicap Ramp with Dimple Pads
0+135.42	Rt.	1	Handicap Ramp with Dimple Pads
0+148.58	Rt.	1	Handicap Ramp with Dimple Pads
0+258.42	Lt.	1	Handicap Ramp with Dimple Pads
0+271.58	Lt.	1	Handicap Ramp with Dimple Pads
0+344.94	Rt.	1	Handicap Ramp with Dimple Pads
0+358.10	Rt.	1	Handicap Ramp with Dimple Pads
	Sub-Total:	8	
	Grand Total	33	

PERMANENT PAVEMENT MARKING TYPE "H" SUMMARY TABLE

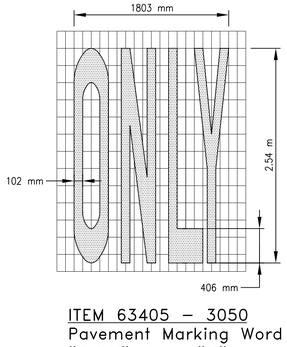
PROJECTS	Item: 63405-2900 Elongated Turn Lane-Use Arrow	Item: 63405-2950 Elongated Through Lane-Use Arrow	Item: 63405-3000 Turn & Thru Lane-Use Arrow	Item: 63405-3050 Word "ONLY"	Item: 63405-3280 Crosswalk, Solid White
N27(2-3)	3	---	4	1	---
N27(4-2)	20	---	---	---	1
N7(2-3)	---	4	8	---	2
N105(1)	8	---	---	2	---
N7(1)	22	---	---	3	6
Total	53	4	12	6	9



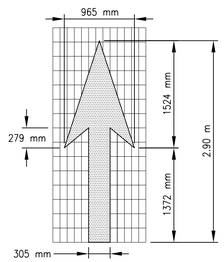
ITEM 63405 - 3000
Pavement Marking Turn And Through Lane-Use Arrow Type "H"



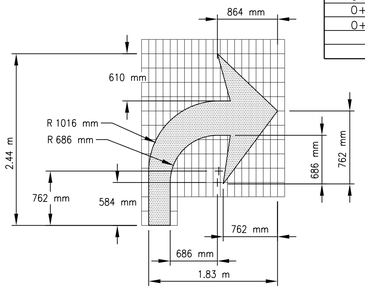
ITEM 63405 - 3000
Pavement Marking Turn And Through Lane-Use Arrow Type "H"



ITEM 63405 - 3050
Pavement Marking Word "ONLY", Type "H"



ITEM 63405 - 2950
Pavement Marking, Elongated Through Lane-Use Arrow, Type "H"



ITEM 63405 - 2900
Pavement Marking, Elongated Turn Lane-Use Arrow, Type "H"

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N27(4-2) & N7(2-3) PAVEMENT MARKING AND PERMANENT TRAFFIC SIGN LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 8/16/2017
DESIGNED BY: NRDOT	DATE: 8/16/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 44 N27_N7 Pvmt Mrkg Dtl 4 081617.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 44 N27_N7 Pvmt Mrkg Dtl 4 081617.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	45	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		

Square Tube Selection: Single Post – 2.80 mm thickness

Post Size	H = Panel Height To Bottom Of sign + 1/2 Height Of Traffic Sign (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H
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	

Square Tube Selection: Double Post – 2.80 mm thickness

Post Size	H = Panel Height To Bottom Of sign + 1/2 Height Of Traffic Sign (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H
50 mm x 50 mm	n/a	n/a	1.49	0.84	0.58	Maximum Sign Area (m^2)
57 mm x 57 mm	n/a	n/a	2.15	1.97	1.81	
64 mm x 64 mm			2.68	2.46	2.26	

Square Tube Selection: Triple Post – 2.80 mm thickness

Post Size	H = Panel Height To Bottom Of sign + 1/2 Height Of Traffic Sign (meter)					
	1.52	1.83	2.13	2.44	2.74	<--- H
57 mm x 57 mm	n/a	n/a	3.08	2.83	2.61	Maximum Sign Area (m^2)
64 mm x 64 mm			3.82	3.52	3.26	

Guide Sign Post Dimensions

(Not for use with Warning, Regulatory or Marker Panels)

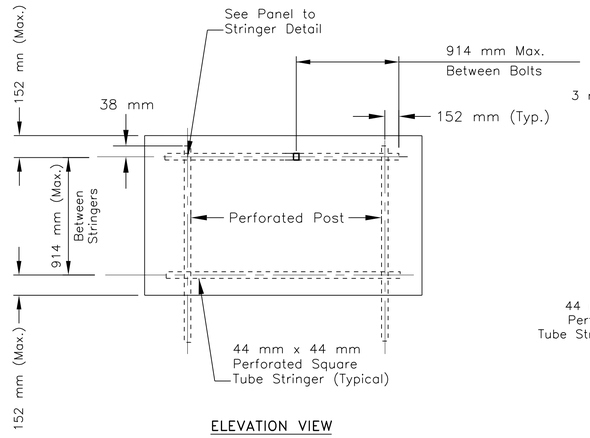
Panel Width	914 mm	1.22 m	1.52 m	1.83 m	2.13 m	2.44 m	2.74 m	3.05 m
two posts spacing (A)	559 mm	711 mm	914 mm	1.12 m	1.27 m	1.47 m	1.63 m	1.83m
bolts to panel (per stringer)			3	3	3	3	4	4
lenght of each stringer			1.22 m	1.42 m	1.57 m	1.78 m	1.93 m	2.13 m
two posts spacing (B)			533 mm	635 mm	737 mm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

GENERAL NOTES:

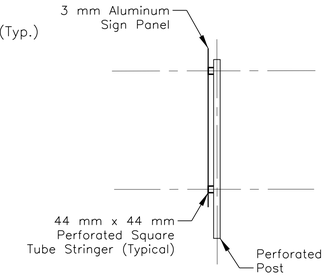
1. THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE LENGTH OF SIGN SUPPORT POSTS. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE FOR THE APPROPRIATE BID ITEMS SHOWN IN THE BID SCHEDULE.

2. SIGNS GREATER THAN 762 mm IN WIDTH SHALL BE MOUNTED ON TWO OR MORE POSTS.

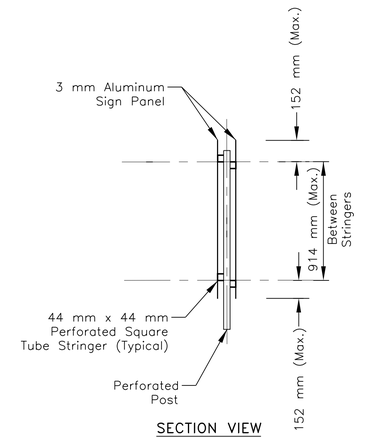
3. SIGN POST CONCRETE FOUNDATION SHALL BE USED IN LOOSE FINE GRAVELLY SOILS THAT ARE HARD TO COMPACT OR FOR INSTALLATION IN SANDSTONE AS DIRECTED BY COTR. THE CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 601.



ELEVATION VIEW

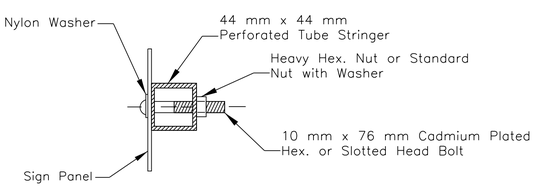


SECTION VIEW
SINGLE PANEL INSTALLATION

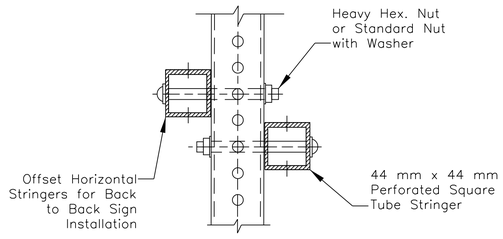


SECTION VIEW
BACK-TO-BACK SIGN INSTALLATION

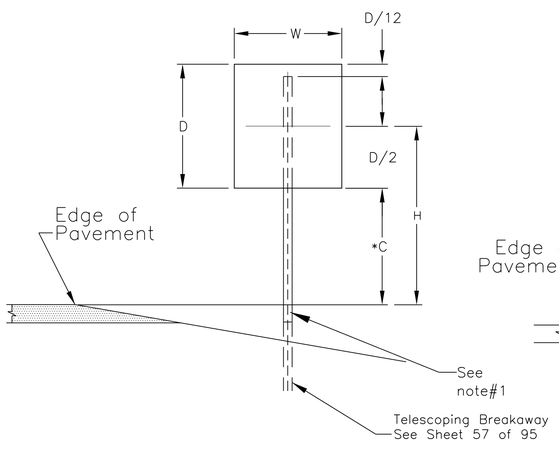
STRINGER DETAILS (FOR GUIDE SIGNS UP TO AND INCLUDING 3.05 mm WIDE)



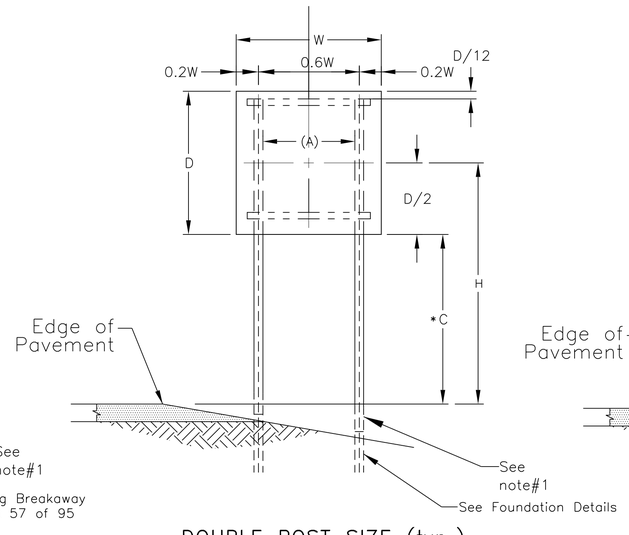
PANEL TO STRINGER OR POST



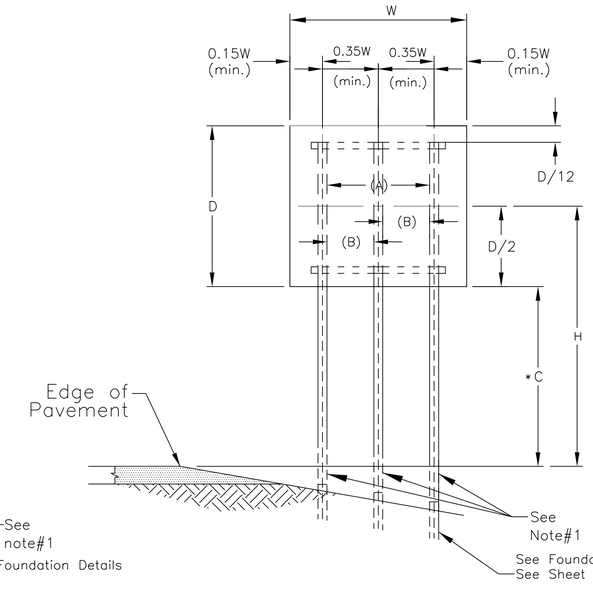
STRINGER TO POST



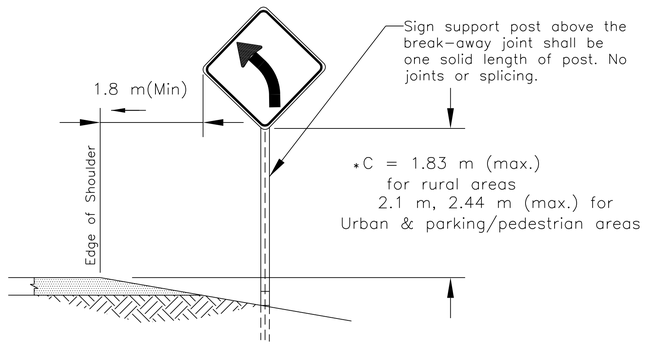
SINGLE POST SIZE (typ.)



DOUBLE POST SIZE (typ.)



THREE POST SIZE (typ.)



TYPICAL ROADSIDE SIGN LOCATION

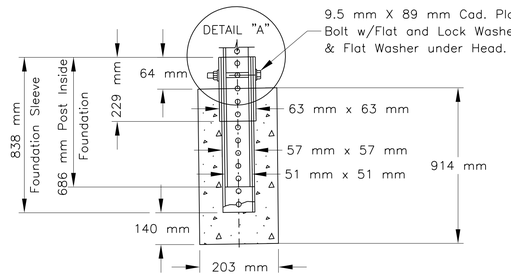
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SQUARE TUBE POST SELECTION AND SIGN MOUNTING DETAILS

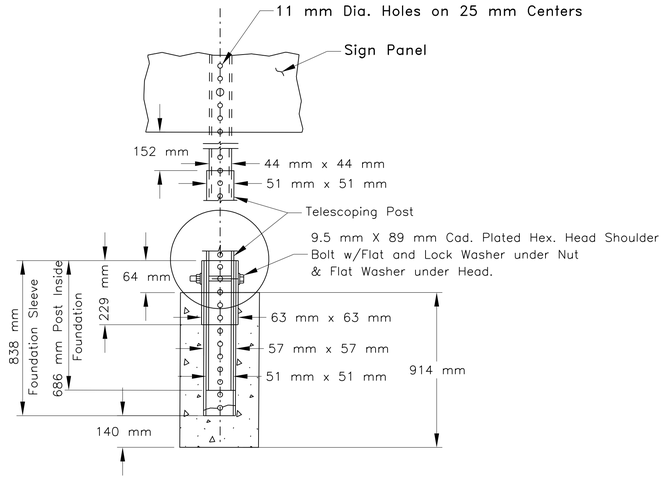
DRAWN BY: NRDOT	DATE: 7/29/2014
DESIGNED BY: NRDOT	DATE: 7/29/2014
REVISED: 1/26/2015	BY: Peterson.Yazzie
Square Tube Post Selection	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 45 SqTube Post & Mtg Dtls 081617.dgn

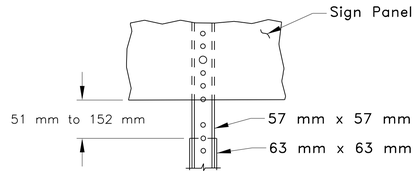
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	46	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		
			N105	N105(1)2&4		



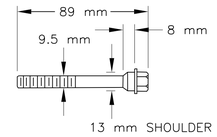
SINGLE POST FOUNDATION DETAIL



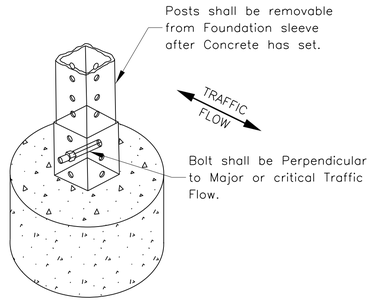
TELESCOPING POST DETAIL



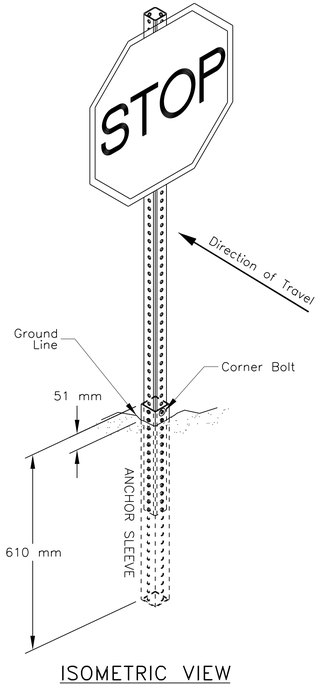
TELESCOPING POST INSTALLATION



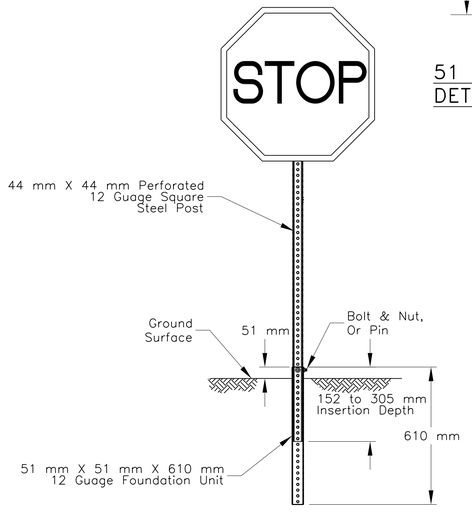
SHOULDER BOLT (HEAD)



DETAIL "A"

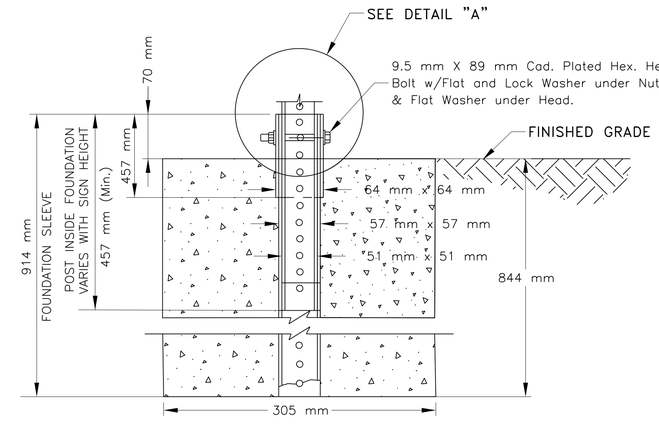


ISOMETRIC VIEW

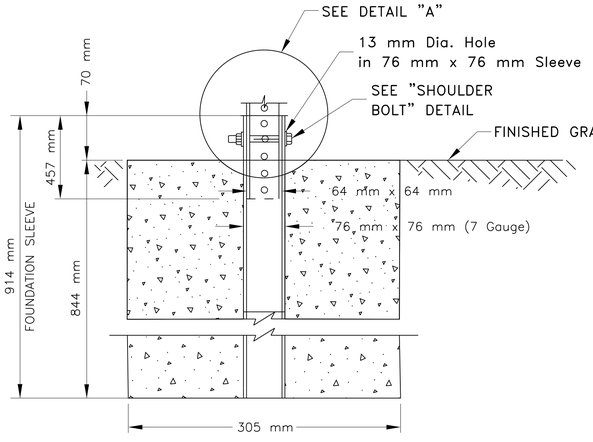


TELESCOPING BREAKAWAY

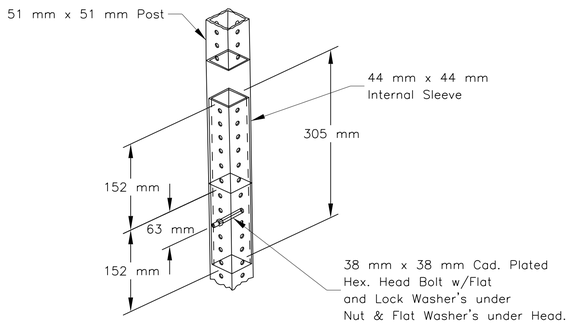
(Single Post)
For all other soils



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



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



SINGLE POST PERMISSIBLE FIELD SPLICE

(Not allowed on Telescoping Post)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

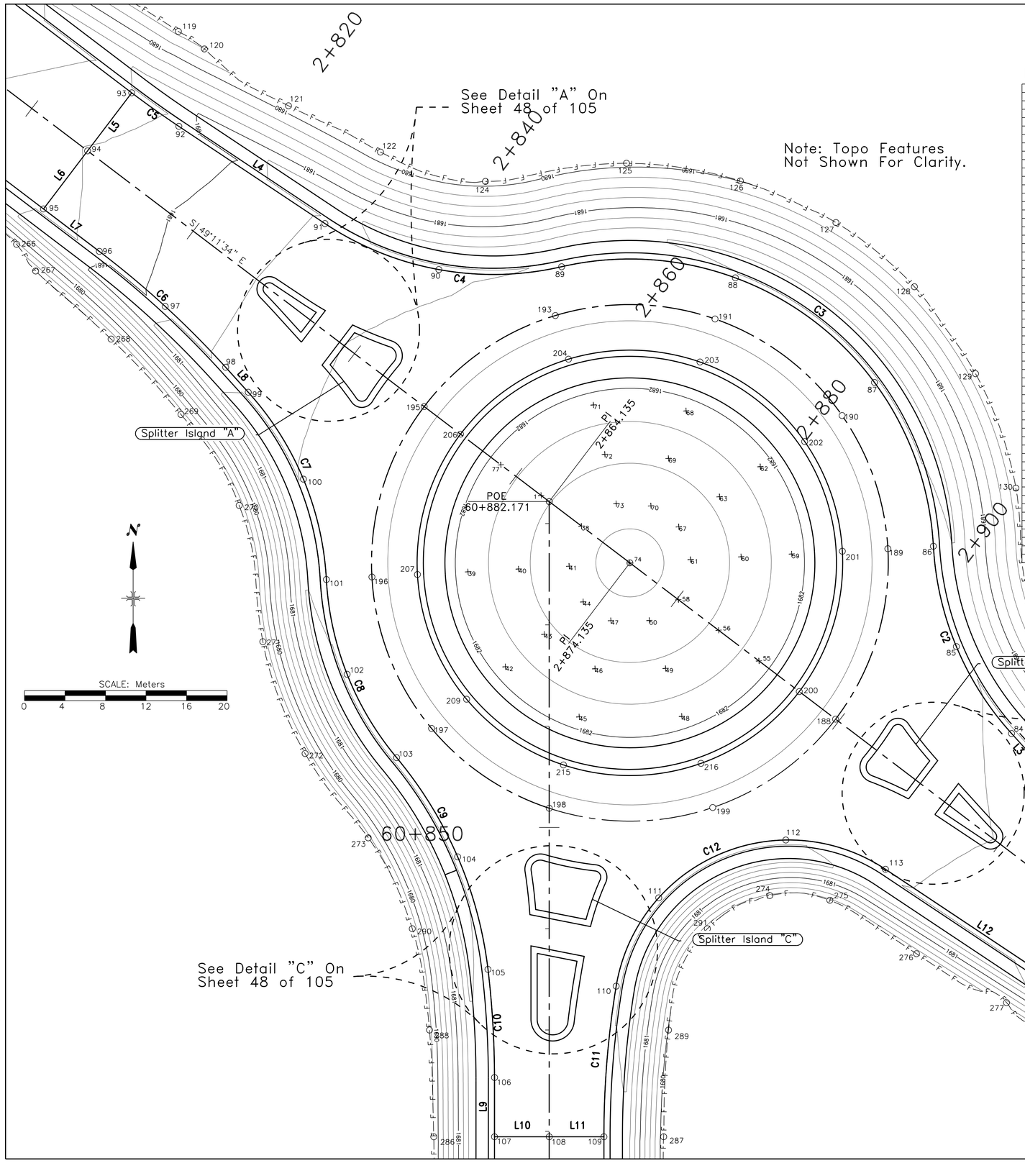
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STEEL 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 46 SqTube Posts Install Dtls 081617.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 46 SqTube Posts Install Dtls 081617.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	47	105
			N7	N7(2-3)2&4		



POINT TABLE

Point No.	Northing	Easting	Elevation	Description
1	571,607.499	268,540.472	1,682.436	Spot Elevation
38	571,604.232	268,544.257	1,682.670	Spot Elevation
39	571,600.432	268,532.799	1,682.100	Spot Elevation
40	571,600.394	268,537.799	1,682.436	Spot Elevation
41	571,600.356	268,542.799	1,682.670	Spot Elevation
42	571,590.840	268,535.902	1,682.100	Spot Elevation
43	571,593.799	268,539.932	1,682.436	Spot Elevation
44	571,596.759	268,543.962	1,682.670	Spot Elevation
45	571,585.452	268,542.864	1,682.100	Spot Elevation
46	571,590.095	268,544.719	1,682.436	Spot Elevation
47	571,594.738	268,546.573	1,682.670	Spot Elevation
48	571,584.865	268,552.973	1,682.100	Spot Elevation
49	571,589.691	268,551.668	1,682.436	Spot Elevation
50	571,594.518	268,550.364	1,682.670	Spot Elevation
55	571,589.854	268,560.909	1,682.100	Spot Elevation
56	571,593.122	268,557.124	1,682.436	Spot Elevation
58	571,596.389	268,553.340	1,682.670	Spot Elevation
59	571,600.189	268,564.798	1,682.100	Spot Elevation
60	571,600.227	268,559.798	1,682.436	Spot Elevation
61	571,600.265	268,554.798	1,682.670	Spot Elevation
62	571,608.988	268,562.241	1,682.100	Spot Elevation
63	571,606.276	268,558.040	1,682.436	Spot Elevation
67	571,603.564	268,553.839	1,682.670	Spot Elevation
68	571,614.941	268,555.275	1,682.100	Spot Elevation
69	571,610.369	268,553.251	1,682.436	Spot Elevation
70	571,605.797	268,551.227	1,682.670	Spot Elevation
71	571,616.096	268,546.185	1,682.100	Spot Elevation
72	571,611.163	268,547.002	1,682.436	Spot Elevation
73	571,606.230	268,547.818	1,682.670	Spot Elevation
74	571,600.310	268,548.798	1,682.811	Spot Elevation
77	571,610.767	268,536.688	1,682.100	Spot Elevation
79	571,556.379	268,599.681	1,681.312	Staking Points
80	571,561.829	268,604.386	1,681.168	Staking Points
81	571,566.354	268,599.144	1,681.238	Staking Points
82	571,572.181	268,592.996	1,681.347	Staking Points
83	571,578.552	268,587.413	1,681.435	Staking Points
84	571,581.149	268,585.342	1,681.464	Staking Points
85	571,590.053	268,580.443	1,681.537	Staking Points
86	571,600.082	268,578.798	1,681.586	Staking Points
87	571,616.581	268,574.003	1,681.626	Staking Points
88	571,627.743	268,560.942	1,681.611	Staking Points
89	571,629.908	268,543.898	1,681.533	Staking Points
90	571,630.385	268,531.784	1,681.441	Staking Points
91	571,635.619	268,520.847	1,681.279	Staking Points
92	571,646.099	268,507.055	1,680.810	Staking Points
93	571,649.692	268,502.621	1,680.621	Staking Points
94	571,644.242	268,497.916	1,680.765	Staking Points
95	571,638.792	268,493.211	1,680.631	Staking Points
96	571,634.267	268,498.452	1,680.830	Staking Points
97	571,628.440	268,504.601	1,681.074	Staking Points
98	571,622.068	268,510.184	1,681.300	Staking Points
99	571,619.472	268,512.255	1,681.370	Staking Points
100	571,610.568	268,517.154	1,681.513	Staking Points
101	571,600.539	268,518.799	1,681.582	Staking Points
102	571,591.075	268,520.255	1,681.622	Staking Points
103	571,582.553	268,524.619	1,681.637	Staking Points

POINT TABLE (Cont.)

104	571,572.402	268,530.023	1,681.624	Staking Points
105	571,561.132	268,532.315	1,681.595	Staking Points
106	571,550.433	268,532.293	1,681.567	Staking Points
107	571,544.597	268,531.928	1,681.550	Staking Points
108	571,544.260	268,537.317	1,681.654	Staking Points
109	571,543.923	268,542.707	1,681.558	Staking Points
110	571,558.685	268,544.841	1,681.625	Staking Points
111	571,567.129	268,549.575	1,681.656	Staking Points
112	571,572.042	268,562.452	1,681.624	Staking Points
113	571,568.545	268,572.087	1,681.537	Staking Points
114	571,554.522	268,590.542	1,681.277	Staking Points
115	571,550.929	268,594.975	1,681.193	Staking Points
199	571,575.694	268,555.452	1,681.718	Staking Points
200	571,586.587	268,564.694	1,681.808	Staking Points
201	571,600.151	268,569.798	1,681.808	Staking Points
202	571,611.187	268,566.762	1,681.808	Staking Points
203	571,619.669	268,556.939	1,681.808	Staking Points
204	571,620.756	268,544.006	1,681.808	Staking Points
206	571,614.034	268,532.903	1,681.808	Staking Points
207	571,600.470	268,527.799	1,681.808	Staking Points
209	571,587.880	268,531.873	1,681.808	Staking Points
215	571,580.808	268,541.010	1,681.808	Staking Points
216	571,580.117	268,554.564	1,681.808	Staking Points
119	571,655.452	268,507.594	1,679.415	Fill
120	571,653.566	268,510.047	1,679.504	Fill
121	571,647.450	268,517.978	1,679.823	Fill
122	571,642.318	268,526.759	1,679.768	Fill
124	571,638.784	268,536.919	1,679.881	Fill
125	571,639.703	268,550.924	1,679.904	Fill
126	571,637.264	268,562.029	1,679.987	Fill
127	571,632.571	268,571.189	1,680.001	Fill
128	571,625.765	268,578.524	1,680.039	Fill
129	571,616.819	268,584.012	1,680.094	Fill
130	571,605.302	268,587.280	1,680.094	Fill
131	571,591.530	268,588.600	1,680.185	Fill
132	571,582.094	268,593.665	1,680.348	Fill
133	571,574.164	268,600.030	1,680.408	Fill
134	571,565.964	268,607.957	1,680.498	Fill
266	571,635.474	268,490.345	1,679.669	Fill
267	571,632.726	268,492.053	1,679.277	Fill
268	571,625.552	268,499.071	1,679.266	Fill
269	571,617.688	268,505.493	1,679.343	Fill
270	571,608.375	268,510.663	1,679.319	Fill
271	571,594.802	268,512.156	1,679.307	Fill
272	571,583.523	268,515.630	1,679.273	Fill
273	571,574.826	268,521.332	1,679.396	Fill
274	571,566.670	268,560.531	1,680.201	Fill
275	571,565.833	268,566.414	1,680.191	Fill
276	571,560.035	268,574.620	1,680.066	Fill
277	571,554.661	268,583.191	1,680.406	Fill
278	571,547.551	268,592.060	1,680.196	Fill
286	571,544.971	268,525.945	1,679.780	Fill
287	571,543.556	268,548.589	1,679.840	Fill
288	571,555.514	268,526.182	1,679.670	Fill
289	571,554.042	268,549.729	1,679.972	Fill
290	571,565.600	268,525.110	1,679.546	Fill
291	571,563.784	268,554.175	1,680.101	Fill

CURVE TABLE

Name	Radius	Arc Length	Chord Length	Tangent Length	Middle Ordinate	External Distance	Chord Direction
C1	91.440	16.948	16.924	8.498	0.392	0.394	N 4°52'59"W
C2	30.000	20.425	20.033	10.626	1.722	1.826	N 19°04'07"W
C3	30.000	52.274	45.908	35.649	10.684	16.593	N 49°28'57"W
C4	30.000	24.416	23.748	12.930	2.450	2.668	N 76°05'06"W
C5	91.440	5.708	5.707	2.855	0.045	0.045	N 50°58'51"W
C6	91.440	16.948	16.924	8.498	0.392	0.394	S 4°52'59"E
C7	30.000	20.425	20.033	10.626	1.722	1.826	S 19°04'07"E
C8	30.000	19.232	18.904	9.959	1.528	1.610	S 17°55'44"E
C9	40.000	23.080	22.761	11.871	1.653	1.724	S 19°45'50"E
C10	91.440	10.706	10.700	5.359	0.157	0.157	S 07°07'11"W
C11	90.000	14.933	14.916	7.484	0.310	0.311	N 8°13'38"E
C12	17.250	34.397	28.975	26.690	7.887	14.529	N 70°06'20"E
C13	91.440	5.708	5.707	2.855	0.045	0.045	S 50°58'51"E

LINE TABLE

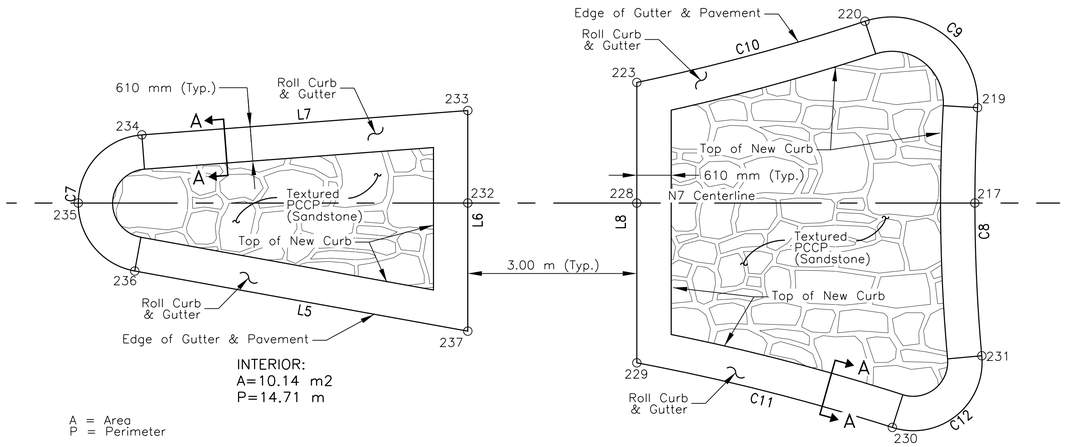
Name	Length (m)	Direction
L1	7.200	N 40°48'26"E
L2	6.925	N 49°11'34"W
L3	3.321	N 38°34'23"W
L4	17.322	N 52°46'09"W
L5	7.200	S 40°48'26"W
L6	7.200	S 40°48'26"W
L7	6.925	S 49°11'34"E
L8	3.321	S 38°34'23"E
L9	5.848	S 3°34'35"W
L10	5.400	S 86°25'25"E
L11	5.400	S 86°25'25"E
L12	23.178	S 52°46'09"E
L13	7.200	N 40°48'26"E

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

N7 & N27 ROUNDABOUT GRADING PLAN

DRAWN BY: NRDOT DATE: 8/16/2017
DESIGNED BY: NRDOT DATE: 8/16/2017
REVISED: 9/22/2017 BY: Gerald.Hood
Sht 47 N7 Rnd Abt Grading Plan rev 081617.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	48	105
			N7	N7(2-3)2&4		

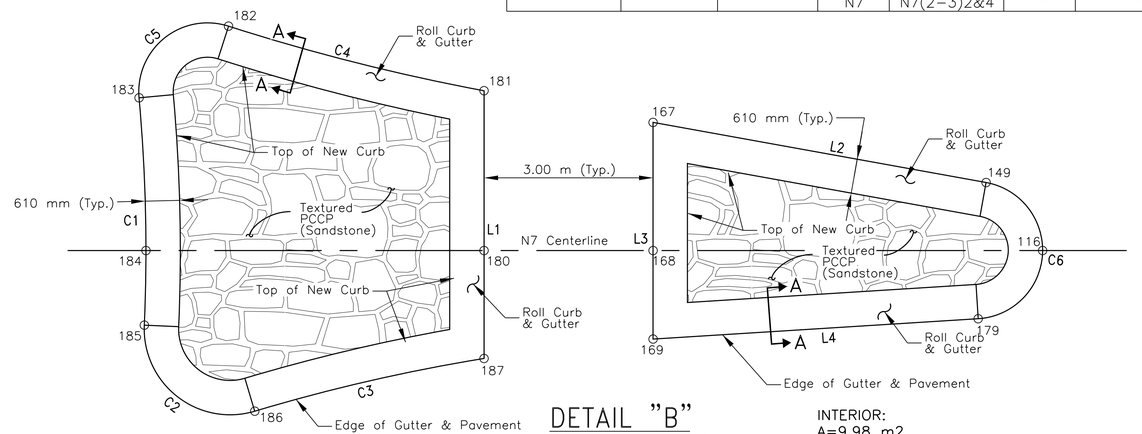


INTERIOR:
A=10.14 m2
P=14.71 m

A = Area
P = Perimeter

DETAIL "A"
N7/SPLITTER ISLAND "A"

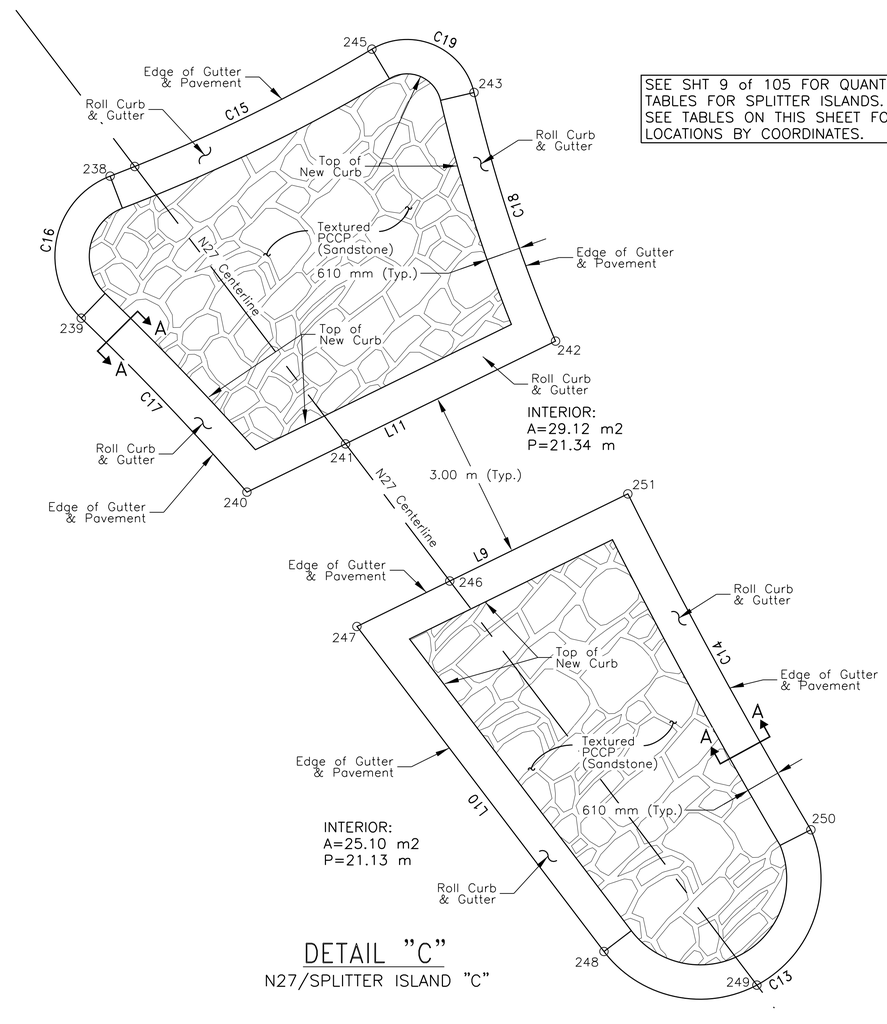
INTERIOR:
A=24.71 m2
P=19.48 m



INTERIOR:
A=23.07 m2
P=18.79 m

DETAIL "B"
N7/SPLITTER ISLAND "B"

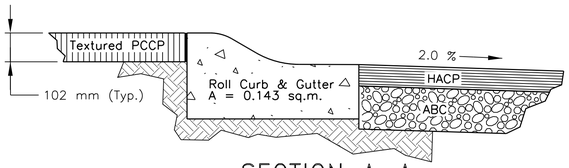
INTERIOR:
A=9.98 m2
P=14.64 m



INTERIOR:
A=25.10 m2
P=21.13 m

DETAIL "C"
N27/SPLITTER ISLAND "C"

SEE SHT 9 of 105 FOR QUANTITY TABLES FOR SPLITTER ISLANDS. SEE TABLES ON THIS SHEET FOR LOCATIONS BY COORDINATES.



SECTION A-A
Roll Curb & Gutter (NTS)

POINT TABLE

Point	Northing	Easting	Elevation	Description	Remarks
116	571,570.305	268,583.551	1,681.493	Splitter Island N7-B/Sta. 2+932.15	Staking Points
149	571,571.874	268,583.581	1,681.490	Splitter Island N7-B	Staking Points
167	571,576.545	268,579.804	1,681.533	Splitter Island N7-B	Staking Points
168	571,574.823	268,578.318	1,681.552	Splitter Island N7-B/Sta. 2+925.24	Staking Points
169	571,573.634	268,577.291	1,681.547	Splitter Island N7-B	Staking Points
179	571,570.136	268,581.894	1,681.497	Splitter Island N7-B	Staking Points
180	571,576.784	268,576.047	1,681.577	Splitter Island N7-B/Sta. 2+922.24	Staking Points
181	571,578.931	268,577.901	1,681.555	Splitter Island N7-B	Staking Points
182	571,582.763	268,575.218	1,681.588	Splitter Island N7-B	Staking Points
183	571,582.838	268,573.185	1,681.613	Splitter Island N7-B	Staking Points
184	571,580.705	268,571.506	1,681.628	Splitter Island N7-B/Sta. 2+916.24	Staking Points
185	571,579.721	268,570.618	1,681.627	Splitter Island N7-B	Staking Points
186	571,577.285	268,571.103	1,681.608	Splitter Island N7-B	Staking Points
187	571,575.334	268,574.795	1,681.574	Splitter Island N7-B	Staking Points
217	571,619.916	268,526.091	1,681.628	Splitter Island N7-A/Sta. 2+856.24	Staking Points
219	571,621.166	268,527.234	1,681.608	Splitter Island N7-A	Staking Points
220	571,623.633	268,526.723	1,681.547	Splitter Island N7-A	Staking Points
223	571,625.457	268,522.948	1,681.472	Splitter Island N7-A	Staking Points
228	571,623.837	268,521.550	1,681.489	Splitter Island N7-A/Sta. 2+850.24	Staking Points
229	571,621.690	268,519.695	1,681.477	Splitter Island N7-A	Staking Points
230	571,617.858	268,522.379	1,681.567	Splitter Island N7-A	Staking Points
231	571,617.783	268,524.412	1,681.609	Splitter Island N7-A	Staking Points
232	571,625.798	268,519.279	1,681.419	Splitter Island N7-A/Sta. 2+847.24	Staking Points
233	571,627.040	268,520.352	1,681.410	Splitter Island N7-A	Staking Points
234	571,630.494	268,515.691	1,681.283	Splitter Island N7-A	Staking Points
235	571,630.316	268,514.046	1,681.259	Splitter Island N7-A/Sta. 2+840.32	Staking Points
236	571,628.746	268,514.016	1,681.280	Splitter Island N7-A	Staking Points
237	571,624.076	268,517.792	1,681.413	Splitter Island N7-A	Staking Points
238	571,572.095	268,538.605	1,681.649	Splitter Island N27-C	Staking Points
239	571,570.522	268,536.570	1,681.626	Splitter Island N27-C	Staking Points
240	571,566.262	268,536.777	1,681.626	Splitter Island N27-C	Staking Points
241	571,565.767	268,538.662	1,681.634	Splitter Island N27-C/Sta. 60+841.01	Staking Points
242	571,564.712	268,542.675	1,681.640	Splitter Island N27-C	Staking Points
243	571,568.999	268,544.464	1,681.643	Splitter Island N27-C	Staking Points
245	571,570.765	268,543.595	1,681.643	Splitter Island N27-C	Staking Points
246	571,562.715	268,538.471	1,681.637	Splitter Island N27-C/Sta. 60+837.95	Staking Points
247	571,563.182	268,536.696	1,681.626	Splitter Island N27-C	Staking Points
248	571,555.949	268,536.245	1,681.623	Splitter Island N27-C	Staking Points
249	571,553.723	268,537.909	1,681.645	Splitter Island N27-C/Sta. 60+828.95	Staking Points
250	571,555.185	268,540.436	1,681.629	Splitter Island N27-C	Staking Points
251	571,561.821	268,541.874	1,681.636	Splitter Island N27-C	Staking Points

CURVE TABLE

Name	Radius	Arc Length	Chord Length	Tangent Length	Middle Ordinate	External Distance	Chord Direction
C1	30.000	4.040	4.037	2.023	0.068	0.068	S 39°28'47" W
C2	1.524	2.905	2.484	2.144	0.641	1.107	S 11°15'40" E
C3	32.200	4.179	4.176	2.092	0.068	0.068	S 62°08'32" E
C4	37.200	4.681	4.678	2.343	0.074	0.074	N 35°00'22" W
C5	1.220	2.406	2.034	1.842	0.546	0.990	N 87°53'24" W
C6	1.220	3.539	2.422	10.073	1.073	8.927	N 44°08'11" E
C7	1.220	3.524	2.420	9.586	1.066	8.444	S 43°47'21" W
C8	30.000	4.409	4.405	2.209	0.081	0.081	N 39°49'55" E
C9	1.524	2.965	2.519	2.237	0.666	1.183	N 11°41'47" W
C10	37.200	4.194	4.192	2.099	0.059	0.059	N 64°12'19" W
C11	37.200	4.681	4.678	2.343	0.074	0.074	S 35°00'22" E
C12	1.220	2.406	2.034	1.842	0.546	0.990	S 87°53'24" E
C13	2.145	6.233	4.261	18.096	1.893	16.077	S 79°40'01" E
C14	95.040	6.792	6.790	3.397	0.061	0.061	N 12°13'48" E
C15	30.000	5.170	5.164	2.592	0.111	0.112	N 75°04'27" W
C16	1.524	3.063	2.573	2.399	0.707	1.318	S 52°17'26" W
C17	49.000	4.266	4.264	2.134	0.046	0.046	S 2°47'18" E
C18	27.000	4.651	4.645	2.331	0.100	0.100	N 22°39'33" E
C19	1.220	2.291	1.969	1.667	0.500	0.846	N 26°12'32" W

LINE TABLE

Name	Length	Direction
L1	4.753	N 40°48'26" E
L2	6.006	N 38°57'29" W
L3	3.846	S 40°48'26" W
L4	5.781	S 52°46'09" E
L5	6.006	S 38°57'29" E
L6	3.916	N 40°48'26" E
L7	5.801	N 53°27'48" W
L8	4.978	S 40°48'26" W
L9	5.354	N 75°16'27" W
L10	7.247	S 3°34'20" W
L11	6.098	S 75°16'27" E

GENERAL NOTES

1. See Sheet 75 of 101 For Roll Curb & Gutter Dimensions
2. Splitter Island Textured (Sandstone) PCCP Color: Navajo Red

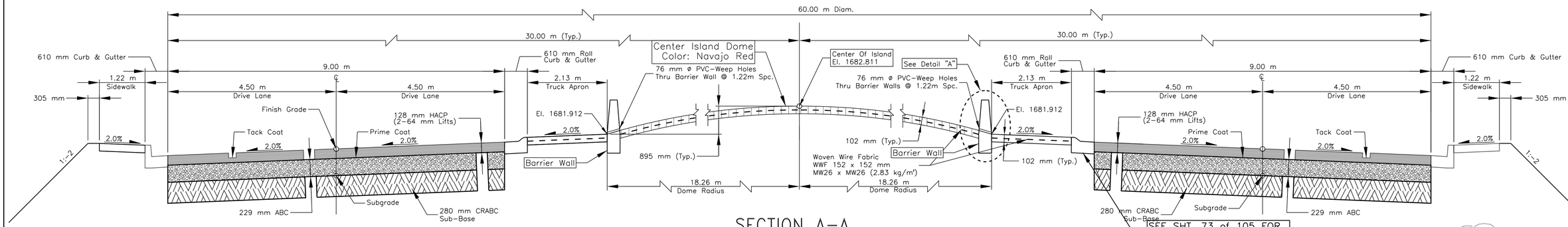
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SPITTER ISLAND LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 8/16/2017
DESIGNED BY: NRDOT	DATE: 8/16/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 48 N7 Splitter Island Details rev 081617.dgn	

i:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 48 N7 Splitter Island Details rev 081617.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(2-3)2&4	49	105



SEE SHT. 73 of 105 FOR CONSTRUCTION DETAILS FOR ROLL CURB & GUTTER

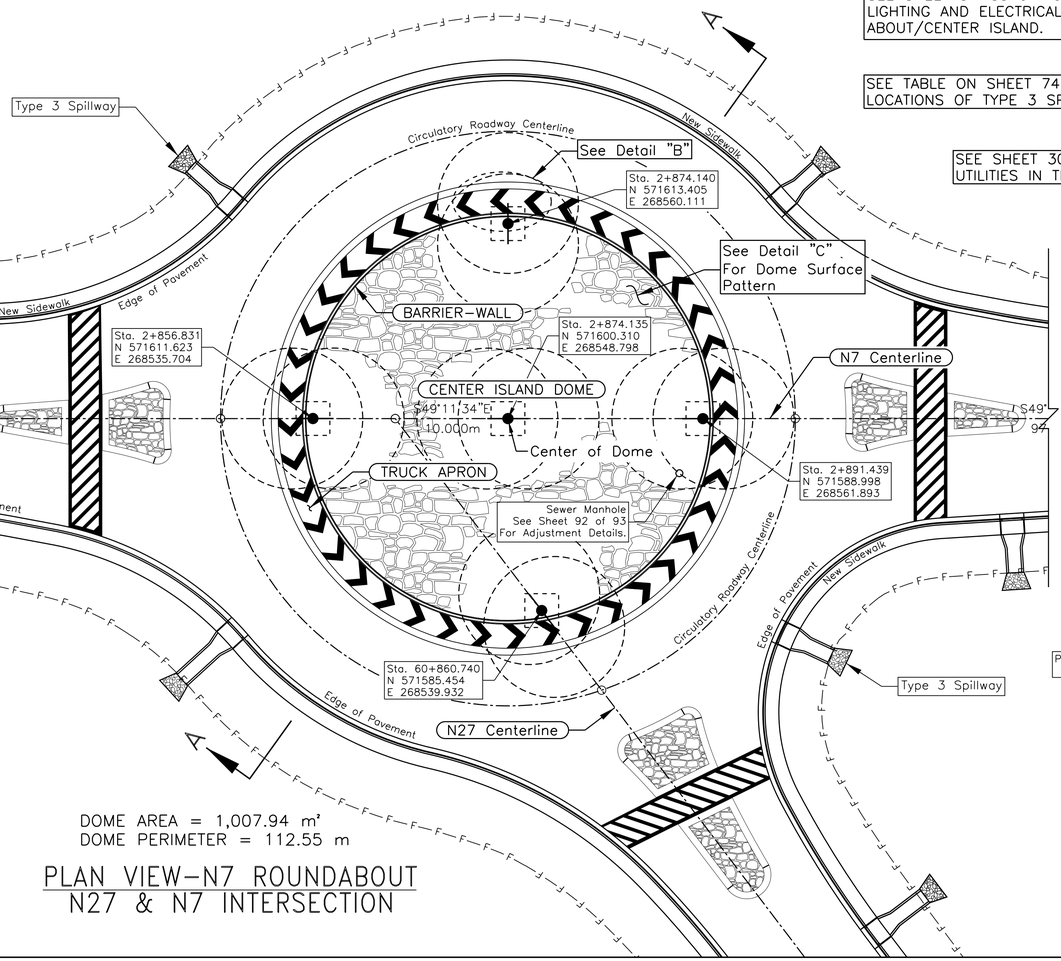
SECTION A-A
TYPICAL CROSS SECTION DETAIL ROUNDABOUT @ N27 & N7 INTERSECTION

FOR SPLITTER ISLAND, CURB & GUTTER, BARRIER WALL, TRUCK APRON, CENTER ISLAND (Dome) QTYS. SEE TABLE ON SHEET 9 of 105. SEE SHEET 47 & 48 FOR SPLITTER ISLAND CONSTRUCTION & LAYOUT DETAILS.

SEE SHEET 51-53 of 105 FOR PROPOSED LIGHTING AND ELECTRICAL AT ROUND-ABOUT/CENTER ISLAND.

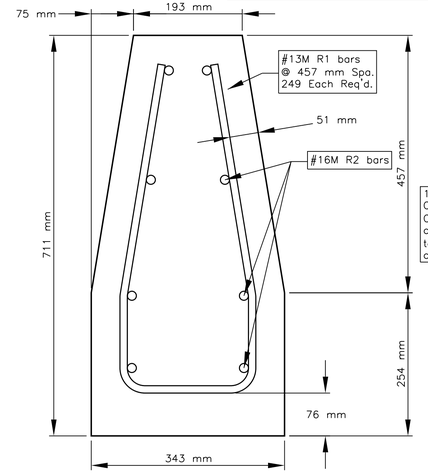
SEE TABLE ON SHEET 74 of 105 FOR LOCATIONS OF TYPE 3 SPILLWAY

SEE SHEET 30 of 105 FOR EXISTING UNDERGROUND UTILITIES IN THE AREA OF THE CENTRAL ISLAND.



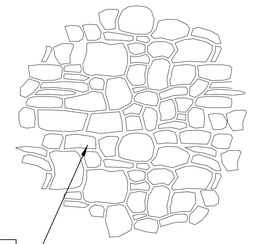
DOME AREA = 1,007.94 m²
DOME PERIMETER = 112.55 m

PLAN VIEW-N7 ROUNDABOUT N27 & N7 INTERSECTION



SECTIONAL AREA=0.210 m²
LONGITUDINAL LENGTH=113.63 m

DETAIL "A"
BARRIER WALL
(NTS)

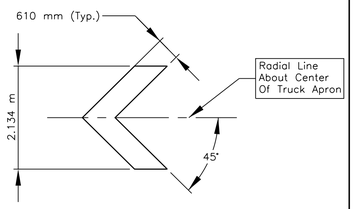


102 mm Thick Concrete.
Color: Navajo Red (Sandstone)
Contractor shall provide a sample concrete brick to the COR/COTR to verify the correct color before construction.

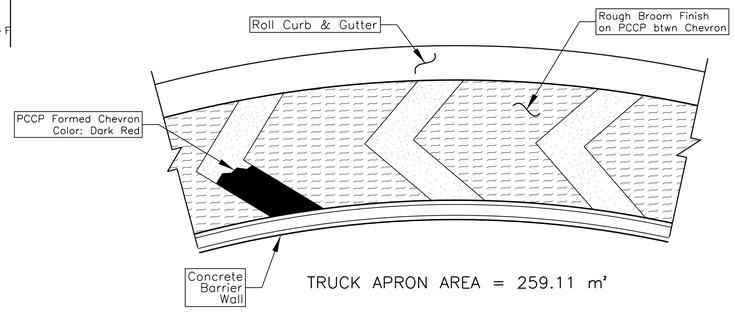
DETAIL "C"
CENTRAL DOME PATTERN
(NTS)

REINFORCING BAR SCHEDULE

Mark	No. of Bars	Length (m)	Size	kg/m	Total Wt. (kg)	Remarks
R1	249	1.360	#13M	0.994	336.608	Lateral bent bars inside barrier wall
R2	8	114.250	#16M	1.552	1418.528	Longitudinal bars inside barrier wall
				Total?	1755.136	



CHEVRON DETAIL
(NTS)



TRUCK APRON AREA = 259.11 m²

DETAIL "B"
TRUCK APRON
(NTS)

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

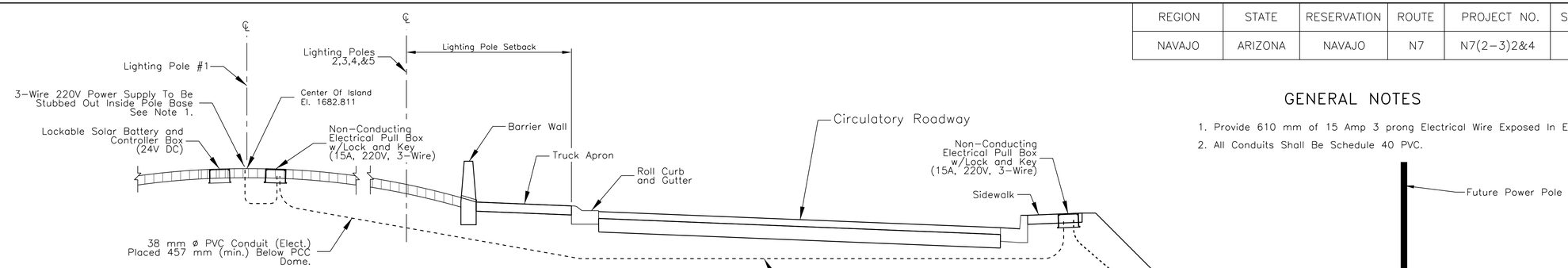
ROUNDABOUT TYPICAL X-SECTIONS, LAYOUT, AND DOME DETAILS

DRAWN BY: NRDOT	DATE: 8/16/2017
DESIGNED BY: NRDOT	DATE: 8/16/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 49 N7 Rnd Abt Ctr Island Plan rev 081617.dgn	

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

DESIGN DATA_072413\CADD Drawings - North\Sht 49 N7 Rnd Abt Ctr Island Plan rev 081617.dgn

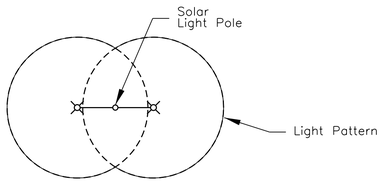
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(2-3)2&4	50	105



SECTION A-A
15A, 220v POWER SOURCE

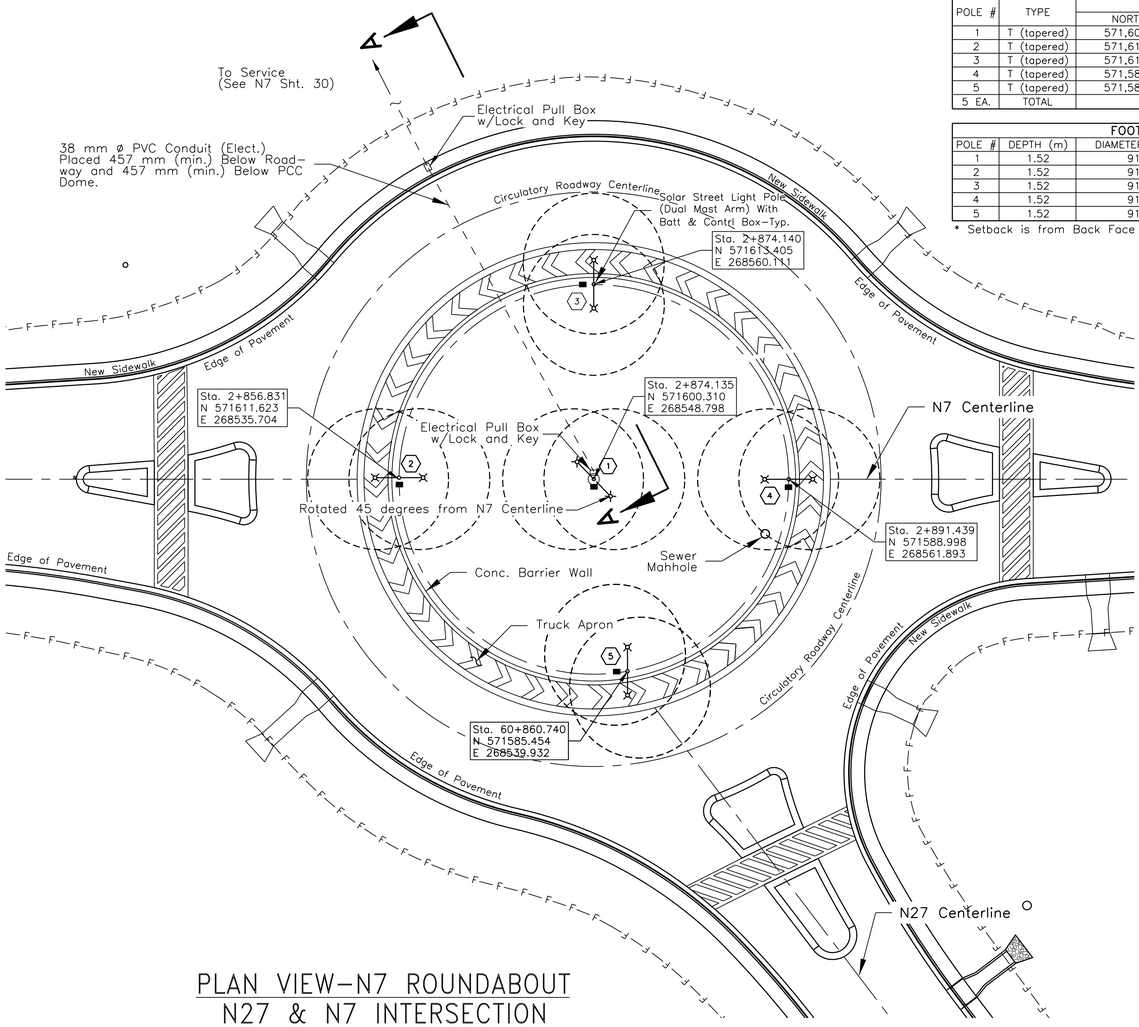
GENERAL NOTES

1. Provide 610 mm of 15 Amp 3 prong Electrical Wire Exposed In Each Pull Boxes (2-ea).
2. All Conduits Shall Be Schedule 40 PVC.



SOLAR LED LIGHT PATTERN
DUAL MAST ARM

SEE SHT. 30 of 105 FOR EXISTING UNDERGROUND UTILITIES IN THE AREA OF THE CENTRAL ISLAND.



PLAN VIEW-N7 ROUNDABOUT
N27 & N7 INTERSECTION

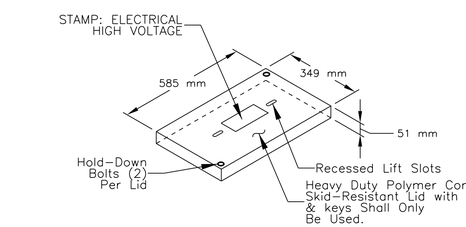
PROJECT: N7 Roundabout
ITEM 63612-1300: LUMINARES, SOLAR LED STREET LIGHTS w/ 8-10m POLE

SOLAR LED LIGHTING SYSTEM: 24V DC							
POLE #	TYPE	LOCATION		* SETBACK (m)	MTG. HEIGHT (m)	1-MAST ARM (m)	REMARKS
		NORTHING	EASTING				
1	T (tapered)	571,600.610	268,548.798	20.39	8.00	1.52	w/Solar Batt & Control Box.
2	T (tapered)	571,611.623	268,535.704	3.69	8.00	1.52	w/Solar Batt & Control Box.
3	T (tapered)	571,613.405	268,560.111	3.69	8.00	1.52	w/Solar Batt & Control Box.
4	T (tapered)	571,588.998	268,561.893	3.69	8.00	1.52	w/Solar Batt & Control Box.
5	T (tapered)	571,585.454	268,539.932	3.69	8.00	1.52	w/Solar Batt & Control Box.
5 EA.	TOTAL						

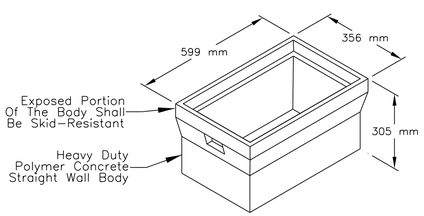
FOOTING			
POLE #	DEPTH (m)	DIAMETER (mm)	REINFORCING
1	1.52	914	#22 @ 152 mm O.C.
2	1.52	914	#22 @ 152 mm O.C.
3	1.52	914	#22 @ 152 mm O.C.
4	1.52	914	#22 @ 152 mm O.C.
5	1.52	914	#22 @ 152 mm O.C.

* Setback is from Back Face of the Roll Curb & Gutter.

LEGEND	
SYMBOL	DESCRIPTION
	Street Lighting Pole (Dual Mast)
	Elect Pull Box-220V AC
(#)	Street Lighting Pole Number
- - - - - -	Conduit Run (220V Power Source)
	Solar Battery & Controller Box-24V DC



LID



PULL BOX

ISOMETRIC VIEW
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

N7 ROUNDABOUT-SOLAR STREET LIGHTING & ELECTRICAL PLAN

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 08/21/2017	BY: Gerald.Hood
Sht 50 N7 Rnd Abt St_Ltg&ElecPlan 082117.dgn	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(2-3)2&4	51	105

ITEM 63502-3000: RAISED PAVEMENT MARKERS, MS-200
Retroflective, Single Side, LED (Yellow-Flashing Light

Solar LED Markers On Left Of N7 Centerline Sta. 2+821.820 to 2+822.309

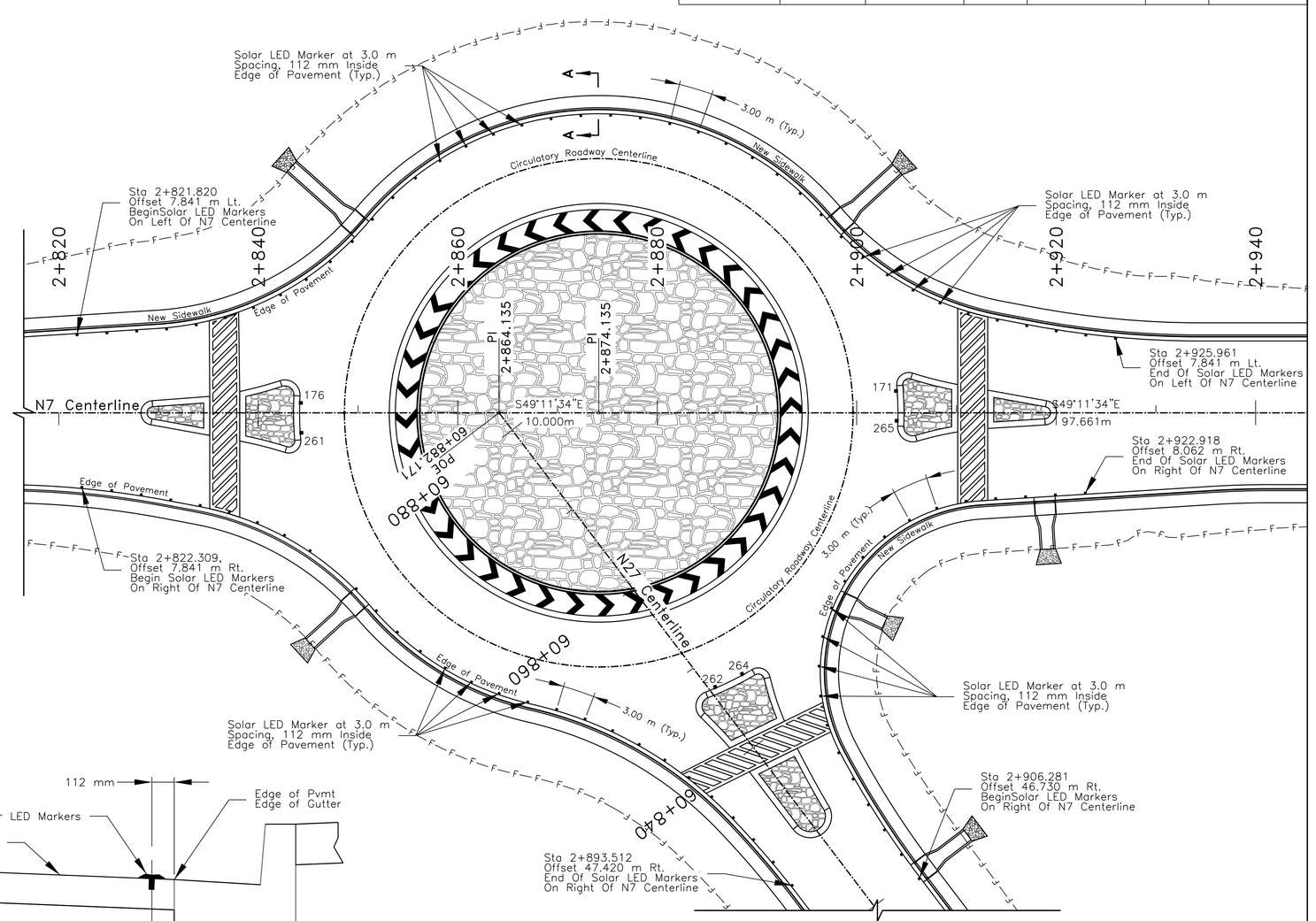
Station	Offset Lt. (m)	Northing	Easting	Each	Description	Remarks
2+821.820	7.841	571,640.434	268,514.325	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+824.814	8.028	571,638.619	268,516.713	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+827.808	8.215	571,636.804	268,519.102	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+830.801	8.416	571,635.000	268,521.499	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+833.770	8.840	571,633.381	268,524.023	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+836.682	9.557	571,632.021	268,526.695	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+839.508	10.560	571,630.933	268,529.490	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+842.220	11.840	571,630.129	268,532.379	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+844.262	0.991	571,620.583	268,526.835	1	Lt Solar LED Markers	Marked w/ Pt No. 176
2+844.791	13.383	571,629.616	268,535.334	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+847.197	15.174	571,629.400	268,538.324	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+849.412	17.195	571,629.482	268,541.322	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+851.419	19.423	571,629.858	268,544.298	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+853.479	21.602	571,630.160	268,547.281	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+855.748	23.563	571,630.162	268,550.280	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+858.202	25.287	571,629.863	268,553.264	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+860.816	26.756	571,629.267	268,556.202	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+863.564	27.956	571,628.379	268,559.067	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+866.418	28.875	571,627.209	268,561.828	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+869.351	29.503	571,625.768	268,564.458	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+872.331	29.834	571,624.071	268,566.930	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+875.330	29.864	571,622.134	268,569.219	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+878.316	29.594	571,619.978	268,571.303	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+881.261	29.026	571,617.624	268,573.161	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+884.134	28.166	571,615.095	268,574.773	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+886.906	27.022	571,612.418	268,576.124	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+889.549	25.607	571,609.619	268,577.200	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+892.037	23.933	571,606.726	268,577.990	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+894.346	22.019	571,603.769	268,578.486	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+896.450	19.883	571,600.776	268,578.683	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+898.465	17.661	571,597.778	268,578.756	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+900.680	15.640	571,594.800	268,579.112	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+903.085	13.849	571,591.873	268,579.762	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+903.944	2.195	571,582.491	268,572.796	1	Lt Solar LED Markers	Marked w/ Pt No. 177
2+905.657	12.305	571,589.025	268,580.699	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+908.369	11.026	571,586.284	268,581.916	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+911.195	10.022	571,583.677	268,583.399	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+914.106	9.305	571,581.231	268,585.134	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+917.055	8.751	571,578.886	268,587.004	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+920.009	8.231	571,576.561	268,588.901	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+922.979	7.807	571,574.300	268,590.871	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
2+925.961	7.481	571,572.104	268,592.915	1	Lt Solar LED Markers	LEDs shall face on-coming traffic
			Sub-Total	42		

Solar LED Markers On Right Of N7 Centerline Sta. 2+822.309 to 2+893.512

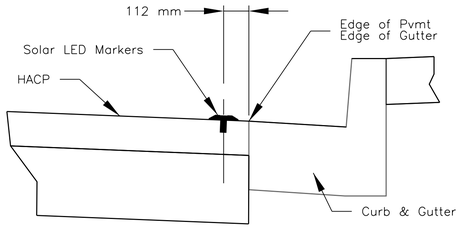
Station	Offset Rt. (m)	Northing	Easting	Each	Description	Remarks
2+822.309	7.481	571,628.517	268,504.682	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+825.291	7.807	571,626.321	268,506.726	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+828.261	8.231	571,624.059	268,508.696	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+831.215	8.751	571,621.735	268,510.593	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+834.164	9.305	571,619.389	268,512.463	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+837.075	10.022	571,616.944	268,514.198	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+839.901	11.026	571,614.337	268,515.681	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+842.613	12.305	571,611.596	268,516.897	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+844.313	2.007	571,618.280	268,524.914	1	Rt Solar LED Markers	Marked w/ Pt No. 261
2+845.185	13.849	571,608.748	268,517.835	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+847.590	15.640	571,605.820	268,518.485	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+849.805	17.661	571,602.843	268,518.840	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+851.820	19.883	571,599.844	268,518.914	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+853.924	22.019	571,596.852	268,519.111	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+856.233	23.933	571,593.895	268,519.607	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+858.721	25.607	571,591.002	268,520.397	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+861.364	27.022	571,588.203	268,521.473	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+864.136	28.166	571,585.525	268,522.823	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+867.009	29.026	571,582.997	268,524.436	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+869.913	29.777	571,580.531	268,526.143	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+872.755	30.737	571,577.947	268,527.667	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+875.517	31.906	571,575.257	268,528.993	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+878.184	33.278	571,572.476	268,530.115	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+880.741	34.846	571,569.618	268,531.026	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+883.173	36.601	571,566.700	268,531.720	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+885.468	38.532	571,563.739	268,532.195	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+885.817	27.513	571,571.851	268,539.660	1	Rt Solar LED Markers	Marked w/ Pt No. 262
2+887.613	40.629	571,560.750	268,532.448	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+888.515	26.204	571,571.079	268,542.558	1	Rt Solar LED Markers	Marked w/ Pt No. 264
2+889.653	42.828	571,557.752	268,532.556	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+891.620	45.092	571,554.752	268,532.565	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+893.512	47.420	571,551.754	268,532.475	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
			Sub-Total	32		

Solar LED Markers On Right Of N7 Centerline Sta. 2+906.281 to 2+922.920

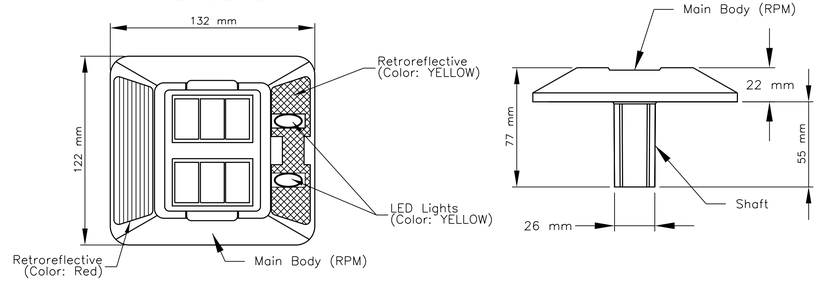
Station	Offset Rt. (m)	Northing	Easting	Each	Description	Remarks
2+906.281	46.730	571,543.932	268,542.591	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+904.502	44.315	571,546.923	268,542.823	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+902.804	41.842	571,549.905	268,543.154	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+901.189	39.313	571,552.873	268,543.584	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+899.659	36.733	571,555.826	268,544.113	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+898.216	34.103	571,558.760	268,544.739	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+897.059	31.339	571,561.608	268,545.670	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+896.395	28.417	571,564.254	268,547.076	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+896.242	25.425	571,566.619	268,548.916	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+896.607	22.451	571,568.632	268,551.135	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+897.477	19.584	571,570.233	268,553.668	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+898.827	16.909	571,571.375	268,556.438	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+900.617	14.506	571,572.024	268,559.363	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+902.794	12.447	571,572.160	268,562.356	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+904.014	0.803	571,580.176	268,570.889	1	Rt Solar LED Markers	Marked w/ Pt No. 265
2+905.292	10.792	571,571.780	268,565.328	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+908.037	9.592	571,570.894	268,568.191	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+910.948	8.882	571,569.530	268,570.858	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+913.935	8.624	571,567.773	268,573.288	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+916.930	8.437	571,565.958	268,575.677	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+919.924	8.250	571,564.143	268,578.065	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
2+922.918	8.062	571,562.327	268,580.454	1	Rt Solar LED Markers	LEDs shall face on-coming traffic
			Sub-Total	22		
			Grand Total	96		



PLAN VIEW-N7 ROUNDABOUT
SOLAR LED LIGHTING LAYOUT



SECTION A-A
RPM PLACEMENT



MS-200 SINGLE SIDE-SOLAR LED MARKERS
RAISED PAVEMENT MARKER (RPM): FLASHING YELLOW LIGHTING

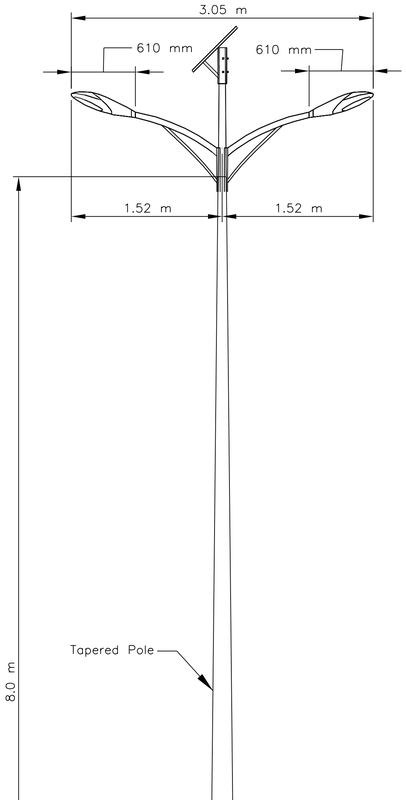
See Installation Requirement Notes on Sht. 53 of 105.

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

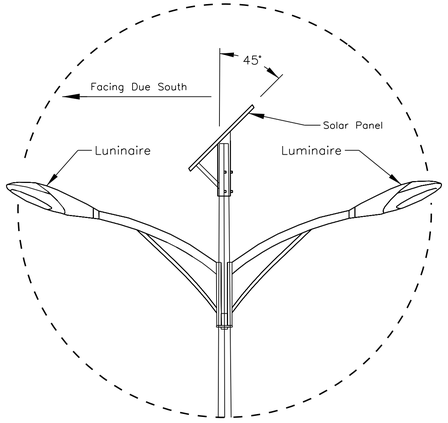
N7 ROUNDABOUT-SOLAR LED LIGHTING LAYOUT PLAN

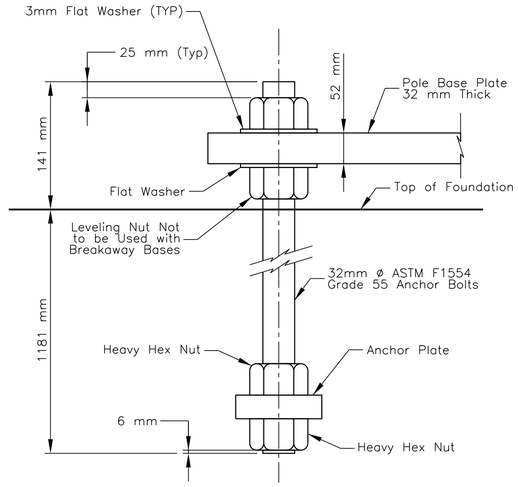
DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 51 REV N7 Rnd Abt SolarLEDRDMkrs_1Plan 082117.dgn	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N2(2-3)2&4	52	105

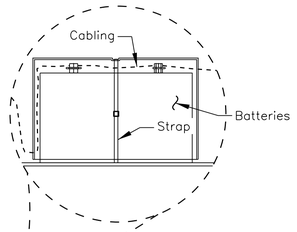


ELEVATION VIEW
ENLARGED

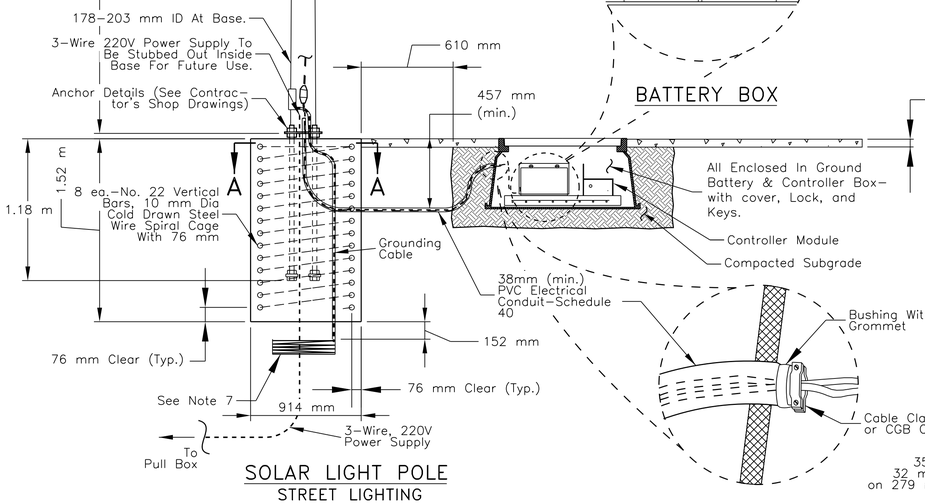




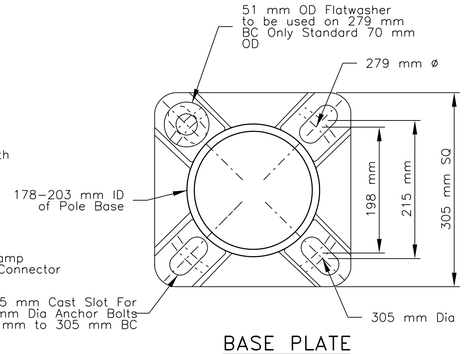
ANCHOR BOLT DETAIL
(For Standard Base Applications)
ALL Anchor Components Shall
Be Galvanized Per ASTM 153



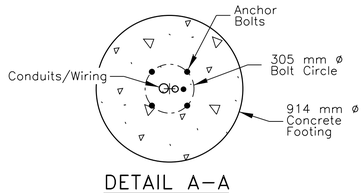
BATTERY BOX



SOLAR LIGHT POLE
STREET LIGHTING



BASE PLATE
LIGHT POLE



DETAIL A-A

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 COTR prior to any construction activity.
5. Type "T" tapered Pole shall be a 7.62m pole. Anchor bolts shall be 32mm x 1118mm 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 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 LightingTECHNICAL 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 / 38W
e. Generally, approximately 5 hours of strong direct sunshine must enable a full charge.
f. Illumination time shall be12 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? 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 8 Lumens and a wider light spread.
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 approximately40 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. Fixturesshall attach and detach to and from the arm which in turn attaches/detaches to thepole.
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. Solarpanels 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 minimumof 15 years subject to environmental factors.
h. Thesize 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.

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

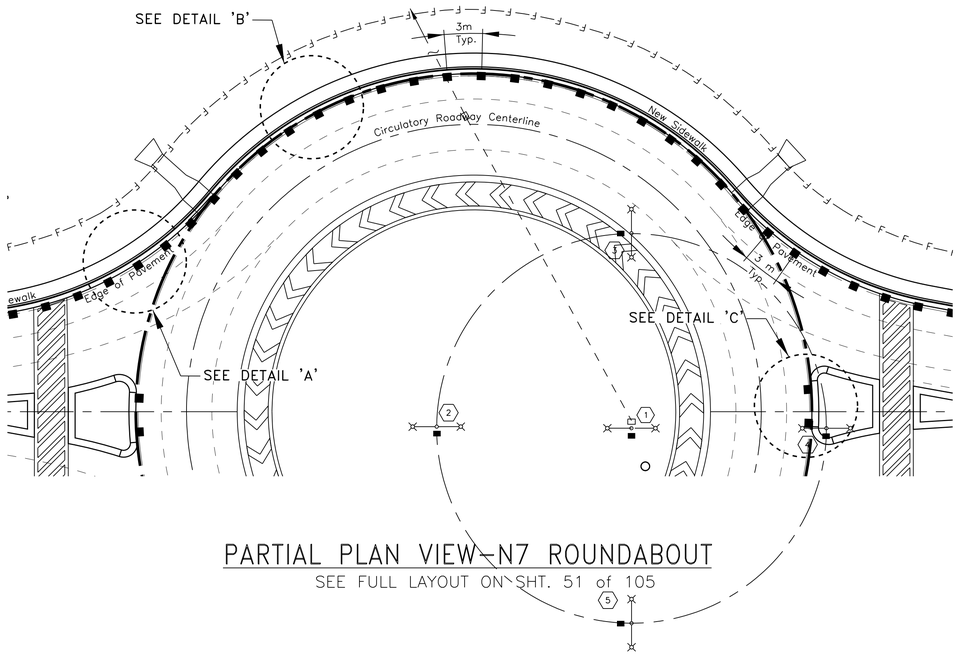
SOLAR LED STREET LIGHTING

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood

Sht 52 N27 Rnd Abt Solar Lt Pole Dtls_082117.dgn

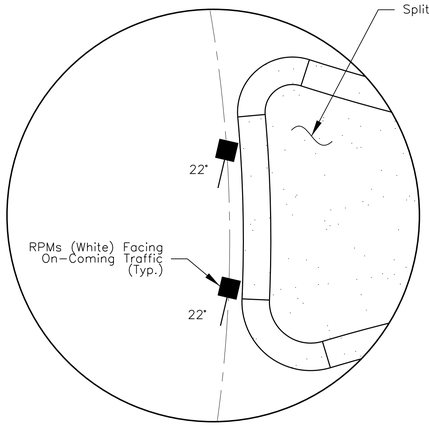
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 52 N27 Rnd Abt Solar Lt Pole Dtls_082117.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(2-3)2&4	53	105



PARTIAL PLAN VIEW-N7 ROUNDABOUT

SEE FULL LAYOUT ON SHT. 51 of 105



DETAIL 'C'

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

INSTALLATION REQUIREMENTS

1. REFLECTOR ORIENTATION:

   PLACE THE REFLECTOR MARKERS AT TANGENT/CHORD ANGLE PER TABLE ON SHEET 51 OF 105 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 51 OF 105 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).

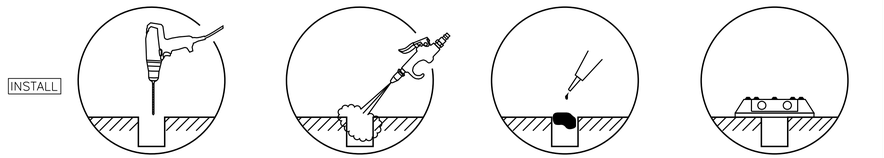
   B.) THOROUGHLY CLEAN OUT THE HOLE BEFORE APPLYING THE ADHESIVE (PICTURE NO. 3). SEE SECTION 718.23 OF THE SUPPLEMENTAL SPECIFICATIONS ON THE TYPE OF ADHESIVE TO USE IN THE HOLE.

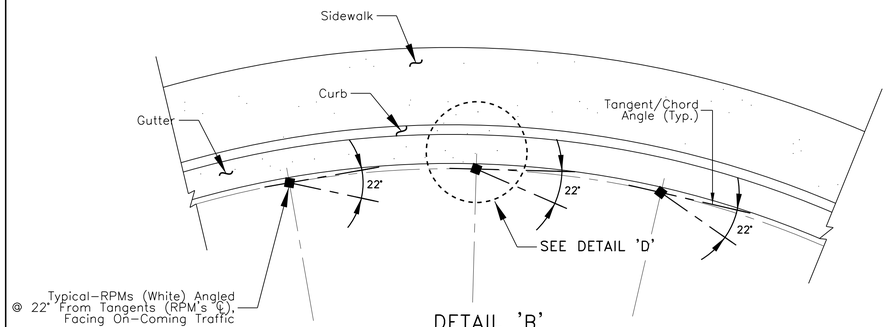
   C.) SET THE SHAFT ALL THE WAY INTO THE HOLE TO INSURE THE REFLECTOR WILL SIT FLUSH WITH THE SURFACE OF THE ROAD PRIOR TO EPOXY PLACEMENT.

   D.) PUT ENOUGH EPOXY RESIN (ADHESIVE BOND) IN THE HOLE OF COMPLETE SHAFT ADHESION, THE 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.

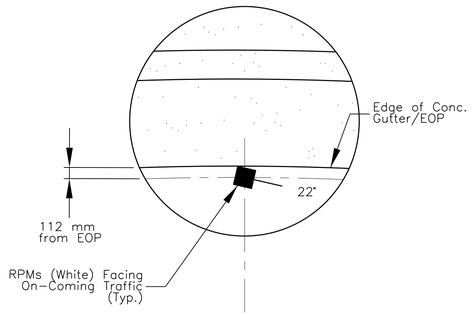
   B.) REFER AND COMPLY WITH THE EPOXY RESIN MANUFACTURER PROCEDURES OF USE DURING INSTALLATION AT ALL TIMES.





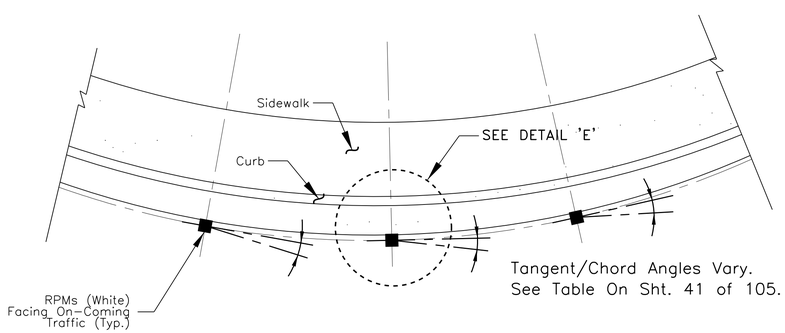
DETAIL 'B'

DIRECTION (AIM) OF RPM/LEDs (22°) AT INSIDE OF CURVE (TYP.)



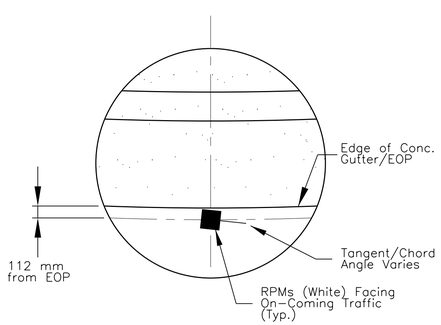
DETAIL 'D'

DIRECTION (AIM) OF RPM/LED (22°)



DETAIL 'A'

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



DETAIL 'E'

DIRECTION (AIM) OF RPM/LED (Varies)

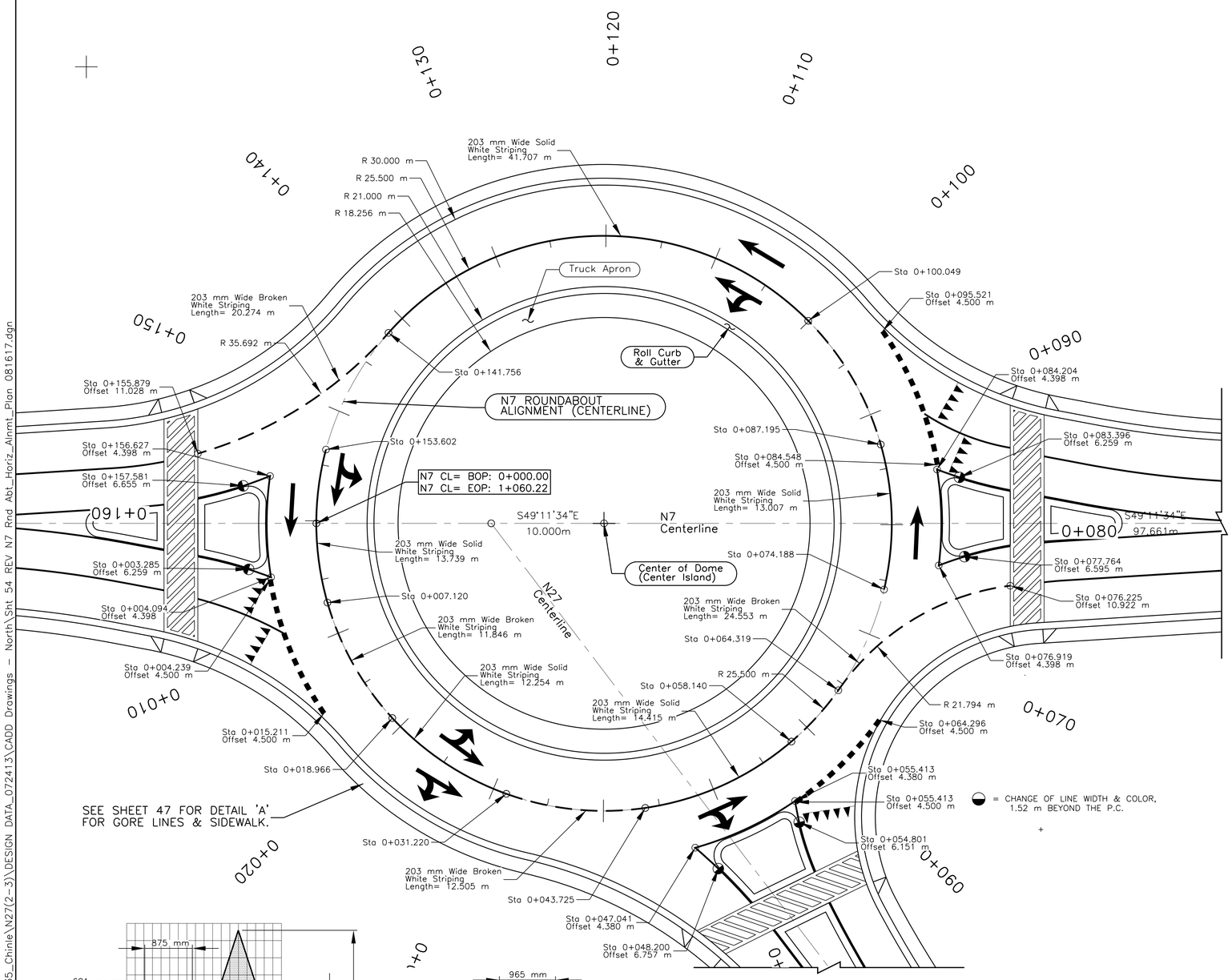
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N7 ROUNDABOUT-SOLAR LED LIGHTING DETAILS

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 53 N7 RndAbt SolarLEDRDMkrs_2Plan rev 08217.dgn	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(2-3)2&4	54	105



PLAN VIEW–N7 ROUNDABOUT
N27 & N7 INTERSECTION

N7 ROUNDABOUT ALIGNMENT TABLE

Point Type		Station / Distance	Northing	Easting
PC		0+000.000	571616.98	268529.50
	Radius:	25.50	Left	
	Length:	48.53		
	Chord:	41.53		
CC			571600.31	268548.80
PCC		0+048.528	571576.63	268539.34
	Radius:	25.50	Left	
	Length:	31.58		
	Chord:	29.60		
CC			571600.31	268548.80
PCC		0+080.111	571583.65	268568.10
	Radius:	25.50	Left	
	Length:	80.11		
	Chord:	51.00		
CC			571600.31	268548.80
PT		0+160.220	571616.98	268529.50

N7 ROUNDABOUT PAVEMENT MARKINGS

ITEM: 63401–1621: TYPE "H", BROKEN WHITE

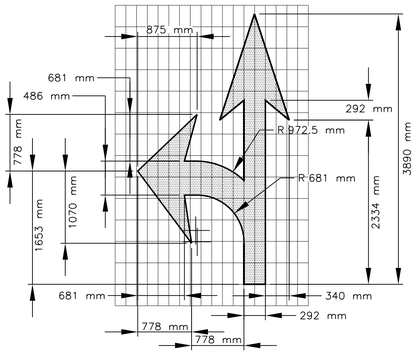
Station	Offset (m)	Northing	Easting	Length (m)	Remarks
1+41.76	0.000	571625.58	268545.38	20.275	Broken White Striping, Width: 203 mm
1+55.88	11.028	571628.523	268525.595		
0+07.12	0.000	571611.01	268525.652	11.846	Broken White Striping, Width: 203 mm
0+18.97	0.000	571599.507	268523.311		
0+58.14	0.000	571574.811	268548.722	24.554	Broken White Striping, Width: 203 mm
0+64.32	0.000	571575.537	268554.843		
0+76.22	10.922	571572.599	268572.434		
0+31.22	0.000	571587.815	268526.569	12.505	Broken White Striping, Width: 203 mm
0+43.73	0.000	571578.819	268535.074		
0+87.19	0.000	571589.578	268571.93	12.854	Broken White Striping, Width: 203 mm
1+00.05	0.000	571602.085	268574.237		
			Total	82.034	

ITEM: 63401–1621: TYPE "H", SOLID WHITE

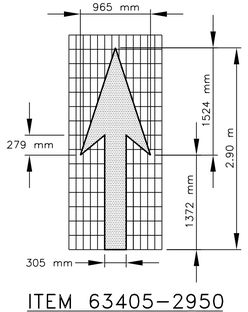
Station	Offset (m)	Northing	Easting	Length (m)	Remarks
1+00.05	0.000	571,602.085	268,574.237	41.707	Solid White Striping, Width: 203 mm
1+41.76	0.000	571,625.580	268,545.380		
1+53.60	0.000	571,621.371	268,534.421	13.739	Solid White Striping, Width: 203 mm
0+07.12	0.000	571,611.010	268,525.652		
0+31.22	0.000	571,587.815	268,526.569	12.254	Solid White Striping, Width: 203 mm
0+18.97	0.000	571,599.507	268,523.311		
0+58.14	0.000	571,574.811	268,548.722	14.415	Solid White Striping, Width: 203 mm
0+43.73	0.000	571,578.819	268,535.074		
0+74.19	0.000	571,579.650	268,563.745	13.007	Solid White Striping, Width: 203 mm
0+87.19	0.000	571,589.578	268,571.930		
0+03.29	6.259	571,617.805	268,522.292	13.654	Solid White Striping, Width: 203 mm
0+04.09	4.398	571,615.980	268,523.336		
1+56.63	4.398	571,622.834	268,529.137		
1+57.58	6.655	571,623.727	268,526.762		
0+48.20	6.757	571,570.511	268,536.450	14.494	Solid White Striping, Width: 203 mm
0+47.04	4.380	571,573.254	268,536.118		
0+55.41	4.380	571,570.611	268,545.520		
0+54.80	6.151	571,568.943	268,544.571		
0+77.76	6.595	571,577.192	268,571.061	13.07	Solid White Striping, Width: 203 mm
0+76.92	4.398	571,578.099	268,568.812		
0+84.20	4.398	571,584.640	268,574.261		
0+83.40	6.259	571,582.816	268,575.305		
			Total	136.34	

ITEM: 63401–1622: TYPE "H", BROKEN WHITE

Station	Offset (m)	Northing	Easting	Length (m)	Remarks
0+04.24	4.500	571615.888	268523.16	12.909	457 mm, 610 mm Segment , 610 mm Gap
0+15.21	4.500	571603.774	268518.999		
0+55.41	4.500	571570.492	268545.507	10.45	457 mm, 610 mm Segment , 610 mm Gap
0+64.30	4.500	571571.159	268555.882		
0+84.55	4.500	571584.933	268574.558	12.909	457 mm, 610 mm Segment , 610 mm Gap
0+95.52	4.500	571597.08	268578.624		
			Total	36.268	



ITEM 63405–3000
Pavement Marking Turn And Through Lane–Use Arrow Type "H"



ITEM 63405–2950
Pavement Marking, Elongated Through Lane–Use Arrow, Type "H"

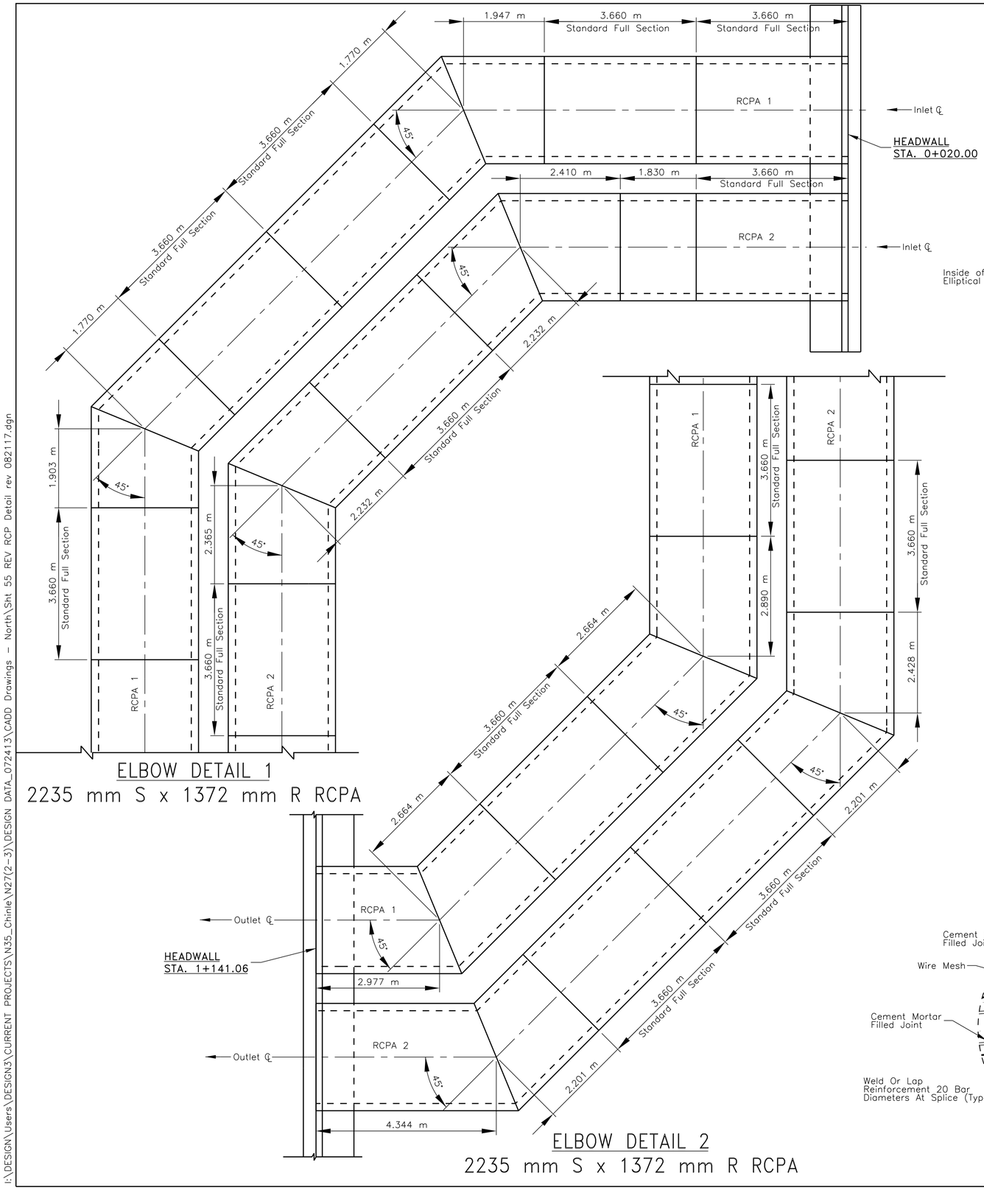
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

N7 ROUNDABOUT ALIGNMENT TABLE PAVEMENT MARKING LAYOUT DETAILS

DRAWN BY: NRDOT	DATE: 8/16/2017
DESIGNED BY: NRDOT	DATE: 8/16/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 54 REV N7 Rnd Abt_Horiz_Alnmt_Plan 081617.dgn	

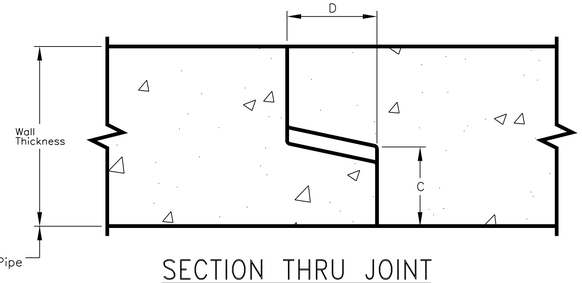
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 54 REV N7 Rnd Abt_Horiz_Alnmt_Plan 081617.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	55	105

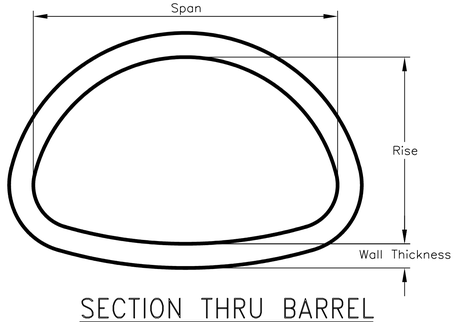


ELBOW DETAIL 1
2235 mm S x 1372 mm R RCPA

ELBOW DETAIL 2
2235 mm S x 1372 mm R RCPA



SECTION THRU JOINT

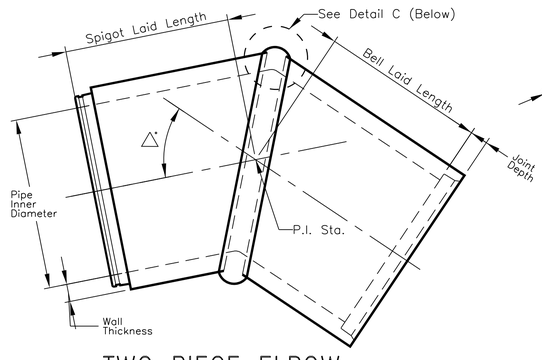


SECTION THRU BARREL

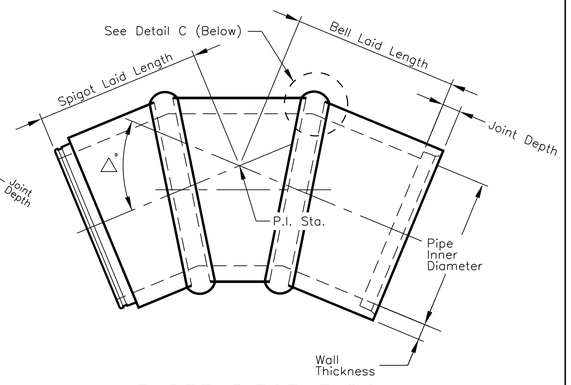
Table of Dimensions And Weights						
Round Equivalent (mm)	Inside Dimension (mm)		Wall Thickness (mm)	C (mm)	D (mm)	Full Flow Water Area (sq/m)	Approx. Weight (kg/m)
	Rise	Span					
1,829	1,372	2,235	178	81	152	2.378	3,144.490

Pipe dimensions may vary depending upon equipment availability.

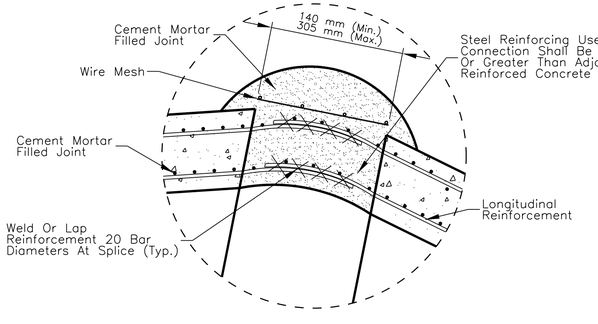
CONCRETE ARCH PIPE
381 mm to 1.828 m EQUIVALENT DIAMETER



TWO PIECE ELBOW



THREE PIECE ELBOW



DETAIL C

REINFORCED CONCRETE – TWO AND THREE PIECE ELBOW FABRICATION DETAILS

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

REINFORCED CONCRETE PIPE ARCH:
SUB-SURFACE DRAINAGE

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 55 REV RCP Detail rev 082117.dgn	

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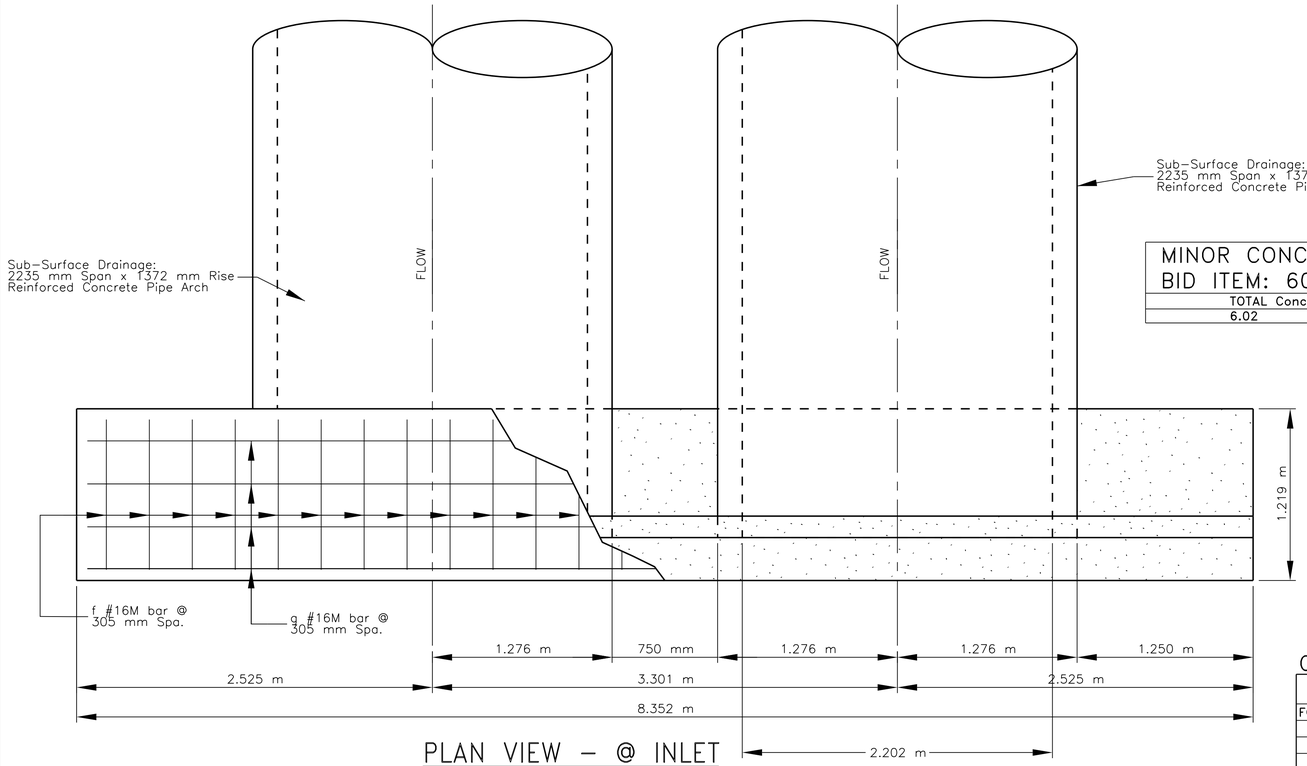
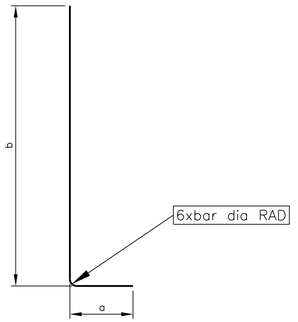
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	56	105



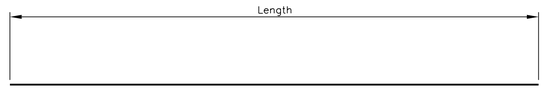
PLAN VIEW – @ INLET
STA. 0+020.00

MINOR CONCRETE A(AE) BID ITEM: 60101-0000
TOTAL Conc. Vol. (m^3)
6.02

SEE SHEET 28 of 105 FOR OVERVIEW OF SUB-SURFACE DRAINAGE.



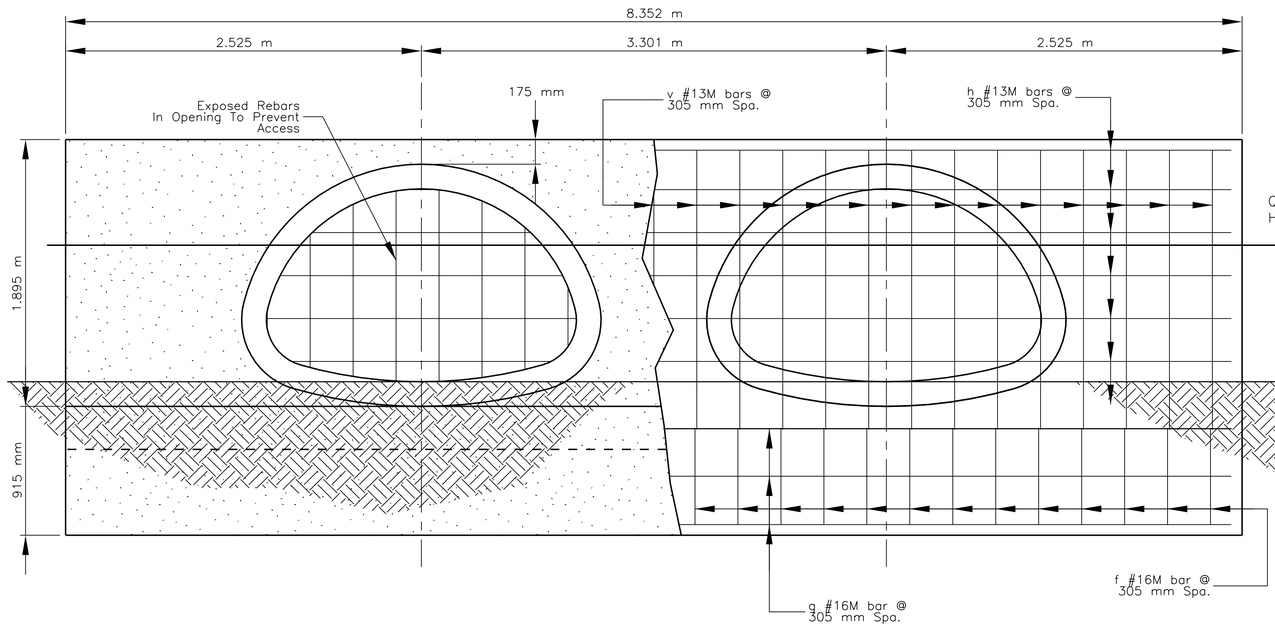
BENT BAR



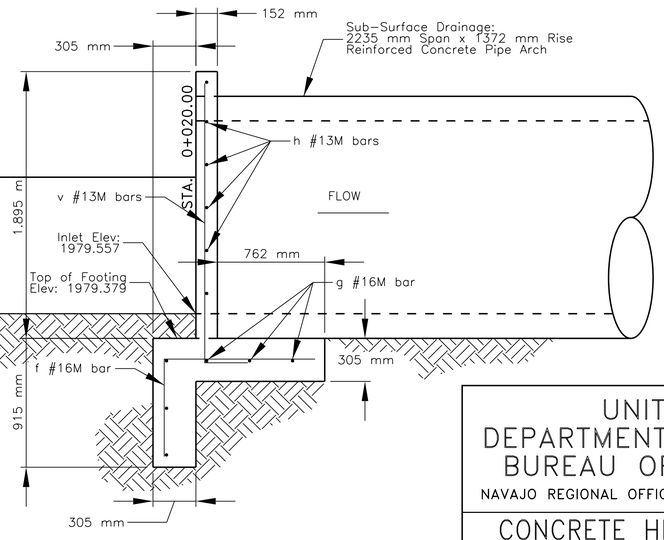
STRAIGHT BARS
(nts)

GRADE 60 REINFORCING BAR SCHEDULE FOR HEADWALL

MARK	No.	SIZE	TYPE	LENGTH Each (m)	kg/m	TOTAL Wt. (kg)	TOTAL Conc. Vol. (m^3)	REMARK
FOR RCPA HEADWALL AT INLET								
v	27	#13M	2	2.290	0.994	61.459	6.020	Vertical bent bars of Headwall
h	6	#13M	1	8.200	0.994	48.905		Horizontal straight bars in Headwall
g	7	#16M	1	8.200	1.552	89.085		Longitudinal straight bars in Footing
f	27	#16M	1	1.750	1.552	73.332		Lateral straight bars in Footing
					TOTAL	272.781	6.020	



ELEVATION VIEW – @ INLET
STA. 0+020.00



SIDE VIEW

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

CONCRETE HEADWALL DETAIL FOR REINFORCED CONCRETE PIPE ARCH

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 56 RCPA Headwall Detail 1 rev 082117.dgn	

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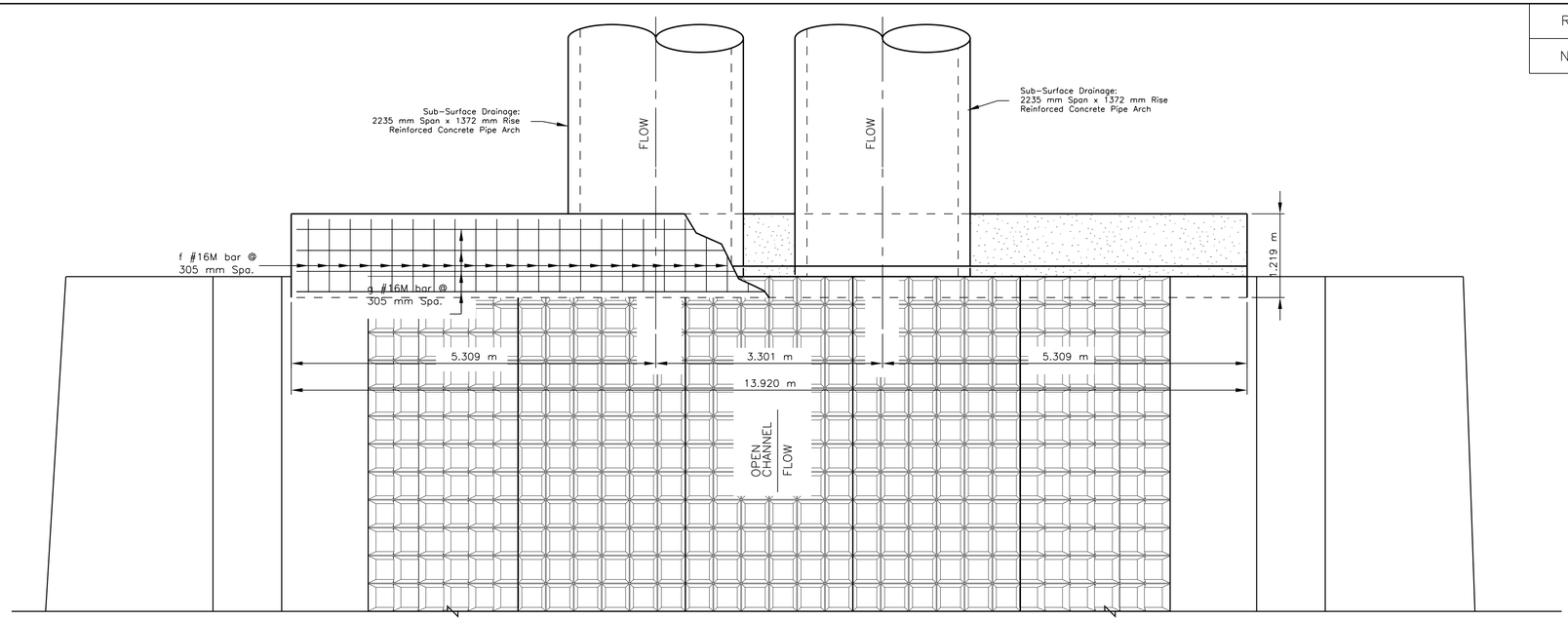
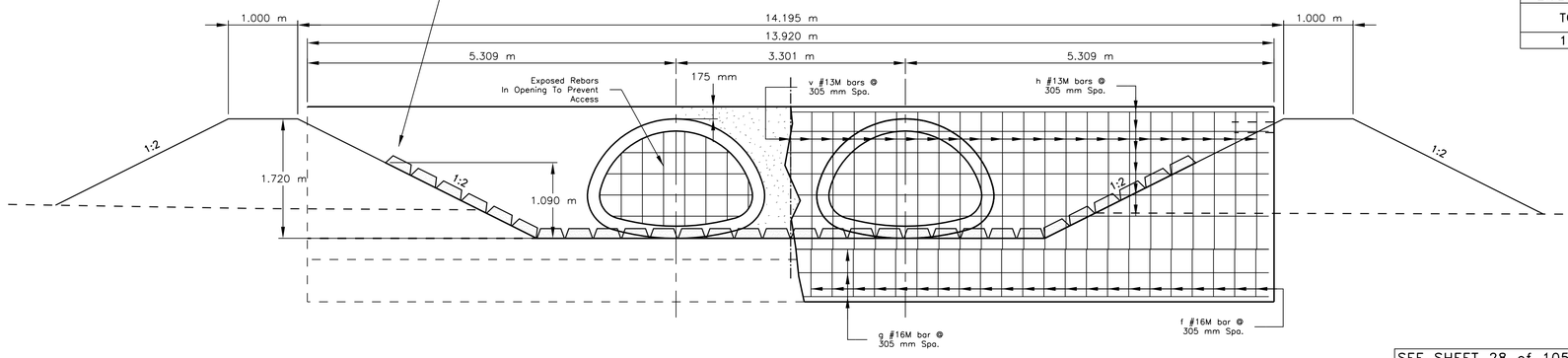
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	57	105



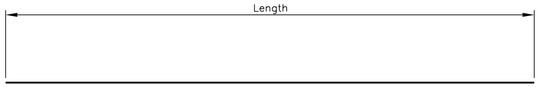
PLAN VIEW - @ OUTLET
STA. 1+141.06



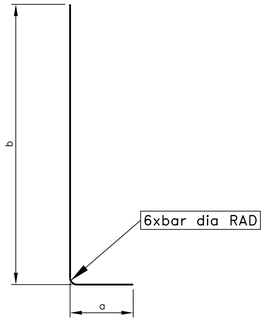
ELEVATION VIEW - @ OUTLET
STA. 1+141.06

MINOR CONCRETE A(AE) BID ITEM: 60101-0000
TOTAL Conc. Vol. (m^3)
10.73

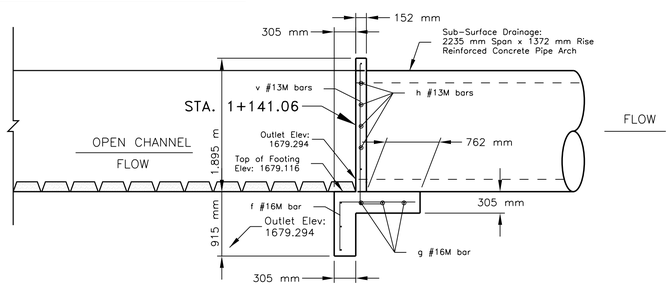
SEE SHEET 28 of 105
FOR OVERVIEW OF SUB-
SURFACE DRAINAGE



STRAIGHT BARS
(nts)



BENT BAR
(nts)



SIDE VIEW
STA. 1+141.06

GRADE 60 REINFORCING BAR SCHEDULE FOR HEADWALL

MARK	No.	SIZE	TYPE	LENGTH Each (m)	kg/m	TOTAL WT (kg)	TOTAL Conc. Vol. (m^3)	REMARK
FOR RCPA HEADWALL AT OUTLET								
v	45	#13M	2	2.290	0.994	102.432	10.730	Vertical bent bars of Headwall
h	6	#13M	1	13.768	0.994	82.112		Horizontal straight bars in Headwall
g	7	#16M	1	13.768	1.552	149.576		Longitudinal straight bars in Footing
f	45	#16M	1	1.754	1.552	122.499		Lateral straight bars in Footing
					TOTAL	**456.619**	**10.730**	

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

CONCRETE HEADWALL DETAIL FOR REINFORCED CONCRETE PIPE ARCH

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 57 REV RCPA Headwall Detail 2 rev 082117.dgn	

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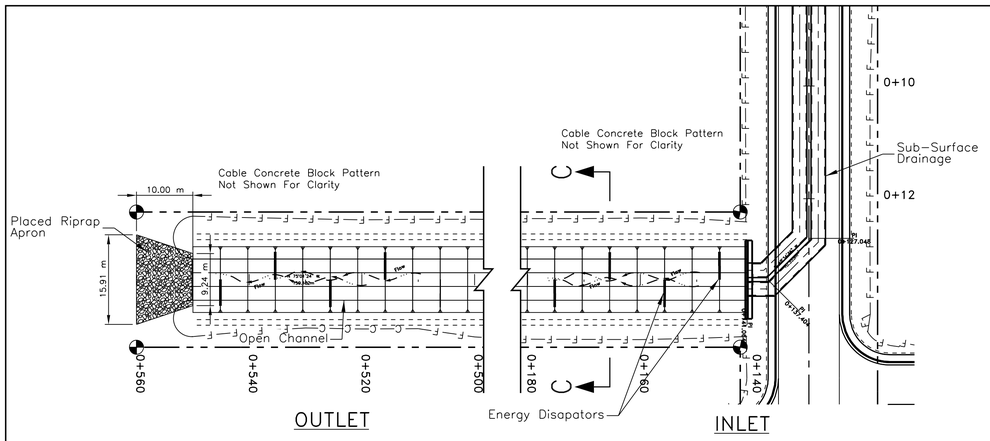
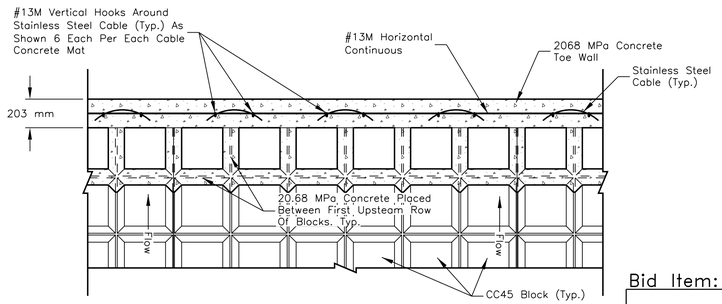
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	58	105

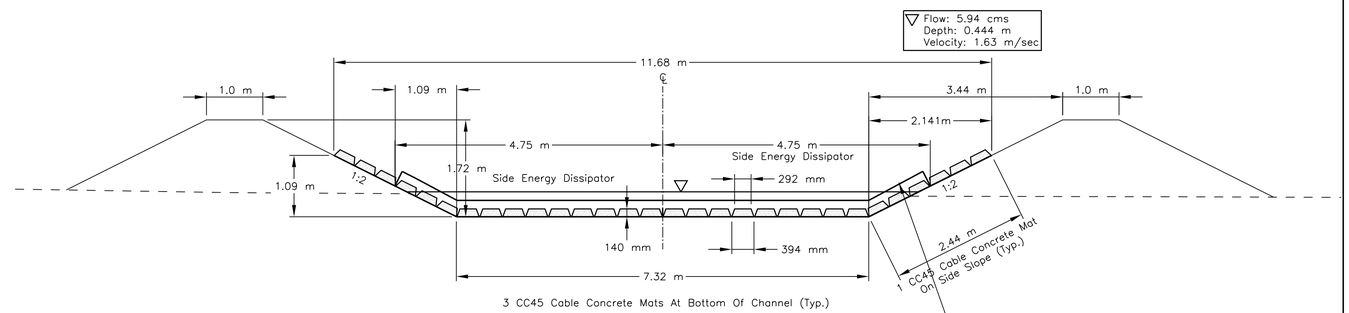


PLAN VIEW OPEN CHANNEL
LINED WITH CABLE CONCRETE MAT

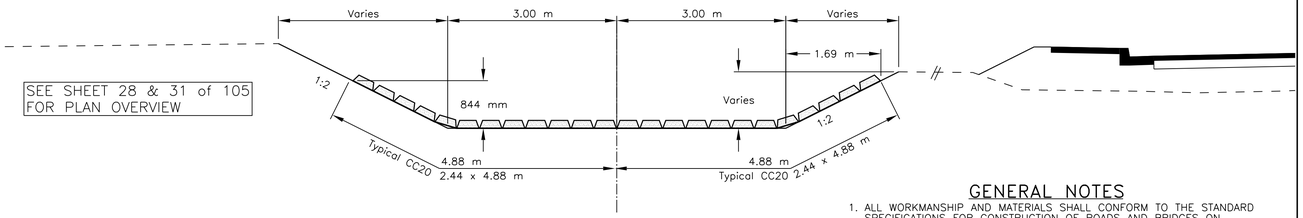


PLAN VIEW OF TOE WALL INSTALLATION

Note: Toe Wall Installation At The End Of The Cable Concrete Mat Where The Transition To Natural Ground Occurs To Prevent Scour.



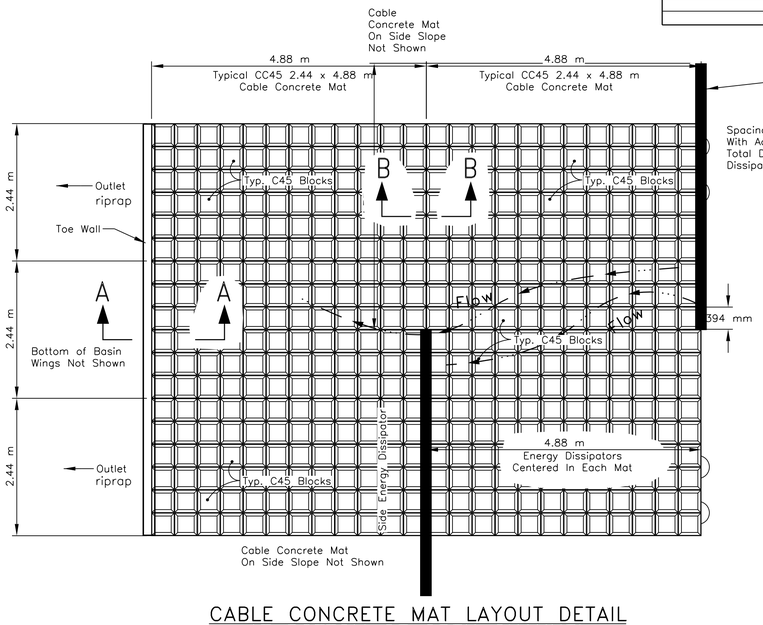
SECTION C-C
TYPICAL CROSS SECTION
N27(4-2) Open Channel



SECTION D-D
TYPICAL CROSS SECTION
N105(1) Side Drainage Channel

Bid Item: 25327-1000 & 25327-1020: CC20 & CC45 Concrete Cable Mats

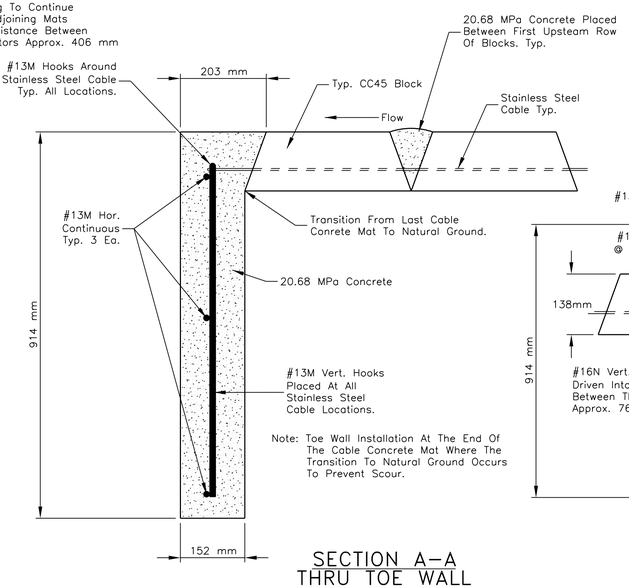
Station to Station	2.44 x 4.88 m Cable Conc. Revetment Mat (Each)	CC20 Item No: 25327-1000 (sq. m.)	CC45 Item No: 25327-1020 (sq. m.)	Midde Energy Dissipator 3.25 m Length (Each)	Side Energy Dissipator 2.44 m Length (Each)
N27(4-2) Open Drainage Channel					
0+141.064 To 0+560.000	420		5,001.02	41	84
N105(1) Side Drainage Channel					
0+018.78, 34.94 m Lt. to 0+048.04, 14.92 m Lt.	42	500.10		n/a	n/a
Total:		500.10	5,001.02	41	84



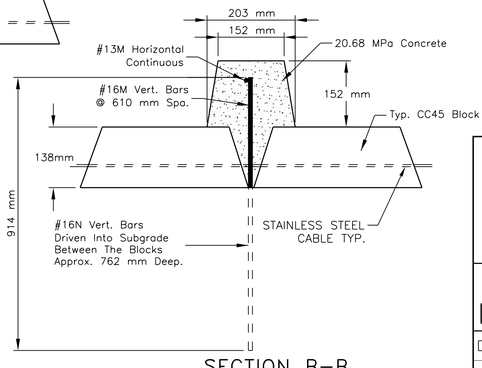
CABLE CONCRETE MAT LAYOUT DETAIL
AT BOTTOM OF OPEN CHANNEL
AT OUTLET

Note: All Energy Dissipators Will Be Cast In The Field To Follow The Contour Of The Cable Concrete Mat.

Note: Concrete & Reinforcing Bars Quantities For Energy Dissipators Shall Be Incidental To Cable Concrete Revetment Mat Bid Item. Contractor Shall Be Responsible For Determining Reinforcing Bar Schedule & Concrete Volumes.



SECTION A-A
THRU TOE WALL



SECTION B-B
THRU ENERGY DISSIPATOR

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03).
2. ALL CONCRETE SHALL BE CLASS A(AE) WITH CLASS 1 FINISH. CHAMFER ALL EXPOSED EDGES 19 mm. THE CONCRETE SHALL CONFORM TO SECTION 601 "MINOR CONCRETE" OF FP-03. F'c = 20.68 MPa.
3. REINFORCING STEEL SHALL CONFORM TO AASHTO SPECIFICATION M-31 (ASTM A615M), GRADE 420, AND SECTION 554 OF FP-03. FURNISHING AND PLACEMENT OF REBARS, ANCHOR BOLT, AND WELDED WIRE FABRIC SHALL BE CONSIDERED INCIDENTAL TO CONTRACT BID ITEM 60101-0000.
4. ALL STRUCTURE EXCAVATION AND EMBANKMENT AROUND THE CONCRETE REVETMENT MATS SHALL BE DONE TO NEAT LINES AND WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
5. THE CONTRACTOR SHALL BE REQUIRED TO MAKE ANY NECESSARY FIELD ADJUSTMENTS TO FIT EXISTING FIELD CONDITIONS, AS DIRECTED BY THE COR/COTR. NO ADDITIONAL PAYMENT SHALL BE MADE FOR SUCH ADJUSTMENTS.
6. IF UNSUITABLE MATERIAL IS FOUND AT THE BASE AND SIDES OF THE CHANNEL LOCATION AND ELEVATIONS, THE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED UNCLASSIFIED BACKFILL AS DIRECTED BY THE COTR. ALL UNCLASSIFIED BACKFILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T99 METHOD C, BEFORE AND AFTER THE MATS ARE PLACED. THE UNCLASSIFIED BACKFILL MATERIAL SHALL CONFORM TO SECTION 208 AND 209 OF FP-03. FURNISHING AND PLACEMENT OF UNCLASSIFIED BACKFILL SHALL BE ACCORDANCE WITH SECTION 204.07 AND 209 .
7. ALL CHANNEL EXCAVATIONS SHALL BE INSPECTED AND APPROVED BY THE COR/COTR PRIOR TO PLACEMENT OF FORMS, REINFORCING STEEL, AND SUBSEQUENT CONCRETE.
8. CHANNEL RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE PLANS AND AS DETERMINED BY THE COR/COTR. ANY WASTE MATERIAL SHALL BE USED AS BORROW WHERE NEEDED IN OTHER PROJECT LOCATION AS DESIGNATED AND APPROVAL BY THE COR/COTR. ALL CHANNEL EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
9. IN NO CASE SHALL ANY BACKFILL BE PLACED UNTIL THE CONCRETE HAS ATTAINED A COMPRESSIVE STRENGTH OF 17.24 MPa.
10. USE NAVAJO RED SANDSTONE COLOR IN ALL THE CONCRETE USED FOR THE OUTLET CHANNEL INCLUDING THE MATS AND ENERGY DISAPATOR BLOCKS. A SAMPLE BRICK SHALL BE PROVIDED TO THE COR/COTR FOR REVIEW AND APPROVAL OF THE COLOR BEFORE ITS USE ON THE PROJECT.

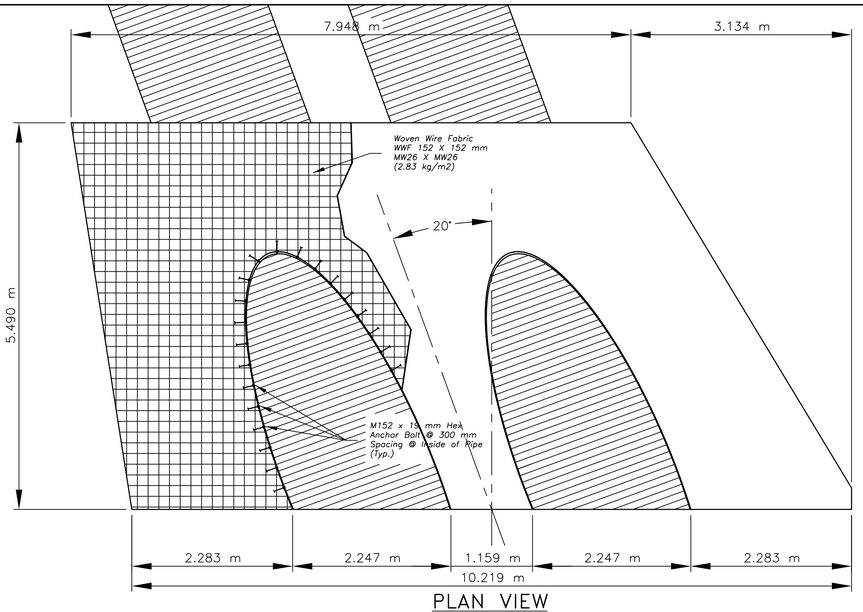
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CABLE CONCRETE REVETMENT MAT DETAIL FOR OPEN DRAINAGE CHANNEL

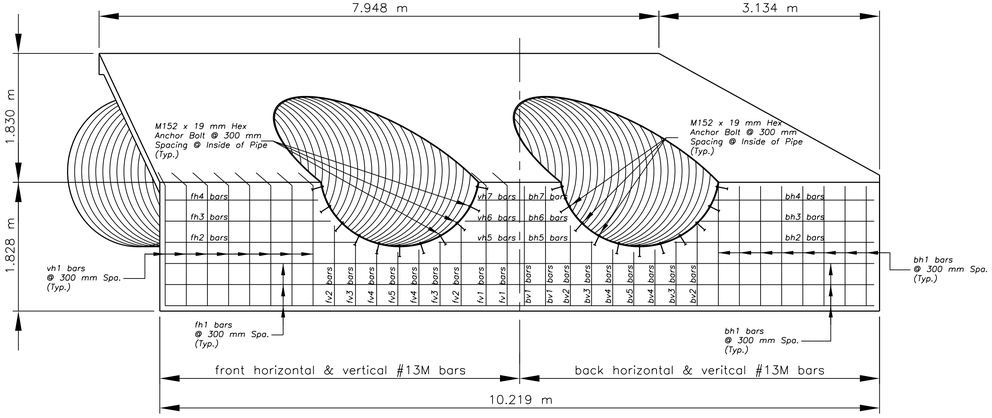
DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 58 N27 Cable Conc Detail rev 082117.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 58 N27 Cable Conc Detail rev 082117.dgn

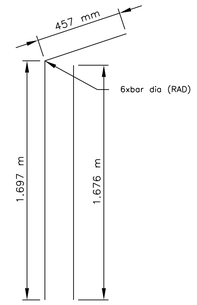
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	59	105



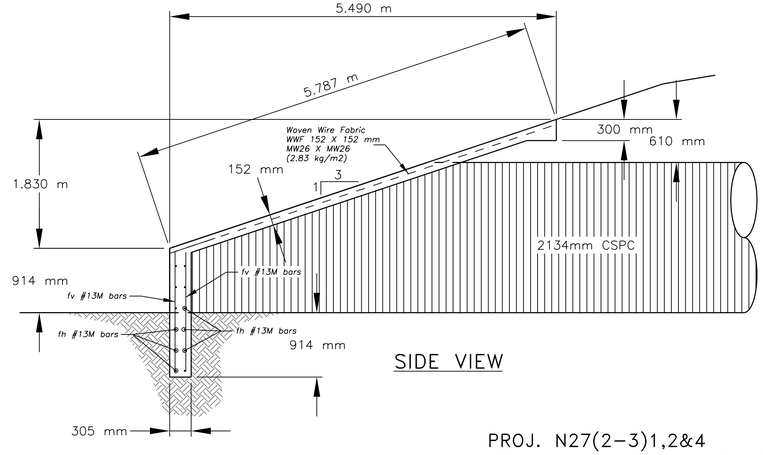
PLAN VIEW



ELEVATION– ISOMETRIC



REBAR



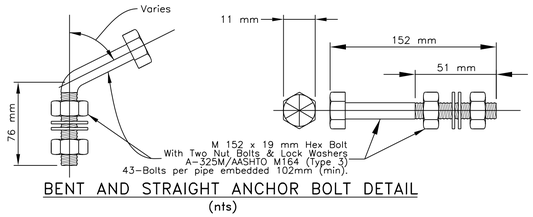
SIDE VIEW

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03).
2. ALL CONCRETE SHALL BE CLASS A(AE) WITH CLASS 1 FINISH. CHAMFER ALL EXPOSED EDGES 19 mm. THE CONCRETE SHALL CONFORM TO SECTION 601 "MINOR CONCRETE" OF FP-03. F'c = 20.68 MPa.
3. REINFORCING STEEL SHALL CONFORM TO AASHTO SPECIFICATION M-31 (ASTM A615M), GRADE 420, AND SECTION 554 OF FP-03. FURNISHING AND PLACEMENT OF REBARS, ANCHOR BOLT, AND WELDED WIRE FABRIC SHALL BE CONSIDERED INCIDENTAL TO CONTRACT BID ITEM 60101-0000.
4. ALL STRUCTURE EXCAVATION AND EMBANKMENT AROUND THE CONCRETE BLANKET SHALL BE DONE TO NEAT LINES AND WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
5. THE CONTRACTOR SHALL BE REQUIRED TO MAKE ANY NECESSARY FIELD ADJUSTMENTS TO FIT EXISTING FIELD CONDITIONS, AS DIRECTED BY THE COR/COTR. NO ADDITIONAL PAYMENT SHALL BE MADE FOR SUCH ADJUSTMENTS.
6. IF UNSUITABLE MATERIAL IS FOUND AT THE FOOTING LOCATION AND ELEVATIONS, THE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED UNCLASSIFIED BACKFILL AS DETERMINED BY THE COR/COTR. ALL UNCLASSIFIED BACKFILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T99 METHOD C, BEFORE AND AFTER FOOTINGS ARE PLACED. THE UNCLASSIFIED BACKFILL MATERIAL SHALL CONFORM TO SECTION 208 AND 209 OF FP-03. FURNISHING AND PLACEMENT OF UNCLASSIFIED BACKFILL SHALL BE ACCORDANCE WITH SECTION 109.02(m), 204 & 209.
7. ALL FOOTING EXCAVATIONS SHALL BE INSPECTED AND APPROVED BY THE COTR PRIOR TO PLACEMENT OF FORMS, REINFORCING STEEL, AND SUBSEQUENT CONCRETE.
8. CHANNEL RESHAPING, CLEANING, AND EXCAVATION SHALL BE DONE IN ACCORDANCE WITH THE PLANS AND AS DETERMINED BY THE COTR. ANY WASTE MATERIAL SHALL BE USED AS BORROW WHERE NEEDED IN OTHER PROJECT LOCATION AS DESIGNATED AND APPROVAL BY THE COR/COTR. ALL CHANNEL EXCAVATION, CLEANING, AND RESHAPING SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
9. IN NO CASE SHALL ANY BACKFILL BE PLACED UNTIL THE CONCRETE HAS ATTAINED A COMPRESSIVE STRENGTH OF 17.24 MPa.
10. ESTIMATED QUANTITIES OF TABULATED CONCRETE, MW26XMW26 WELDED WIRE FABRIC, AND REINFORCING STEEL IS FOR INLET OF STRUCTURE ONLY. CONCRETE BLANKETS ARE REQUIRED AT INLET SIDE OF THE DRAINAGE STRUCTURE , UNLESS OTHERWISE NOTED.
11. AT LOCATIONS WHERE THE TOP EDGE OF THE CONCRETE BLANKET EXTENDS BEYOND/NEAR THE HINGE POINT OR CANNOT BE INSTALLED DUE TO INSUFFICIENT COVER OVER THE PIPES, THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE VERTICAL HEIGHT ABOVE THE PIPE(S) TO 305 mm AND INSTALL TWO (2) ADDITIONAL #13M REBARS SET VERTICALLY ±152 mm APART W/ 76 mm MINIMUM COVER ALL AROUND ACROSS THE ENTIRE WIDTH OF THE STRUCTURE AND WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE STRUCTURE.
12. EROSION CONTROL MATTING SHALL CONFORM TO SECTION 629 AND 713.17(k) OF THE FP-03 FOR TYPE IV-B MATERIAL, AND SHALL BE INCIDENTAL TO THE UNIT PRICE BID FOR ITEM 60101-0000. MATTINGS SHALL BE TUCKED OR EMBEDDED INTO EMBANKMENT ALONG ALL EDGES AS SHOWN. SEE SHEET 80 OF 95 FOR EROSION CONTROL MATTING INSTALLATION DETAILS.

REINFORCING BAR SCHEDULE

Mark	No. of Bars	Length (m)	Size	kg/m	Total Wt. (kg)	Remarks
Sta. 56+247.00 CSPC Inlet						
fh1	3	10.067	#13M	0.994	30.020	Front Horizontal Straight Bars, Bottom of Pipes
fh2	1	2.781	#13M	0.994	2.764	Front Horizontal Straight Bars, Outside of Pipes
fh3	1	2.404	#13M	0.994	2.390	Front Horizontal Straight Bars, Outside of Pipes
fh4	1	2.225	#13M	0.994	2.212	Front Horizontal Straight Bars, Outside of Pipes
fh5	1	2.252	#13M	0.994	2.238	Front Horizontal Straight Bars, Between Pipes
fh6	1	1.500	#13M	0.994	1.491	Front Horizontal Straight Bars, Between Pipes
fh7	1	1.141	#13M	0.994	1.134	Front Horizontal Straight Bars, Between Pipes
fh8	1	2.726	#13M	0.994	2.710	Front Horizontal Straight Bars, Outside of Pipes
fh9	1	2.349	#13M	0.994	2.335	Front Horizontal Straight Bars, Outside of Pipes
fh10	1	2.170	#13M	0.994	2.157	Front Horizontal Straight Bars, Outside of Pipes
fv1	20	2.320	#13M	0.994	46.122	Front Vertical Bent Bars, Left, Right & Between Pipes, a = 610 mm b = 1706 mm
fv2	4	1.140	#13M	0.994	4.533	Front Vertical Straight Bars, Under Pipes
fv3	4	0.912	#13M	0.994	3.626	Front Vertical Straight Bars, Under Pipes
fv4	4	0.798	#13M	0.994	3.173	Front Vertical Straight Bars, Under Pipes
fv5	2	0.762	#13M	0.994	1.515	Front Vertical Straight Bars, Under Pipes
bh1	3	10.067	#13M	0.994	30.020	Back Horizontal Straight Bars, Bottom of Pipes
bh2	1	2.838	#13M	0.994	2.821	Back Horizontal Straight Bars, Outside of Pipes
bh3	1	2.461	#13M	0.994	2.446	Back Horizontal Straight Bars, Outside of Pipes
bh4	1	2.281	#13M	0.994	2.267	Back Horizontal Straight Bars, Outside of Pipes
bh5	1	2.255	#13M	0.994	2.241	Back Horizontal Straight Bars, Between Pipes
bh6	1	1.501	#13M	0.994	1.492	Back Horizontal Straight Bars, Between Pipes
bh7	1	1.141	#13M	0.994	1.134	Back Horizontal Straight Bars, Between Pipes
bh8	1	2.671	#13M	0.994	2.655	Back Horizontal Straight Bars, Outside of Pipes
bh9	1	2.294	#13M	0.994	2.280	Back Horizontal Straight Bars, Outside of Pipes
bh10	1	2.115	#13M	0.994	2.102	Back Horizontal Straight Bars, Outside of Pipes
bv1	20	1.697	#13M	0.994	33.736	Back Vertical Straight Bars
bv2	4	1.140	#13M	0.994	4.533	Back Vertical Straight Bars, Under Pipes
bv3	4	0.912	#13M	0.994	3.626	Back Vertical Straight Bars, Under Pipes
bv4	4	0.798	#13M	0.994	3.173	Back Vertical Straight Bars, Under Pipes
bv5	2	0.762	#13M	0.994	1.515	Back Vertical Straight Bars, Under Pipes
				Total:	204.461	



BENT AND STRAIGHT ANCHOR BOLT DETAIL
(nts)

PROJ. N27(2-3)1,2&4
ITEM 60101-0000: MINOR CONCRETE (AE)

STATION	STRUCTURE	Vol. (m³)	Area (m²)	WWF (kg) **	Remarks
56+247.00	2 Barrel 2134 mm CSPC	10.52	38.85	109.95	
	TOTAL	10.52	38.85	109.95	

** WWF Unit Wt. 2.83 kg/m²

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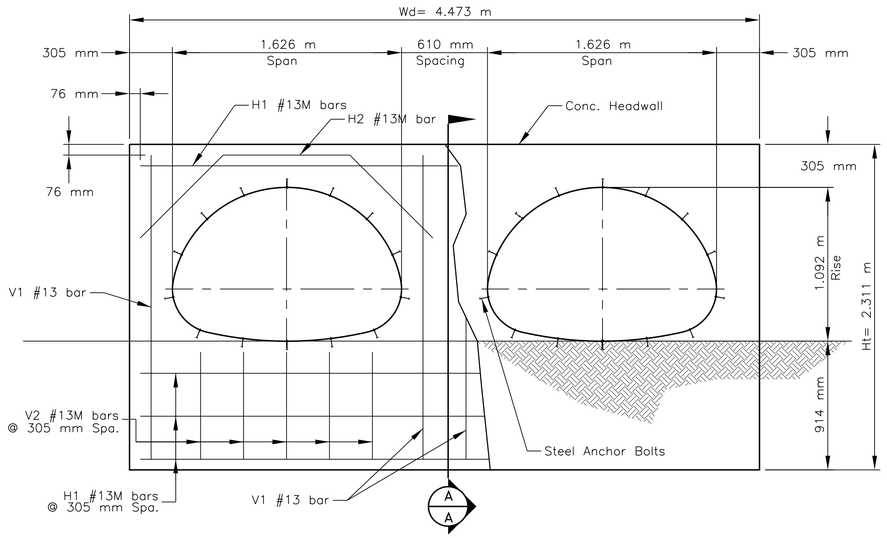
STA 56+247.00-CONCRETE SLOPE PAVING DETAIL

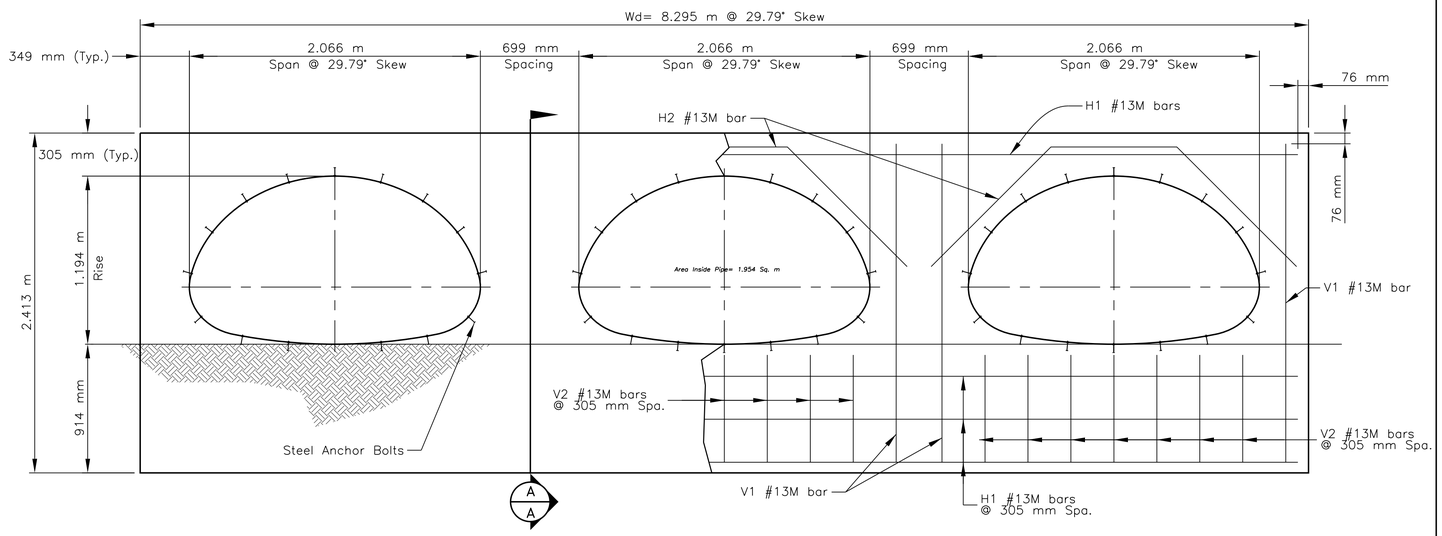
DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 59 Sta_56+247.00 Slope Paving 1 REV	082117.dgn

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 59 Sta_56+247.00 Slope Paving 1 REV 082117.dgn

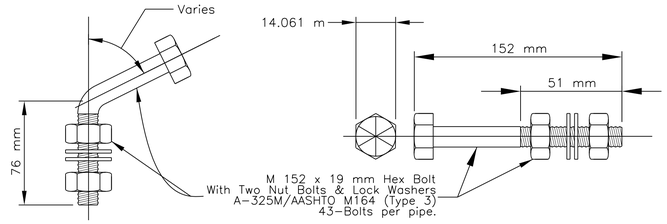
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(4-2)2&4	60	105
			N105	N105(1)2&4		



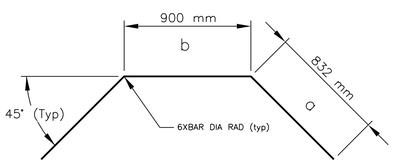
N27(2-3)CONCRETE HEADWALL
ELEVATION VIEW
2-BARREL 1626 mm Span x 1092 m Rise CSPA



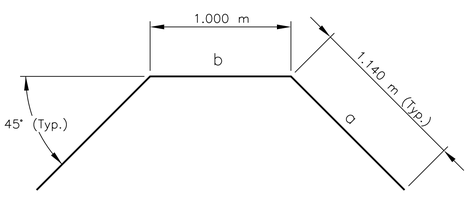
N105 CONCRETE HEADWALL
ELEVATION VIEW
3-BARREL 1803 mm Span x 1194 m Rise CSPA



BENT AND STRAIGHT ANCHOR BOLT DETAIL
(nts)



For 1626 mm Span x 1.092 m Rise CSPA

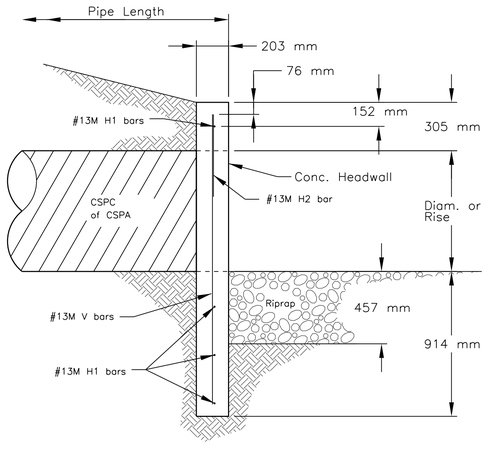


For 1803 mm Span x 1.194 m Rise CSPA

BAR BENDING DIAGRAM (H2 bars)

Project N27(2-3) and N105(1)
ITEM No. 60101-0000: MINOR CONCRETE, CLASS A(AE), TYPE II

STATION	LOCATION	VOLUME INLET (m^3)	VOLUME OUTLET (m^3)	TOTAL VOLUME (m^3)	REMARKS
N27: 59+928.000	Under TO Lt.	1.527	1.527	3.054	2-1626 mm S x 1092 mm R CSPA
N27: 60+058.000	Under TO Lt.	1.527	1.527	3.054	2-1626 mm S x 1092 mm R CSPA
N105: 0+265.000	Under TO Lt.	14.153	14.153	28.306	3-1803 mm S x 1194 mm R CSPA
			TOTAL	34.414	



SECTION A-A

REINFORCING BAR SCHEDULE

Station	Location	W (m)		mark:	size:	No. req'd	length (m)	kg/m^3	Total wt (kg)	a*(mm)	b*(mm)	Remarks:
59+928.000	Left Turnout	4.473	2.311	Straight reinforcing bars (Type 1)								Headwall With 2-barrel 1626 mm S x 1092 mm R CSPA
				V1	#13M	4	2.159	0.994	8.584			
				V2	#13M	10	0.762	0.994	7.574			
				H1	#13M	4	4.321	0.994	17.180			
				Bent reinforcing bars								
				H2	#13M	2	2.565	0.994	5.099	914	902	
								Sub-Total	38.438	Per 1-Wall		
60+058.000	Left Turnout	4.473	2.311	Straight reinforcing bars (Type 1)								Headwall With 2-barrel 1626 mm S x 1092 mm R CSPA
				V1	#13M	4	2.159	0.994	8.584			
				V2	#13M	10	0.762	0.994	7.574			
				H1	#13M	4	4.321	0.994	17.180			
				Bent reinforcing bars								
				H2	#13M	2	2.565	0.994	5.099	914	902	
								Sub-Total	38.438	Per 1-Wall		
Under N105 TO @ Sta. 0+265.00 Lt.	Left Turnout	7.240	2.413	Straight reinforcing bars (Type 1)								Headwall With 3-barrel 1803 mm S x 1194 mm R CSPA
				V1	#13M	6	2.261	0.994	13.485			
				V2	#13M	21	0.762	0.994	15.906			
				H1	#13M	4	8.143	0.994	32.377			
				Bent reinforcing bars								
				H2	#13M	3	3.280	0.994	9.781	1063	902	
								Sub-Total	71.548	Per 1-Wall		
								Sub-Total	148.424	Per 1-Wall		
								Grand-Total	296.848	Both Walls @ Inlet & Outlet		

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CONCRETE HEADWALL LAYOUT DETAIL FOR CSPA

DRAWN BY: NRDOT	DATE: 2/4/2016
DESIGNED BY: NRDOT	DATE: 2/4/2016
REVISED: 8/21/2017	BY: HAROLD RILEY
Sht 60 N27 N105 TO Hdwls Dtls REV 08217.dgn	

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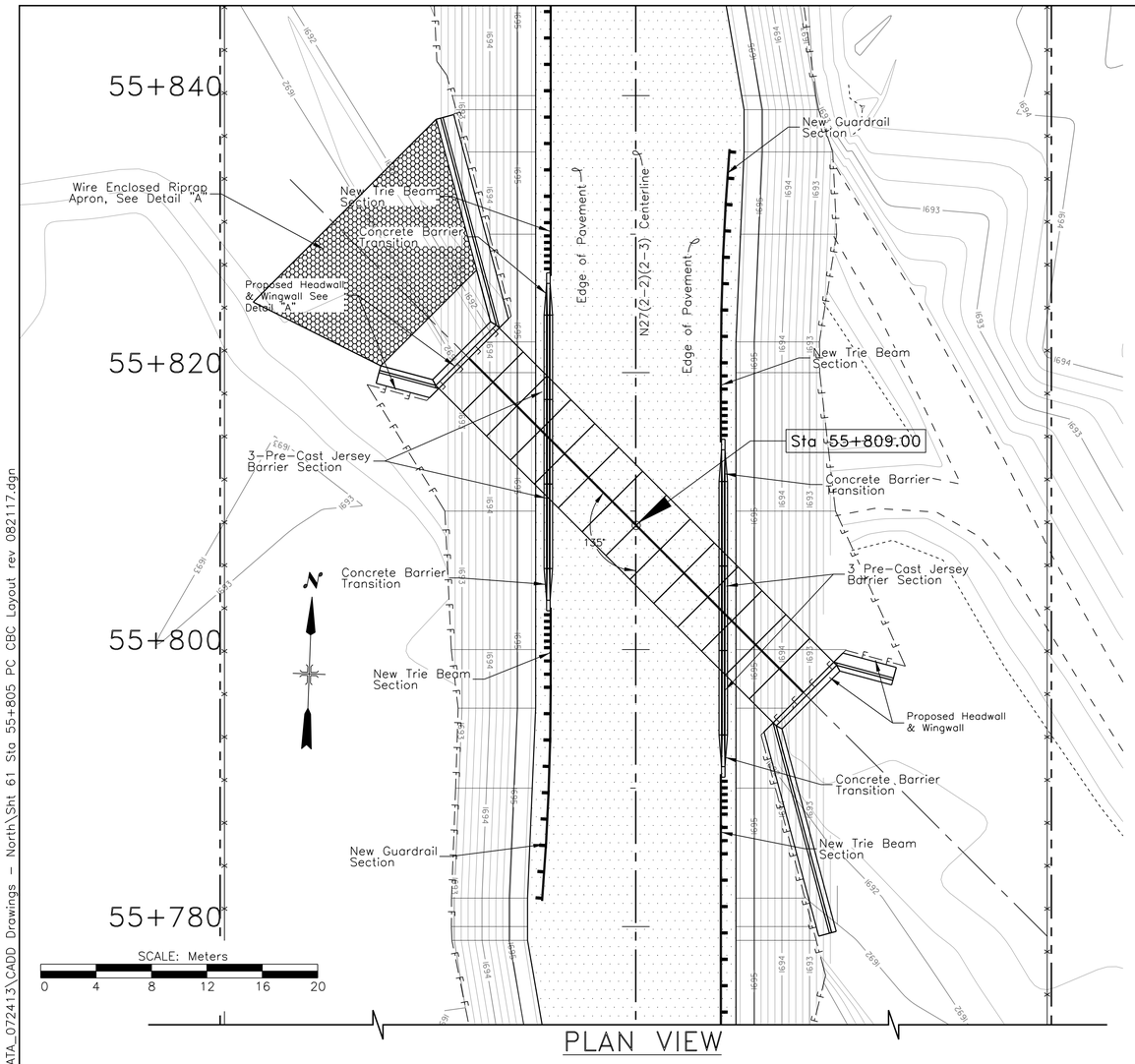
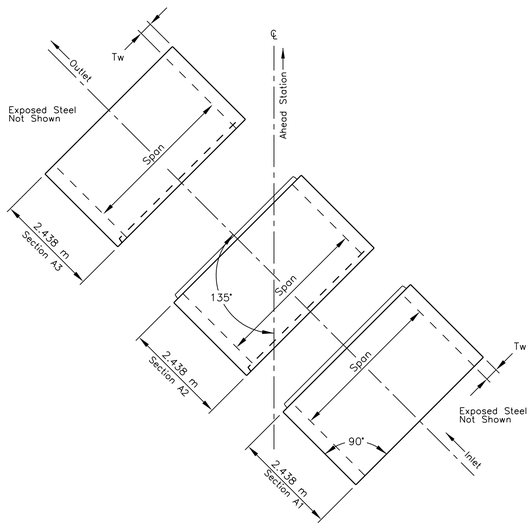
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	61	105



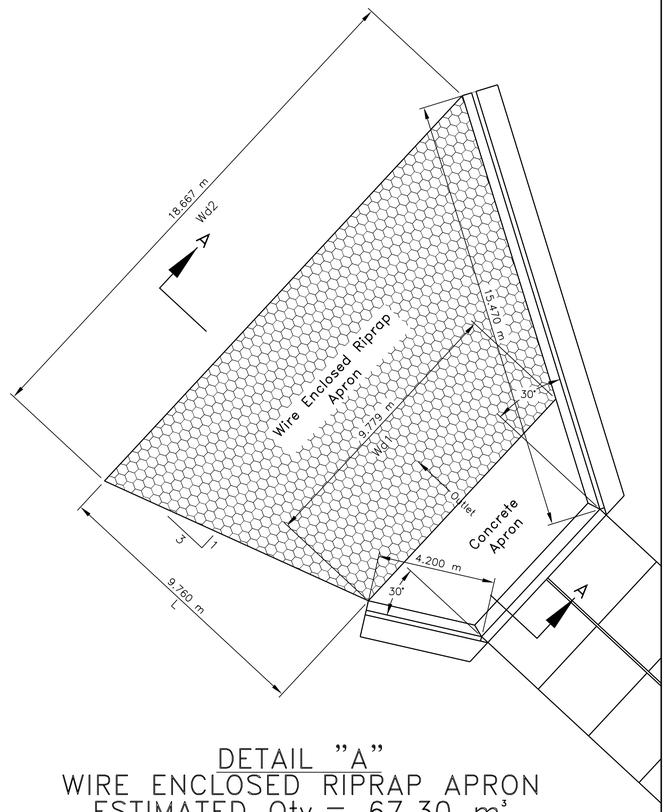
PLAN VIEW

See Sheet 82-86 of 105 For Guardrail Details and Sheet 71-72 of 105 For Concrete Jersey Barrier Details.

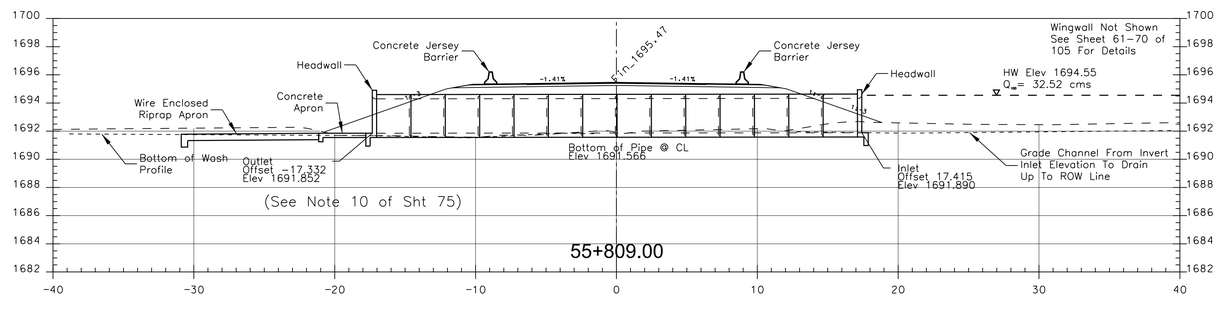


PLAN VIEW
PRE-CAST BOX CULVERT
LAYOUT DETAIL

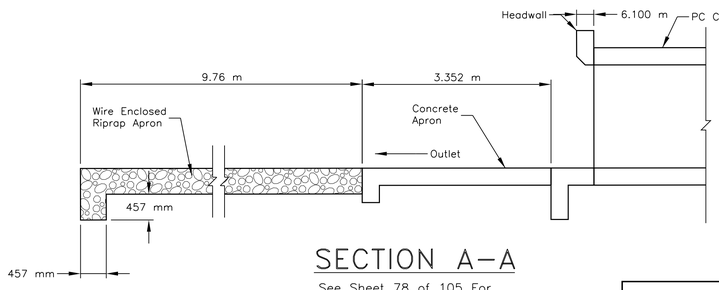
See Sheet 77 of 105 For WE Riprap/Dimension Tables



DETAIL "A"
WIRE ENCLOSED RIPRAP APRON
ESTIMATED Qty.= 67.30 m³



CROSS SECTION VIEW
2-BARREL 2.44 m Span x 2.44 m Rise
PRE-CAST BOX CULVERT At
Sta. 55+809.00
Skew No. 135.0



SECTION A-A
See Sheet 78 of 105 For Additional Enclosed Riprap Details.

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PRE-CAST CONCRETE BOX CULVERT
LAYOUT DETAIL AT Sta. 55+809.00

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 61 Sta 55+805 PC CBC Layout rev 082117.dgn	

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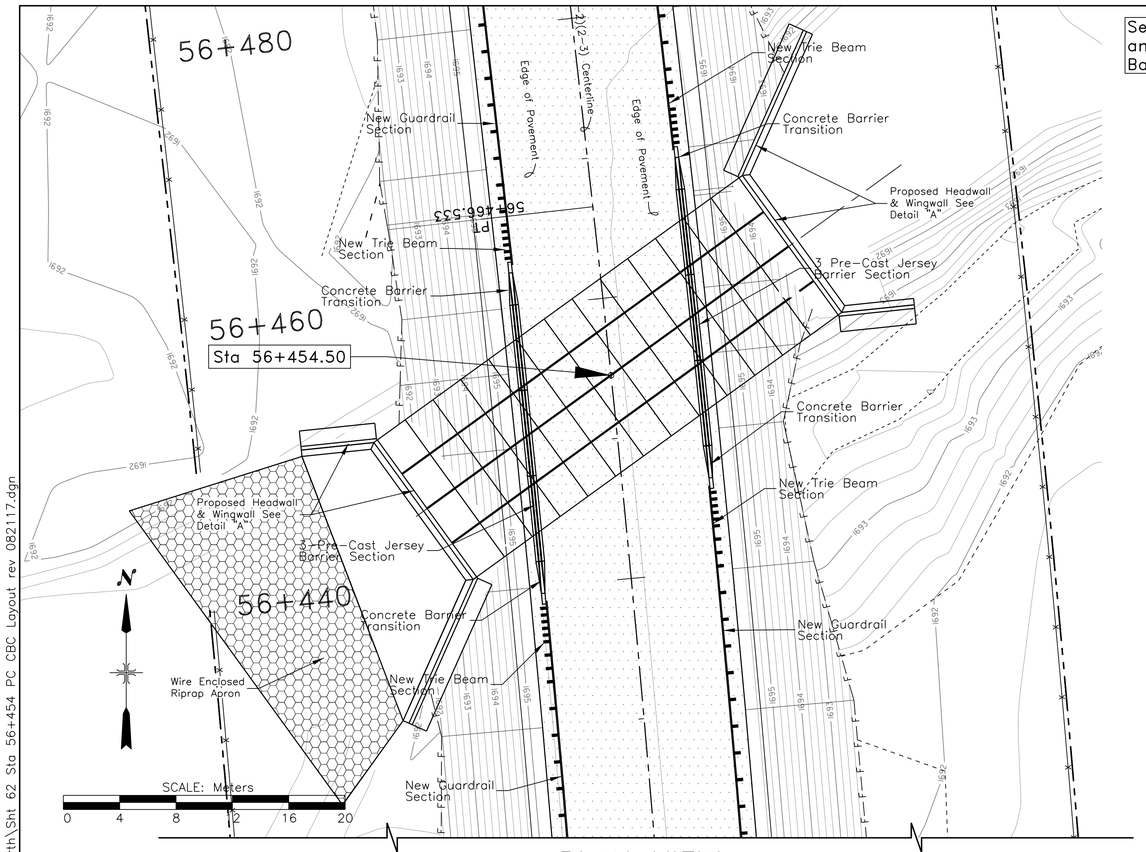
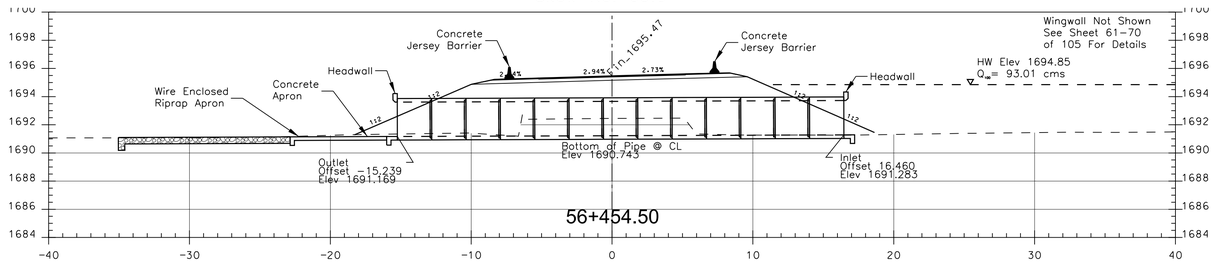
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	62	105

See Sheet 82-86 of 105 For Guardrail Details and Sheet 71-72 of 105 For Concrete Jersey Barrier Details.

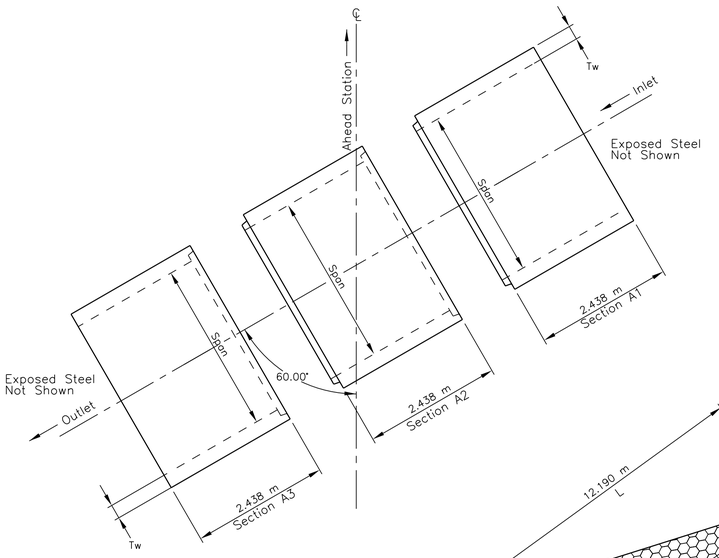


PLAN VIEW

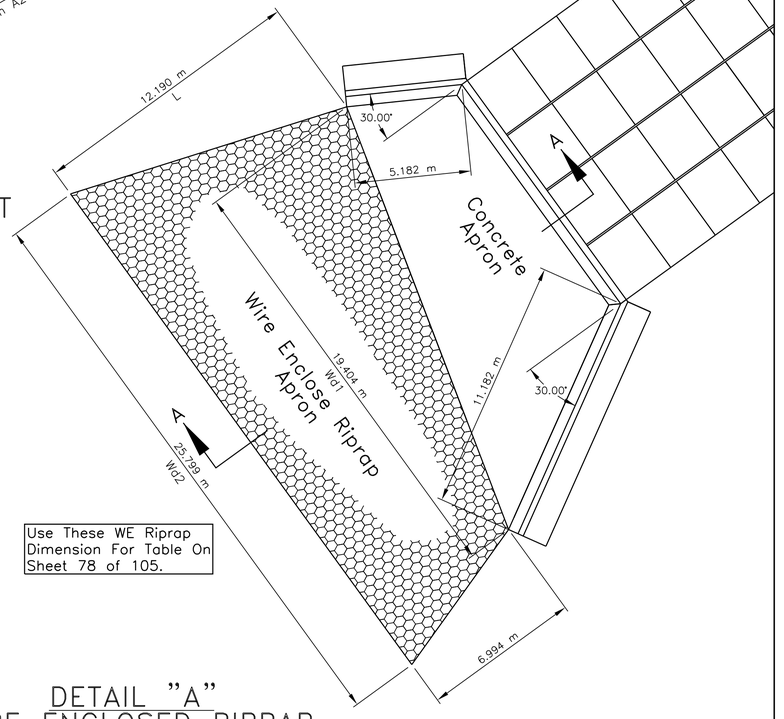
4-BARREL 2.44 m Span x 2.44 m Rise
PRE-CAST BOX CULVERT At 56+454.50
Skew No. 60.0



CROSS SECTION VIEW

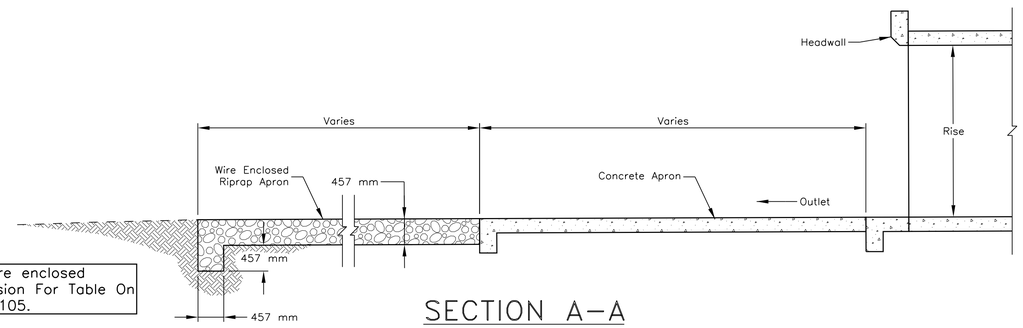


PLAN VIEW
PRE-CAST BOX CULVERT
LAYOUT DETAIL



Use These WE Riprap Dimension For Table On Sheet 78 of 105.

DETAIL "A"
WIRE ENCLOSED RIPRAP
APRON
ESTIMATED QTY.= 105.45 m³



Use These Wire enclosed Riprap Dimension For Table On Sheet 78 of 105.

SECTION A-A

See Sheet 77 of 105 For Additional Enclosed Riprap Details.

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRE-CAST CONCRETE BOX
CULVERT LAYOUT DETAIL AT
Sta 56+454.50

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 62 Sta 56+454 PC CBC Layout rev 082117.dgn	

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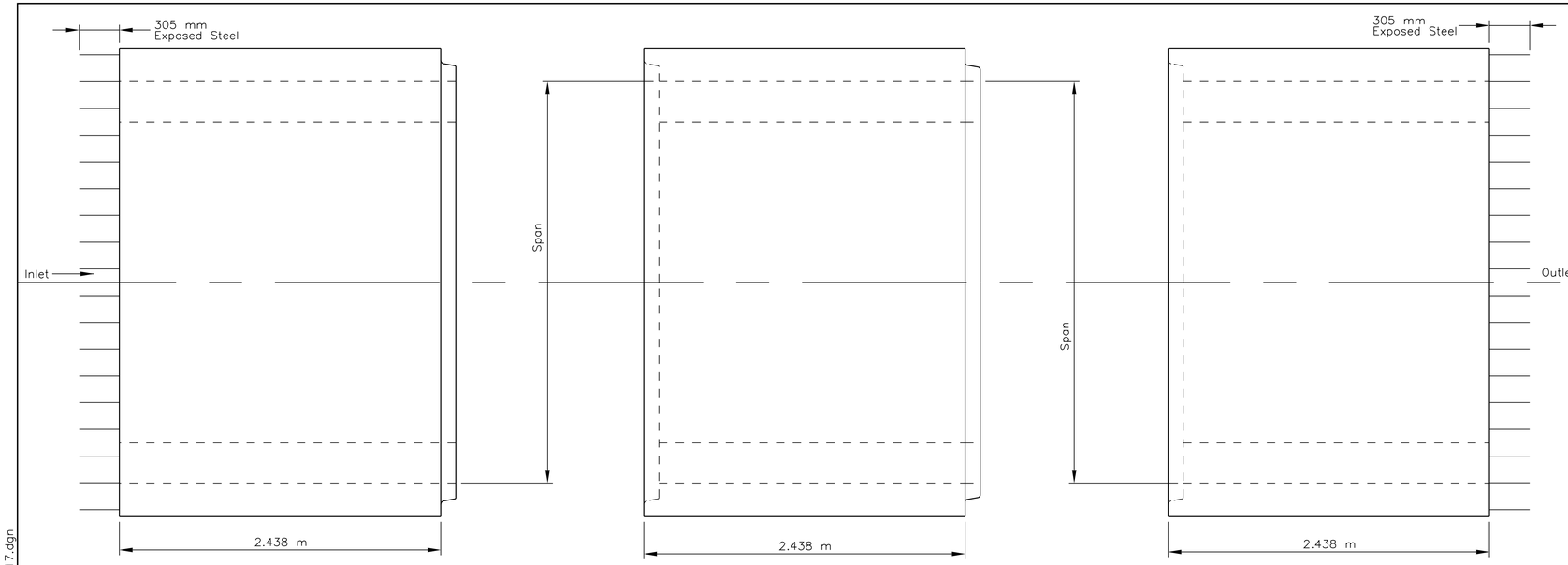
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	63	105



PLAN VIEW–BOX CULVERT
SECTION A 1

PLAN VIEW–BOX CULVERT
SECTION A 2

PLAN VIEW–BOX CULVERT
SECTION A 3

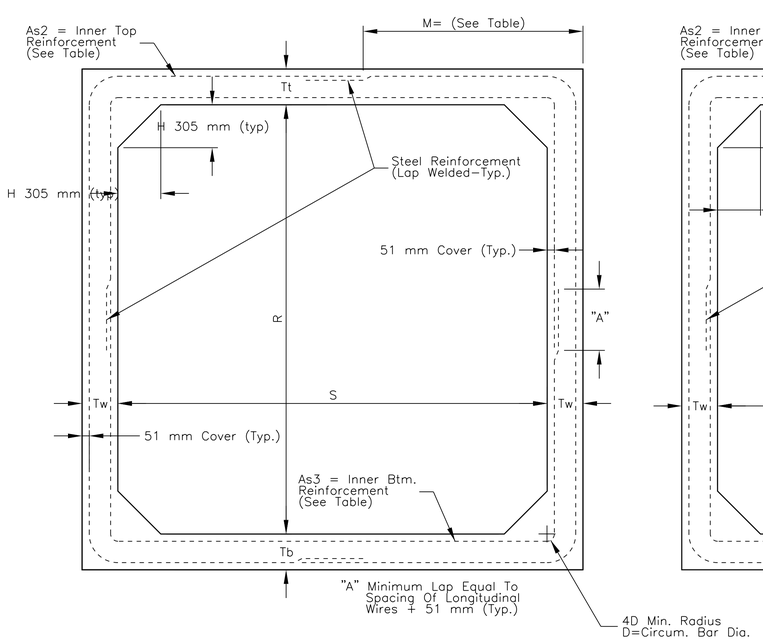
Note: Protect Exposed Steel From Damage Or Bending In Fabrication Yard And During Transport To Project Site.

GENERAL NOTES

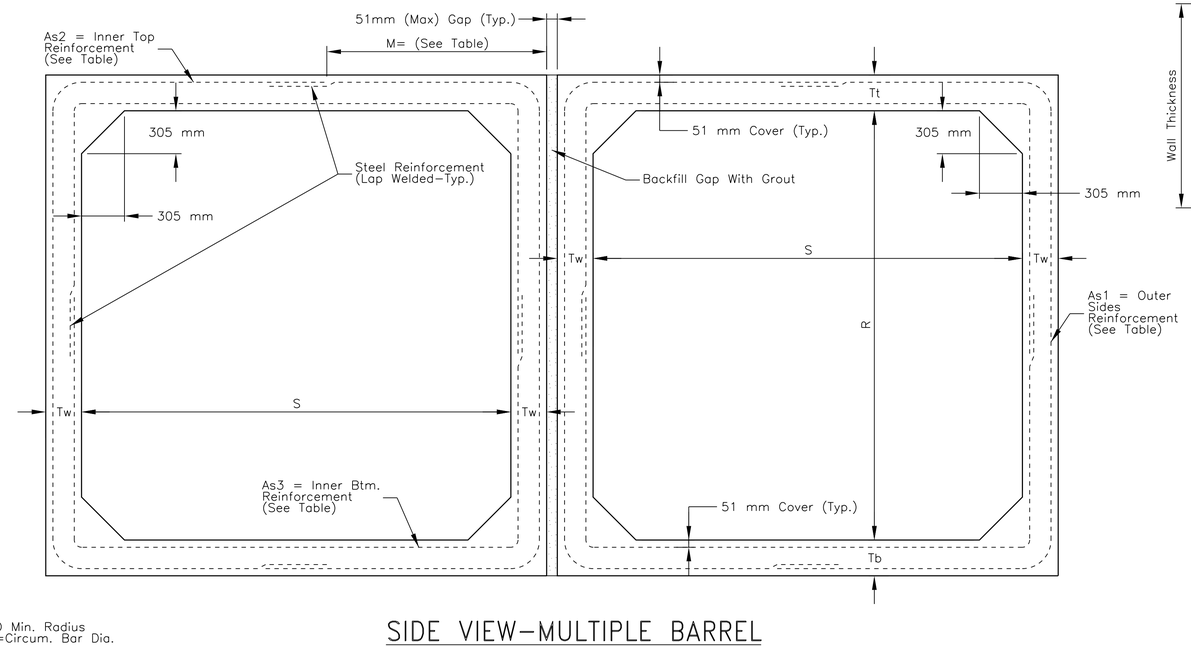
1. ONLY ONE DESIGN OF PRECAST BOX CULVERT IS TO BE USED FOR ANY INSTALLATION.
2. REINFORCING STEEL MUST CONSIST OF SMOOTH OR DEFORMED WELDED WIRE REINFORCEMENT (WWR) MEETING THE REQUIREMENTS OF SPECIFICATION SECTION 931. LONGITUDINAL REINFORCEMENT MAY CONSIST OF REINFORCING BARS MEETING THE REQUIREMENTS 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

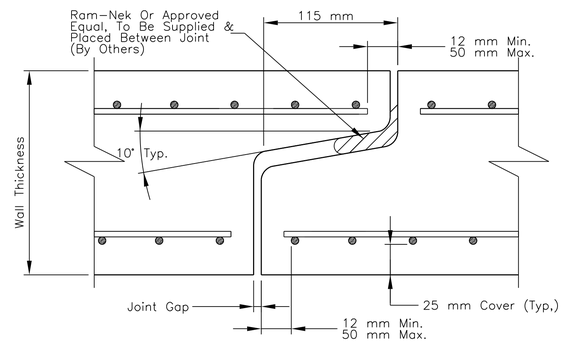
STATION	SPAN x RISE (S) x (R) (m)	SLAB/WALL THICKNESS TOP (Tt) (mm)	BOT, (Tb) (mm)	SIDE (Tw) (mm)	HAUNCH (H) (mm)	DESIGIN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq mm/per meter) As1	As2	As3	As4	As5	As6	As7	As8	As9	As1 EXT. LENGTH (M) (mm)
55+809.00	2.438 x 2.438	203	203	203	102 to 305	914 mm to < 1.524 m	804	1228	1291	296	–	–	–	–	See General Note 5	1651
56+454.50	2.438 x 2.438	203	203	203	102 to 305	914 mm to < 1.524 m	804	1228	1291	296	–	–	–	–		1651



SIDE VIEW–SINGE BARREL



SIDE VIEW–MULTIPLE BARREL
2 OF MORE BARRELS



BOX CULVERT
JOINT DETAIL

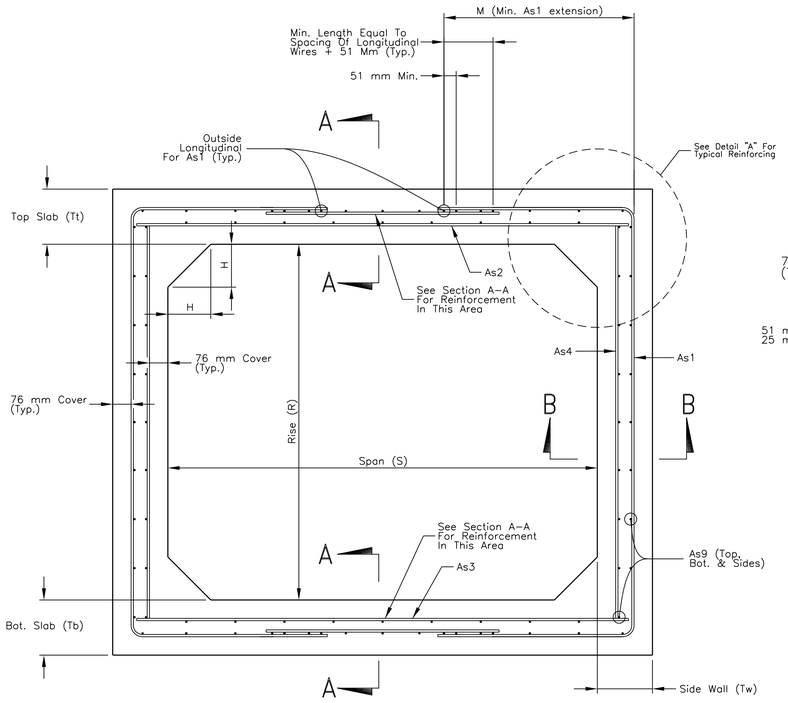
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PRE–CAST CONCRETE
BOX CULVERT DETAIL

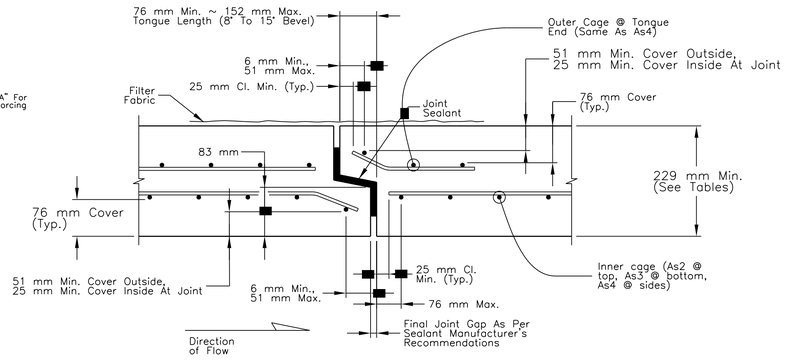
DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 63 PC CBC Dtl 1 REV 082117.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle N27(2–3)\DESIGN DATA_072413\CADD Drawings – North\Sht 63 PC CBC Dtl 1 REV 082117.dgn

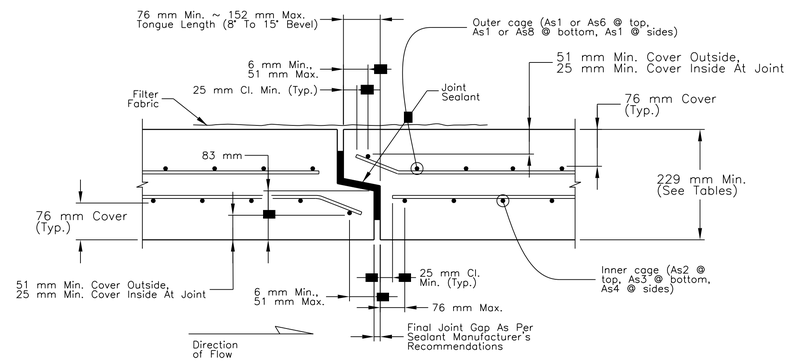
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	64	105



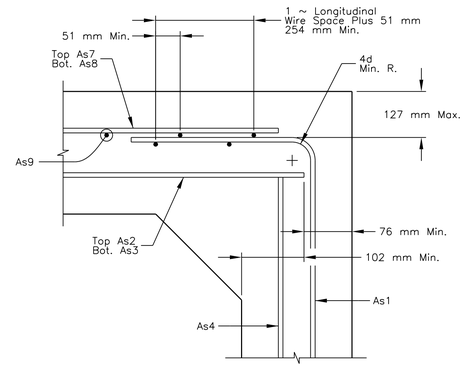
TYPICAL BOX SECTION (TYPE 2)
DESIGN EARTH COVER 51 mm OR GREATER
(Option 1 Reinforcing Configuration Shown)



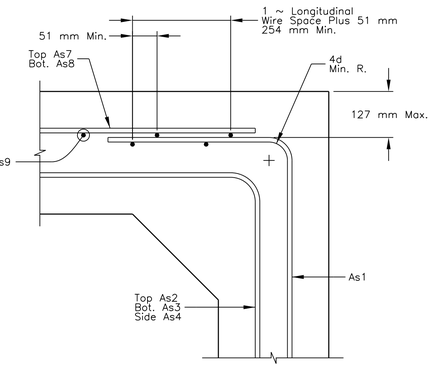
SECTION A-A



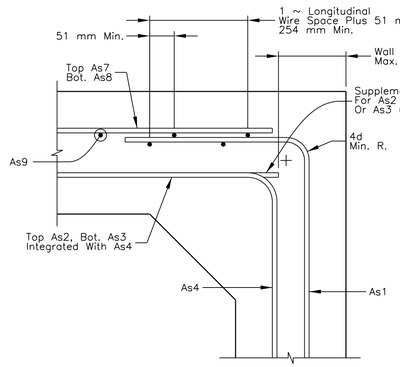
SECTION B-B
TYPICAL SECTION THRU JOINT



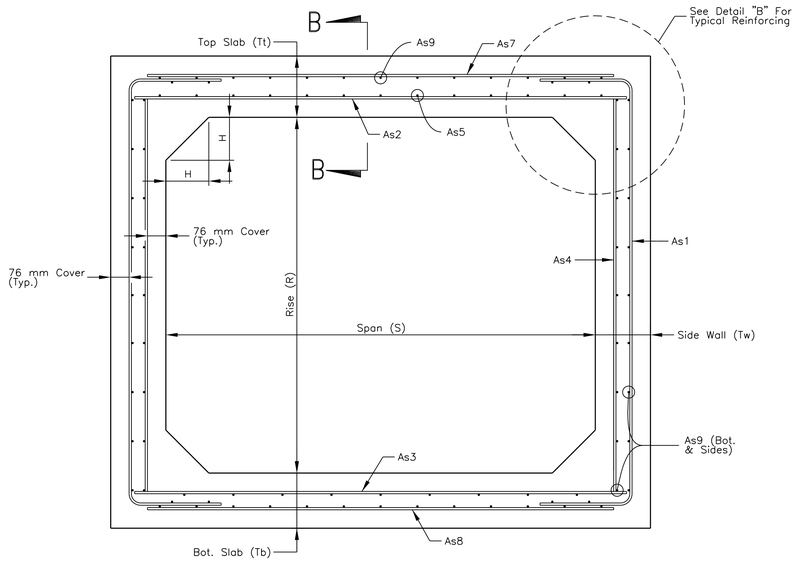
DETAIL "B"
(OPTION 1)



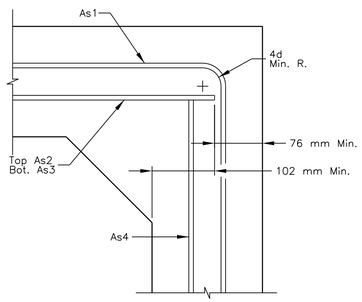
DETAIL "B"
(OPTION 2)



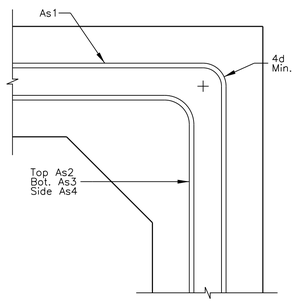
DETAIL "B"
(OPTION 3)



TYPICAL BOX SECTION (TYPE 1)
DESIGN EARTH COVER LESS THAN 51 mm
(Option 1 Reinforcing Configuration Shown)



DETAIL "A"
(OPTION 1)



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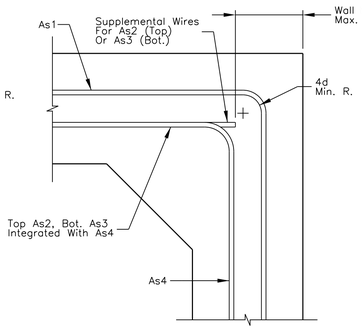
(OPTION 2)



DETAIL "A"
(OPTION 3)

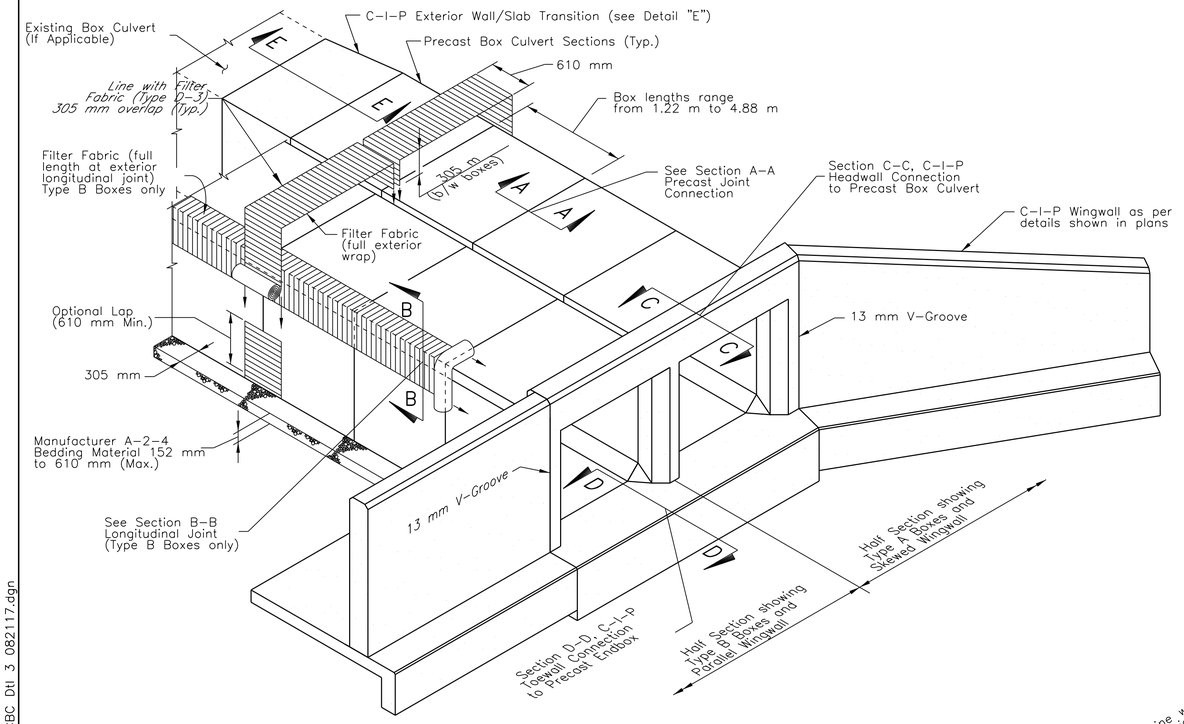
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD PRECAST BOX
CULVERT
REBAR LAYOUT
WITH 76 mm CONCRETE COVER

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 64 PC CBC Dtl 2 REV 082117.dgn	

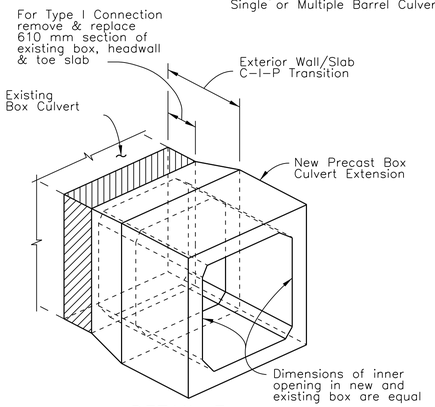
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 64 PC CBC Dtl 2 REV 082117.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	65	105



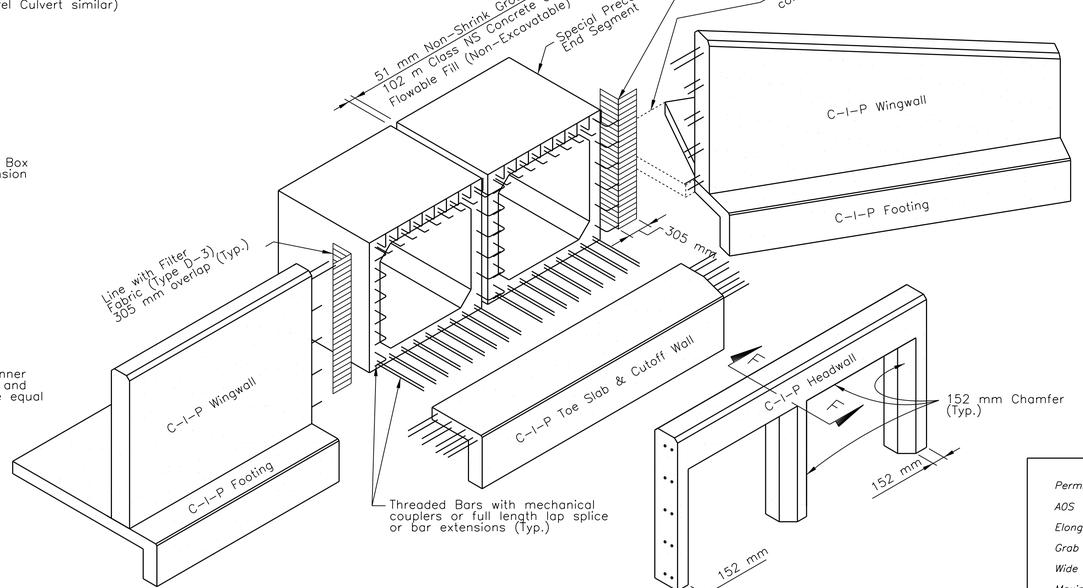
ISOMETRIC VIEW OF PRECAST CONCRETE BOX CULVERT

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 3.048m BY 3.048m. 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 THISCONTRACT.
   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, GALVANIZIED 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 INTERNAL FRICTION Ó: 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. COEFFICENT 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. THE 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)	Three sided bottom section; Top slab section		Contractor Design
C	Multicell Monolithic	Not Applicable		Contractor Design

STANDARD CRITERA

CLASS	TYPE (1)	APPLOCATION 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 No. 200 SIEVE	% SOIL PASSING No. 200 SIEVE	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
		French Drain	285									
		Sheet Piling Filter		<15% 0.5	<15% 40		<50%					
		Filter Fabric Jacket (Culvert	280	15% to 50% 0.2	15% to 50% 60	<50% 248 ≥50% 128	5.7 ≥50% 3.6	<50% 90 ≥50% 57	<50% 90** ≥50% 57			
		Concrete Pavement Subdrainag	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 unvegatated state as determined by tests performed by Utah State University, Texas Transportation Institute or*

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

PRECAST CONCRETE BOX CULVERTS WITH WINGWALLS DETAILS

DRAWN BY: NRDOT	DATE: 8/21/2017
DESIGNED BY: NRDOT	DATE: 8/21/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 65 PC CBC Dtl 3 082117.dgn	

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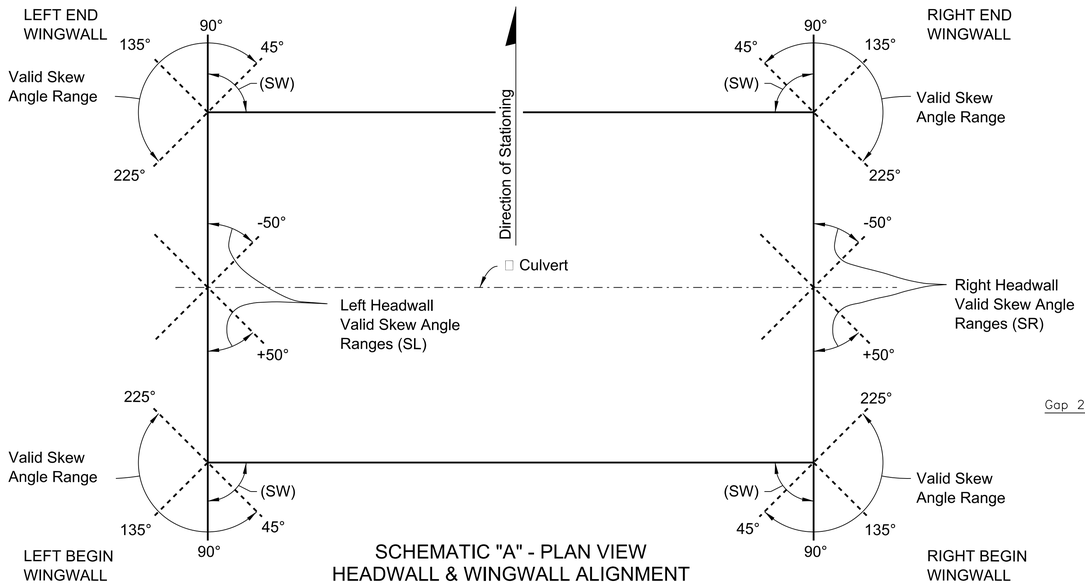
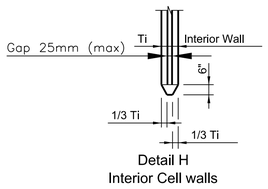
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	66	105

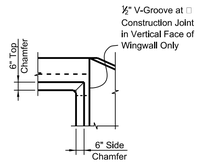


SCHEMATIC "A" - PLAN VIEW
HEADWALL & WINGWALL ALIGNMENT

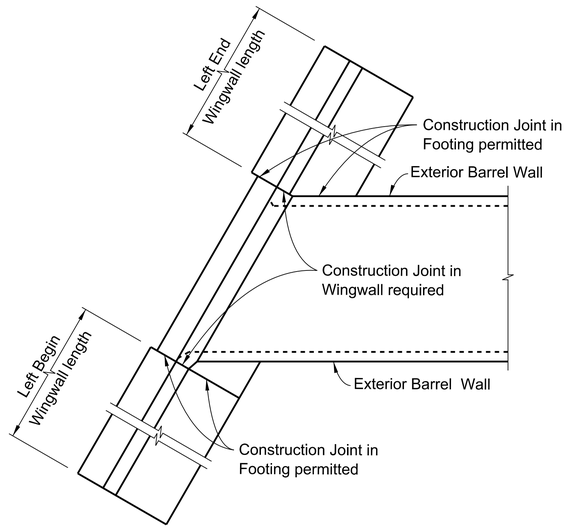
NOTE: All headwall and culvert skew angles are measured in degrees from a line perpendicular to the centerline of culvert (counter-clockwise positive), see Schematic "B".



Detail H
Interior Cell walls

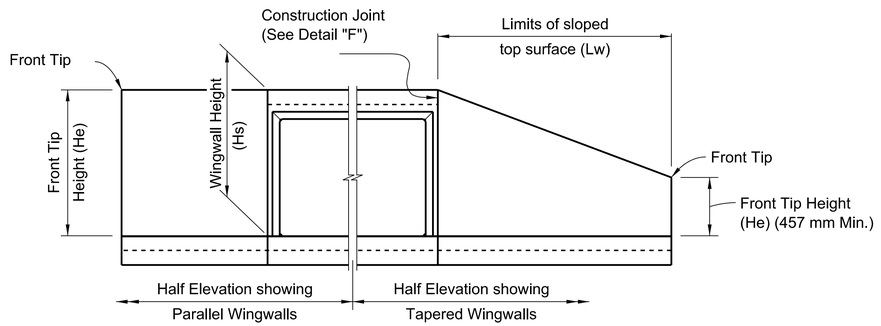


DETAIL "F"



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

GENERAL NOTES:

LIVE LOAD: HL-93.

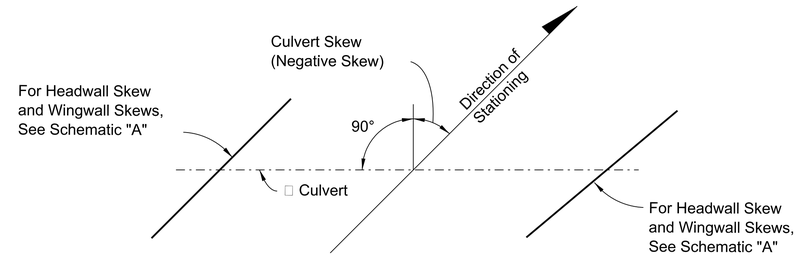
CONSTRUCTION LOADING: It is the construction Contractor's responsibility to provide for supporting construction loads that exceed AASHTO HL-93, and any construction load applied prior to 610 mm of compacted fill placed above the top slab.

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 67 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.

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.

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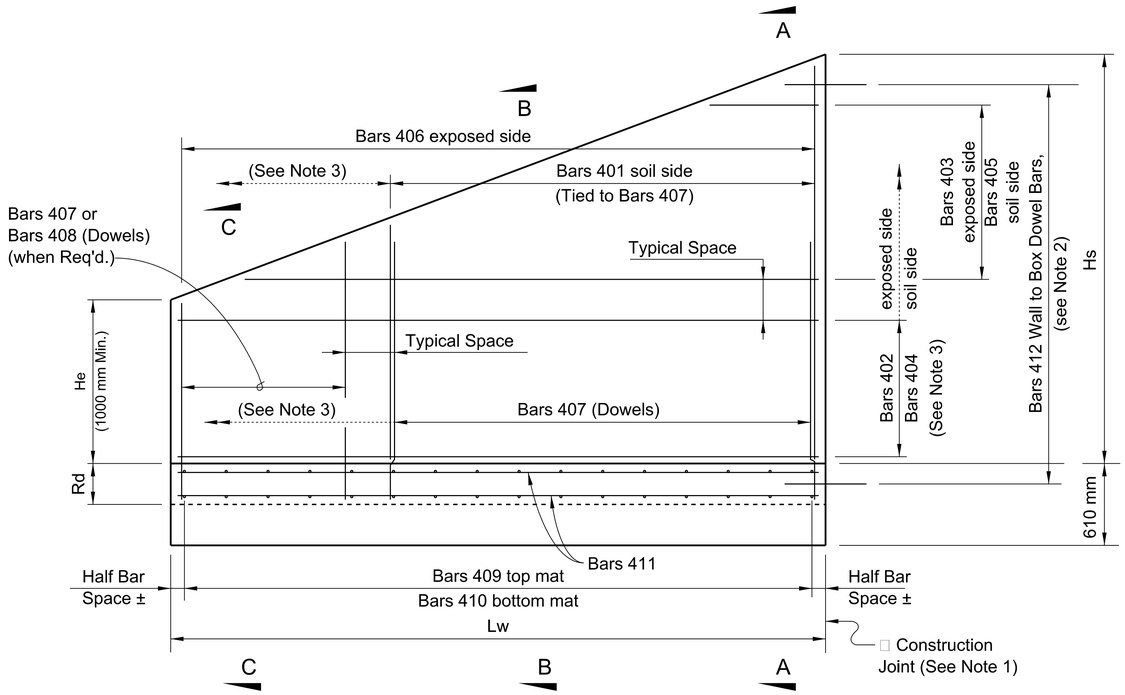
CONCRETE BOX CULVERT DETAIL

DRAWN BY: NRDOT	DATE: 4/3/2014
DESIGNED BY: NRDOT	DATE: 4/3/2014
REVISED: 8/5/2015	BY: Leroy.Toledo
Sht 66 PC CBC Dtl 4 rev 082117.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 66 PC CBC Dtl 4 rev 082117.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	67	105



WINGWALL ELEVATION - Variable Height
(Left End shown - other corners similar)

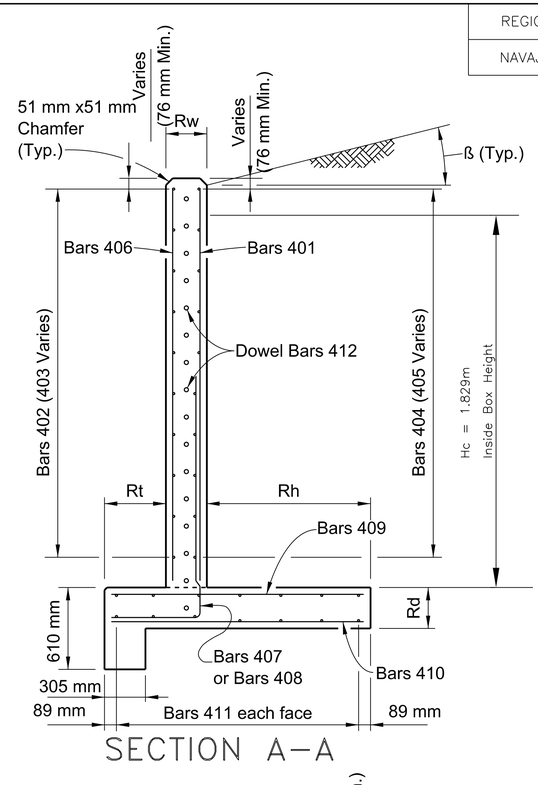
BOX, HEADWALL AND CUTOFF WALL DATA TABLE (mm unless shown otherwise)														
LOCATION:	STRUCTURE / BRIDGE NUMBER	BOX									HEADWALL AND CUTOFF WALL			
		# Cells	S (m)	R (m)	Tt(mm)	Tw(mm)	Tb(mm)	Ti(mm)	Lc (m)	Cover	Blhw(mm)	Hlhw(mm)	Blcw(mm)	Hlcw(mm)
55+809.00		56	2.438	2.438	203	203	203	457	34.138	76mm	305	305	305	610
56+454.50		26	2.438	2.438	203	203	203	457	31.700	76mm	305	305	305	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)
55+809.00	457	203	1092	203	1.00		15.47	457	203	1092	203		2.95	4.2
56+454.50	457	203	1092	203	1.00		5.182	457	203	1092	203		2.95	11.182

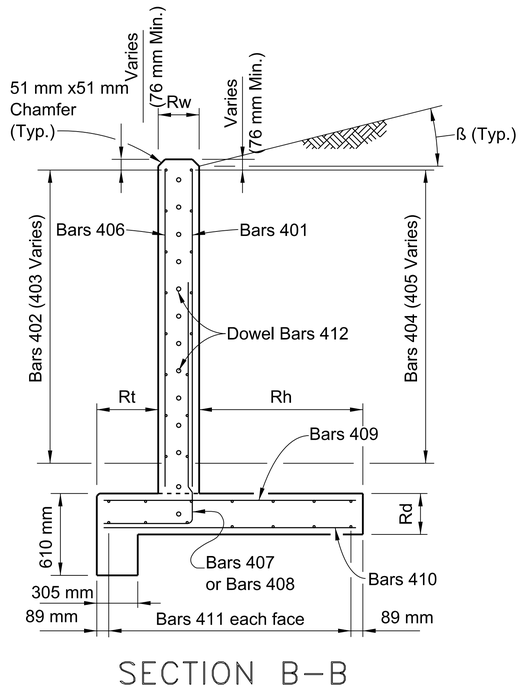
RIGHT SIDE WINGWALLS DATA TABLE (mm unless shown otherwise)														
STRUCTURE / BRIDGE NUMBER	RIGHT END WINGWALL							RIGHT BEGINNING OF WINGWALL @ BOX						
	Rt	Rw	Rh	Rd	He (m)	Hs (m)	Lw (m)	Rt	Rw	Rh	Rd	He (m)	Hs (m)	Lw (m)
55+809.00	457	203	1092	203	1.00		4.2	457	203	1092	203		2.95	15.47
56+454.50	457	203	1092	203	1.00		11.182	457	203	1092	203		2.95	5.182

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

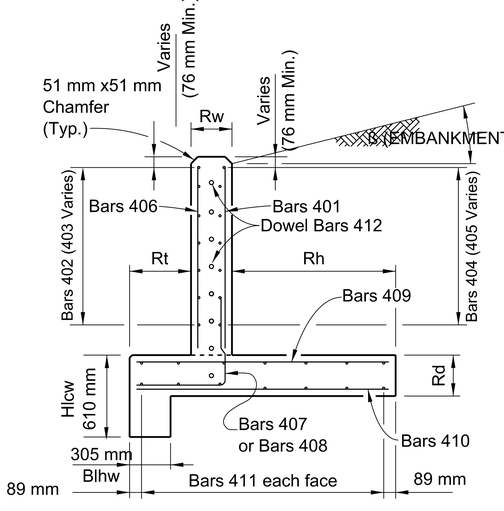
Wingwall Note: Bar designations in "( )" are only required for variable height wingwalls. (T&S)= temperature & Shrinkage steel



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 resonsible for determiming all bar lengths dimensions for the barrel, wingwall and concrete apron reinforcement in accordance with table on drawing, using the bar designations shown and provide shop plans for review.

BAR DESIGNATIONS SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL PROVIDE THEIR OWN DETAIL BAR SCHEDULE AND DRAWINGS USING THEIR OWN BAR DESIGNATIONS.

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CONCRETE BOX CULVERT AND WIND WALL DETAIL

DRAWN BY: NRDOT	DATE: 4/3/2014
DESIGNED BY: NRDOT	DATE: 4/3/2014
REVISED: 8/5/2015	BY: Leroy.Toledo
Sht 67 PC CBC Dtl 5 rev 082317.dgn	

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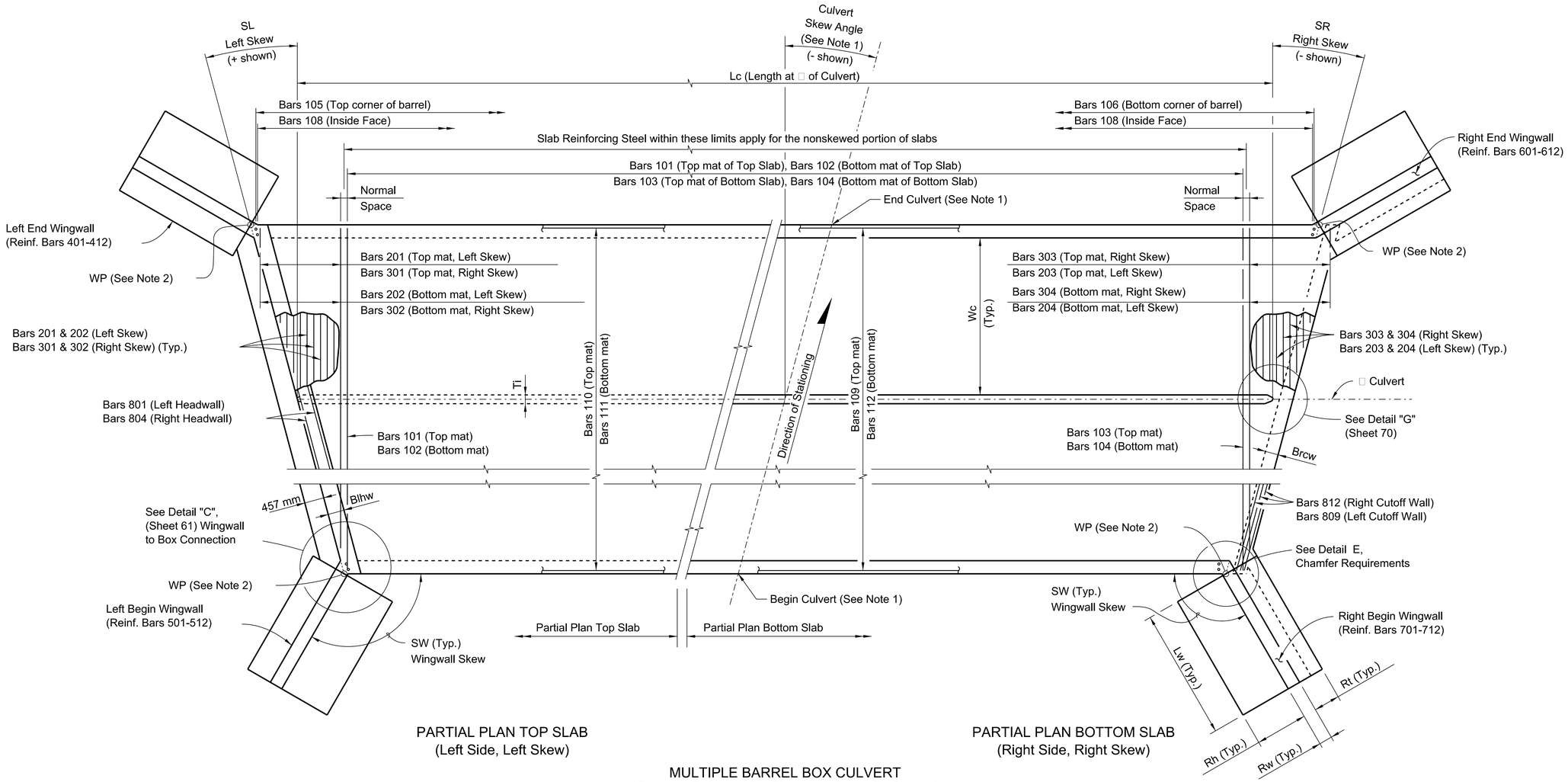
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	68	105



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)

NOTES:
1. See Contract Plans Sht 61 & 62 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 (Sheet 61).

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MULTIPLE BARREL BOX CULVERT DETAIL

DRAWN BY: NRDOT	DATE: 4/3/2014
DESIGNED BY: NRDOT	DATE: 4/3/2014
REVISED: 4/15/2014	BY: Leroy.Toledo
Sht 68 PC CBC Dtl 7 rev 082317.dgn	

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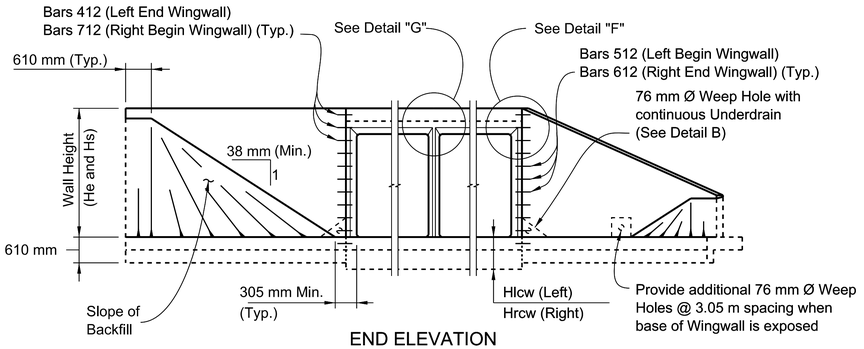
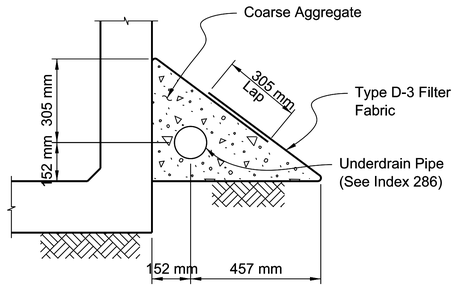
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	69	105

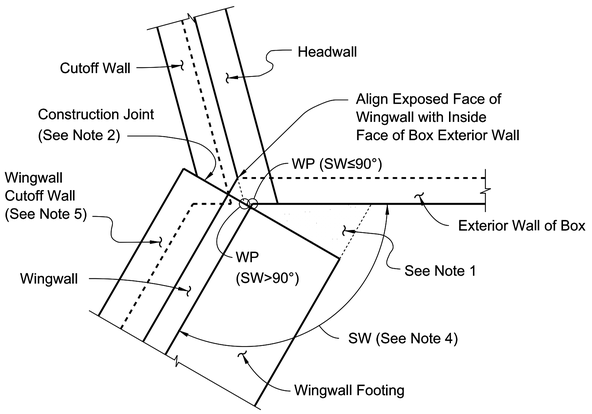


END ELEVATION
(Showing Constant Height And Variable Height Wingwalls)

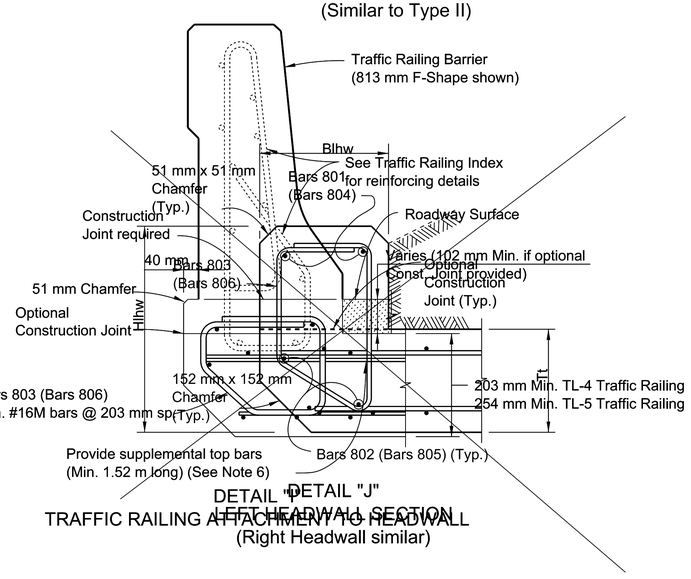


DETAIL "B"
UNDERDRAIN DETAIL
(Similar to Type II)

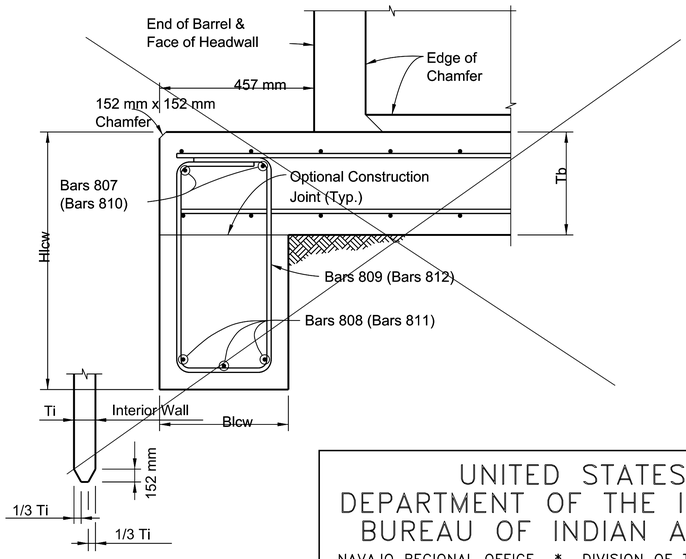
NOTES:
1. For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less then 90 degrees, field bend wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this 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 67 of 105 for referenced dimensions.



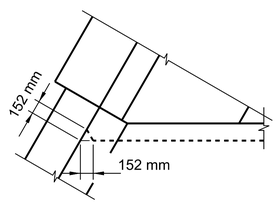
DETAIL "C" - PLAN VIEW
WINGWALL TO BOX CONNECTION
(Left Begin Corner Shown, Other Corners Similar)



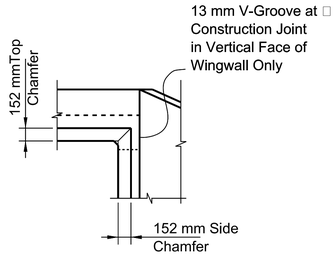
DETAIL "H"
TRAFFIC RAILING ATTACHMENT TO HEADWALL
(Right Headwall similar)



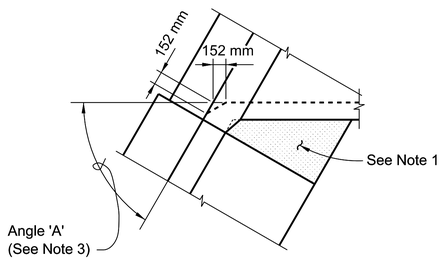
SECTION H-H
Ti = 229 mm



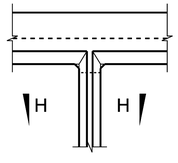
DETAIL "D"



DETAIL "F"



DETAIL "E"



DETAIL "G"

CROSS REFERENCE:
See Sheet 59 for locations of Details "D", "E", "J" & "K".
See Sheet 60 for locations of Detail "C".

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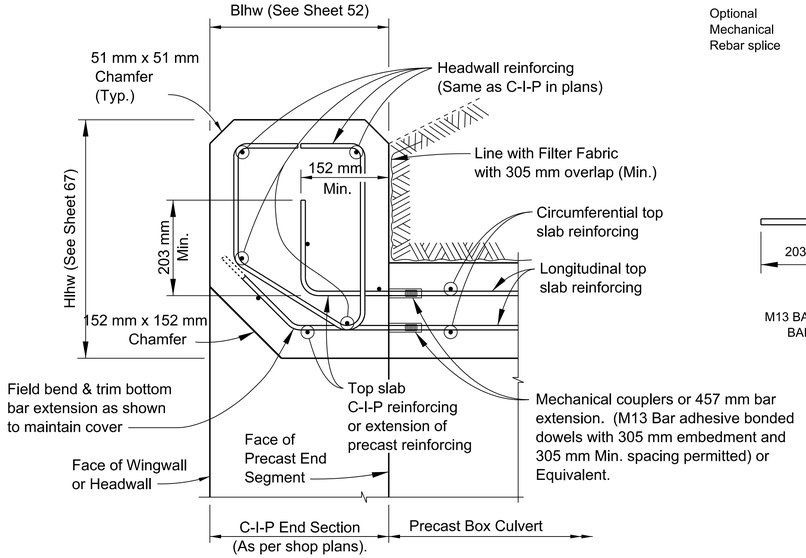
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CUT OFF SECTION
CONCRETE BOX CULVERT DETAIL

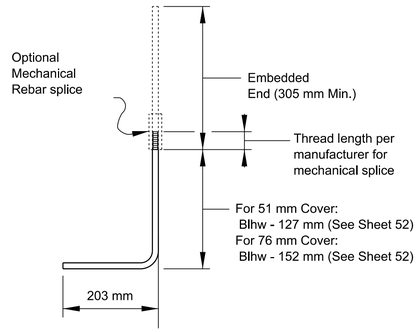
DRAWN BY: NRDOT	DATE: 4/2/2014
DESIGNED BY: NRDOT	DATE: 4/2/2014
REVISED: 4/15/2014	BY: Leroy.Toledo
Sht 69 PC CBC Dtl 8 rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 69 PC CBC Dtl 8 rev 082317.dgn

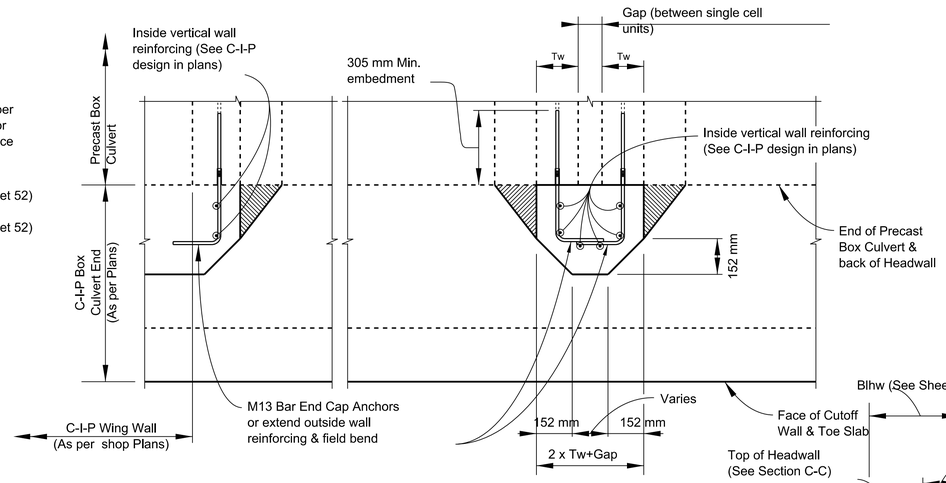
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)	70	105



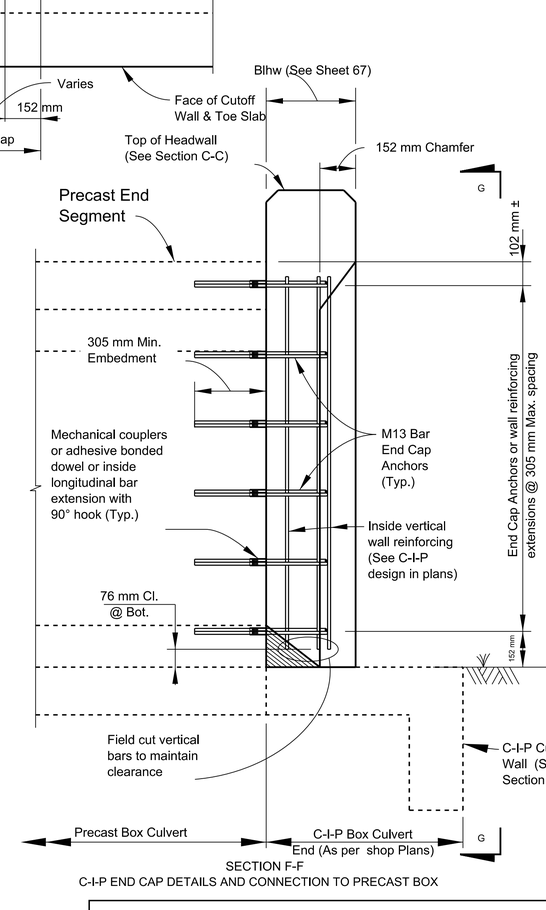
SECTION C-C
C-I-P HEADWALL DETAILS AND CONNECTION TO PRECAST BOX



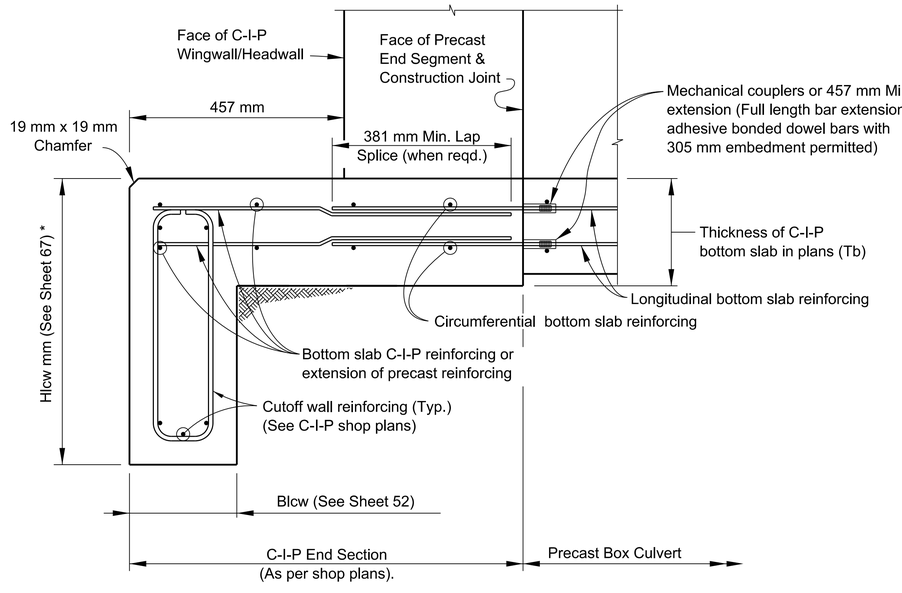
M13 BAR END CAP ANCHOR BAR BEND DIAGRAM



SECTION H-H

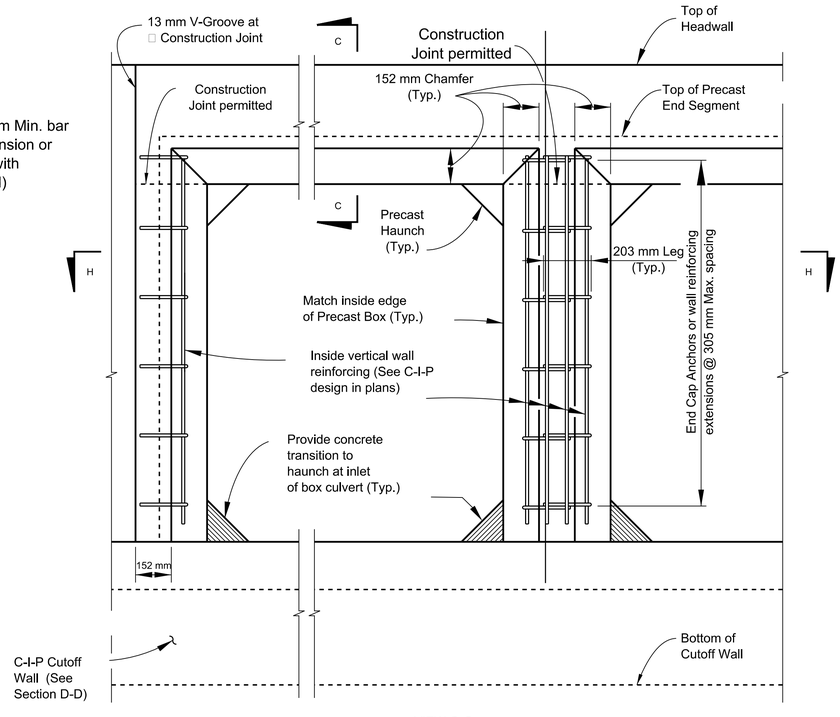


SECTION F-F
C-I-P END CAP DETAILS AND CONNECTION TO PRECAST BOX



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.



VIEW G-G
(Headwall, Toe Slab and Cutoff Wall Reinforcing not shown for clarity)

ELEVATION VIEW

BOX BLOCKOUT DETAILS

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: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 3/14/2014	BY: Leroy.Toledo

Sht 70 Box headwall cutoff wall end cap details 082317.dgn

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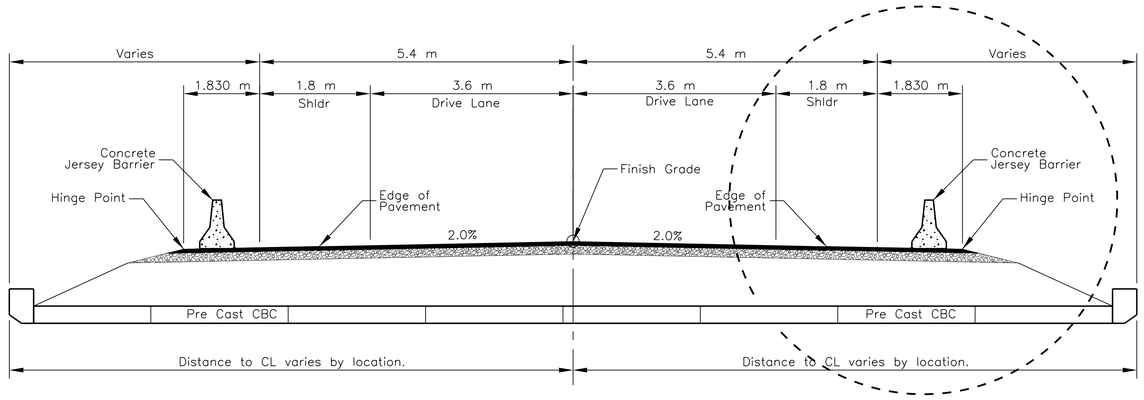
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	71	105



TYPICAL CBC SECTION AT NORMAL
Sta. 55+809.00 (2-Barrel 2.44 x 2.44 m PCCBC)
And Sta. 56+454.50 (4-Barrel 2.44 x 2.44m PCCBC)

SEE DETAIL "A"

SEE SHEET 8 of 105 FOR ESTIMATED QUANTITY TABLE

GENERAL NOTES

1.AT NO TIME DURING THE PLACEMENT OF THE CBC GUARDRAILS SHALL THE ROADWAY EDGE AT ACTIVE TRAFFIC LANES BE LEFT WITHOUT CONTROL BARRIERS OR FLAGMEN.

2.PLACMENT OF PRECAST CONCRETE BARRIER SECTIONS SHALL BE BASED ON THE MIDPOINT OF CBC. MIDPOINT OF CBC SHALL BE DETEMINED IN THE FIELD BY MEASURMENT OF INLET AND OUTLET OF EACH CBC, AND SHALL BE CONCURRED BY THE COR/AOTR.

3.AT THE CONTRACTOR'S OPTION, THE CONCRETE BARRIER MAY BE CAST IN PLACE IN LIEU OF PROVIDING PRECAST SECTIONS.

4.THE EXISTING ASPHALT AT THE NEW W-BEAM GUARDRAIL (INCLUDING THE 6 METER SHOULDER WIDENING TAPER AT GUARDRAIL ENDS) AND CONCRETE BARRIER TRANSITION (NOT THE PRECAST BARRIER SECTIONS) LOCATIONS, SHALL BE FULL DEPTH SAW CUT AT THE SHOULDER LINE AND ALL ASPHALT BEYOND SAW CUT SHALL BE REMOVED. THE EXISTING ASPHALT AT THE PRECAST BARRIER SECTIONS SHALL BE SAW CUT AND REMOVED TO THE LIMITS SHOWN ON THIS SHEET. THE WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 20304-1000, REMOVAL OF STRUCTURES AND OBSTRUCTIONS.

5.THE PRECAST CONCRETE BARRIER SECTIONS AND THE CONCRETE BARRIER TRANSITIONS WITH FOOTING SHALL BE SET AS PER FP-03, SECTION 618 AND AS DETAILED ON SHEETS 70 AND 86 OF 95.

6.GUARDRAIL WIDENING AND THE AREA IN FRONT OF THE TRANSITION FOOTING SHALL BE SURFACED WITH 152 mm OF ABC AND 76 mm OF ASPHALT SURFACING AND SHALL BE PLACED TO THE DIMENSIONS SHOWN ON SHEET 18 OF 95. AGGREGATE BASE COURSE AND HOT ASPHALTIC CONCRETE FOR GUARDRAIL WIDENING SHALL BE PAID UNDER ITEM 30301-2000, UNTREATED AGGREGATE BASE COURSE, GRADING D, AND ITEM 40401-0000, MINOR HOT ASPHALTIC CONCRETE, RESPECTIVELY. THE FINISH ELEVATION OF THE GUARDRAIL WIDENING ASPHALT SHALL MATCH THE FINISHED RECYCLED ASPHALT COURSE ELEVATION.

7.THE NEW GUARDRAIL AND THRIE BEAM TRANSITION STRUCTURES SHALL BE INSTALLED AS PER FP-03, SECTION 617 AND AS DETAILED ON SHEETS 81-86 OF 95.

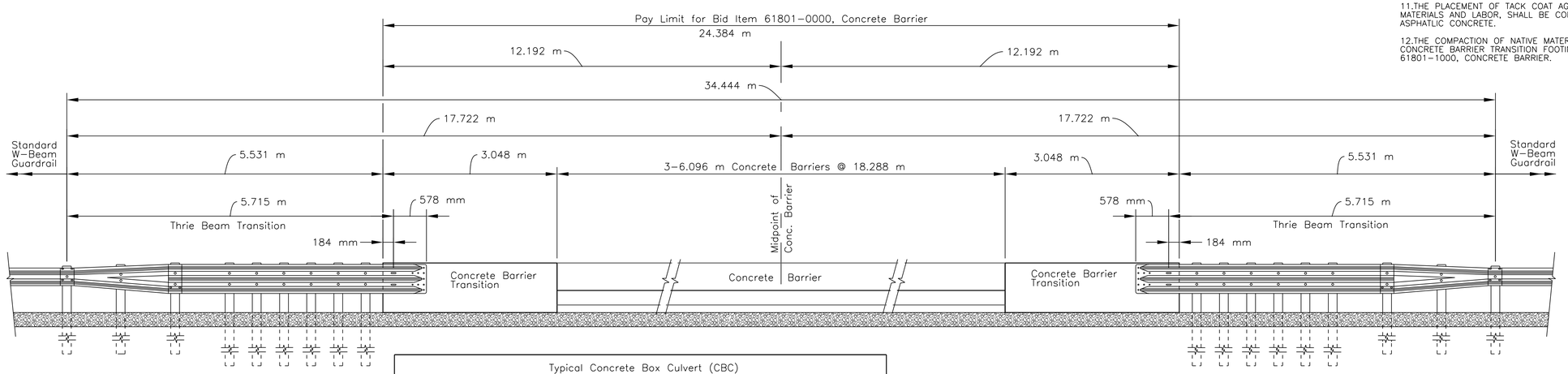
8.THRIE-BEAM TRANSITIONS, INCLUDING ALL HARDWARE FOR CONNECTION TO THE CONCRETE BARRIER TRANSITON, SHALL BE PAID UNDER ITEM 61801-1000 CONCRETE BARRIER.

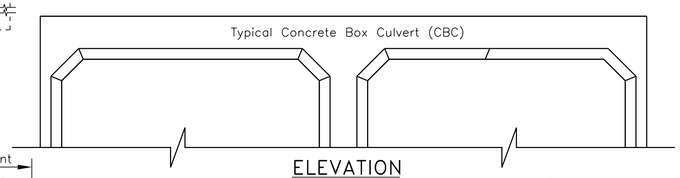
9.ALL WORK, MATERIALS AND LABOR REQUIRED FOR THE EXISTING MATERIAL REMOVAL ABOVE THE EXISTING GUARDRAIL ATTACHMENT BLOCKS, AS SHOWN ON THIS SHEET, SHALL BE CONSIDERED INCIDENTAL ITEM 20304-1000, REMOVAL STRUCTURES AN OBSTRUCTIONS.

10.ALL WORK, MATERIALS AND LABOR REQUIRED FOR THE CONSTRUCTION OF THE HACP BACKFILL BENEATH THE CONCRETE BARRIER, AS SHOWN ON THIS SHEET, SHALL BE PAID UNDER ITEM 40201-0500, MINOR HOT ASPHALTIC CONCRETE.

11.THE PLACEMENT OF TACK COAT AGAINST AND UNDER CONCRETE BARRIER, INCLUDING ALL MATERIALS AND LABOR, SHALL BE CONSIDERED INCIDENTAL TO ITEM 40201-0500, MINOR HOT ASPHATLIC CONCRETE.

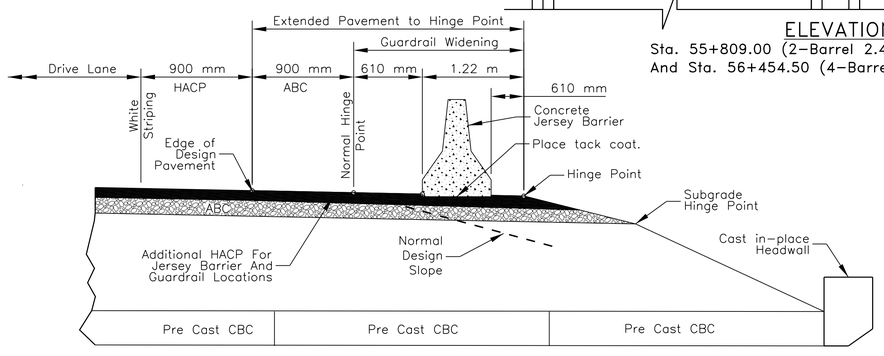
12.THE COMPACTION OF NATIVE MATERIAL BELOW HACP BACKFILL FOR AREAS BETWEEN CBC AND CONCRETE BARRIER TRANSITION FOOTING SHALL BE CONSIDERED INCIDENTAL TO ITEM 61801-1000, CONCRETE BARRIER.





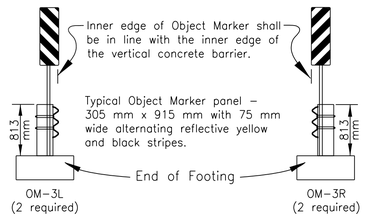
ELEVATION
Sta. 55+809.00 (2-Barrel 2.44 x 2.44 m PCCBC)
And Sta. 56+454.50 (4-Barrel 2.44 x 2.44m PCCBC)

SYSTEM	A	H
SGM10a	60	810



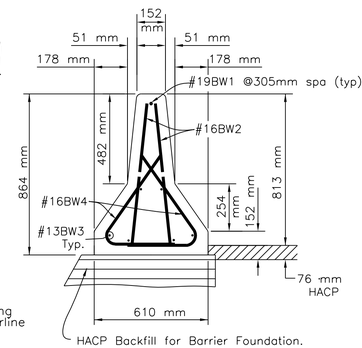
DETAIL "A"
BARRIER PLACEMENT

NOTE: Place Type 3 Object Markers between Concrete Barrier Transition and first Thrie-beam Transition post. If this is not possible, place between first and second post.



TYPE 3 OBJECT
MARKER INSTALLATION

NOTE:
1. Concrete Barrier Transition sections shall be cast in place.
2. At Skewed Box Locations, guardrailing are off center relative to the Centerline



HACP Backfill for Barrier Foundation. (See Sheet 72 of 105 for additional details and notes.)

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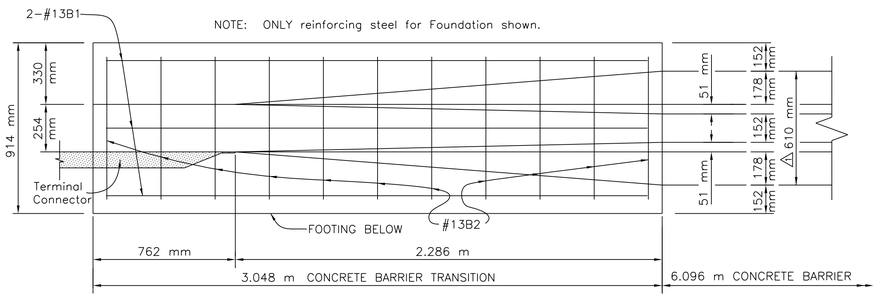
CONCRETE BARRIER DETAILS AT CBC LOCATIONS

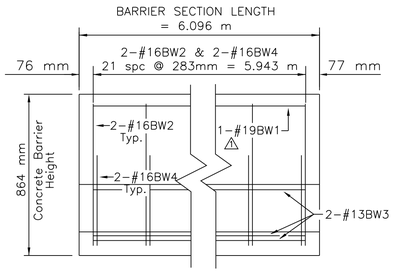
DRAWN BY: NRDOT	DATE: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 71 N27 Conc Barrier 1 rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 71 N27 Conc Barrier 1 rev 082317.dgn

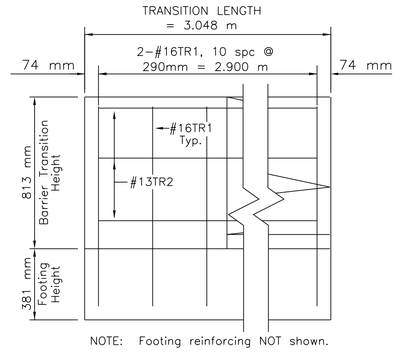
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	72	105



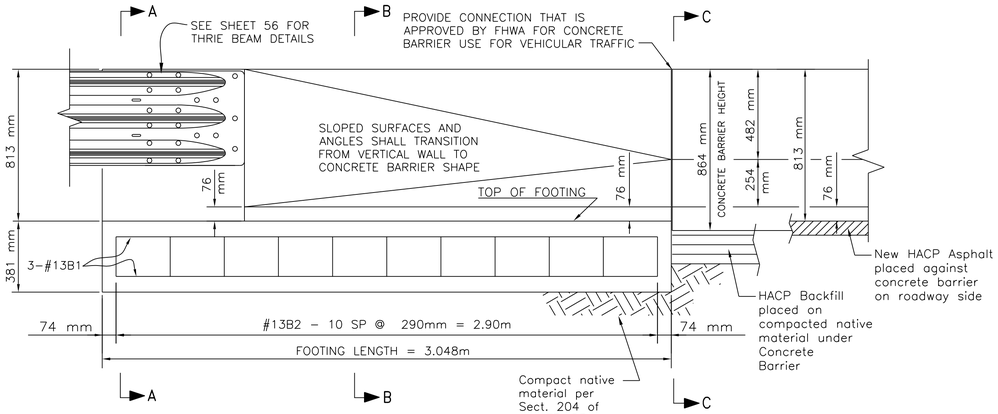
PLAN



CONCRETE BARRIER
REINFORCING DETAILS – ELEVATION



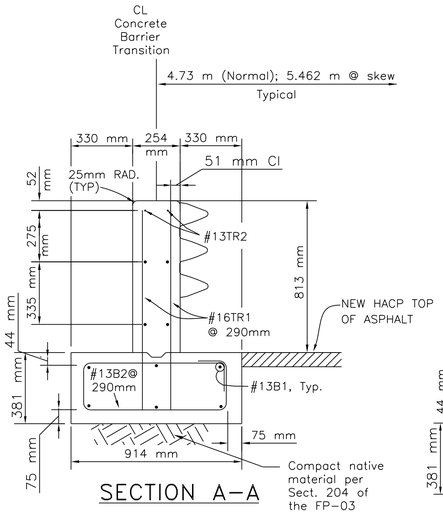
CONCRETE BARRIER TRANSTION
REINFORCING DETAILS – ELEVATION



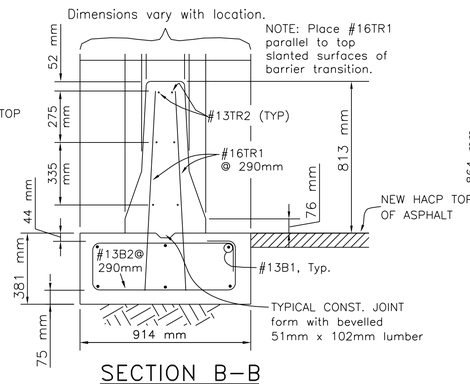
ELEVATION

CONCRETE BARRIER NOTES:

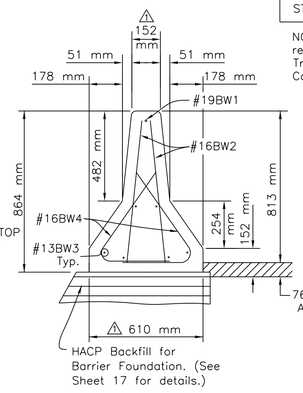
1. SPECIFICATIONS: DESIGN: AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES, SEVENTEENTH EDITION, 2002 AND SUBSEQUENT INTERIM SPECS. CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-03, AND ALL SUBSEQUENT REVISIONS.
2. UNITS: ALL DIMENSIONS ARE IN SI (METRIC) UNITS.
3. CONCRETE: 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



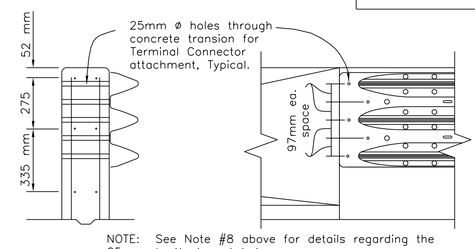
SECTION B–B



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.

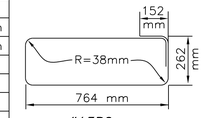
TERMINAL CONNECTOR
ATTACHMENT DETAIL

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



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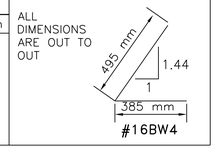

#16BW4

UNITED STATES
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CONCRETE BARRIER TRANSITION TO THRIE BEAM DETAILS

DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/19/2017	BY: Leroy.Toledo
Sht 72 N27 Conc Barrier 2 rev 082317.dgn	

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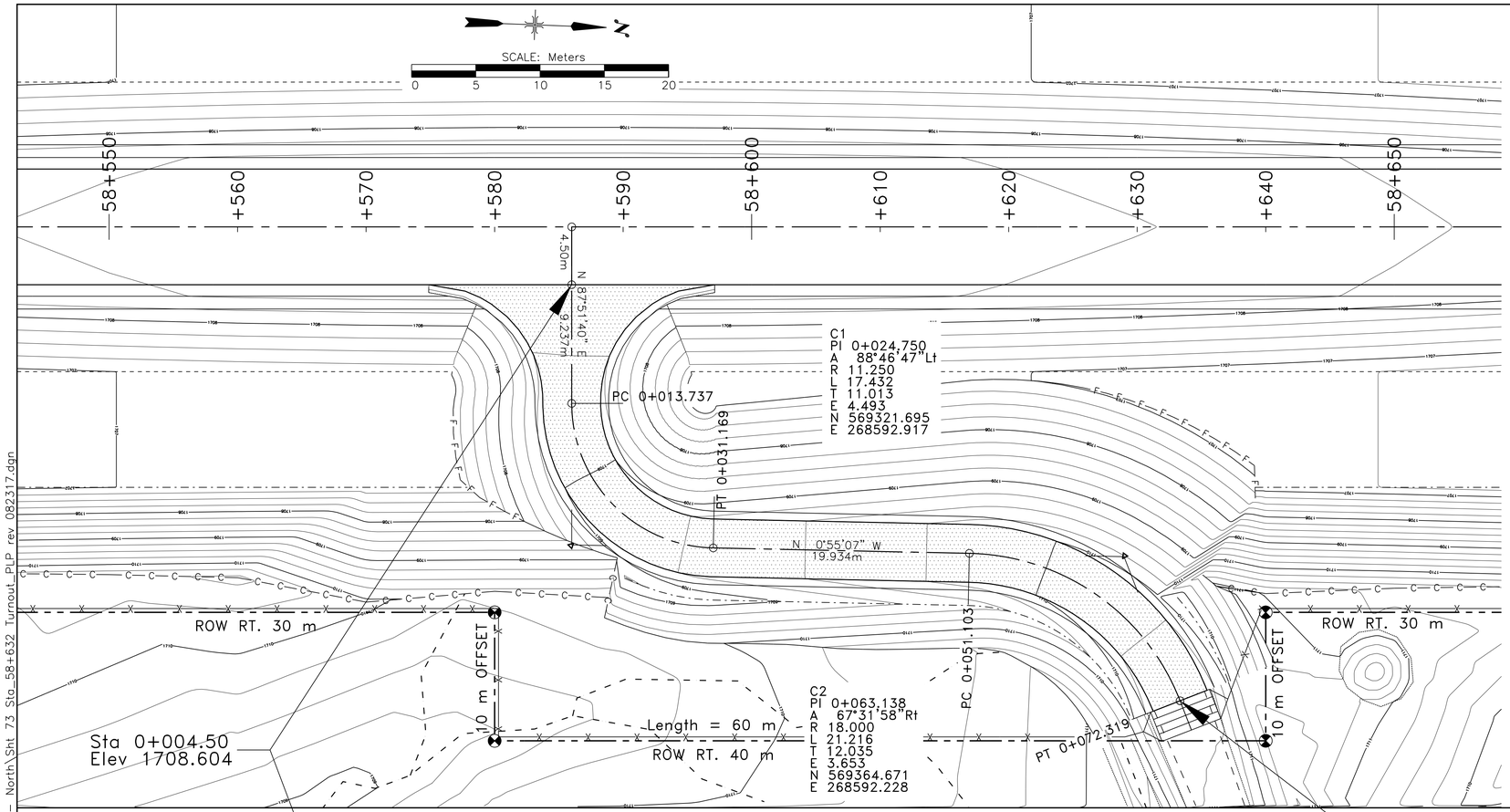
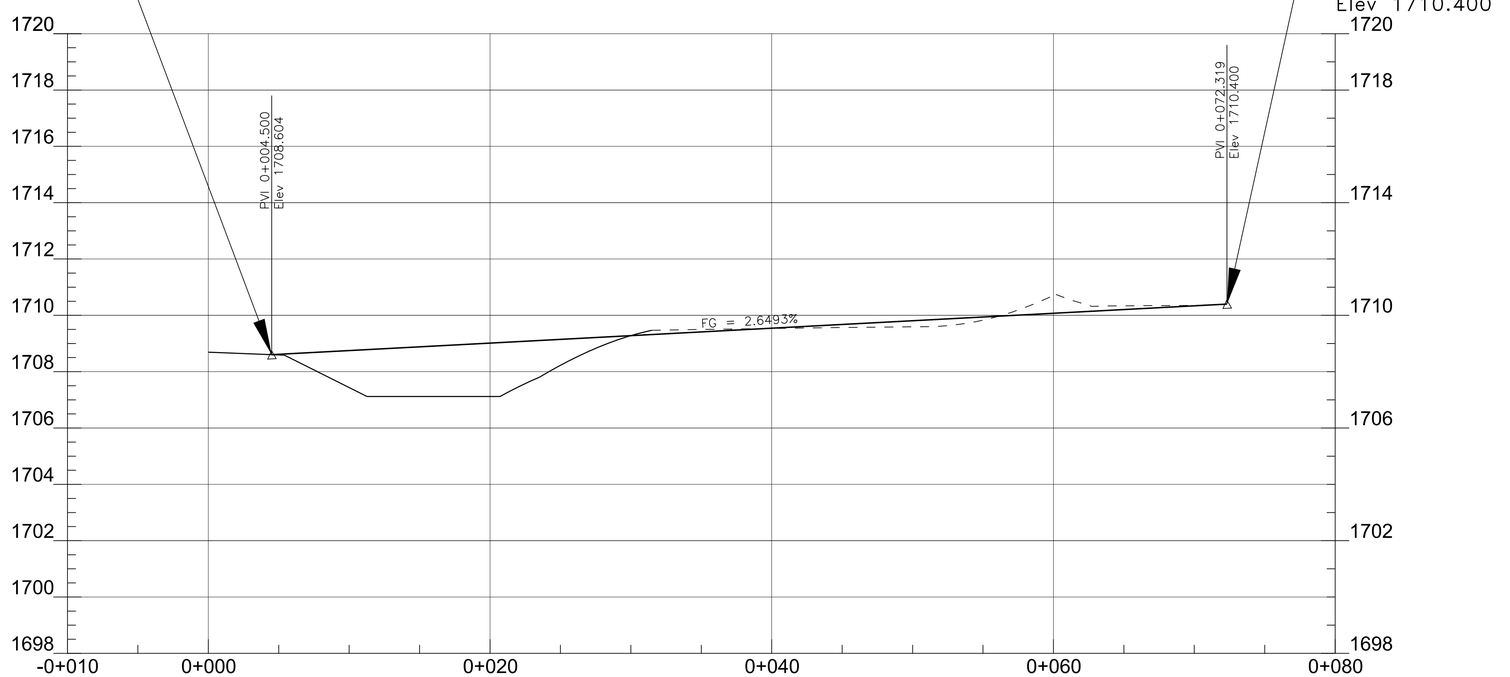
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	73	105





SEE SHEET 22 of 105 FOR ADDITIONAL PLAN VIEW.

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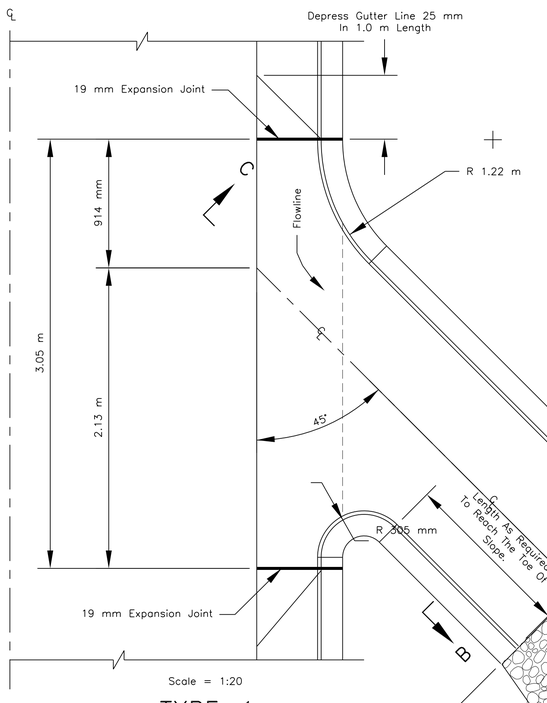
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

Sta. 58+586.00 Rt TURNOUT PLAN & PROFILE DETAIL

DRAWN BY: NRDOT	DATE: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 73 Sta_58+632 Turnout_PLP rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 73 Sta_58+632 Turnout_PLP rev 082317.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	74	105



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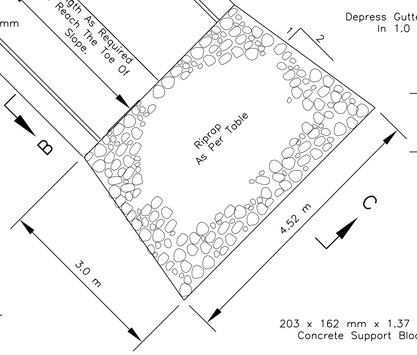
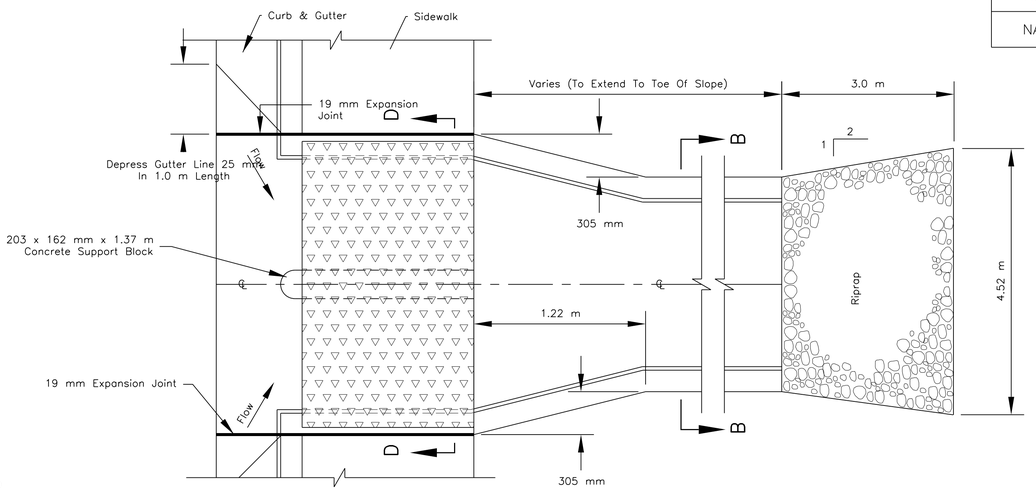
TYPE-1

SECTION B-B

NTS





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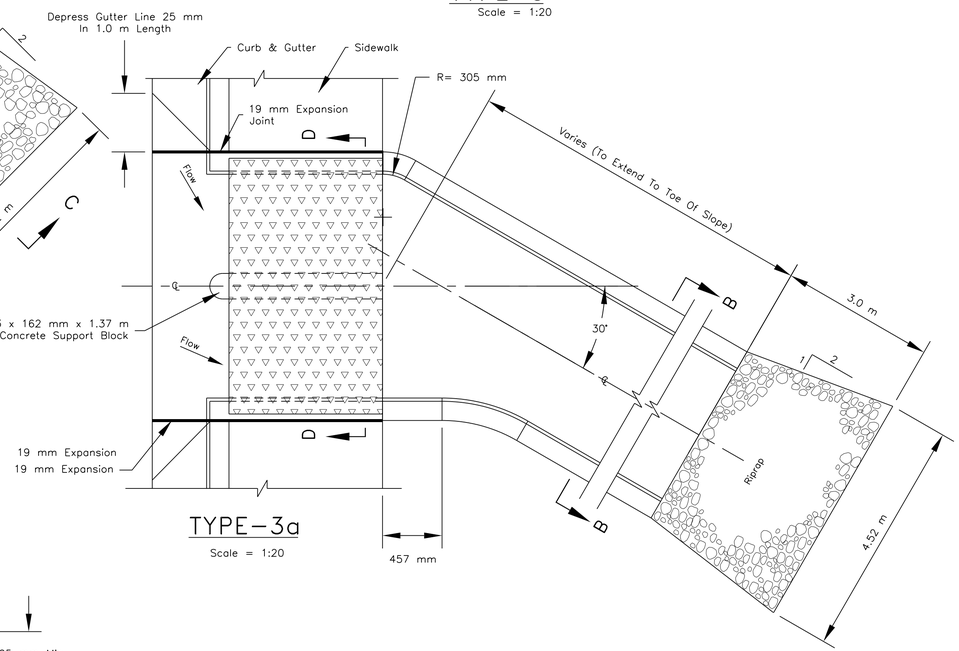

TYPE-3a

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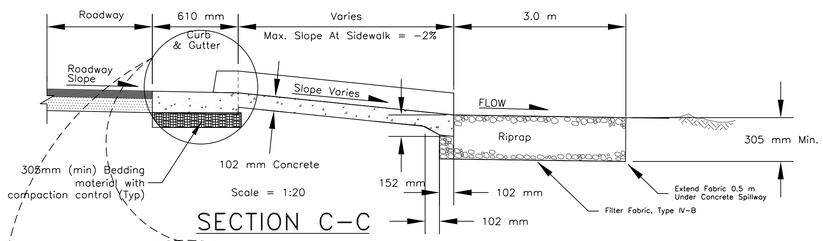

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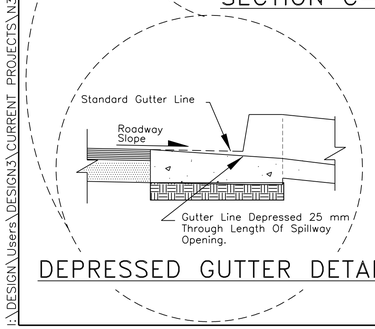
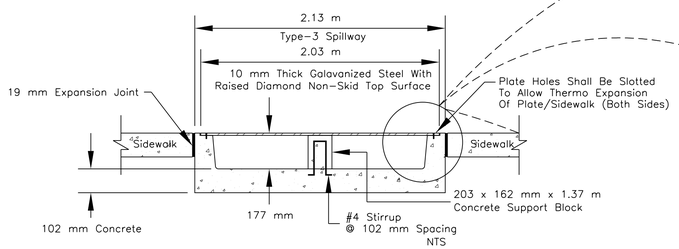
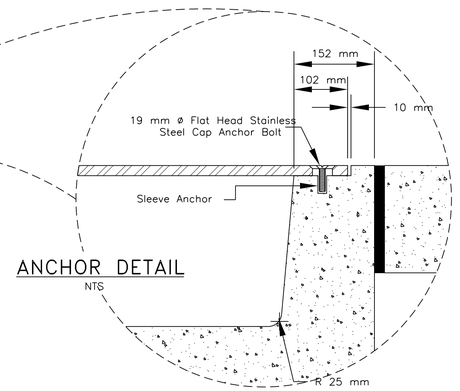
SECTION C-C



DEPRESSED GUTTER DETAIL



SECTION D-D



ANCHOR DETAIL

NTS

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 RIPRAP TO BE CLASS (II) MEETING THE GRADING REQUIREMENTS OF TABLE 705-1; SECTION 251- "RIPRAP" OF THE FP-03. SHAPE AND LAYOUT OF RIPRAP MAYBE ADJUSTED BY THE COR/COTR TO FIT FIELD CONDITIONS. SHAPE AND LAYOUT ADJUSTMENTS ARE TO BE INCIDENTAL TO THE RIPRAP ITEM.
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 RIPRAP AND SPILLWAYS.
7. 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.
8. THE 10mm THICK, GALVANIZED STEEL PLATE SHALL BE A-36 STEEL. SUPPLYING OF PLATE, HARDWARE & #4 STIRRUPS, INSTALLATION SHALL BE INCIDENTAL TO THE UNIT PRICE BID FOR ITEM 60910.

60812-0300: CONCRETE SPILLWAY, TYPE 3
25101-2000: PLACED RIPRAP, CLASS 2

STATION	LOCATION	TYPE	SPILLWAY (Each)	RIPRAP VOLUME: (m^3)
N27(4-2)-Street				
60+190.00	Lt. & Rt.	3	2	5.53
60+295.00	Lt. & Rt.	3	2	5.53
60+400.00	Lt. & Rt.	3	2	5.53
60+505.00	Lt. & Rt.	3	2	5.53
60+610.00	Lt. & Rt.	3	2	5.53
60+720.00	Lt.	3	1	2.76
60+730.00	Rt.	3	1	2.76
60+820.00	Lt. & Rt.	3	2	5.53
		Sub-Total:	14	38.70
N7(2-3)-Roundabout				
2+761.07	Lt. & Rt.	3	2	5.53
2+863.76	Lt. & Rt.	3	2	5.53
2+910.15	Lt. & Rt.	3	2	5.53
2+930.96	Rt.	3	1	2.76
2+982.80	Lt. & Rt.	3	2	5.53
		Sub-Total:	9	24.88
N105(1)-NHA Access				
0+100.00	Lt. & Rt.	3	2	5.53
0+200.00	Lt. & Rt.	3	2	5.53
0+330.00	Lt. & Rt.	3	2	5.53
		Sub-Total:	6	16.59
		Grand-Total:	29	80.17

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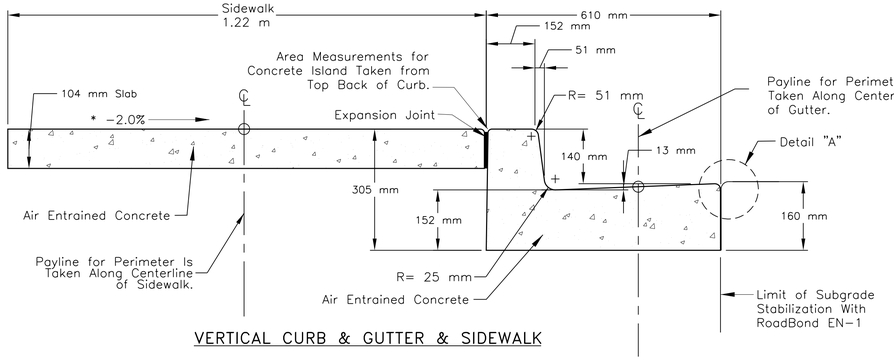
CONCRETE SPILLWAY DETAILS

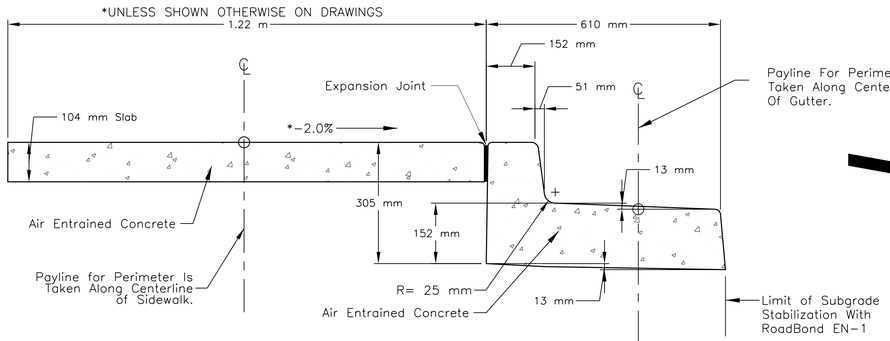
DRAWN BY: NRDOT	DATE: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 74 Conc Spillway Details rev 082318.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 74 Conc Spillway Details rev 082318.dgn

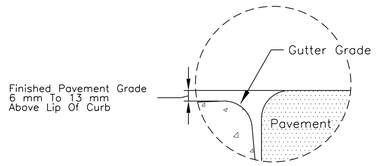
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	75	105



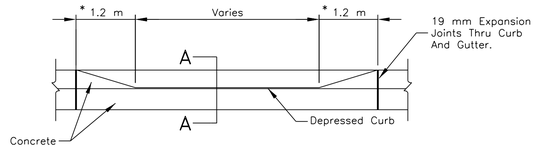
VERTICAL CURB & GUTTER & SIDEWALK



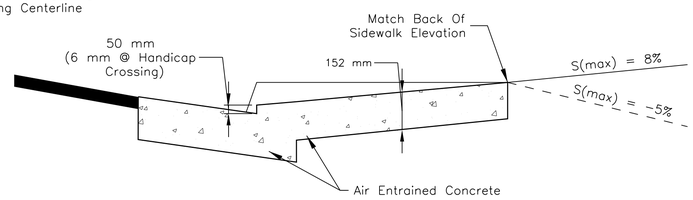
OUT SLOPE GUTTER



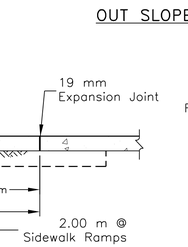
DETAIL "A"



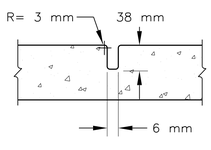
WING-TYPE DRIVEWAY
*2.0 METER @ HANDICAP ACCESS AREAS



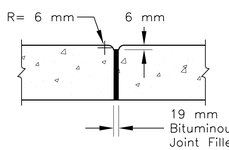
SECTION A-A



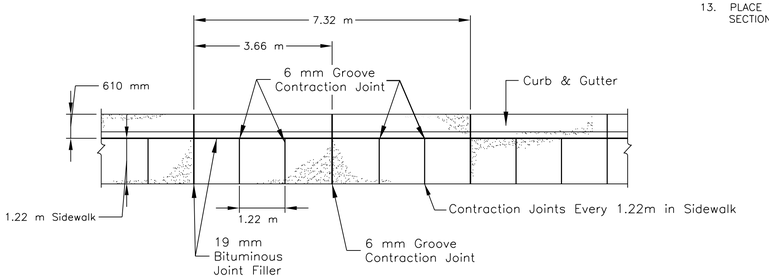
CURB TERMINAL SECTION
(Unless Noted Otherwise On Plans)



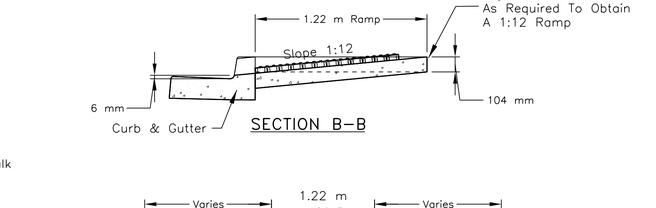
CONTRACTION JOINT



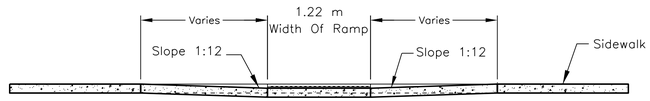
EXPANSION JOINT



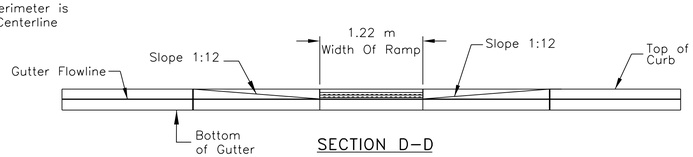
CURB GUTTER & SIDEWALK JOINT DETAIL



SECTION B-B

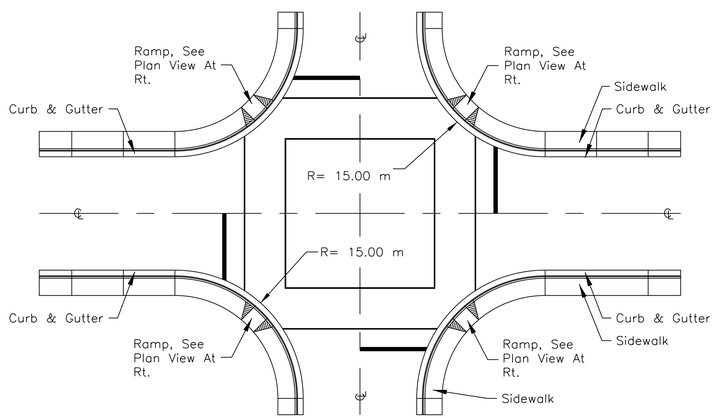


SECTION C-C

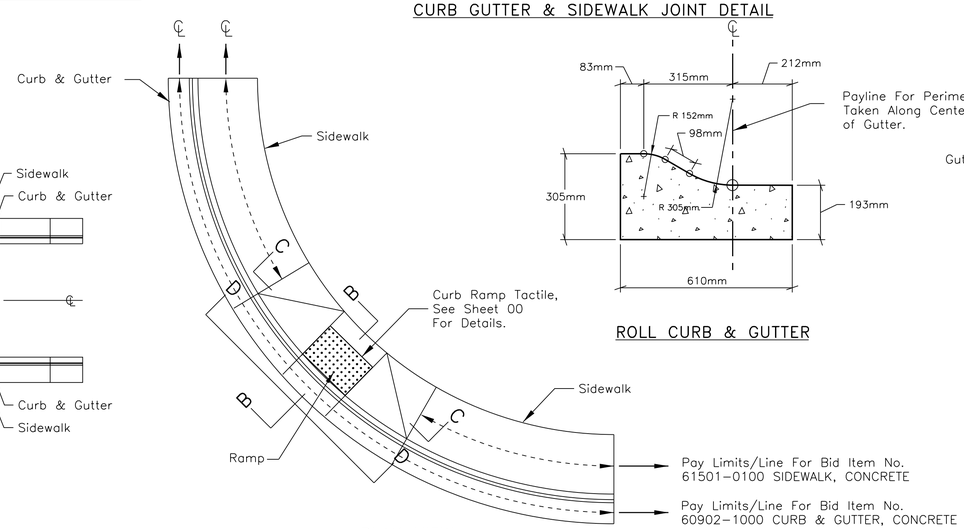


SECTION D-D

* WHERE CURB TAPERS ARE NEEDED (AS PER COTR) 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.



TYPICAL HANDICAP RAMP - TYPE I
(@ Street Intersection)



PLAN VIEW

ROLL CURB & GUTTER

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 COTR IN ACCORDANCE WITH SECTION 109.02(m).
5. ALL PCC CONCRETE, DEPRESSED CURBS, WHEELCHAIR RAMPS, GUTTER FILLET AREAS, AND WING TYPE DRIVEWAYS SHALL BE CONSIDERED INCIDENTAL TO INSTALLATION OF THE SIDEWALK AND CURBING.
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 COTR PRIOR TO INSTALLATION. THIS MATERIAL AND THE INSTALLATION THEREFORE SHALL BE CONSIDERED INCIDENTAL TO ITEMS 61501-0100.
7. THE CONTRACTOR WILL BE REQUIRED TO MAKE ANY AND ALL NECESSARY FIELD ADJUSTMENTS 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 61501-0100.
9. THE CONTRACTOR WILL BE REQUIRED TO MAKE ANY AND ALL NECESSARY FIELD ADJUSTMENTS TO MATCH FIELD CONDITIONS AS DIRECTED BY THE COTR AFTER THE DRIVEWAYS, CURB AND VALLEY GUTTERS ARE FORMED AND PRIOR TO PLACING, THE CONTRACTOR SHALL NOTIFY THE COTR AND ALLOW TIME FOR THE COTR TO CHECK DRAINAGE. IF POSITIVE DRAINAGE IS NOT FOUND, ELEVATIONS SHALL BE ADJUSTED TO ENSURE DRAINAGE AROUND CURB RETURNS AND DRIVEWAYS 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. TACK COAT MATERIAL SHALL MEET FP-03 SECTION 412, SHALL BE APPLIED TO ALL VERTICAL PCC EDGES (CURB & GUTTER, VALLEY GUTTER, SLABS, ETC.) ABUTTED BY NEW ASPHALT SURFACING. TACK COAT SHALL BE APPLIED USING BRUSHES OR SPRAY EQUIPMENT TO THE SATISFACTION OF THE COR/COTR TACK COAT SHALL NOT BE "DRIBBLED" OR "POURED" ON USING SHOVELS, BUCKETS OR SIMILAR EQUIPMENT. PCC EDGES SHALL BE CLEAN AND DRY AS APPROVED BY THE COTR. TACK COAT WILL BE INCLUDED IN BID ITEM 41201-1000.
12. 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 61501-0100 SEE THIS SHEET FOR DETAILS.
13. PLACE 305mm OF BEDDING MATERIAL WITH COMPACTION CONTRIL UNDERNEATH THE CURB GUTTERS, AND SIDEWALK PER SECTION 704.02.

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DEPARTMENT OF THE INTERIOR
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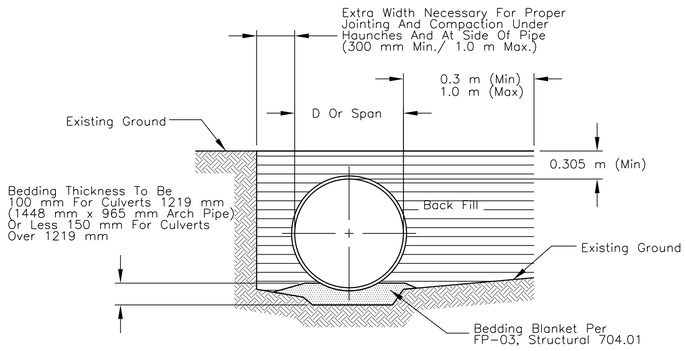
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

CONCRETE CURB, GUTTER AND SIDEWALK DETAILS

DRAWN BY: NRDOT	DATE: 6/25/2014
DESIGNED BY: NRDOT	DATE: 6/25/2014
REVISED: 10/27/2014	BY: Leroy.Toledo
Sht 75 Curb Gutter Sidewalk Detail rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 75 Curb Gutter Sidewalk Detail rev 082317.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	76	105



NEGATIVE PROJECTING POSITIVE PROJECTING

FIGURE A: BEDDING

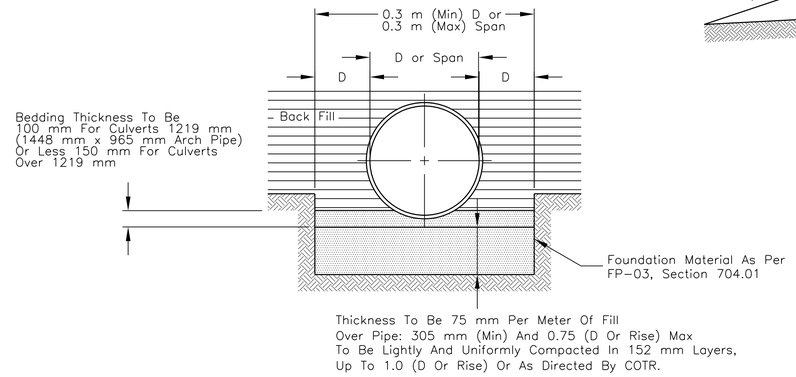


FIGURE B: ROCK BEDDING

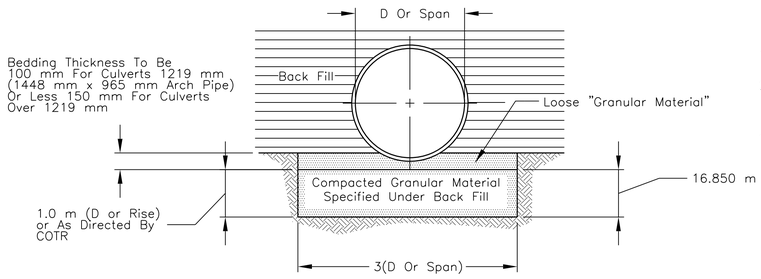
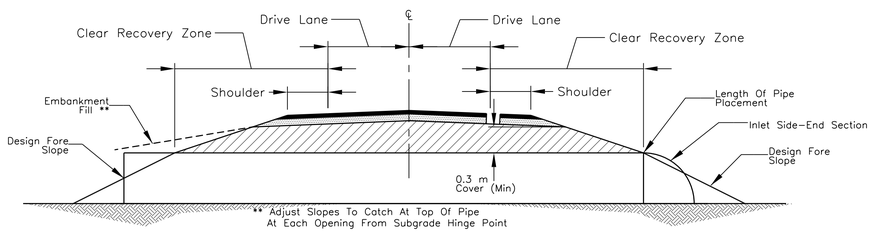
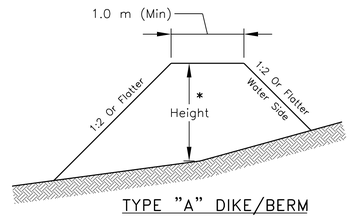


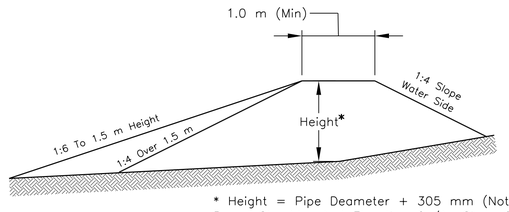
FIGURE C: FOUNDATION STABILIZATION BEDDING



TYPICAL PIPE INSTALLATION FOR TURNOUT/DRIVEWAY (1-END SECTION)

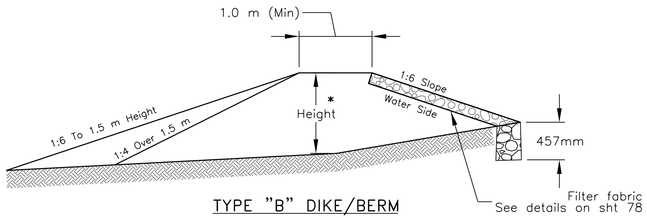


TYPE "A" DIKE/BERM



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

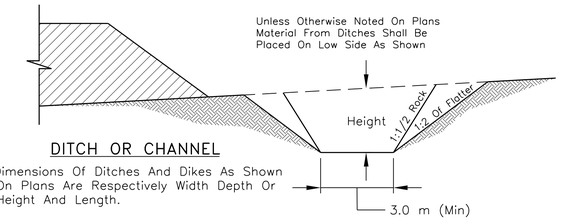
TYPE "B" DIKE/BERM



TYPE "B" DIKE/BERM

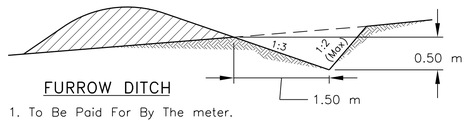
NOTE: When Necessary The Slope May Be Flattened To 1:6 With 457 mm Thick Riprap Protection As Called For On Plans.

EARTHEN DIKE/BERM DETAILS



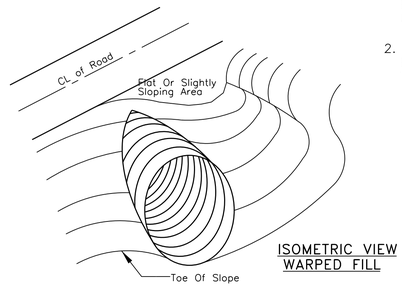
DITCH OR CHANNEL

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



FURROW DITCH

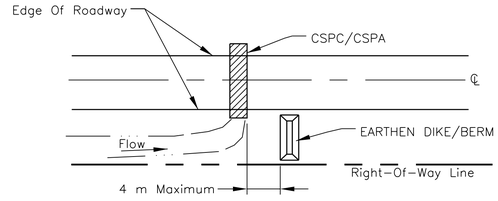
1. To Be Paid For By The meter.
2. Furrow Ditch Sections As Shown Above And/Or Approved Equivalent Shall Be Built As Directed By The COTR.
3. See Sheet __ For Riprap Lined Furrow Ditch Dimensions.



ISOMETRIC VIEW WARPED FILL

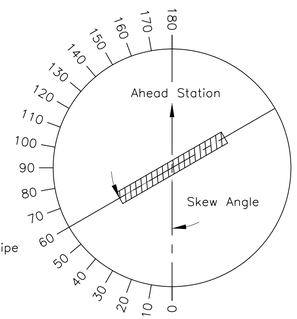
PIPE SKEWS TO THE EMBANKMENT (TYP.)

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



EARTHEN DIKE/BERM INSTALLATION AT STRUCTURE

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



STRUCTURE SKEW DIAGRAM

GENERAL NOTES

1. PLACE LOOSE BEDDING ROUGHLY SHAPED TO BOTTOM OF PIPE, THEN COMPACT UNDER HAUNCHES AFTER PIPE PLACEMENT.
2. SEE SECTION 204, 209, 602, AND 704 OF FP-03, INCLUDING THE SUPPLEMENTAL SPECIFICATION FOR ADDITIONAL NOTES.
3. ALL DRAINAGE STRUCTURE MATERIAL SHALL BE UNLOADED AND HANDLED WITH REASONABLE CARE. NO STRUCTURE SHALL BE DRAGGED OR ALLOWED TO STRIKE ANY HARD SURFACE DURING PLACEMENT. ANY DAMAGED STRUCTURE SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE GOVERNMENT.
4. ALL STRUCTURAL PLATE PIPE AND PRECAST BOX STRUCTURES SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE FABRICATORS RECOMMENDATIONS.
5. BACKFILL MATERIAL SHALL BE PLACED AT PIPE DIAMETER WIDE ON THE SIDES AND 300 mm(MIN)/ 1.0 m(MAX) OVER THE PIPE. BACKFILL MATERIAL BEYOND THE LIMITS SHALL BE REGULAR EARTHWORK EMBANKMENT MATERIAL. THE BACKFILL MATERIAL SHALL BE APPROVED BY THE 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 610 mm BETWEEN END SECTIONS UNLESS OTHERWISE DIRECTED BY THE COTR OR AS SHOWN ON THE PLANS.
9. ALL PIPE SHALL BE PROTECTED BY A COVER OR NOT LESS THAN 0.914 m OF EMBANKMENT ABOVE PIPE BEFORE ANY HEAVY EQUIPMENT IS ALLOWED TO PASS OVER THE STRUCTURE(S) DURING CONSTRUCTION.
10. ALL CULVERTS SHALL BE INSTALLED AT THE ORIGINAL GROUND LINE AND SLOPED TO ASSURE POSITIVE DRAINAGE UP TO THE R.O.W. LIMITS. IN NO CASE SHALL THE PIPE BE PLACED BELOW THE ORIGINAL GROUND ELEVATIONS, UNLESS OTHERWISE DIRECTED BY THE COTR. THIS SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE PROJECT AND NO ADDITIONAL PAYMENT SHALL BE MADE.
11. AT DRAINAGE PIPE REPLACEMENTS, INSTALLATIONS, EXTENSIONS AND IN-PLACE PIPE CLEANING LOCATIONS, THE CONTRACTOR SHALL RESHAPE, REGRACE 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 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 THE PIPE AS DIRECTED BY COTR TO PROVIDE FOR MINIMUN COVER.
13. TYPE "A" DIKE /BERM SHALL BE USED ON THE PROJECT UNLESS OTHERWISE NOTED ON THE PLANS. EMBANKMENT MATERIAL NEEDED TO BUILD EARTHEN DIKE/DERM SHALL BE CONSIDERED INCIDENTAL TO ITEM 20443-1000.
14. ADJUST DIKE AS DIRECTED BY THE COTR TO BETTER FIT DRAINAGE FIELD CONDITIONS AND TO MORE SMOOTHLY DIRECT FLOW INTO THE PIPE AND/OR TO LESSEN THE WATERS IMPACT ON THE FACE OF THE EARTHEN DIKE/BERM. THIS WORK TO BE INCIDENTAL TO BID ITEM 20443-1000.

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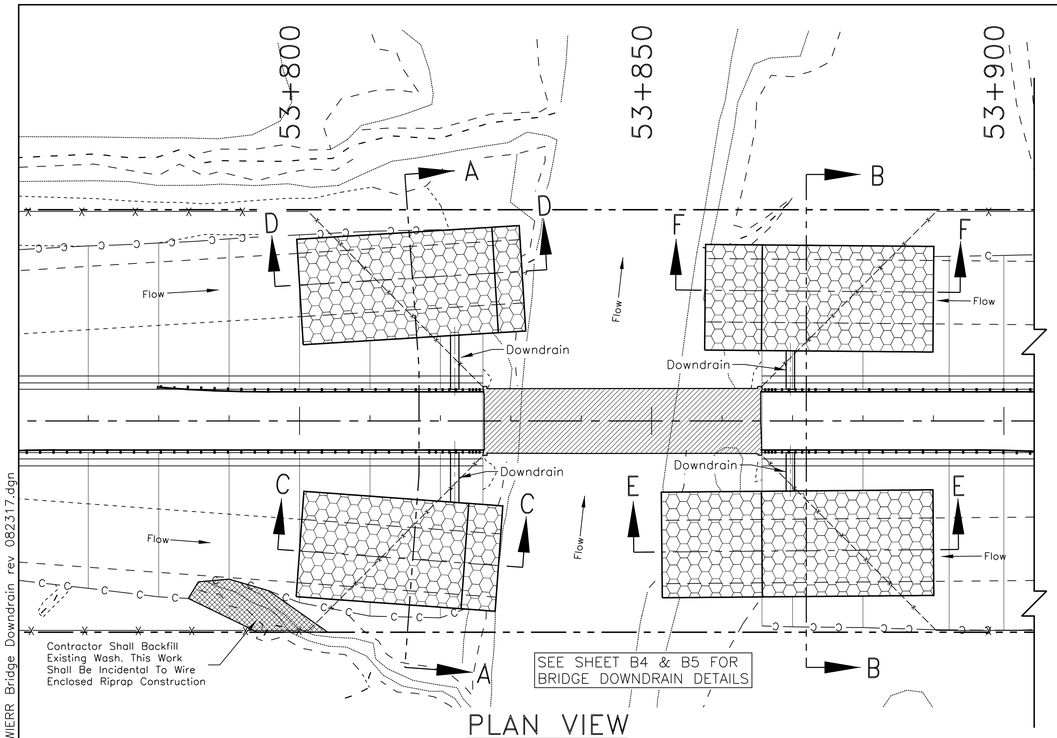
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD PIPE INSTALLATION AND DITCH DETAILS

DRAWN BY: NRDOT	DATE: 8/26/2015
DESIGNED BY: NRDOT	DATE: 8/26/2015
REVISED: 8/26/2015	BY: Leroy.Toledo
Sht 76 N27 pipe install ditch details rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Ghirle\N27(2-3)\DESIGN DATA_072413\CADD Drawings = North\Sht 76 N27 pipe install ditch details rev 082317.dgn

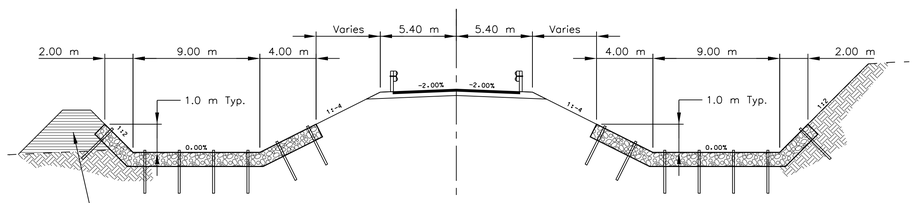
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	77	105



PLAN VIEW

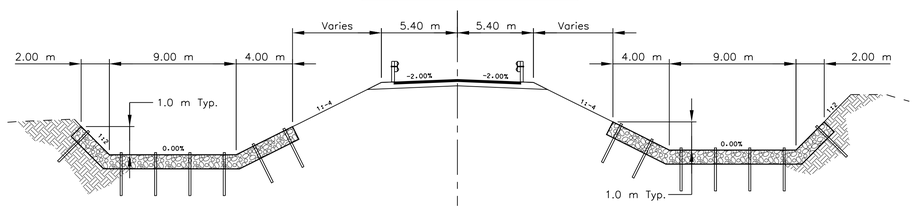
Project N27(2-3)1,2&4
ITEM No. 25112-2000 WIRE ENCLOSED RIPRAP, Class 2

STA. TO STA.	LOCATION	QUANTITY (m^3)	REMARKS
53+800.00 TO 53+828.24	Rt.	220.00	Wire Enclosed Riprap Downdrain
53+800.00 TO 53+831.59	Lt.	246.00	Wire Enclosed Riprap Downdrain
53+851.44 to 53+890.00	Rt.	300.00	Wire Enclosed Riprap Downdrain
53+857.59 to 53+890.00	Lt.	252.00	Wire Enclosed Riprap Downdrain
	TOTAL	1018.00	

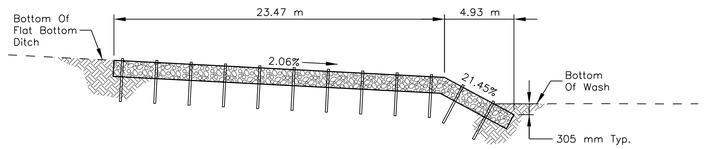


SECTION B-B
(NTS)

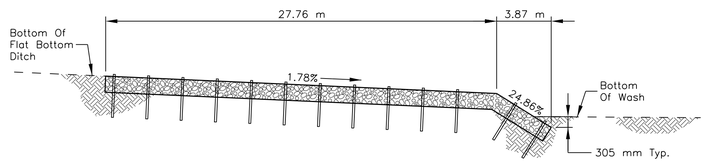
SEE SHEET B4 & B5 FOR BRIDGE DOWNDRAIN DETAILS



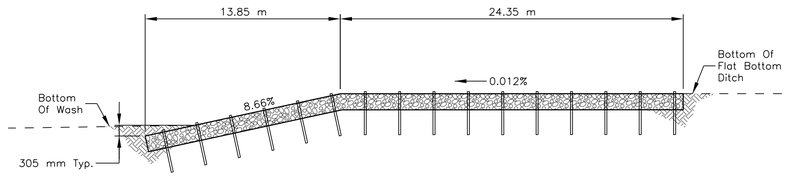
SECTION A-A
(NTS)



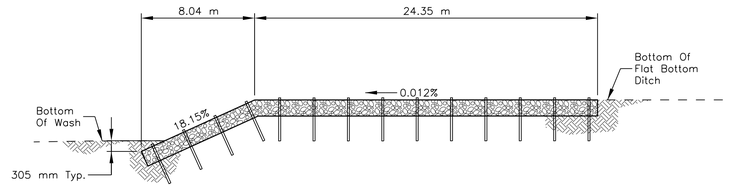
SECTION C-C
(NTS)



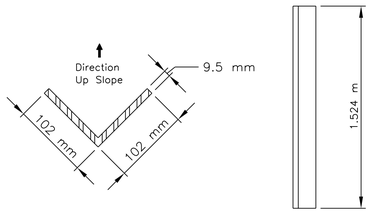
SECTION D-D
(NTS)



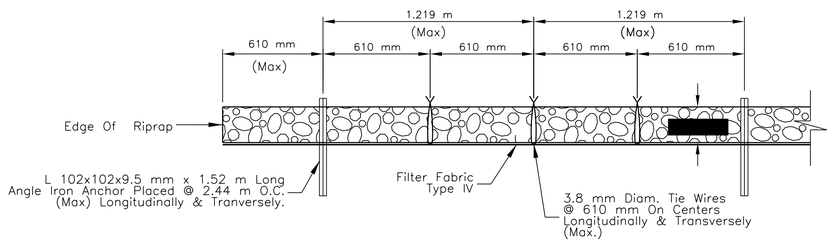
SECTION E-E
(NTS)



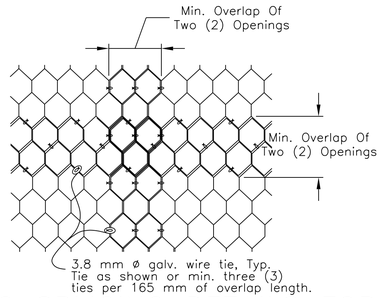
SECTION F-F
(NTS)



ANGLE IRON ANCHOR DETAIL



ANCHORING DETAILS FOR
WIRE ENCLOSED RIPRAP APRON



FABRIC SPLICING DETAILS FOR
WIRE ENCLOSED RIPRAP APRON

GENERAL NOTES

1. SEE BRIDGE PLANS (SHTS. B1-B5) FOR ADDITIONAL DETAILS AND NOTES.

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

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

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

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

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

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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

WIRE ENCLOSED RIPRAP
DOWNDRAIN AT BRIDGE LOCATION

DRAWN BY: NRDOT	DATE: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 77 N27 WIERR Bridge Downdrain rev 082317.dgn	

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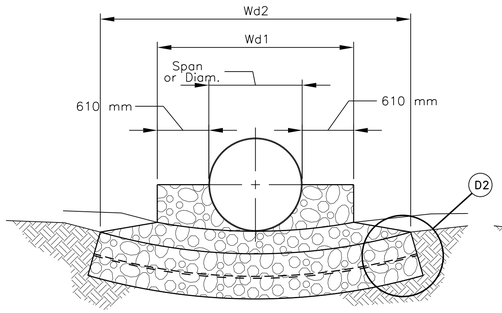
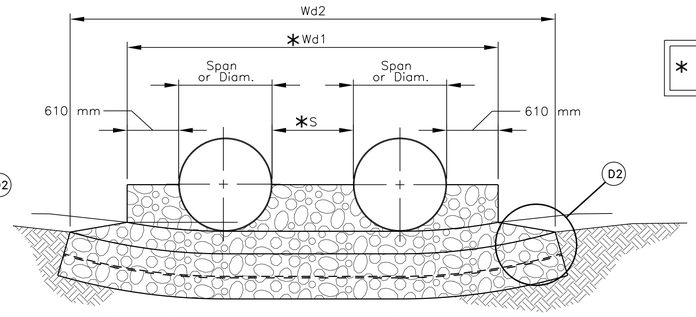
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	78	105
			N27	N27(2-4)2&4		
			N105	N105(1)2&4		

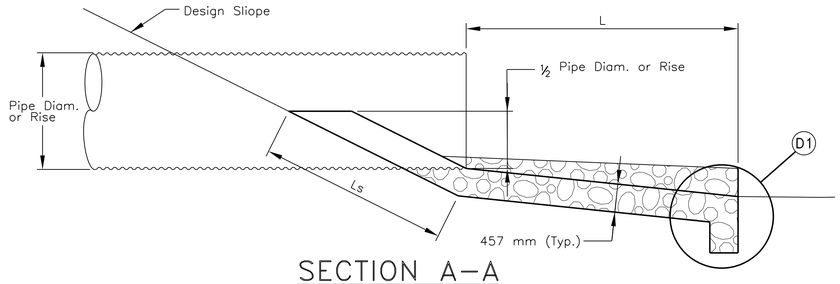


ELEVATION – SINGLE BARREL

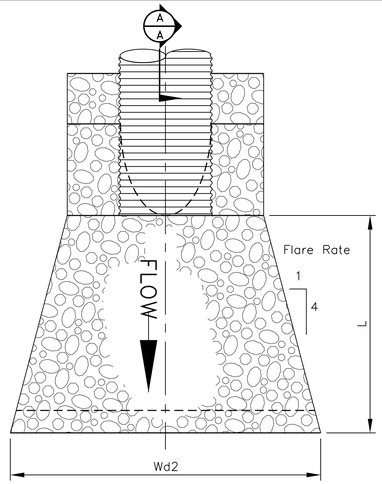


ELEVATION – DOUBLE BARREL

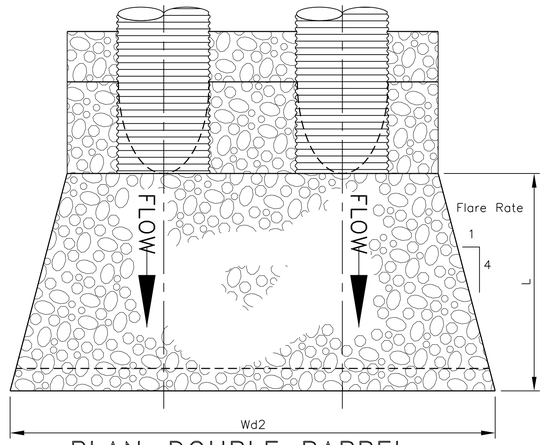
* Note: For Multiple Pipe Installations, The Quantity is adjusted For End Section Width And Spacing



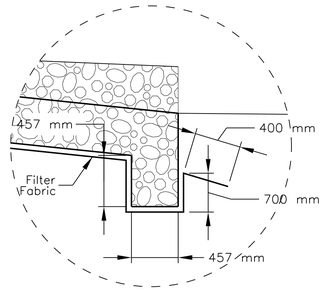
SECTION A–A



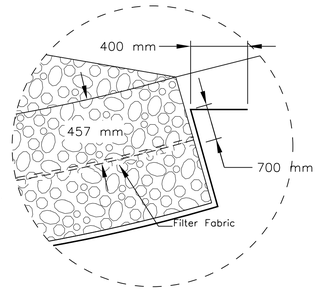
PLAN–SINGLE BARREL



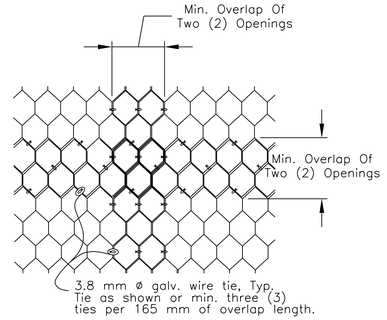
PLAN–DOUBLE BARREL



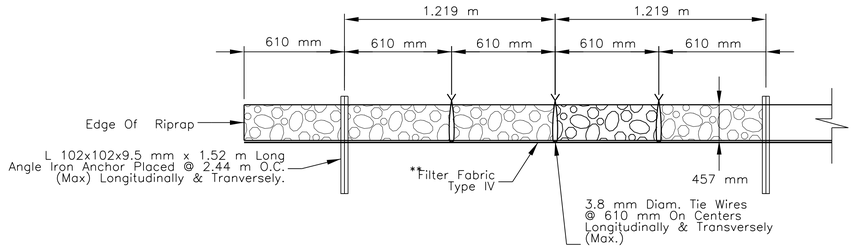
DETAIL–D1



DETAIL–D2



FABRIC SPLICING DETAILS FOR WIRE ENCLOSED RIPRAP APRON



**Not Used On Grouted Riprap Areas.

ACHORING DETAILS FOR WIRE ENCLOSED RIPRAP APRON

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

Project	Station:	Structure:	Location	S (m)	Wd1 (m)	Wd2 (m)	L (m)	Ls (m)	t (mm)	Estimated Quantity (m³)
N27(2–3)1,2&4	59+073.00	1–610 mm CSPC	Outlet	n/a	2.68	6.18	3.58	6.80	457	14.10
N27(2–3)1,2&4	59+474.00	2–1448 mm S x 965 mm R CSPA	Outlet	2.520	7.66	11.10	4.46	4.11	457	30.11
									Sub–Total	**44.21**
N27(4–2)2&4: Open Channel	0+550.00	Open Drainage Channel	Outlet	n/a	9.24	15.91	10.00	n/a	457	60.79
									Sub–Total	**60.79**
									TOTAL	**105.00**

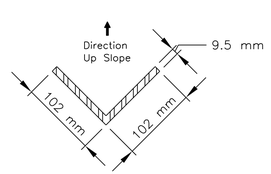
ITEM No. 25101–3000: PLACED RIPRAP APRON, CLASS 3

Project	Station:	Structure:	Location	S (m)	Wd1 (m)	Wd2 (m)	L (m)	Ls (m)	t (mm)	Estimated Quantity (m³)
N27(2–3)1,2&4	59+247.00	2–2134 mm x 48.768 m CSPC	Outlet	1.067	6.98	13.52	9.08	3.57	610	70.53
									TOTAL	**70.53**

ITEM No. 25112–2000: WIRE ENCLOSED RIPRAP APRON, CLASS 2

Project	Station:	Structure:	Location	S (m)	Wd1 (m)	Wd2 (m)	L (m)	Ls (m)	t (mm)	Estimated Quantity (m³)
N27(2–3)1,2&4	55+809.00	2–2.44 m x 2.44 m precast CBC	Outlet	n/a	9.79	18.67	9.76	n/a	457	67.30
N27(2–3)1,2&4	56+454.50	4–2.44 m x 2.44 m precast CBC	Outlet	n/a	19.40	25.80	9.59	n/a	457	105.45
									Sub–Total	**172.75**
N105(1)2&4	0+265.00 T.O., Lt.	3–1803 mm Span x 1194 mm Rise CSPA	Outlet	0.61	9.60	9.60	6.00	n/a	457	27.46
									Sub–Total	**27.46**
									TOTAL	**200.21**

Ls (m) = Length of Riprap up against the backslope. S(m) = Spacing Between multiple pipes



ANGLE IRON ANCHOR DETAIL

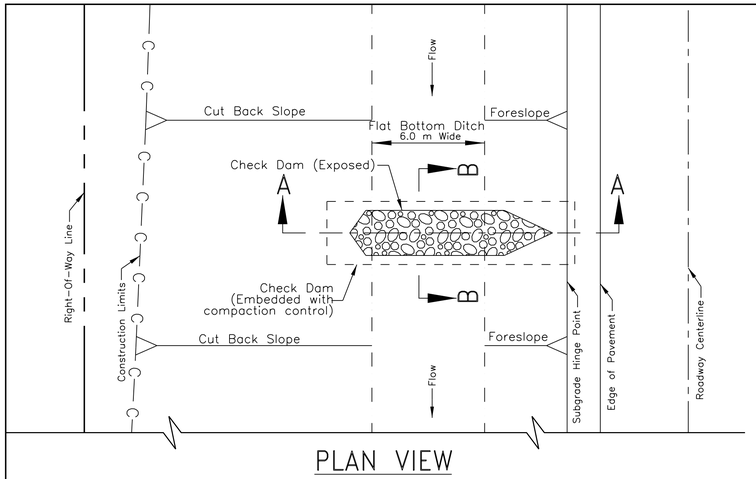
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

PLACED AND WIRE ENCLOSED RIPRAP APRON DETAIL

DRAWN BY: NRDOT	DATE: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 78 Riprap Apron Details rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 78 Riprap Apron Details rev 082317.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	79	105



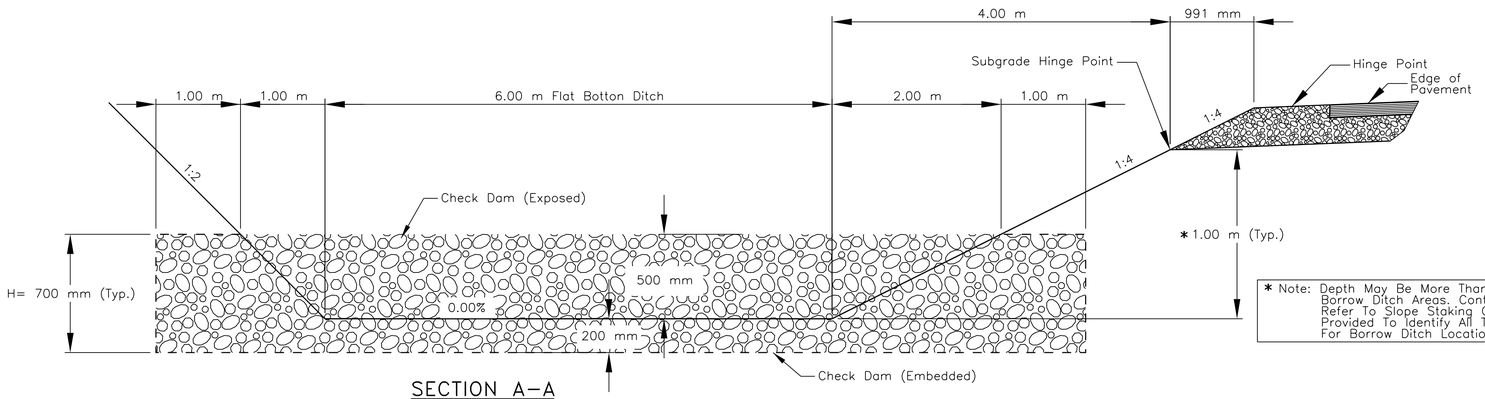
PLAN VIEW

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

STATION	LOCATION	L (m)	W (m)	H (mm)	CUT BACKSLOPE	VOLUME (m^3)	REMARKS
53+380.00	Lt.	11.00	2.80	700	1:2	10.78	Borrow FBD
53+380.00	Rt.	11.50	2.80	700	1:3	11.27	Borrow FBD
53+440.00	Lt.	11.00	2.80	700	1:2	10.78	Borrow FBD
53+440.00	Rt.	11.50	2.80	700	1:3	11.27	Borrow FBD
53+480.00	Lt. & Rt.	11.50	2.80	700	1:3	22.54	Borrow FBD
53+520.00	Lt.	11.50	2.80	700	1:3	11.27	Borrow FBD
53+560.00	Lt. & Rt.	11.50	2.80	700	1:3	22.54	Borrow FBD
53+600.00	Rt.	11.50	2.80	700	1:3	11.27	Borrow FBD
53+660.00	Lt. & Rt.	11.50	2.80	700	1:3	22.54	Borrow FBD
53+720.00	Lt.	11.50	2.80	700	1:3	11.27	Borrow FBD
					TOTAL:	145.53	

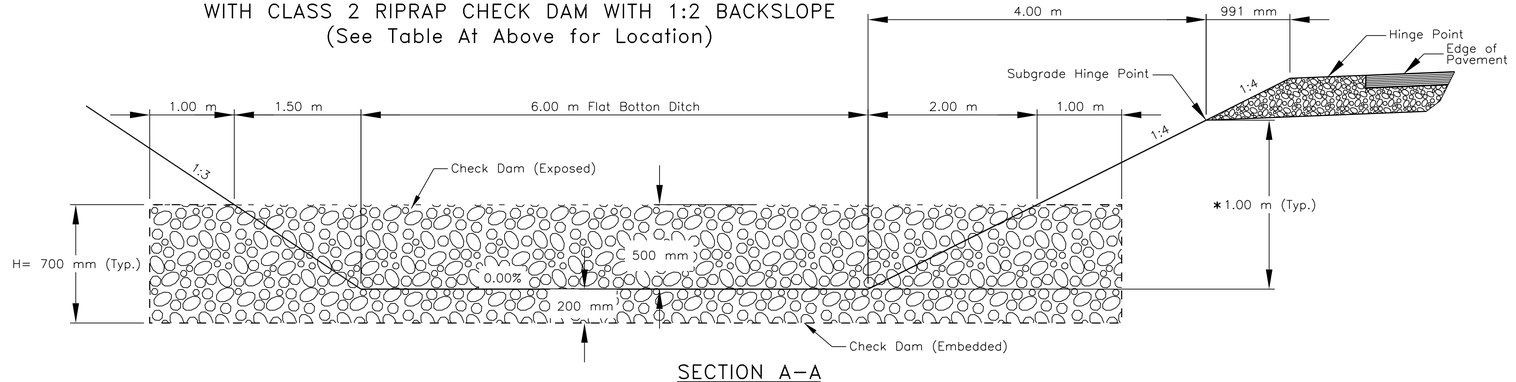
GENERAL NOTES

1. ROUND ALL SHARP CONTOURS AS REQUIRED TO FIT THE RIPRAP MATERIAL FLUSHWITH THE EXISTING GROUND.
2. THE CONTRACTOR SHALL BE REQUIRED TO MAKE FIELD ADJUSTMENTS TO MATCH ACTUAL FIELD CONDITIONS AS DIRECTED BY THE COR/COTR AT NO ADDITIONAL PAYMENT FOR SUCH ADJUSTMENTS.
3. EMBANKMENT AROUND THE CHECK DAMS SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99, METHOD C AND CONFORM TO SECTION 204 OF FP-03.
4. EXCAVATION OF RIPRAP TOE TRENCH TO PLACE RIPRAP BELOW FLOW LINE AND OTHER EXCAVATION AND EMBANKMENT NECESSARY TO PLACE RIPRAP AS SHOWN SHALL BE INCIDENTAL TO ITEM 25101-2000 - PLACED RIPRAP.
5. STONE SIZE SHALL CONFORM TO TABLE 705-1, SECTION 705, STONE FOR RIPRAP, CLASS 2.
6. ROCK CHECK DAM SHALL BE INCLUDED IN BID ITEM 25101-2000.

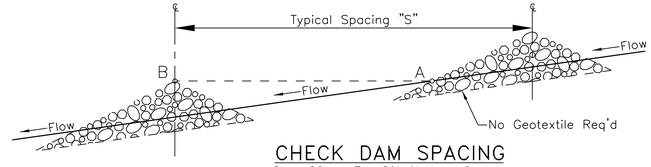


SECTION A-A
5.0 m WIDE FLAT BOTTOM DITCH
WITH CLASS 2 RIPRAP CHECK DAM WITH 1:2 BACKSLOPE
(See Table At Above for Location)

* Note: Depth May Be More Than 1.219 m In Borrow Ditch Areas. Contractor Shall Refer To Slope Staking Gradebook Provided To Identify All The Locations For Borrow Ditch Locations.

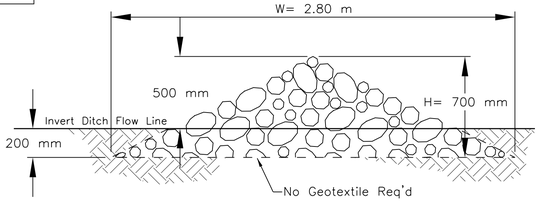


SECTION A-A
5.0 m WIDE FLAT BOTTOM DITCH
WITH CLASS 2 RIPRAP CHECK DAM WITH 1:3 BACKSLOPE
(See Table At Above for Location)



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

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



SECTION B-B

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

PLACED RIPRAP CHECK DAM
IN FLAT BOTTOM DITCH

DRAWN BY: NRDOT	DATE: 6/25/2014
DESIGNED BY: NRDOT	DATE: 6/25/2014
REVISED: 12/16/2014	BY: Leroy.Toledo
Sht 79 N27 chkdam rev 082317.dgn	

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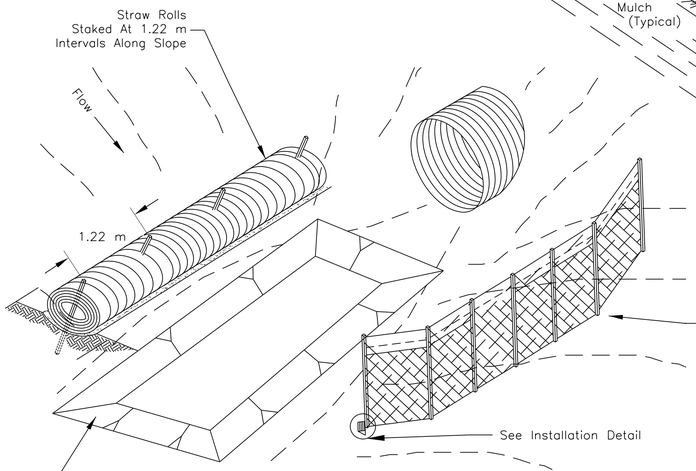
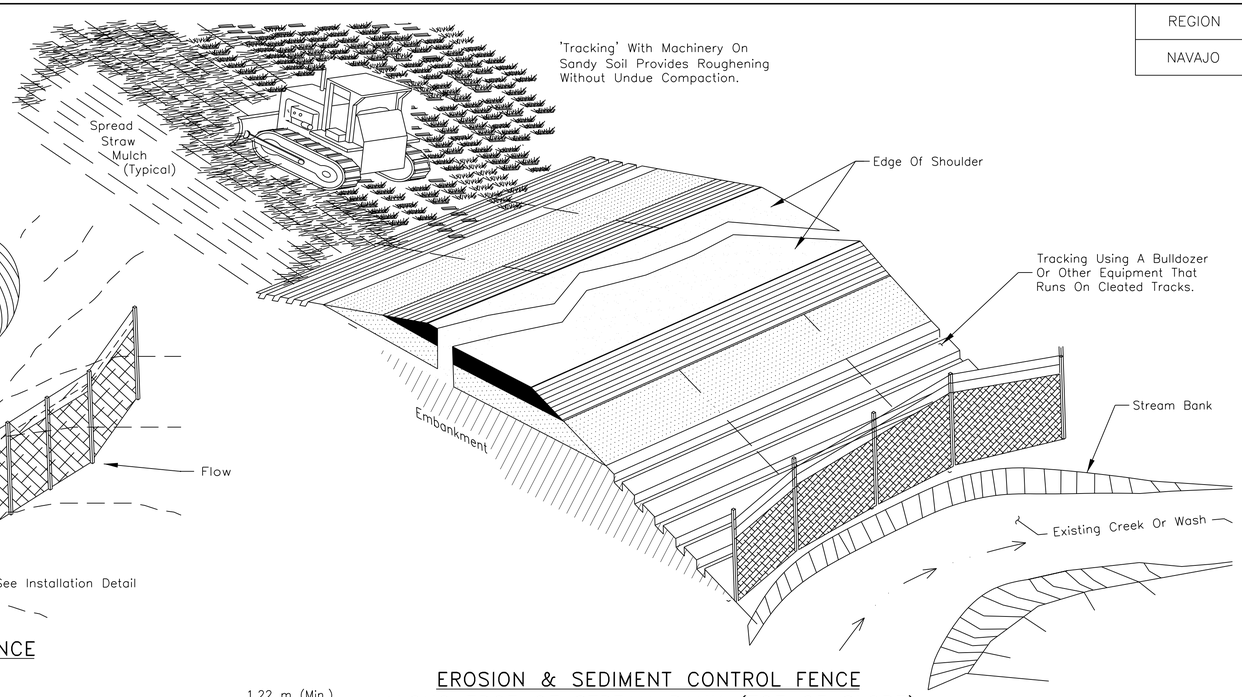
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	80	105

GENERAL NOTES

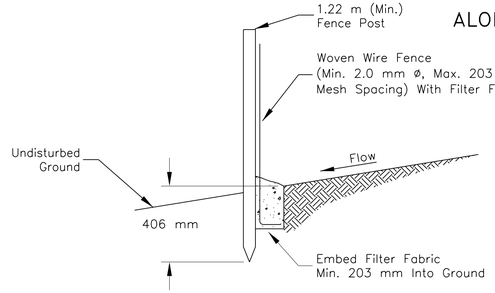
1. THE CONTRACTOR SHALL PREPARE AND SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IN FULL DETAIL FOR ALL PHASES OF THE WORK FOR REVIEW AND APPROVAL AT LEAST 14 CALANDER DAYS BEFORE IMPLEMENTATION. THE PLAN SHALL MEET THE REQUIREMENTS HEREIN AND SECTION 157 OF THE FP-03 AS MODIFIED IN THE SUPPLEMENTAL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



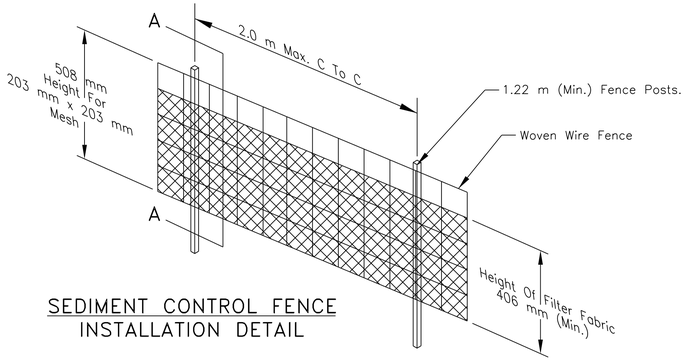
EROSION & SEDIMENT CONTROL FENCE
AT DRAINAGE STRUCTURE



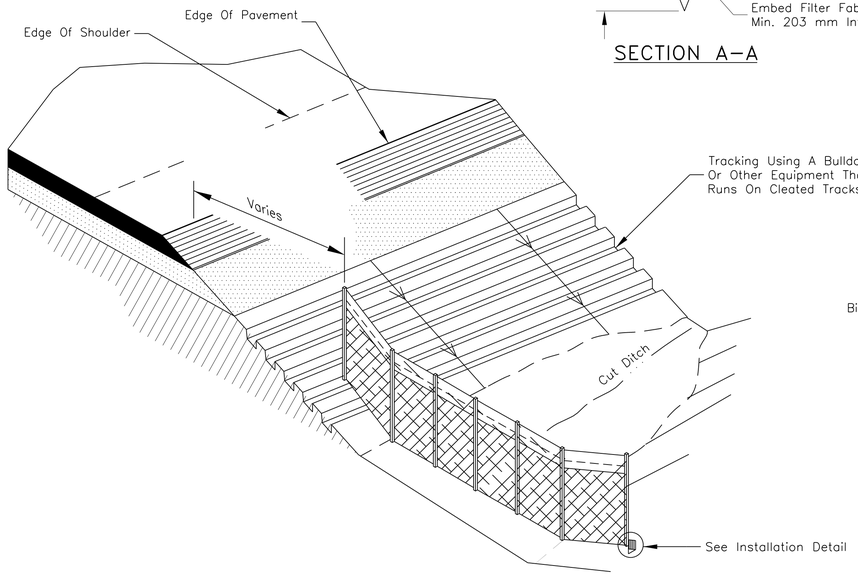
EROSION & SEDIMENT CONTROL FENCE
ALONG EDGE OF STREAM BANK (TOE OF SLOPE)



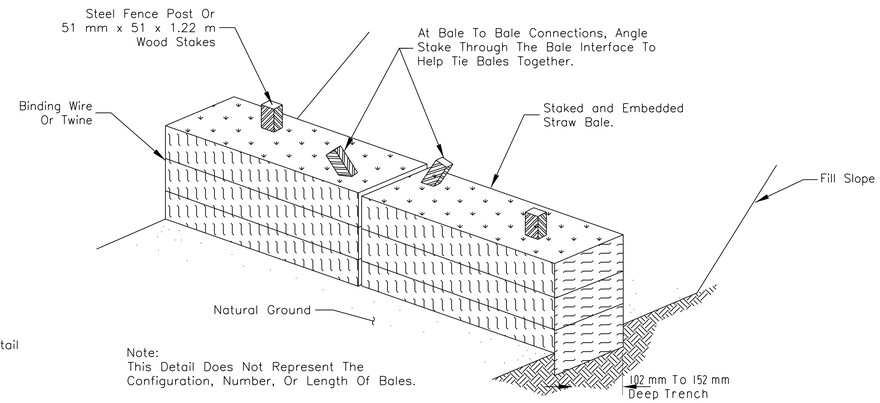
SECTION A-A



SEDIMENT CONTROL FENCE
INSTALLATION DETAIL



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



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

TYPICAL STRAW BALE STAKING
AND TRENCHING DETAIL

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STORMWATER POLLUTION AND EROSION/SEDIMENT CONTROL DETAILS

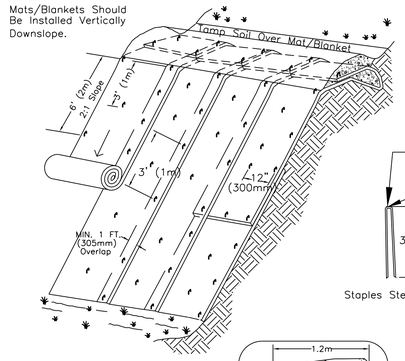
DRAWN BY: NRDOT	DATE: 1/31/2013
DESIGNED BY: NRDOT	DATE: 1/31/2013
REVISED: 5/28/2013	BY: Leroy.Toledo
Sht 80 N27 ERO1 SWPPP1 rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 80 N27 ERO1 SWPPP1 rev 0823117.dgn

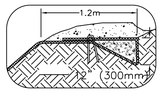
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	81	105

GENERAL NOTES

1. SEE SHEET 80 OF 106 FOR ADDITIONAL NOTES AND DETAILS.
2. THE CONTRACTOR SHALL INSTALL EROSION CONTROL BLANKETS, TYPE 4, PER SECTION 713.17(K) WITH 305 mm (min) OVERLAP.
   A. CONSTRUCT FINISH GRADING AROUND STRUCTURE TO BE PLACED.
   B. CUT TRENCHES FOR FOOTING OF SLAB.
   C. INSTALL 2.0 m OF EROSION CONTROL BLANKETS ANCHORED ON FLOOR AND TOP ALONG THE CUT FACE OF TRENCH AS SHOWN WITH COMPACTION CONTROL PER SECTION 204.11.
   D. PLACE CONCRETE FORMS, REINFORCEMENTS AND SUBSEQUENT CONCRETE.
3. CONSTRUCT SEDIMENT BASIN AND TRAPS, EROSION CHECKS AND/OR FILTERS IN STRATEGIC LOCATIONS ON THE PROJECT TO FILTER STORM RUNOFF BEFORE IT EXISTS THE PROJECT CONSTRUCTION LIMITS OR ENTERS A STREAM AS SHOWN IN THE APPROVED SWPPP.
4. CLEAN ALL SEDIMENTS BASIN AND TRAPS OF ACCUMULATED SEDIMENT WHEN HALF FULL OF SEDIMENT.
5. USE DRAIN PIPE, RIPRAP, GEOTEXTILE FABRIC, OR GRASS-LINED WATERWAY FOR TEMPORARY SLOPE DRAINS TO CHANNEL RUNOFF DOWN SLOPES, CHANNEL WATER INTO SLOPE DRAINS WITH STRAW BALES, WATTLES, OR EARTH BERMS CONSTRUCTED AT THE TOP OF A CUT SLOPE. ANCHOR SLOPE DRAINS TO THE SLOPE.
6. THE CONTRACTOR SHALL ADJUST THE DIMENSIONS AND/OR LOCATIONS OF TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES TO FIT ACTUAL FIELD CONDITIONS.
7. REMOVE AND DISPOSE OF EROSION CONTROL MEASURES ARE SATISFACTORILY ESTABLISHED. DRAINAGE DITCHES AND CHANNELS ARE LINED AND STABILIZED, IN ACCORDANCE WITH SECTION 157 OF FP-03.
8. AT CUT SLOPES SPECIFIED IN THESE PLANS TO BE COVERED WITH EROSION MATTING PROTECTION, THE CORT SHALL INSPECT THE SLOPES FOR EXISTING AND STABLE ROCK MATERIAL. IF IN THE OPINION OF THE CORT, THE CUT SLOPES ARE SUFFICIENTLY STABLE DUE TO THE NATURAL ROCK, THE CORT MAY DELETE THE MATTING IN THOSE AREAS.



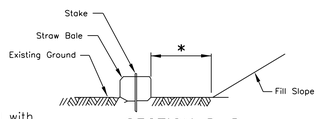
TYPICAL SLOPE SOIL STABLIZATION



NOT TO SCALE

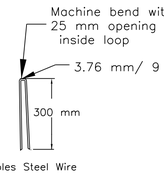
NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/ BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION

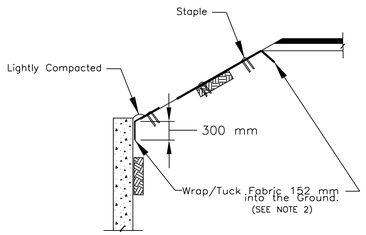


SECTION D-D

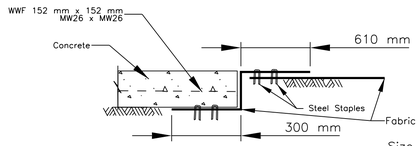
* See General Notes.



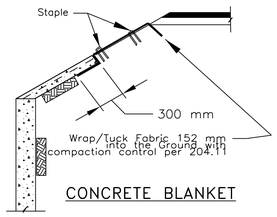
Staples Steel Wire



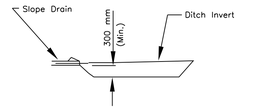
CONCRETE HEADWALL

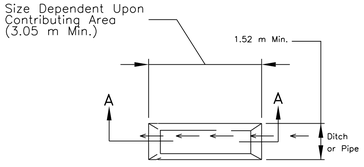


TUCKING of FABRIC AROUND CONCRETE STRUCTURE DETAIL



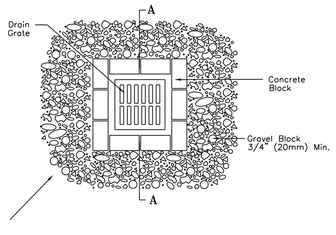
CONCRETE BLANKET

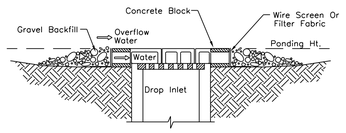




SEDIMENT TRAP

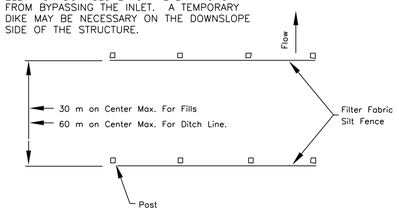
(Traps shall not fill to beyond one-half capacity prior to cleaning)





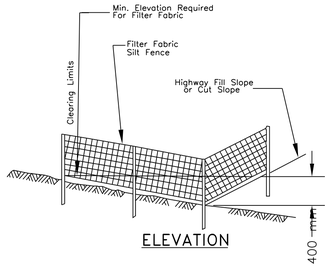
NOTES:
1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. EXCAVATE A BASIN OF SUFFICIENT SIZE ADJACENT TO THE DROP INLET.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING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

BLOCK AND GRAVEL DROP INLET SEDIMENT BARRIER

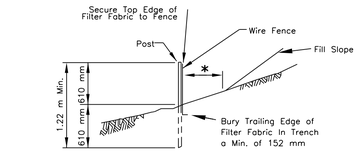


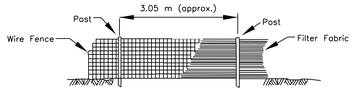
PLAN

SILT FENCE EROSION CHECK



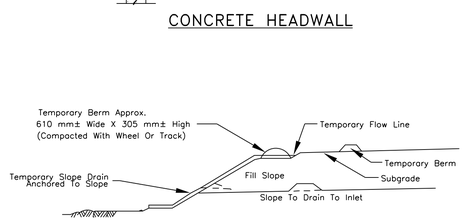
ELEVATION



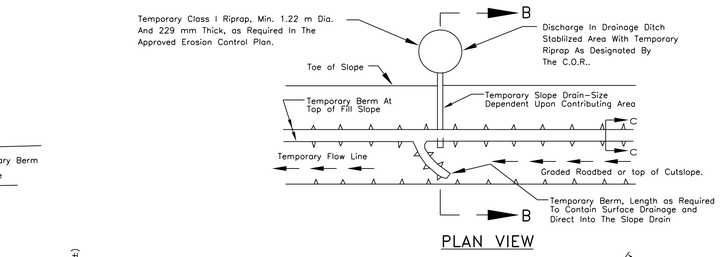


FILTER FABRIC SILT FENCE

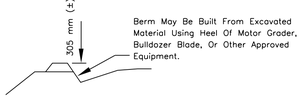
* See General Notes.



SECTION B-B

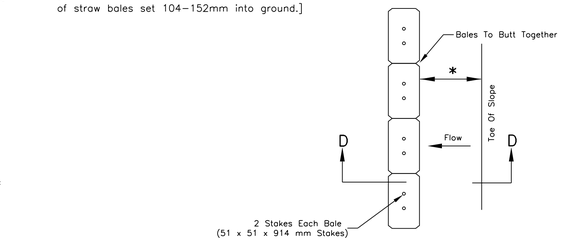


PLAN VIEW



SECTION C-C

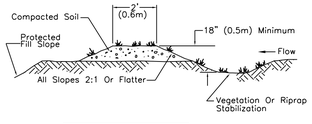
Temporary Slope Drain, Berm. (for fill and cutslopes)
[NOTE: Temporary berms may also be constructed of straw bales set 104-152mm into ground.]



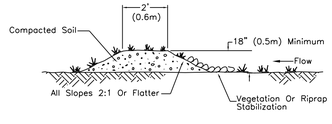
PLAN

STRAW BALE SILT BARRIER

* See general notes.

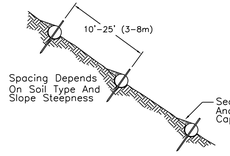


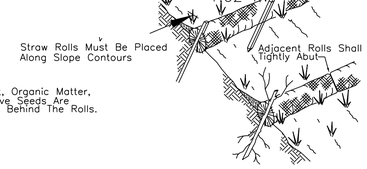
NOTES:
1. THE CHANNEL BEHIND THE DIKE SHALL HAVE POSITIVE GRADE TO A STABILIZED OUTLET.
2. THE DIKE SHALL BE ADEQUATELY COMPACTED TO PREVENT FAILURE.
3. THE DIKE SHALL BE STABILIZED WITH TEMPORARY OR PERMANENT SEEDING OR RIPRAP.
4. THE DIVERSION DIKE SHALL EXTEND TO THE BOTTOM OF CUT BACK SLOPE AND INTERCEPT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

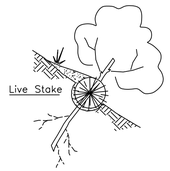


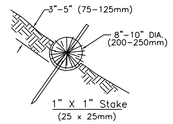
(For Top Of Cut Back Slopes.)

TEMPORARY DIVERSION DIKE









Not To Scale

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

STRAW ROLLS

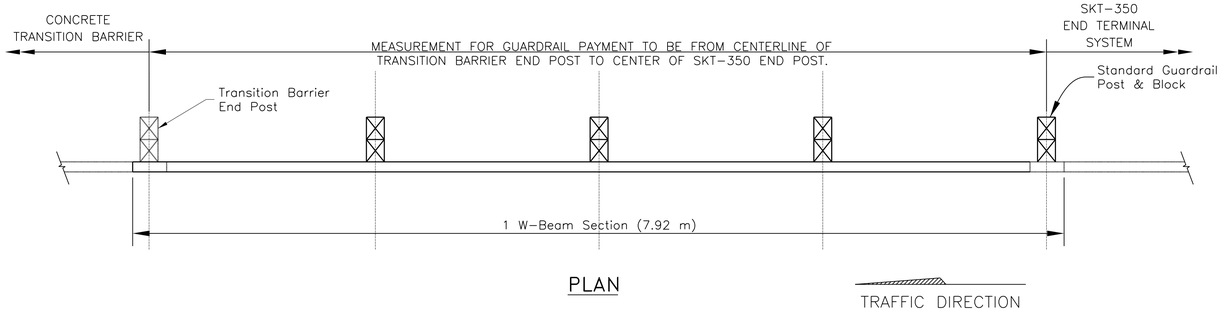
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STORMWATER POLLUTION AND EROSION/SEDIMENT CONTROL DETAILS

DRAWN BY: NRDOT	DATE: 8/26/2015
DESIGNED BY: NRDOT	DATE: 8/26/2015
REVISED: 8/26/2015	BY: Leroy.Toledo
Sht 81 N27 ER02 SWPPP2 rev 082317.dgn	

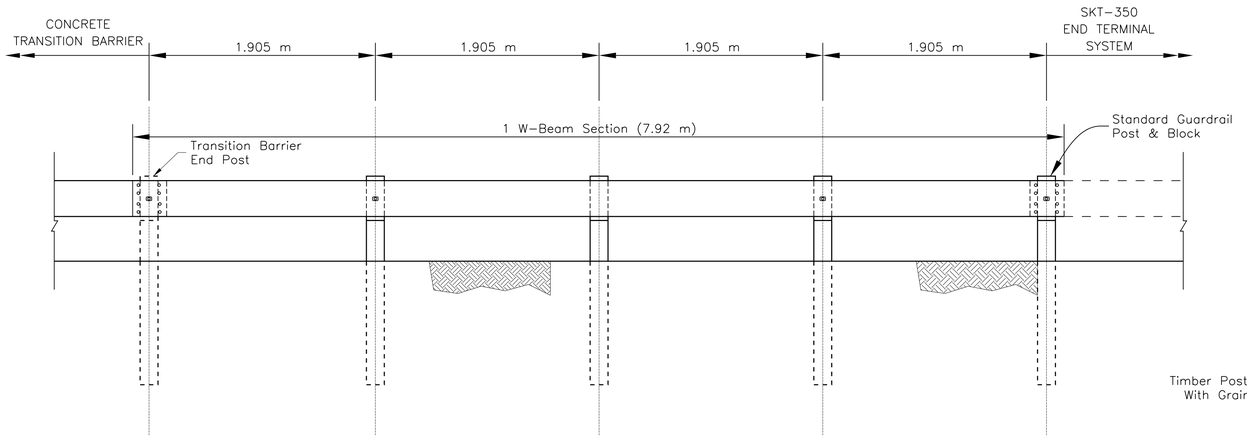
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 81 N27 ER02 SWPPP2 rev 082317.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	82	105

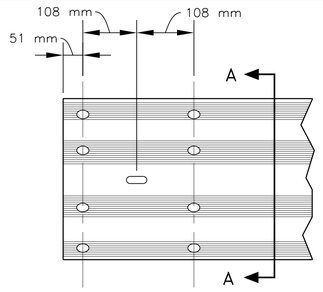


PLAN

TRAFFIC DIRECTION

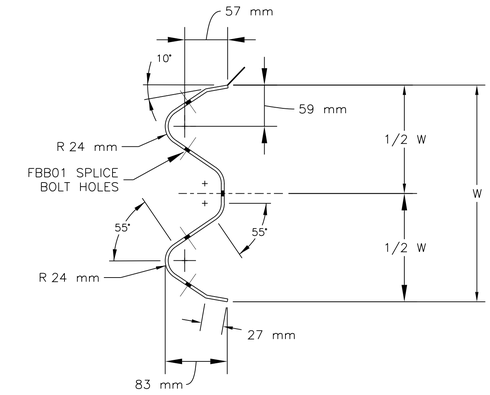


ELEVATION

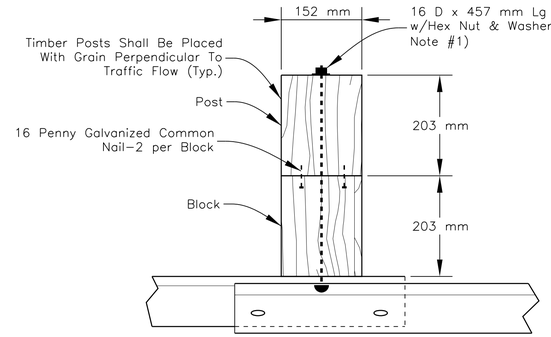


ELEVATION
RAIL

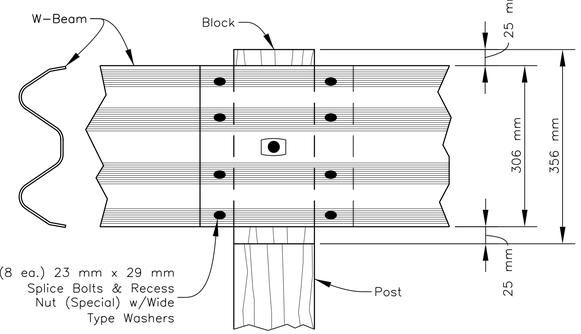
DESIGNATOR	COMPONENT	NUMBER
FBB01	Splice Bolt and Nut	2
FBB02	Guardrail-Post Bolt and Nut	2
FBB03	Guardrail-Post Bolt and Nut	2
FBB04	Guardrail-Post Bolt and Nut	2
FBX16a	Post Blockout Bolt (40 mm)	4
FWC16a	Round Washer	2
PDB01a	Timber Post Blockout	2
PDB01b	Timber Post Blockout	2
PDE02	Timber Post	2
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



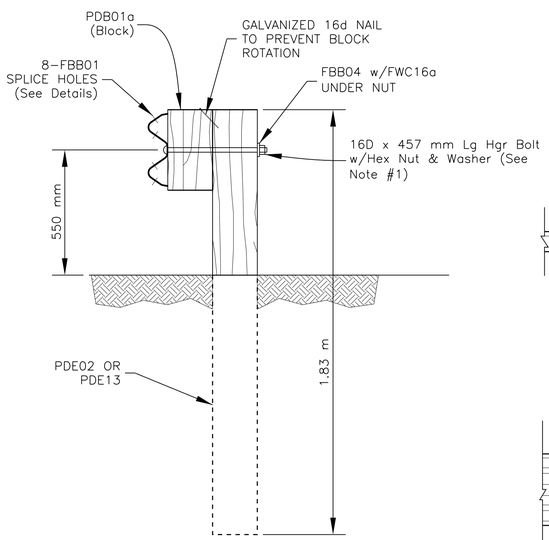
SECTION A-A
W-BEAM (RWM02A)



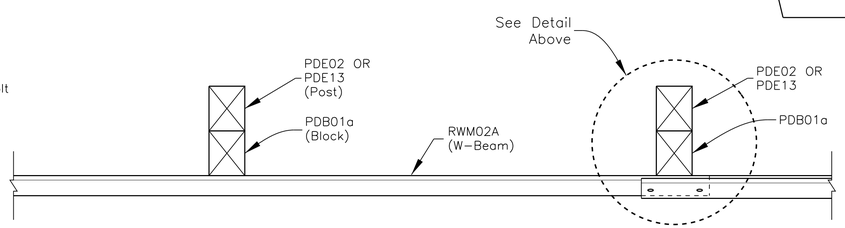
PLAN
POST/BLOCK &
SPLICE DETAIL



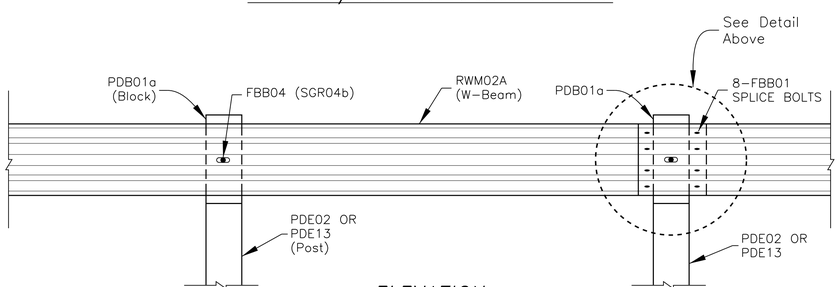
ELEVATION
POST/BLOCK
SPLICE DETAIL



ELEVATION
STRONG-POST W-BEAM



PLAN
W-BEAM/POST & BLOCK DETAILS



ELEVATION
W-BEAM/POST & BLOCK DETAILS

GENERAL NOTES

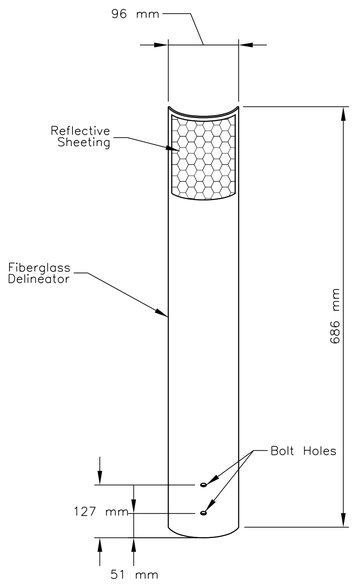
1. THE 16 D FLAT WASHER IS USED UNDER THE NUT, BEHIND THE POST ONLY. NO WASHER IS USED AT THE RAIL.
2. SEE SHEET 83 OF 101 FOR ADDITIONAL NOTES.
3. THE CONTRACTOR HAS THE OPTION TO USE ALL-STEEL POSTS W/WOODEN BLOCK ON STANDARD LINE POSTS, UNLESS OTEHERWISE NOTED ON THE DESIGN PLANS.
4. IF STEEL POSTS ARE APPROVED THEN RUBBER BLOCKS WILL BE REQUIRED.
5. BEGIN/END ASPHALT CURB AT POST #??.
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

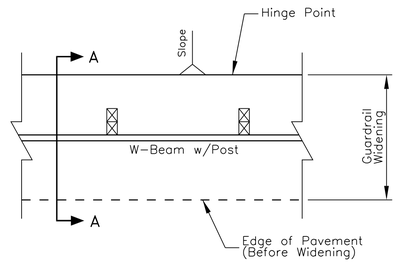
STANDARD GUARDRAIL DETAIL 1

DRAWN BY: NRDOT	DATE: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 82 N27_SGR04 Std Gdrail Redesign1_rev 082317.dgn	

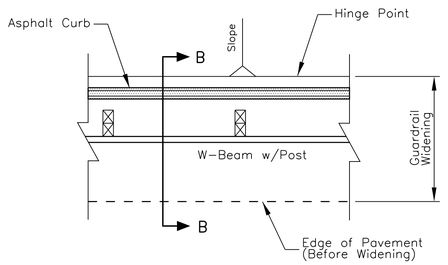
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	83	105



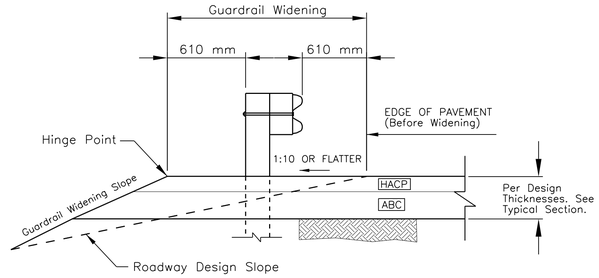
DELINEATOR DETAIL
(Reflective Sheeting Shall Face Traffic)



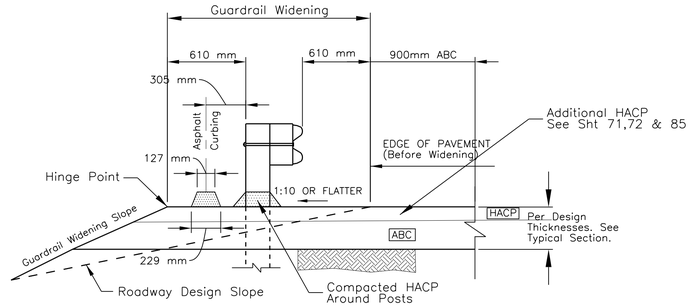
PLAN VIEW
w/NO CURBING



PLAN VIEW
w/CURBING



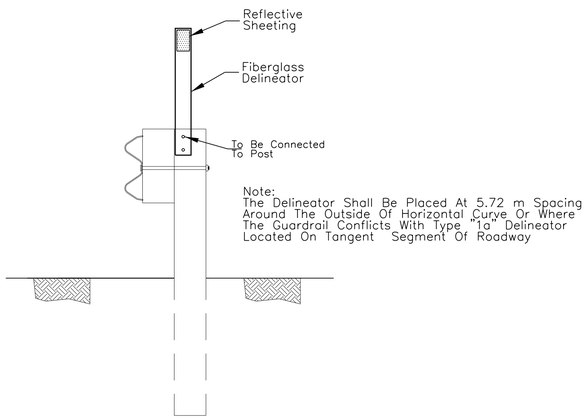
SECTION A-A
w/No Curbing



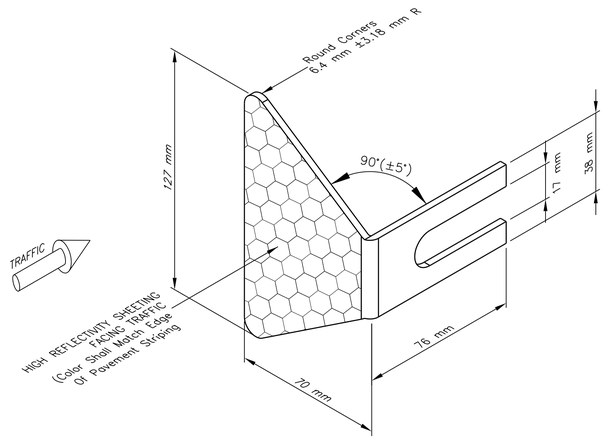
SECTION B-B
w/CURBING
Asphalt Curb Depth=102 mm

GENERAL NOTES

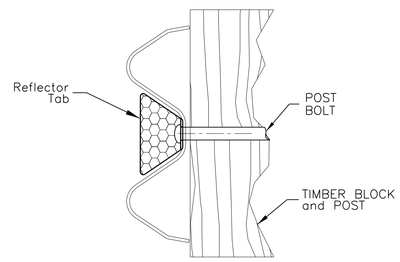
1. ALL GUARDRAIL "W" BEAMS, SHALL BE GALVANIZED IN ACCORDANCE WITH (AASHTO M-180, CLASS A, TYPE 1) SPECIFICATION. ALL HARDWARE SHALL CONFORM TO (ASTM A-325) AND GALVANIZED IN ACCORDANCE WITH (ASTM A-153).
2. ALL STRUCTURAL STEEL ITEMS SHOWN SHALL CONFORM TO (AASHTO N183/ASTM A36) AND BE GALVANIZED IN 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 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 BID 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 IN BID 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 Second Post

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

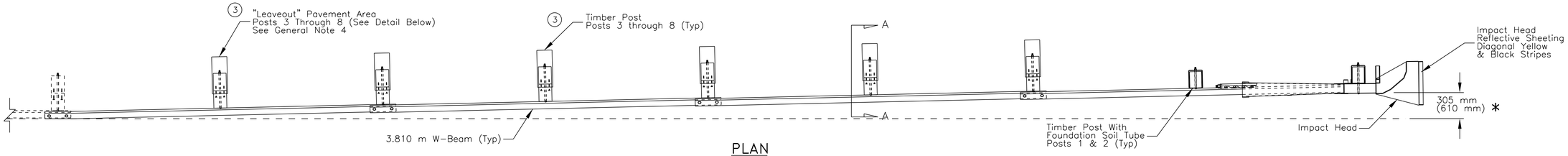
STANDARD GUARDRAIL DETAIL 2

DRAWN BY: NRDOT	DATE: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 83 N27_SGR04 Std Gdrail Redesign2_rev 082317.dgn	

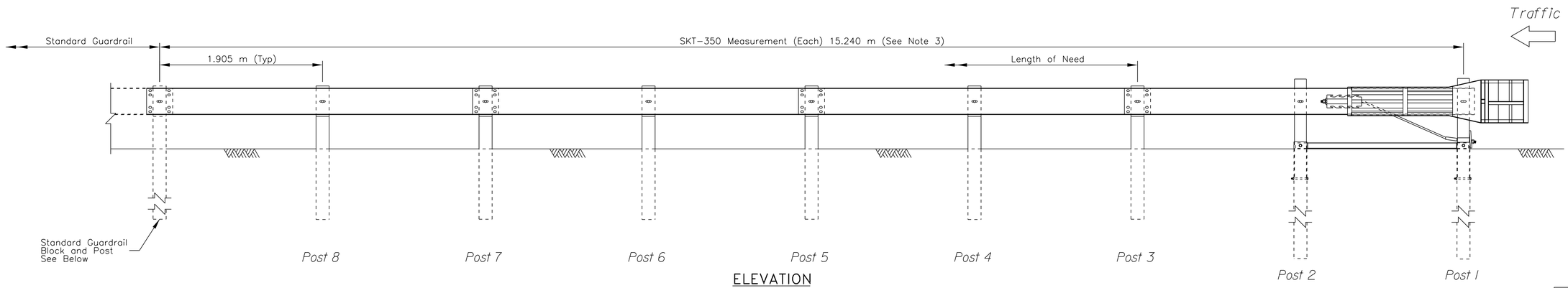
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 83 N27_SGR04 Std Gdrail Redesign2_rev 082317.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	84	105

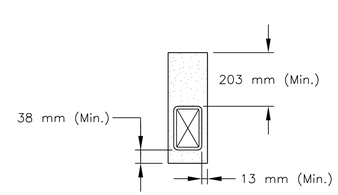
*FOR ELEVATIONS ABOVE (1,220 m) USE THE VALUES IN PARENTHESES



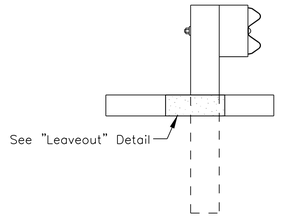
PLAN



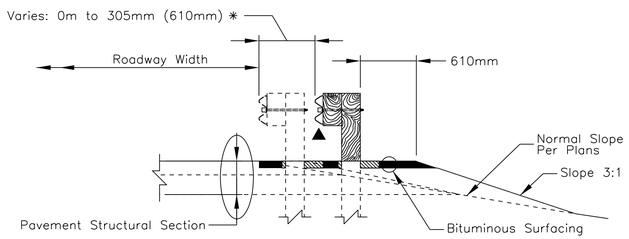
ELEVATION



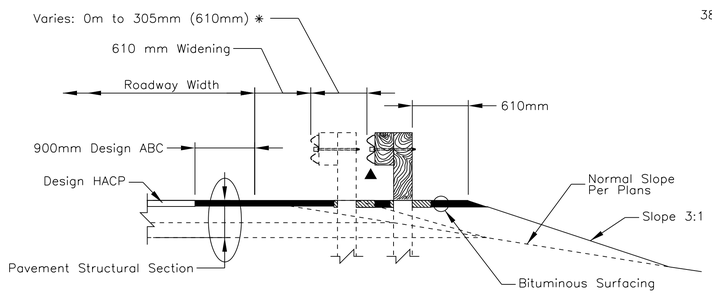
LEAVEOUT DETAIL



SECTION A-A
Typical At Post 3 Thru 8



TYPE A SECTION

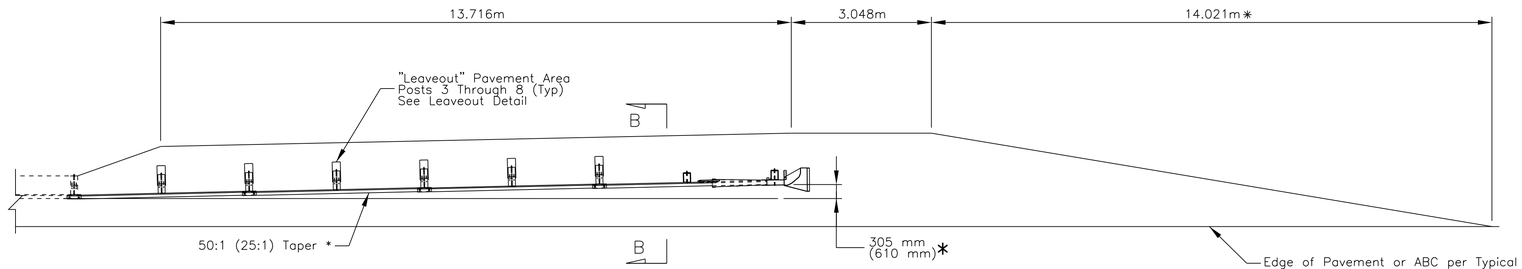


TYPE B SECTION

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 15.240 m W-BEAM LENGTH SHALL CONSIST OF FOUR 4.0 m SECTIONS. THE END SECTION BEING A PROPRIETARY SPLIT RAIL.
4. "LEAVEOUT" 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.

See Sheet 87 For General Notes.



TYPE B GUARDRAIL INSTALLATION
(FACE OF RAIL OFFSET 610mm FROM NORMAL EDGE OF PAVEMENT)

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

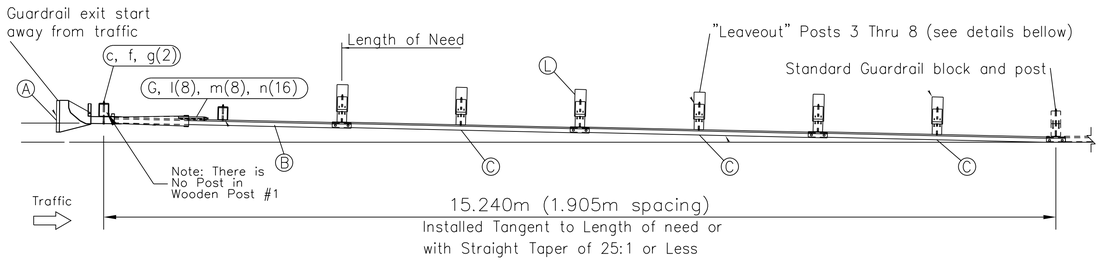
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

GUARDRAIL END TREATMENT SKT-350 LAYOUT; SHEET 1 of 2

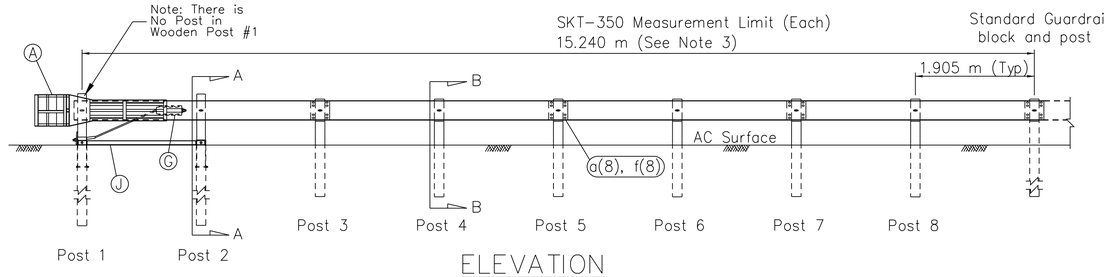
DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 84 N27 SKT-350_1of3_rev 091917.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 84 N27 SKT-350_1of3_rev 091917.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	85	105



PLAN



ELEVATION

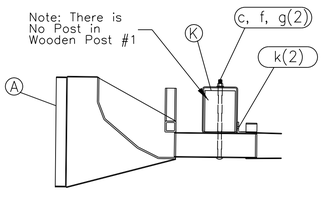
GENERAL NOTES

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-350 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 FOR SPECIFIC INSTALLATIONS.
4. THE SOIL TUBES SHALL NOT PROTRUDE MORE THAN 102 mm ABOVE GROUND (MEASURED ALONG A 1.5 m CHORD). SITE GRADING MAY BE NECESSARY TO MEET THIS REQUIREMENT.
5. THE SOIL TUBES MAY BE DRIVEN WITH AN APPROVED DRIVING HEAD. SOIL TUBES SHOULD NOT BE DRIVEN WITH THE POST IN THE TUBE. IF THE TUBES ARE PLACED IN DRILLED HOLES, THE BACKFILL MATERIAL MUST BE SATISFACTORILY COMPACTED TO PREVENT SETTLEMENT.
6. WHEN ROCK IS ENCOUNTERED DURING EXCAVATION, A 305 mm DIA. POST HOLE, 508 mm INTO ROCK MAY BE USED IF APPROVED BY THE ENGINEER. GRANULAR MATERIAL WILL BE PLACED IN THE BOTTOM OF THE HOLE APPROX. 64 mm 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 BE CONSIDERED PRIOR TO USING THE SKT-350 WHERE THERE IS LESS THAN 7.620 m BETWEEN THE OUTLET SIDE OF THE SKT-350 AND ANY ADJACENT DRVING 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.

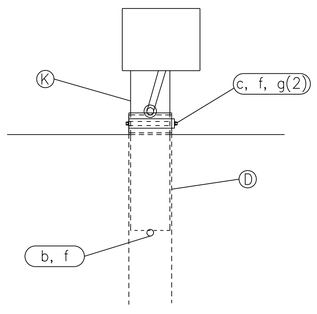
"LEAVEOUT" REQUIREMENT:

FOR POSTS 3 THROUGH 8, "LEAVEOUTS" IN TH3 ASPHALTIC CONCRETE PAVEMENT, AS SHOWN IN SECTION B-B AND BLOCKOUT DETAIL, AROUND GUARDRAIL POSTS SHALL BE PROVIDED WHERE ASPHALT THICKNESS EXCEEDS 39 mm NOMINAL (51 mm max) AND WHERE THE ASPHALT EXTENDS MORE THAN 457 mm BEHIND THE POSTS. THE "LEAVEOUT" SHALL BE USED AT THE POST LOCATIONS INDICATED AND THE "LEAVEOUT" MATERIAL TO BE PLACE IN THE VOID SHALL CONSIST OF A 1-SACK GROUT MIX OR OTHER NON-COHESIVE MATERIAL AS APPROVED BY THE NRDOT MATERIALS UNIT.

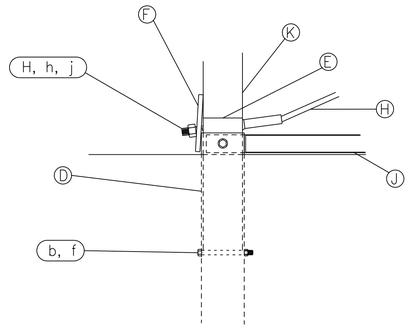
Code	QTY.	BILL OF MATERIALS	ITEM#
A	1	IMPACT HEAD	S3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 GA., 3.810m	FS1303
C	3	W-BEAM GUARDRAIL, 12 GA., 3.810m RAIL ELEMENTS	G1203
D	2	FOUNDATION SOIL TUBE, 152mm x 203mm x 1.829m	E731
E	1	PIPE SLEEVE	E740
F	1	BEARING PLATE, 203mm x 203mm x 16mm	E750
G	1	CABLE ANCHOR 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



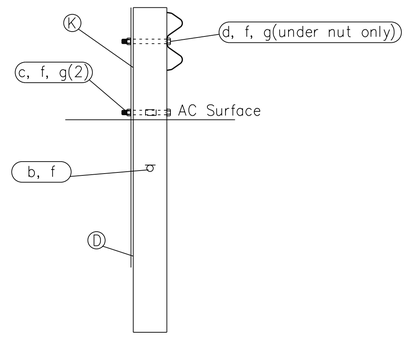
IMPACT HEAD
CONNECTING DETAIL



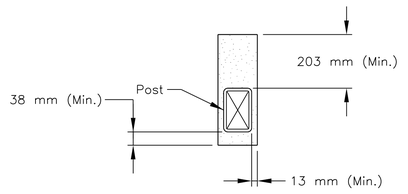
FRONT VIEW OF POST 1



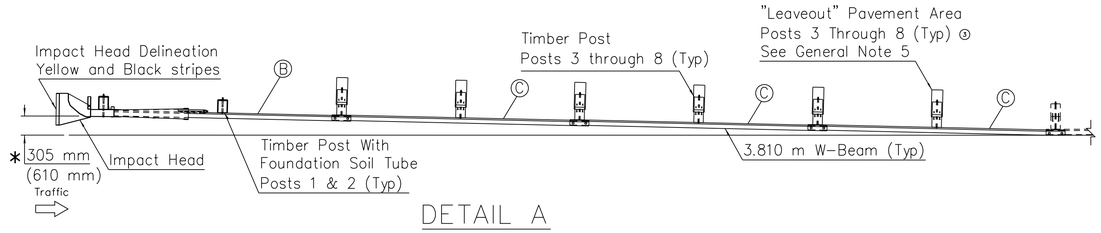
SIDE VIEW OF POST 1



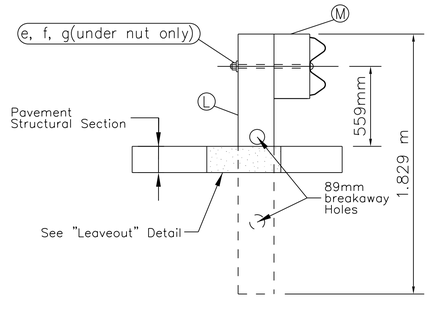
SECTION A-A



"LEAVEOUT" DETAIL



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

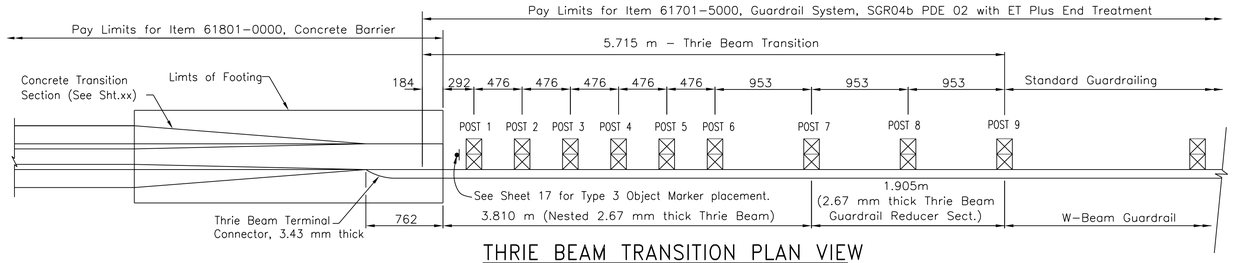
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

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

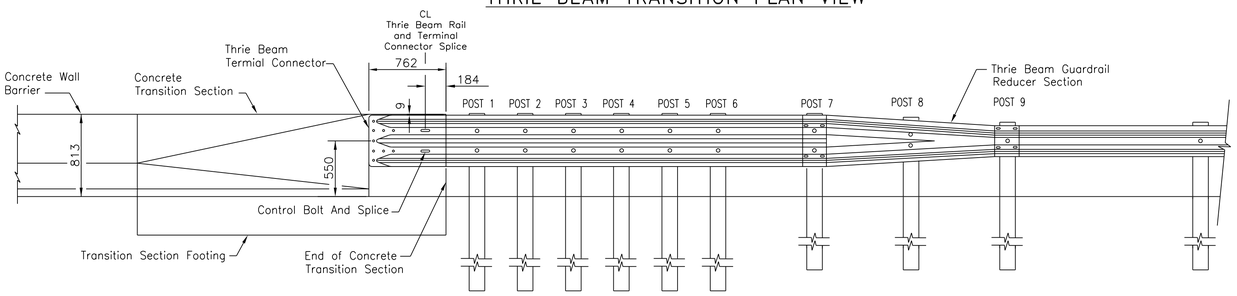
DRAWN BY: NRDOT	DATE: 9/19/2017
DESIGNED BY: NRDOT	DATE: 9/19/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 85 N27 SKT-350_2of2_rev 091917.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 85 N27 SKT-350_2of2_rev 091917.dgn

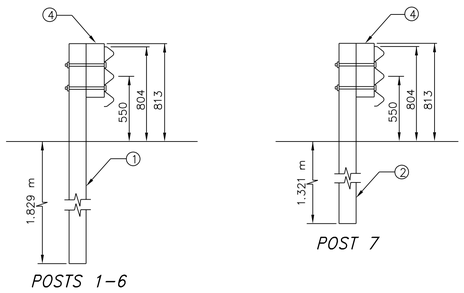
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	86	105



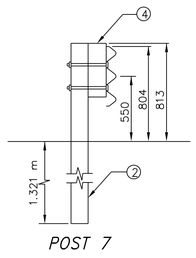
THRIE BEAM TRANSITION PLAN VIEW



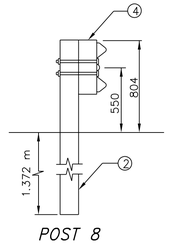
THRIE BEAM TRANSITION ELEVATION VIEW



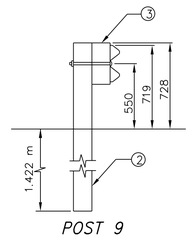
POSTS 1-6



POST 7



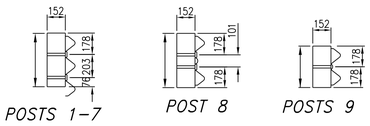
POST 8



POST 9

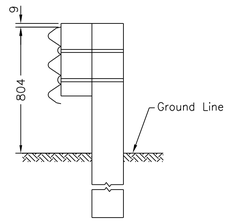
LEGEND

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

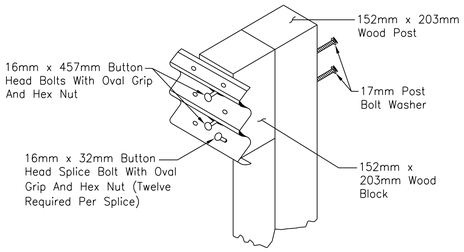
BLOCK DETAILS



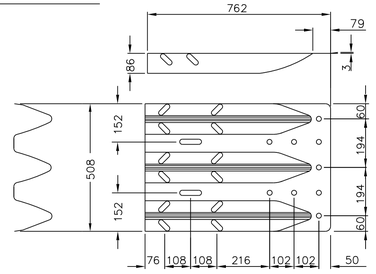
THRIE BEAM RAIL ASSEMBLY

GENERAL NOTES

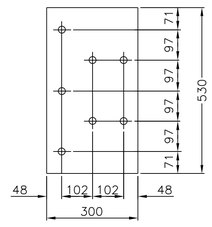
1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN.
2. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO FP-03.
3. ALL HARDWARE SHALL MEET FHWA CRASH WORTHINESS REQUIREMENTS AS PER NCHRP 350 GUIDELINES.
4. FIVE 22 mm DIAMETER GALVANIZED AASHTO M164 BOLTS ARE REQUIRED FOR THE ATTACHMENT OF THE THRIE BEAM TERMINAL CONNECTOR
5. TO THE CONCRETE BARRIER, LENGTH TO BE DETERMINED IN THE FIELD BY THE COR/AOTR. HOLES FOR BOLTS SHALL BE 25 mm DIA. AND SHALL BE EITHER FORMED OR CORE DRILLED.
6. 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.
7. INSTALL THRIE BEAM TERMINAL CONNECTOR BETWEEN NESTED GUARDRAIL ELEMENTS ON THE APPROACH SECTION.
8. INSTALL THRIE BEAM TERMINAL CONNECTOR OUTSIDE OF THE NESTED GUARDRAIL ELEMENTS ON THE DEPARTURE SECTION.
9. 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.
10. DO NOT PLACE ANY WASHERS UNDER THE BOLTS ON THE TRAFFIC SIDE OF THE BARRIER.
11. PLACE REFLECTOR TABS ON POSTS 1, 6 AND 9.
12. THE COLOR OF THE REFLECTIVE SHEETING ON THE REFLECTOR TABS SHALL BE THE SAME AS THE COLOR OF THE EDGELINE PAVEMENT MARKING IN FRONTOF THE BARRIER.
13. REFLECTOR TABS SHALL HAVE A MINIMUM OF 76 x 127 mm REFLECTIVE SHEETING ON BOTH SIDES AND SHALL ATTACH SECURELY TO THE BLOCKOUT.
14. SPLICES SHALL BE LAPPED SO THE FREE END DOES NOT FACE TRAFFIC FLOW.
15. CONSTRUCTION TOLERANCE FOR HEIGHT OF GUARDRAIL IS 13 mm.
16. TERMINAL CONNECTOR, THRIE BEAM BEARING PLATE AND ASSOCIATED HARDWARE SHALL BE INCLUDED IN THE UNIT PRICE FOR BID ITEM 61701-5000.



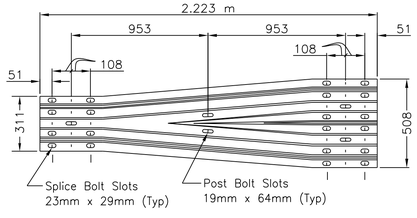
THRIE BEAM POST ASSEMBLY



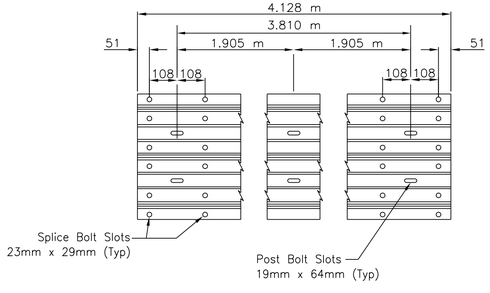
STANDARD THRIE BEAM TERMINAL CONNECTOR



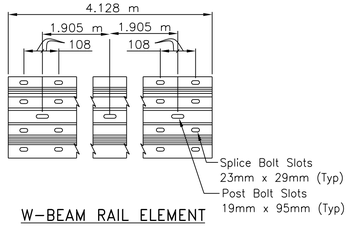
16 mm BEARING PLATE



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: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Gerald.Hood
Sht 86 ThrieBeamTransition_rev 082317.dgn	

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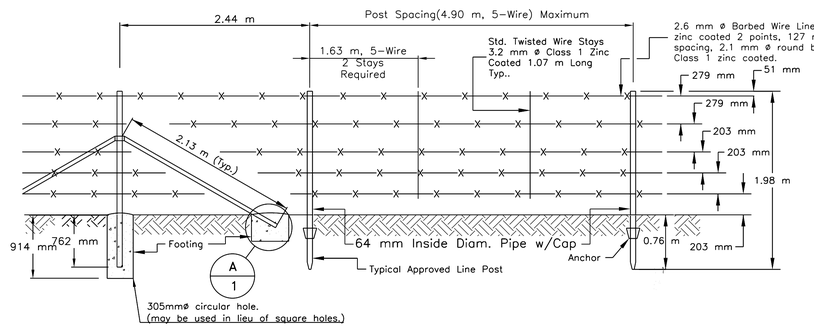
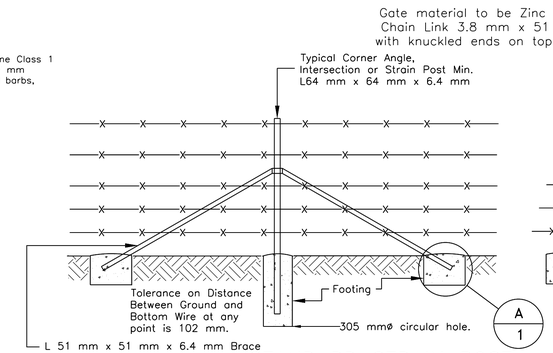
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	87	105

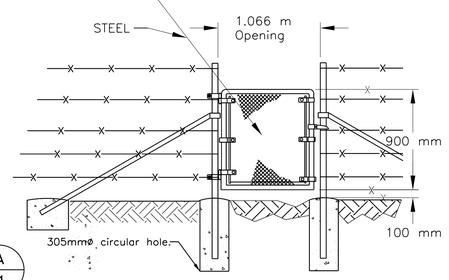


STANDARD 5 LINE GALVANIZED BARBED WIRE PANEL



STANDARD STRAIN POST

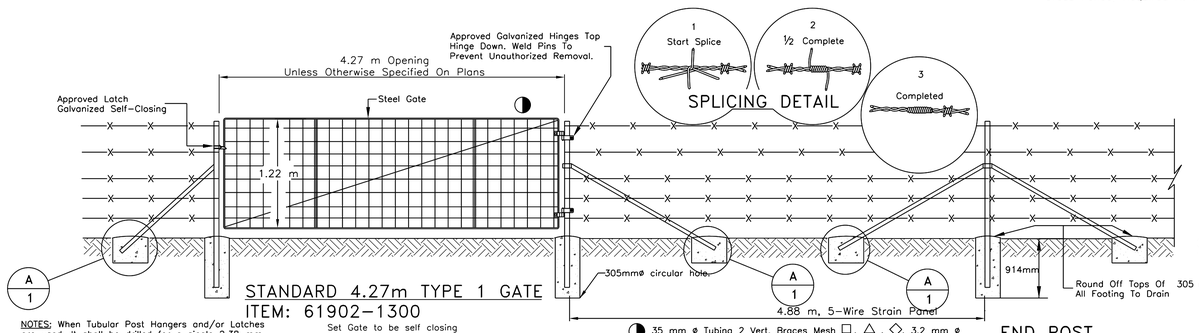
To Be Placed @ 198 m Max. Intervals. Strain Posts With Braces Shall Be Installed At All Corners (R/W Corners Etc.) And Angles Exceeding 15° And Fence Intersections. A Third Brace, In Line With Cross Fence, Required At Intersection.



STANDARD PEDESTRIAN GATE DETAIL

GENERAL NOTES

1. CORNER, GATE, INTERMEDIATE BRACE POSTS AND LINE POSTS SHALL BE EITHER GALVANIZED OR PAINTED IN ACCORDANCE WITH AASHTO M 281-96. METAL POST AND BRACES SHALL BE FABRICATED FROM RAIL, BILLET, OR COMMERICAL GRADE STEEL CONFORMING WITH THE REQUIREMENT OF ASTM A 702
2. LINE POSTS SHALL BE FABRICATED IN ACCORDANCE WITH AASHTO M 281-96, AND SHALL BE A NOMINAL WEIGHT OF 1.98 kg/m EXCLUSIVE OF ANCHOR PLATES. ANCHOR PLATES SHALL BE CLAMPED, WELDED OR RIVETED TO THE SECTION IN SUCH A MANNER AS TO PREVENT DISPLACEMENT WHEN THE POSTS ARE DRIVEN.
3. WHEN LINE POST ANCHORS ARE OMITTED, DUE TO CHANGE IN SOIL CONDITIONS SUCH AS ROCK, THEN THE POSTS SHALL BE SET IN CONCRETE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO BID ITEM 61901-1000.
4. THE 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) SHALL MEET THE REQUIREMENTS OF ASTM A 641. FURNISHING AND PLACEMENT OF FASTENERS SHALL BE INCLUDED WITH BID 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 WITH ITEM 61901-1000.
6. TWO SPLICES ON THE SAME LINE BETWEEN THE STRAIN POST ASSEMBLIES SHALL NOT BE PERMITTED. NO SPLICES SHALL BE PLACED CLOSER THAN 30 METER OF ANY POST ASSEMBLIES.
7. CONNECT ALL R.O.W. FENCING TO CATTLEGUARDS, CULVERTS (GREATER THAN 1524 mm DIA.). AND CONCRETE 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 AS DIRECTED BY THE COR/COTR. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO 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 INCIDENTALTO THE INSTALLATION OF FENCING AND NO ADDITIONAL PAYMENT SHALL BE MADE.
10. ALL DRILLING INTO ROCK MATERIAL, ETC. SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING AND NO ADDITIONAL PAYMENT SHALL BE MADE.
11. GATE CLOSURE DEVICE SHALL BE STEEL PIPE, NPS 3 /4 (26.7 mm) SCHEDULE 40, CONFORMING TO THE REQUIREMENT OF ASTM A 53. THE GATE CLOSURE STEEL CHAIN SHALL BE WELDED TO THE STEEL PIPE AND CIRCULAR TUBING IRON FENCE POST. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCE POST AND NO ADDITIONAL PAYMENT SHALL BE MADE.
12. CONTRACTOR SHALL BE REQUIRED TO INSTALL SAG WEIGHTS WHERE VERTICAL CLEARANCE BETWEEN THE BOTTOM WIRE AND NATURAL GROUND IS 610 mm OR GREATER. THIS WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF FENCING.
13. THE CONTRACTOR SHALL SUBMIT COMPLETE DETAILED SHOP DRAWINGS FOR PEDESTRAIN GATE, HINGES AND LATCH TO PLANNING AND DESIGN CHIEF, THROUGH THE COR/COTR, FOR REVIEW AND APPROVAL. GATE POSTS, BRACES, HINGES AND LATCH TO MATCH STANDARD TYPE 1 GATES, MINIMUM GATE. FRAME TO BE CONSTRUCTED WITH 30 mm DIAMETER PIPE. GATE SHALL BE SELF CLOSING.



STANDARD 4.27m TYPE 1 GATE
ITEM: 61902-1300

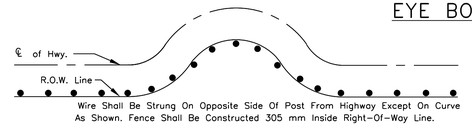
NOTES: When Tubular Post Hangers and/or Latches are used, it shall be drilled for a single 2.38 mm ø Min. drive pin to prevent rotation of the hangers and/or latches.

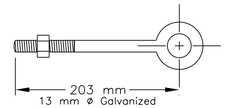
Set Gate to be self closing (use only when specified by special note in the plans)

For Gate Details at Cattle guard location see standard cattle guard drawings.

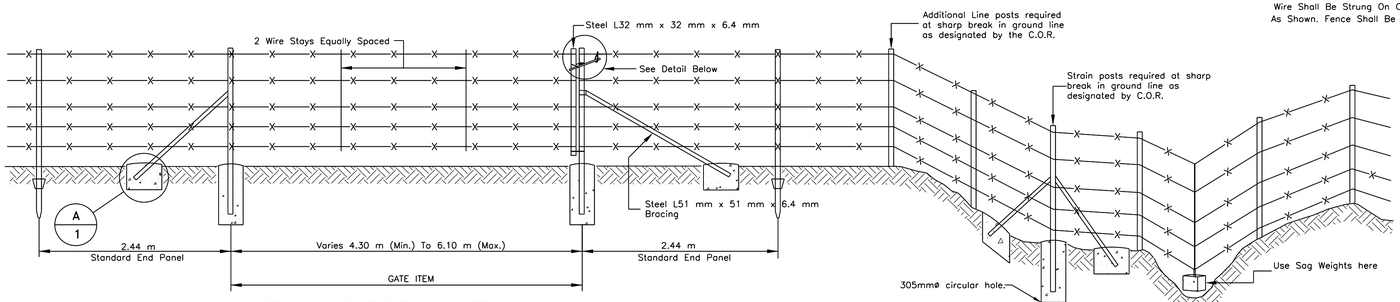
◑ 35 mm ø Tubing 2 Vert. Braces Mesh □, △, ◇, 3.2 mm ø Line Wires 2.6 mm ø Crosswires. 1 Adjustable Diagonal Guy Fully Galvanized.

END POST





EYE BOLT DETAIL

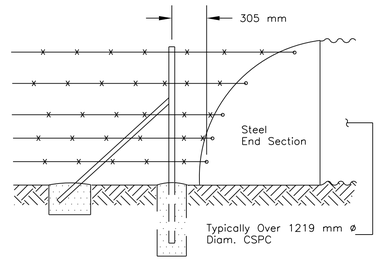


STANDARD TYPE-2 GATE
ITEM: 61902-2600

Use At Locations Noted On Plans

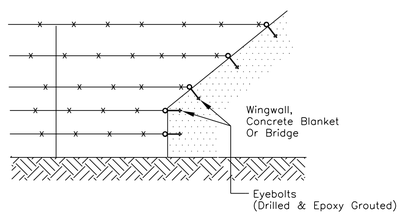
FENCE PROFILE IN ROUGH TERRAIN

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

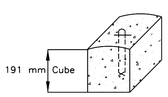


WING FENCE

Detail For Corr.
Metal Culvert



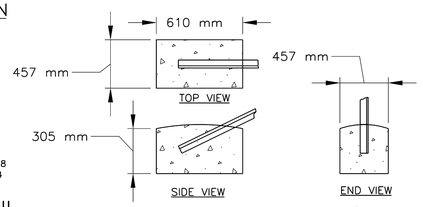
TYPICAL STEEL POST SECTION



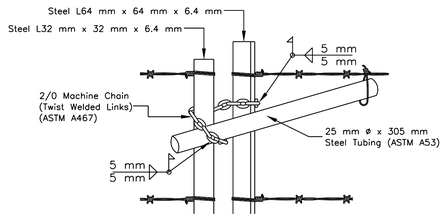
38 mm x 127 mm Doubled and Twisted 3.8 mm(dia.) Wire Loop Centered in Block. 25.4 mm Projection Twisted Ends Down.

CONCRETE SAG WEIGHT DETAIL

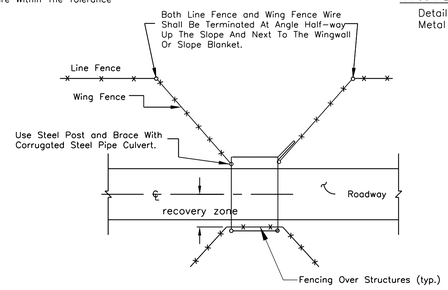
Min. Weight Of Concrete Sag Shall Be 16 kg.



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



GATE SECURING DETAIL



WING FENCE DETAIL

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

STANDARD FENCING DETAIL

DRAWN BY: NRDOT	DATE: 1/31/2013
DESIGNED BY: NRDOT	DATE: 1/31/2013
REVISED: 5/28/2013	BY: Leroy.Toledo
Sht 87 N27 FenDtls rev 082317.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	88	105

GENERAL NOTES

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

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

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

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

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

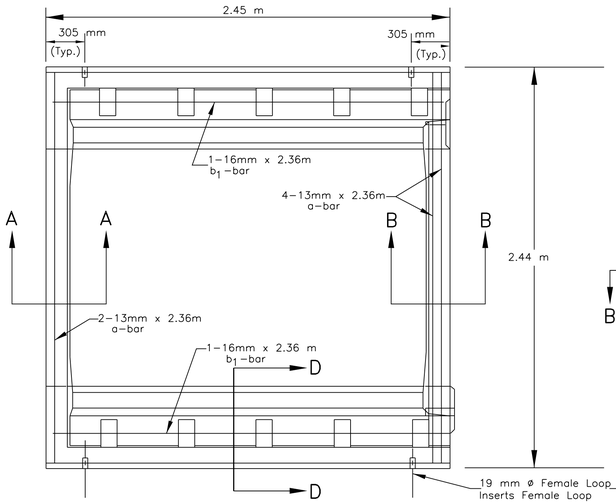
6. WING BRACES SHALL BE CONSIDERED SUBSIDIARY ITEMS TO THE CATTLEGUARD UNIT.

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

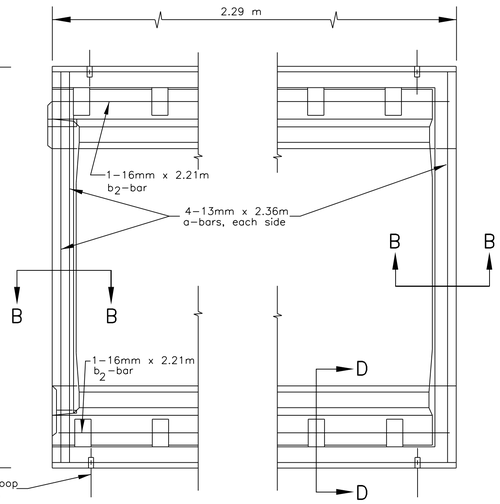
8. ELASTOMERIC BEARING PADS SHALL BE SEAL WITH EPOXY ADHESIVE PRIOR TO THE INSTALLATION OF TRAFFIC GRILL UNIT.

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

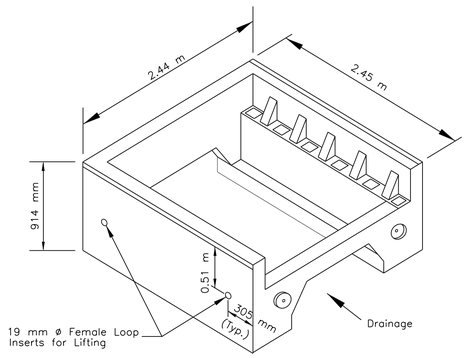
   DESIGN LOADS: HS20 AND DESIGN TANDEM WITH 33% IMPACT.



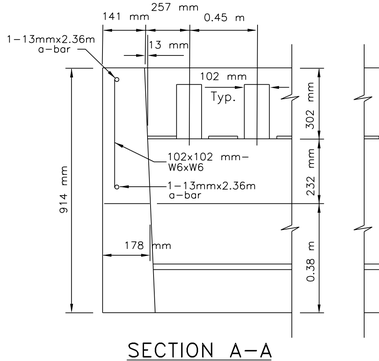
PLAN – END UNIT



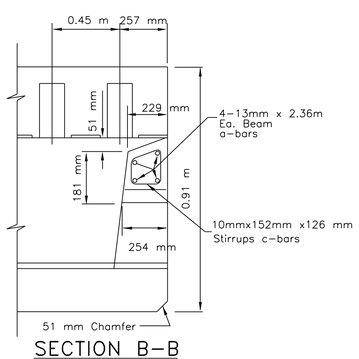
PLAN – INTERMEDIATE UNIT



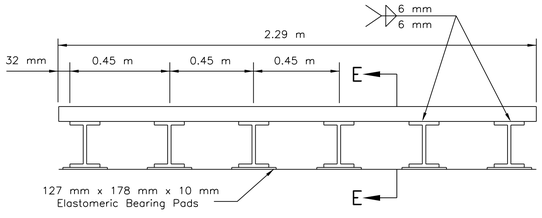
ISOMETRIC VIEW – END UNIT



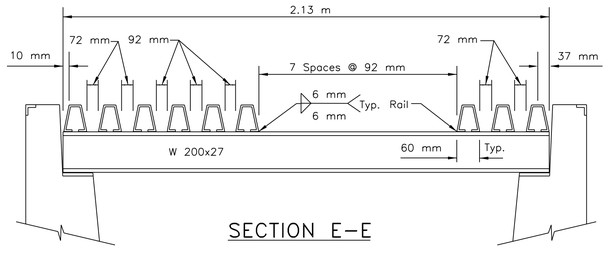
SECTION A–A



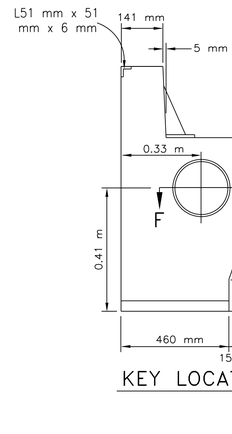
SECTION B–B



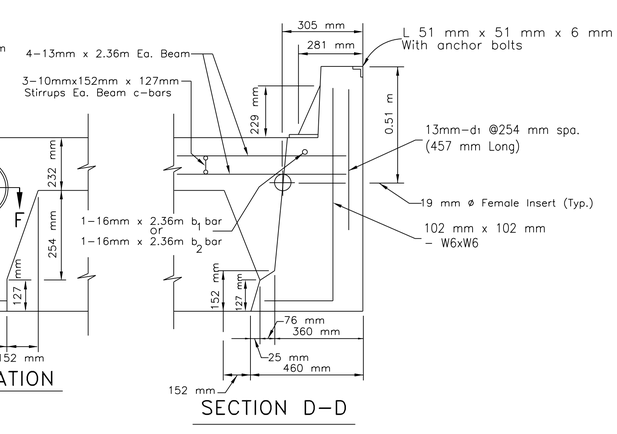
TRAFFIC GRILLE UNIT



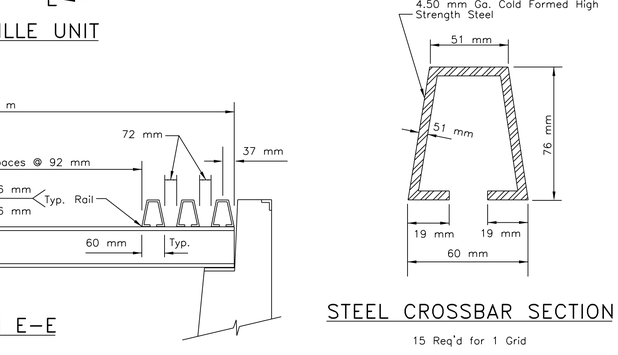
SECTION E–E



KEY LOCATION

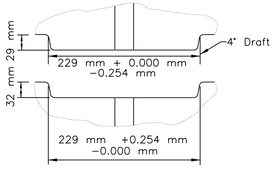


SECTION D–D

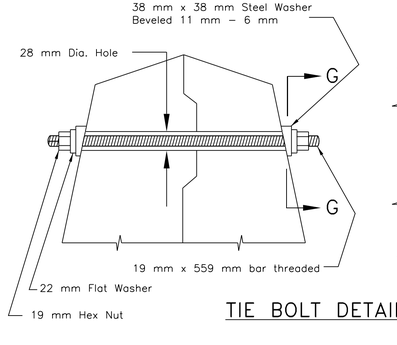


STEEL CROSSBAR SECTION

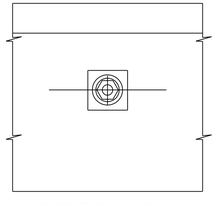
15 Req'd for 1 Grid



SECTION F–F



TIE BOLT DETAIL



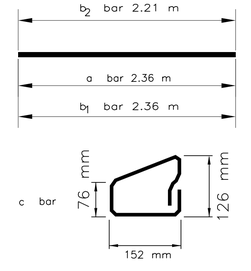
SECTION G–G

REINFORCING STEEL SCHEDULE

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

BENDING DIAGRAMS

ALL DIMENSIONS ARE OUT TO OUT



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

PRECAST CONCRETE CATTLEGUARD DETAILS

DRAWN BY: NRDOT	DATE: 8/26/2015
DESIGNED BY: NRDOT	DATE: 8/26/2015
REVISED: 8/26/2015	BY: Leroy.Toledo
Sht 88 N27 pcc cattleguard dtl rev 082317 dgn	

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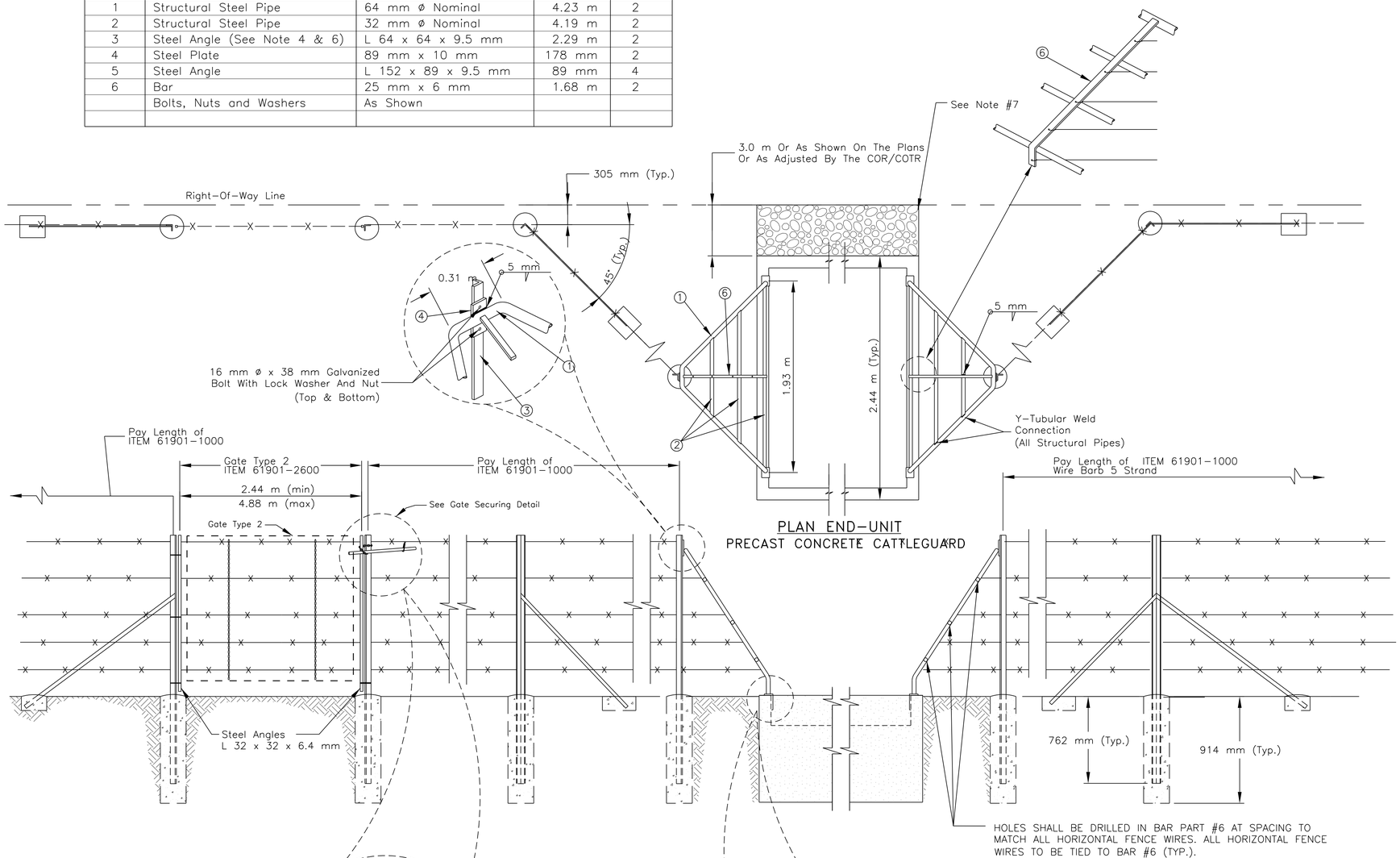
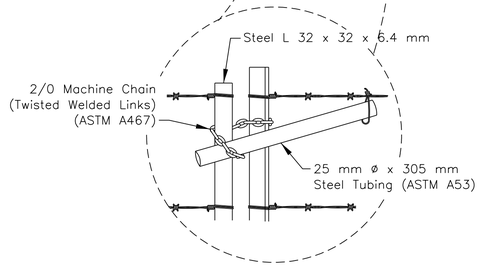
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	89	105

ESTIMATED MATERIAL LIST

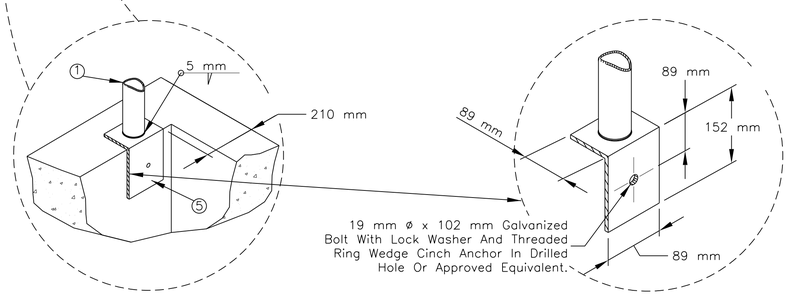
PART NO.	MATERIAL	SIZE AND THICKNESS	LENGTH	QUANTITY
1	Structural Steel Pipe	64 mm ø Nominal	4.23 m	2
2	Structural Steel Pipe	32 mm ø Nominal	4.19 m	2
3	Steel Angle (See Note 4 & 6)	L 64 x 64 x 9.5 mm	2.29 m	2
4	Steel Plate	89 mm x 10 mm	178 mm	2
5	Steel Angle	L 152 x 89 x 9.5 mm	89 mm	4
6	Bar	25 mm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



PLAN END-UNIT
PRECAST CONCRETE CATTLEGUARD



GATE SECURING DETAIL



GENERAL NOTES

1. STRUCTURAL PIPE SHALL CONFORM TO ASTM A53-93a, GRADE B. ALL OTHER STRUCTURAL STEEL SHALL CONFORM TO ASTM-A36.
2. ALL STRUCTURAL PIPE JOINTS SHALL BE FABRICATED IN ACCORDANCE WITH AISC MANUAL OF STEEL CONSTRUCTION, LATEST EDITION.
3. WELDING SHALL MEET THE REQUIREMENTS OF AASHTO STANDARD SPECIFICATIONS FOR WELDING AT STRUCTURAL STEEL HIGHWAY BRIDGES, LATEST EDITION.
4. THE SUPPORTING WING BRACE POSTS LENGTH (PART 3) SHALL PROVIDE A MINIMUM OF 610 mm OF SOIL PENETRATION. UNDER CERTAIN CONDITIONS (SUCH AS DRAIN THROUGH CATTLEGUARD, HIGH EMBANKMENT, ETC.) THE LENGTH OF POST MAY VARY TO FULLY SUPPORT THE WING BRACES. THIS WORK SHALL BE INCIDENTAL TO CONTRACT ITEM 61903. INSTALLATION OF GATE SHALL BE SUBSIDIARY ITEM TO THE CATTLEGUARD ITEM(S).
5. THE 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 CONTRACT ITEM 61903 OF FP-03. ANY MISTAKES MADE BY CORT IN DIRECTING ADJUSTMENTS TO THE FINISHED GRADE FOR THE CATTLEGUARDS AND APPROACH ROADWAY WILL BE CORRECTED UNDER SUBSECTION 109.02(m).
6. AT SKEWED TURNOUT LOCATIONS, THE CATTLEGUARD SHALL BE INSTALLED PERPENDICULAR TO TURNOUT.
7. THE LENGTH OF THE TRUNOUT BETWEEN THE BACK EDGE OF THE CATTLEGUARD AND THE RIGHT-OF-WAY LIMIT SHALL BE SURFACED WITH A 100 mm THICKNESS OF AGGREGATE BASE COURSE AT ALL 4.5 m WIDE TURNOUTS. FOR TURNOUTS WIDER THAN 4.5 m, PLACE AGGREGATE BASE COURSE AND ASPHALT SURFACING TO MATCH THE TURNOUT STRUCTURAL SECTION, BETWEEN THE BACK OF THE CATTLEGUARD AND THE RIGHT-OF-WAY LINE. THE SURFACING MATERIAL AND WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PAVING ITEMS SHOWN IN THE BID SCHEDULE.
8. AT CATTLEGUARD LOCATIONS WHERE THE DESIGN TYICAL WIDTH IS WIDER ON ONE SIDE OF THE CATTLEGUARD THAN THE OTHER SIDE, THE NARROWER ROADWAY WIDTH SHALL FLARED OUT TO MATCH THE WIDER ROADWAY WIDTH USING AN 8:1 TAPER OR TO THE LENGTH ALLOW BY THE RIGHT-OF-WAY WIDTH. THIS INCLUDES AT NARROW RIGHT-OF-WAY WIDTH WHERE THE TURNOUT RADIUS CANNOT BE COMPLETELY INSTALL BETWEEN THE MAIN ROAD AND THE CATTLEGUARD. THIS WORK SHALL BE PAID UNDER THE EARTHWORK, AGGREGATE BASE, AND PAVING ITEMS INCLUDED IN THED BID SCHEDULE.

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

CATTLEGUARD AND WING BRACE DETAILS

DRAWN BY: NRDOT	DATE: 2/12/2014
DESIGNED BY: NRDOT	DATE: 2/12/2014
REVISED: 6/1/2015	BY: Leroy.Toledo
Sht 89 N27 CG Wing bracing rev 082317.dgn	

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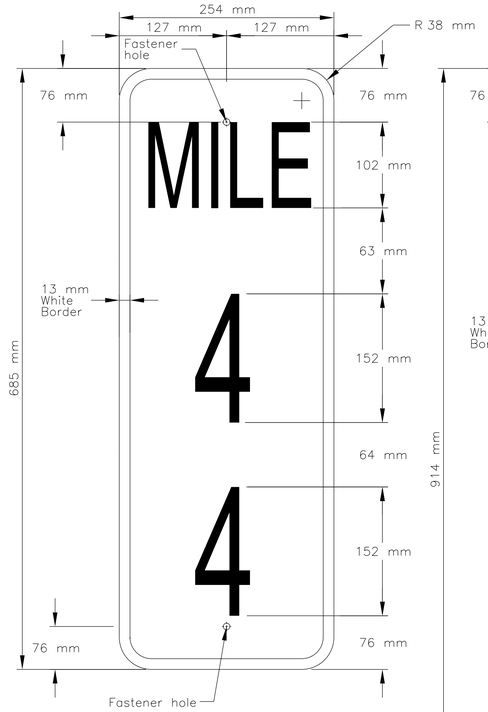
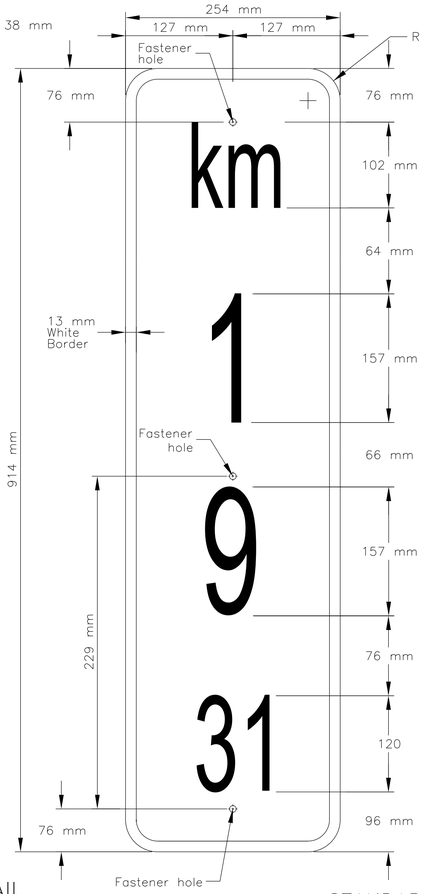
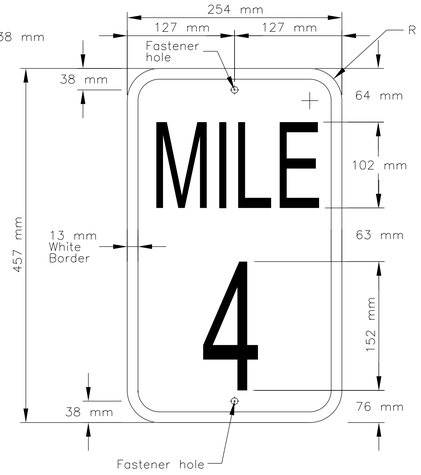
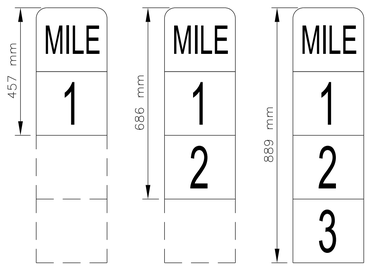
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	90	105



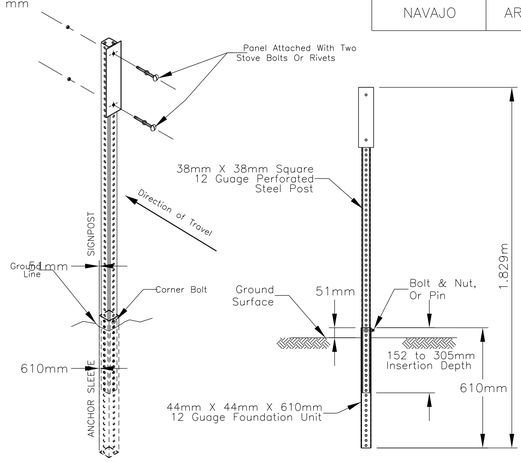


TYPICAL MILEPOST DETAIL



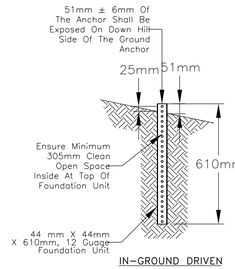


STANDARD NUMERAL POSITION

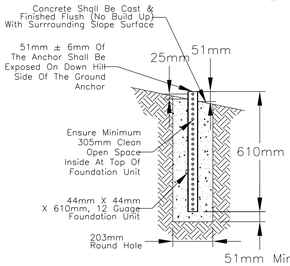


ISOMETRIC VIEW

ALTERNATE ASSEMBLY

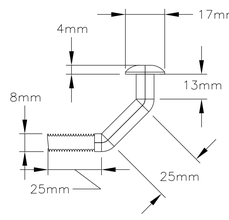


IN-GROUND DRIVEN

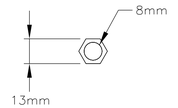


IN-GROUND CONCRETE

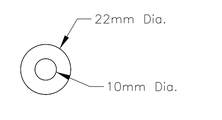
Use Chair Device To Ensure Minimum 51mm Clearance Above Bottom Of Hole



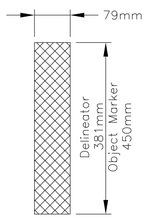
BREAK-AWAY BOLT



LOCK NUT

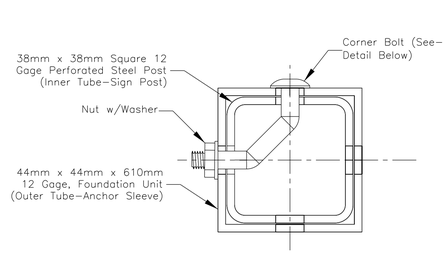


FLAT WASHER

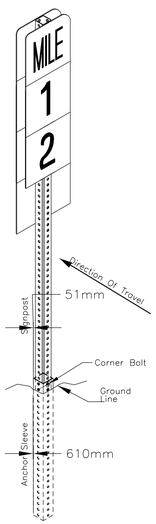


REFLECTIVE PANEL
(Pre-Drilled/Punched)

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



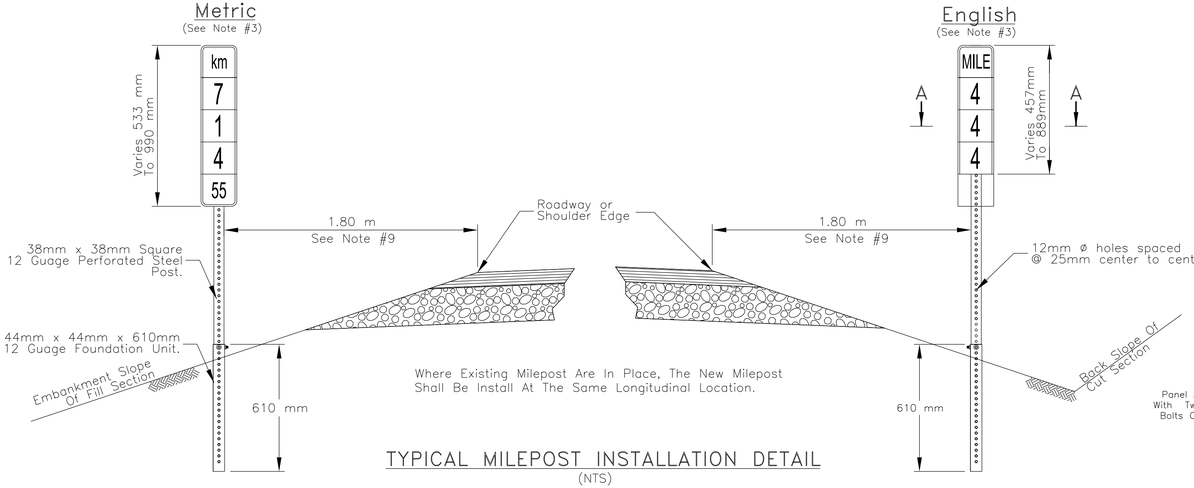
"BREAK-AWAY" DETAIL
SIGN POST/SLEEVE INTERFACE



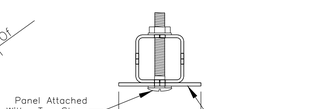
ISOMETRIC VIEW
NOTE: Square Tube Splice Connection Detail on Sheet 59

Project: N27(2-3)1,2&4
ITEM: 63318-1020 MILEPOST, 1-38 mm x 38 mm STEEL SQUARE TUBE

STATION (m)	LOCATION	Kilometers (Labels)	MILES (Labels)	QUANTITY (Each)
54+077.86	Lt. & Rt.	53.1	33	2
55+686.86	Lt. & Rt.	54.7	34	2
57+295.86	Lt. & Rt.	56.3	35	2
58+904.86	Lt. & Rt.	57.9	36	2
60+513.86	Lt. & Rt.	59.5	37	2
			TOTAL:	10



TYPICAL MILEPOST INSTALLATION DETAIL
(NTS)



SQUARE TUBE POST AND PANEL

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 REFER TO SHEET 94 FOR PLACEMENT LOCATIONS FOR THE DELINEATORS.
3. THE MILE POSTS (38mm x 38mm) 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 (GALV)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/COTR 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.
12. THE CONTRACTOR SHALL USE 51mm x 51mm ALL STEEL SQUARE TUBE HIGHWAY DELINEATORS. DELINEATEORS TYPE 1a AND 1b SHALL BE INSTALLED 610mm (Min.) OR 1219mm (Normal) OR IN-LINE WITH GUARDRAIL POSTS MEASURED FROM ROADWAY SHOULDER EDGE. DELINEATORS TYPE 1c (i.e. DRAINAGE STRUCTURE) AND OBJECT MARKERS SHALL BE USED TO MARK OBSTRUCTIONS THAT ARE LOCATED WITHIN 610mm (Min.) OR 1219mm (Normal) OF THE PAVEMENT EDGE AND SHALL BE MOUNTED ON OR IMMEDIATELY IN FRONT OF THE OBSTRUCTION.

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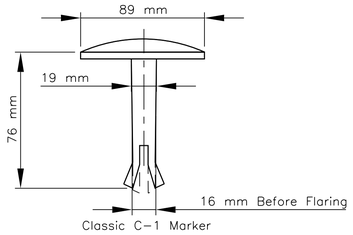
STANDARD MILEPOST AND PERFORATED SQUARE STEEL TUBE POST DETAILS

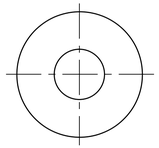
DRAWN BY: NRDOT	DATE: 2/12/2014
DESIGNED BY: NRDOT	DATE: 2/12/2014
REVISED: 6/1/2015	BY: Leroy.Toledo
$FILES$	

$FILES$

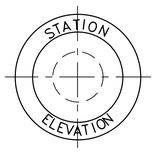
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	91	105



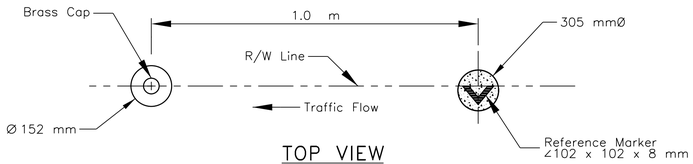
BRASS CAP DETAIL



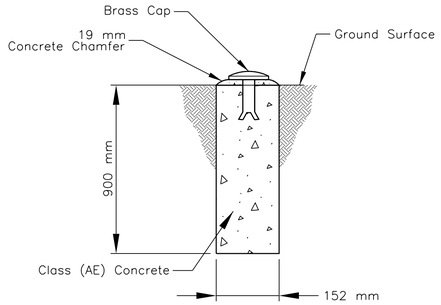
BOTTOM VIEW



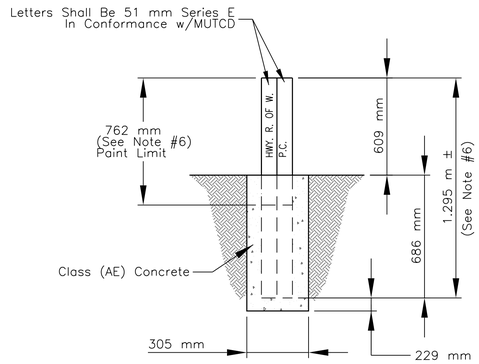
TOP VIEW



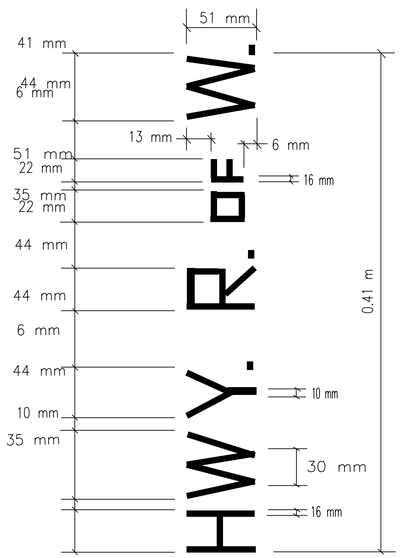
TOP VIEW



SURVEY MONUMENT
NTS



REFERENCE MARKER
NTS



DETAIL OF LETTERS

R/W MONUMENT SYMBOL

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

Station	Description	Location	Monument	Marker
		N27(2-3)1,2&4		
53+433.843	PC 6	30.48 m Lt. & Rt.	2	2
53+553.979	PT 6	30.48 m Lt. & Rt.	2	2
54+372.346	PC 7	30.48 m Lt. & Rt.	2	2
54+517.904	PT 7	30.48 m Lt. & Rt.	2	2
55+700.000	POT	30.48 m Rt.	1	1
55+700.000	POT	40.00 m Rt.	1	1
56+210.000	POT	30.48 m Lt.	1	1
56+210.000	POT	55.00 m Lt.	1	1
56+250.000	POT	55.00 m Lt.	1	1
56+250.000	POT	30.48 m Lt.	1	1
56+349.561	PC 8	40.00 m Lt. & 30.48 m Rt.	2	2
56+466.533	PT 8	40.00 m Lt. & 30.48 m Rt.	2	2
56+920.000	POT	40.00 m Rt.	1	1
56+920.000	POT	30.48 m Rt.	1	1
57+841.693	PC 9	30.48 m Lt. & Rt.	2	2
57+958.332	PT 9	30.48 m Lt. & Rt.	2	2
58+580.000	POT	30.48 m Rt.	1	1
58+580.000	POT	40.00 m Rt.	1	1
58+640.000	POT	40.00 m Rt.	1	1
58+640.000	POT	30.48 m Rt.	1	1
58+956.468	PC 10	30.48 m Lt. & Rt.	2	2
59+064.974	PT 10	30.48 m Lt. & Rt.	2	2
59+457.419	PC 11	30.48 m Lt. & Rt.	2	2
59+644.530	PT 11	30.48 m Lt. & Rt.	2	2
59+920.000	POT	30.48 m Rt.	1	1
59+920.000	POT	60.00 m Rt.	1	1
59+960.000	POT	60.00 m Rt.	1	1
59+960.000	POT	30.48 m Rt.	1	1
60+000.000	POT	15.24 m Rt.	1	1
60+000.000	POT	30.48 m Rt.	1	1
60+164.386	EOP	15.24 m Rt.	1	1
60+164.386	EOP	30.48 m Lt.	Existing	Existing
		Sub-Total:	43	43
		N27(4-2)2&4		
60+164.386	BOP	12.19 m Lt. & Rt.	2	2
60+838.446	EOP	12.19 m Lt.	2	
60+833.064	EOP	12.19 Rt.		2
		N27(4-2)2&4: SUB-SURFACE DRAINAGE/OPEN CHANNEL		
0+142.273	Begin ROW	12.00 m Lt. & Rt.	2	2
0+430.920	PC 1	12.00 m Lt. & Rt.	2	2
0+450.818	PT 1	12.00 m Lt. & Rt.	2	2
0+560.000	EOP	12.00 m Lt. & Rt.	2	2
		Sub-Total:	12	12
		N7(2-3)2&4--Roundabout		
Base Station	**Location**	**Offset:**	**Monument (ea.)**	**Marker (ea.)**
2+817.898	Lt.	15.240 m Lt.	1	1
2+817.898	Lt.	22.192 m Lt.	1	1
2+843.595	Lt.	22.192 m Lt.	1	1
2+843.595	Lt.	37.192 m Lt.	1	1
2+907.500	Lt.	13.192 m Lt.	1	1
2+907.500	Lt.	18.192 m Lt.	1	1
2+922.896	Lt.	18.192 m Lt.	1	1
2+922.896	Lt.	15.240 m Lt.	1	1
2+817.898	Rt.	15.240 m Rt.	1	1
2+817.898	Rt.	42.192 m Rt.	1	1
2+917.900	Rt.	22.555 m Rt.	1	1
2+917.900	Rt.	15.240 m Rt.	1	1
		Sub-Total:	12	12
		N105(1)2&4		
0+030.766	Begin ROW	41.910 m Lt.	2	2
0+030.416	Begin ROW	9.450 m Rt.	Existing	Existing
0+368.329	POT	41.910 m Lt.	1	1
0+368.329	POT	19.050 m Lt.	1	1
0+455.606	PC 1	19.050 m Lt.	1	1
0+455.606	PC 1	11.189 m Lt. & Rt	2	2
0+576.822	PT 1	11.189 m Lt. & Rt	2	2
0+610.000	EOP	11.189 m Lt. & Rt	2	2
		Sub-Total:	11	11
		Total:	78	78

GENERAL NOTES

1. Survey monuments and reference markers shall be placed as shown on the plans or as director by COTR/COR. The cost of supplying all materials and installation of Right-Of-Way Monument and Markers shall be included in the unit price bid under item 62101-0000 & 62102-0000.
2. If rock is encountered when installing the Right-Of-Way Monument and reference Marker, drill a 152 mm ø for survey monument and 305 mm ø for reference marker hole in the rock to the depth required to install the monument and marker to full depth. All holes drilled 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. Furnishings and placement 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 CORT.
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 tip 762 mm and shall conform to subsection 708.04(c), (d), or (e) of FP-03.
   c) All letters, numerals, symbols, etc. shall be painted on the reference markers using the dimensions shown using black Lamp paint conforming to ASTM D 209. The required information to place on the reference markers shall be furnished to the Contractor by the AOTR/COR.
7. The Contractor has the option to use an approved State Highway paint specifications in lieu of that stated in Note (6) above. The Contractor shall submit (in writing) the paint specifications and request for use on the project at least 14 days in advance of the paint use for review and approval. The contractor shall not be allowed to use any paint until the proper approval has been given by the COTR/COR. Any painting performed by the contractor without the proper approval shall cause the work to be rejected.
8. The Contractor shall use glass fiber type highway delineators. The cost of supplying materials and installation of steel U-channel shall be included in the unit price bid under Items 63308-2000, 63309-0010, and 63309-0020.
9. Set Right-Of-Way monument at station and offset to match the Right-Of-Way plat. These locations may vary from the stations and offsets shown on the construction plan and profile sheets. The COR/COTR shall furnish the ROW Plat during construction.

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

RIGHT-OF-WAY & REFERENCE MARKERS DETAILS

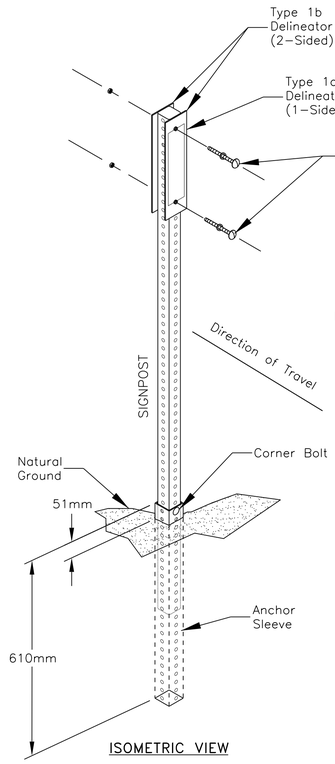
DRAWN BY: NRDOT	DATE: 8/26/2015
DESIGNED BY: NRDOT	DATE: 8/26/2015
REVISED: 8/26/2015	BY: Leroy.Toledo
Sht 91 N27 RWMontMkrs rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 91 N27 RWMontMkrs rev 082317.dgn

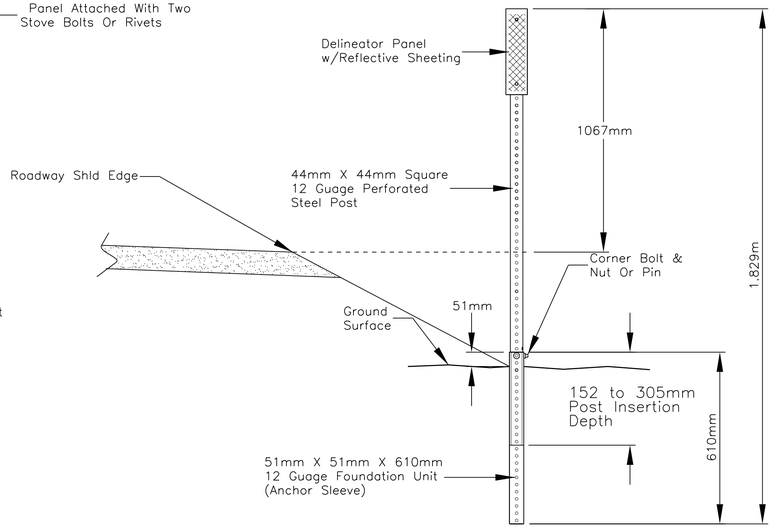
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	92	105
			N27	N27(4-2)2&4		
			N7	N7(2-3)2&4		

GENERAL NOTES

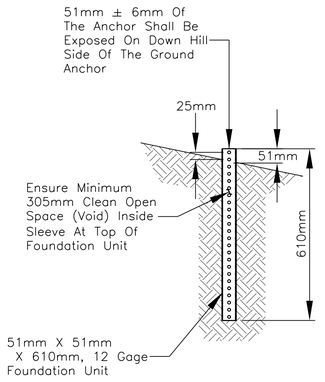
1. ALL CONCRETE SHALL BE CLASS A(AE) AND SHALL CONFORM TO SECTION 601 OF THE FP-03. FURNISHING AND PLACING OF CONCRETE, WHEN REQUIRED, SHALL BE CONSIDERED INCIDENTAL TO ITEM 63309-0020.
2. THE CONTRACTOR SHALL USE 44x44 mm STEEL SQUARE TUBE FOR ALL TYPE "1a", "1b" & 2 DELINEATORS. SEE SHEET 93 FOR POST SPACING.



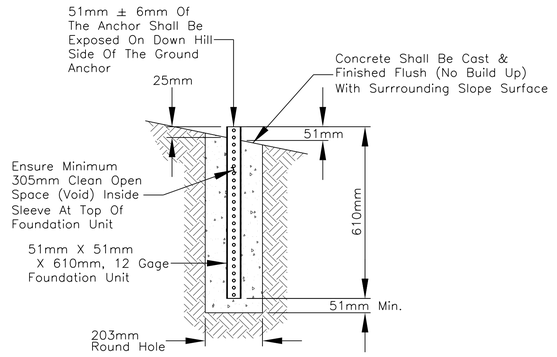
ISOMETRIC VIEW



ALTERNATE ASSEMBLY



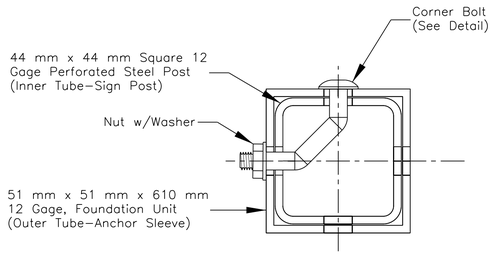
IN-GROUND DRIVEN



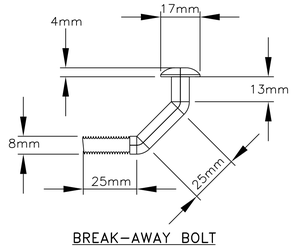
IN-GROUND CONCRETE

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

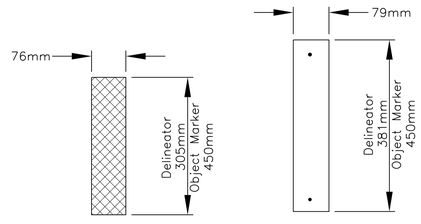
LOCK NUT FLAT WASHER



"BREAK-AWAY" DETAIL
SIGN POST/SLEEVE INTERFACE

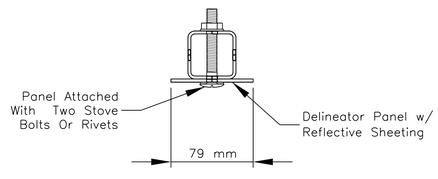


BREAK-AWAY BOLT



REFLECTIVE SHEETING

DELINEATOR PANEL
(Pre-Drilled/Punched)



SQUARE TUBE POST AND PANEL

TYPE	POST	HIGH INTENSITY REFLECTIVE SHEETING
1a	SQ. TUBE	WHITE, ONE SIDE
1b	SQ. TUBE	WHITE, BOTH SIDES
2	SQ. TUBE	AMBER, ONE SIDE

UNITED STATES
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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

SQUARE TUBE STEEL POST AND REFLECTIVE PANEL DELINEATOR DETAILS

DRAWN BY: NRDOT	DATE: 1/24/2013
DESIGNED BY: NRDOT	DATE: 1/24/2013
REVISED: 12/18/2014	BY: Peterson.Yazzie
Sht 92 N27 SqTube Reflect Delin Dtls rev 082317.dgn	

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 92 N27 SqTube Reflect Delin Dtls rev 082317.dgn

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	93	105

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

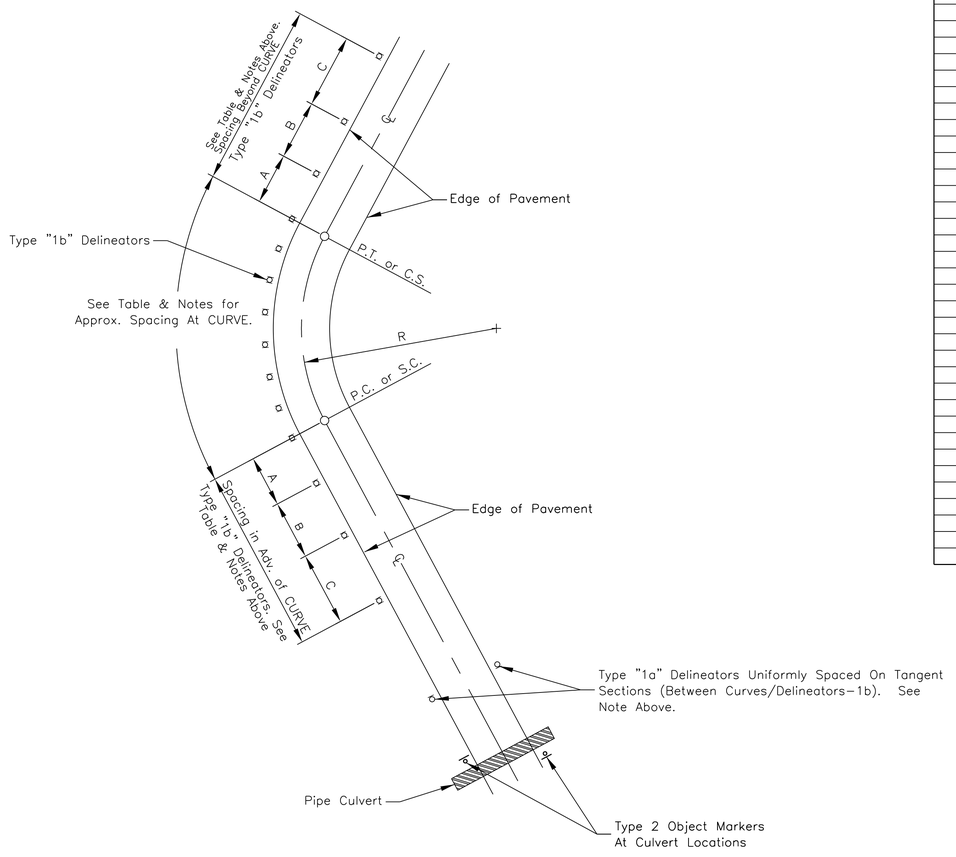
S= 1.7 * sq. rt. (R-15).
Spacing for specific radii may be interpolated from table.
The spacing on curves should not exceed 90 meters.
Shaded areas denotes to use 90 meter spacings.
Delineators should be spaced 60 to 160 meters apart on Roadway tangent sections.

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.

NOTE: Delineator and Object Markers shall be installed 610 (min) or 1219 mm (max) mearsured from Roadway or shoulder hinge point edge outward. For guardrail locations, place delineator in-line with the guardrail posts.

Project N27(2-3)1,2&4
ITEM 63308-2000: OBJECT MARKERS, Type 2
ITEM 63308-3000: OBJECT MARKERS, Type 3

STATION	LOCATION	TYPE 2	TYPE 3
53+826.026	Rt. & Lt.		2
53+865.65	Rt. & Lt.		2
56+246.00	Rt.	1	
56+247.00	Lt.	1	
58+932.00	Rt.	1	
58+947.89	Lt.	1	
59+003.44	Rt.	1	
59+017.00	Lt.	1	
59+060.00	Rt.	1	
59+084.91	Lt.	1	
59+182.81	Rt.	1	
59+193.00	Lt.	1	
59+738.00	Rt.	1	
59+753.00	Lt.	1	
59+952.00	Rt.	1	
59+963.00	Lt.	1	
60+105.00	Rt.	1	
60+177.00	Lt.	1	
	TOTAL	16	4



Project N27(2-3)1,2&4
ITEM 63309-0030 - DELINEATORS, Type-1a
ITEM 63309-0040 - DELINEATORS, Type-1b

Station	Offset	Type 1a	Type 1b
53+276.840	Left		1
53+366.840	Left		1
53+433.840	Left		1
53+463.870	Left		1
53+493.900	Left		1
53+523.930	Left		1
53+553.980	Left		1
53+620.980	Left		1
53+720.980	Left		1
53+920.980	Left		1
54+005.350	Right		1
54+205.350	Right		1
54+305.350	Right		1
54+372.350	Right		1
54+401.460	Right		1
54+430.570	Right		1
54+459.680	Right		1
54+488.790	Right		1
54+517.900	Right		1
54+605.000	Right		1
54+684.900	Right		1
54+884.900	Right		1
55+033.630	Left	1	
55+033.630	Right	1	
55+182.360	Left	1	
55+182.360	Right	1	
55+331.090	Left	1	
55+331.090	Right	1	
55+479.820	Left	1	
55+479.820	Right	1	
55+628.560	Right		1
56+021.560	Right		1
56+218.560	Right		1
56+349.560	Right		1
56+597.530	Right		1
56+794.530	Right		1
57+180.000	Right		1
57+180.000	Left		1
57+513.690	Left		1
57+710.690	Left		1
57+841.690	Left		1
57+900.000	Left		1
57+958.330	Left		1
58+089.330	Left		1
58+286.330	Left		1
58+432.470	Right		1
58+679.330	Left		1
58+718.470	Right		1
58+861.470	Right		1
59+159.970	Right		1
59+260.000	Right		1
59+260.000	Left		1
59+362.420	Left		1
59+457.420	Left		1
59+504.190	Left		1
59+550.960	Left		1
59+597.730	Left		1
59+644.530	Left		1
	Total	8	50

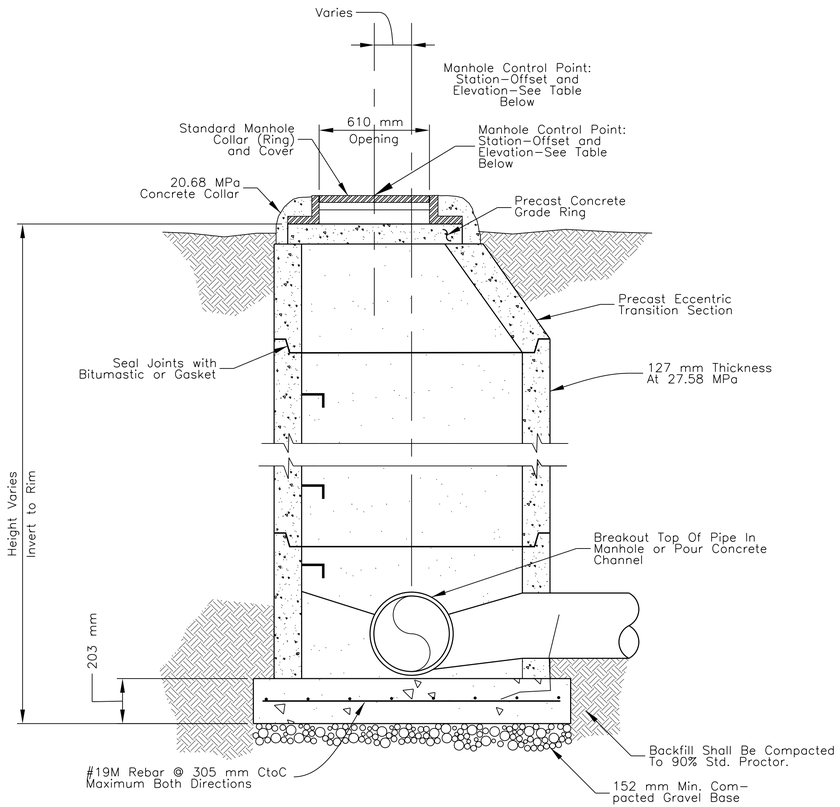
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

DELINEATOR, OBJECT MARKER PLACEMENT DETAIL & TABLES

DRAWN BY: NRDOT DATE: 3/7/2014
DESIGNED BY: NRDOT DATE: 3/7/2014
REVISED: 8/31/2016 BY: Leroy.Toledo
Sht 93 N27 Delin_Obj_Mkr Placement Table rev 0823[illegible].dgn

I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 93 N27 Delin_Obj_Mkr Placement Table rev 0823[illegible].dgn

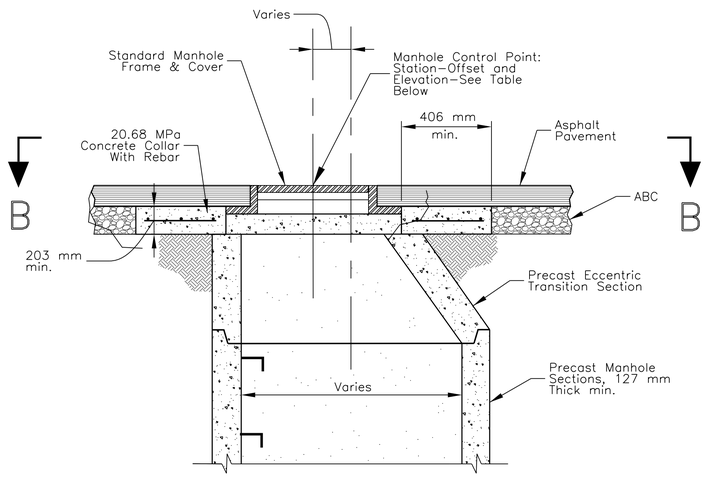
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	94	105
			N27	N7(2-3)2&4		



SECTION VIEW

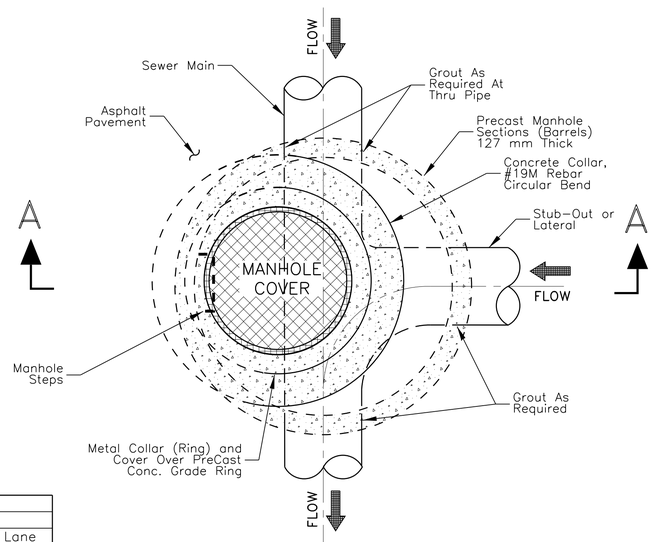
RURAL AREAS

MAINLINE: SIZE	MANHOLE: INSIDE DIMENSION
203 mm to 610 mm	1.219 m
Over 610 mm	1.828 m



SECTION VIEW

PAVED AREAS-SECTION A-A



PLAN VIEW

PAVED AREAS-SECTION B-B

GENERAL NOTES

1. THE CONTRACTOR SHALL CONTACT THE NAVAJO TRIBAL UTILITY AUTHORITY (NTUA) WATER DEPARTMENT, FOR WATER/SEWER LINE, GATE VALVE, AND CONCRETE MANHOLE AS-BUILT DRAWINGS.
2. PRECAST MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH AASHTO M199.
3. IN RURAL AREAS NOT IN STREETS, MANHOLE SHOULD EXTEND 152mm ABOVE GROUND LEVEL.
4. MINIMUM 1-51mm GRADE RING BUT NOT MORE THAN 305mm OF GRADE RINGS, PROVIDE CONCRETE COLLAR ON EXTEND. GRADE RINGS SHOULD BE SIZED SUCH THAT NO MORE THAN TWO (2) COLLARS ARE NEEDED.
5. CONCRETE FORCAST-IN-PLACE MANHOLES SHALL BE CLASS A(AE) WITH CLASS 1 FINISH. CONCRETE SHALL CONFORM TO SECTIONS 552 & 601 OF THE FP-03. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF F'c = 20.684 MPa IN 28 DAYS.
6. REINFORCING STEEL SHALL CONFORM TO AASHTO SPECIFICATOIN M-31 (ASTM A 615M), GRADE 40, AND SECTION 554 OF FP-03. ALL REINFORCING STEEL SHALL HAVE 76mm CLEARANCE COVER UNLESS OTHERWISE AS NOTED IN THE DETAILS. ALL REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO ITEM 60401-1000.
7. IN NO CASE SHALL ANY BACKFILL BE PLACED UNTIL THE CONCRETE HAS ATTAINED A COMPRESSIVE STRENGTH OF 17.24 MPa.
8. THE CONTRACTOR SHALL BE REQUIRED TO MAKE FIELD ADJUSTMENTS AS DIRECTED BY THE COR/COTR TO MATCH FIELD CONDITIONS. THESE ADJUSTMENTS SHALL BE CONSIDERED INCIDENTALTO ITEM 60401-1000.

ITEM NO. 60401-0000 - MANHOLE ADJUSTMENT

STATION	OFFSET	LOC	QTY (Each)	FINISH ELEV (m)	REMARKS
N7(2-3)2&4					
2+790.02	5.15	Rt.	1	1,680.27	Sewer Manhole Adjustment/East Bound Lane
2+889.35	4.85	Rt.	1	1,682.10	Sewer Manhole Adjustment/Center Island
		Total:	2		

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NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

MANHOLE INSTALLATION DETAILS

DRAWN BY: NRDOT	DATE: 8/23/2017
DESIGNED BY: NRDOT	DATE: 8/23/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 94 Manhole Detail rev 082317.dgn	

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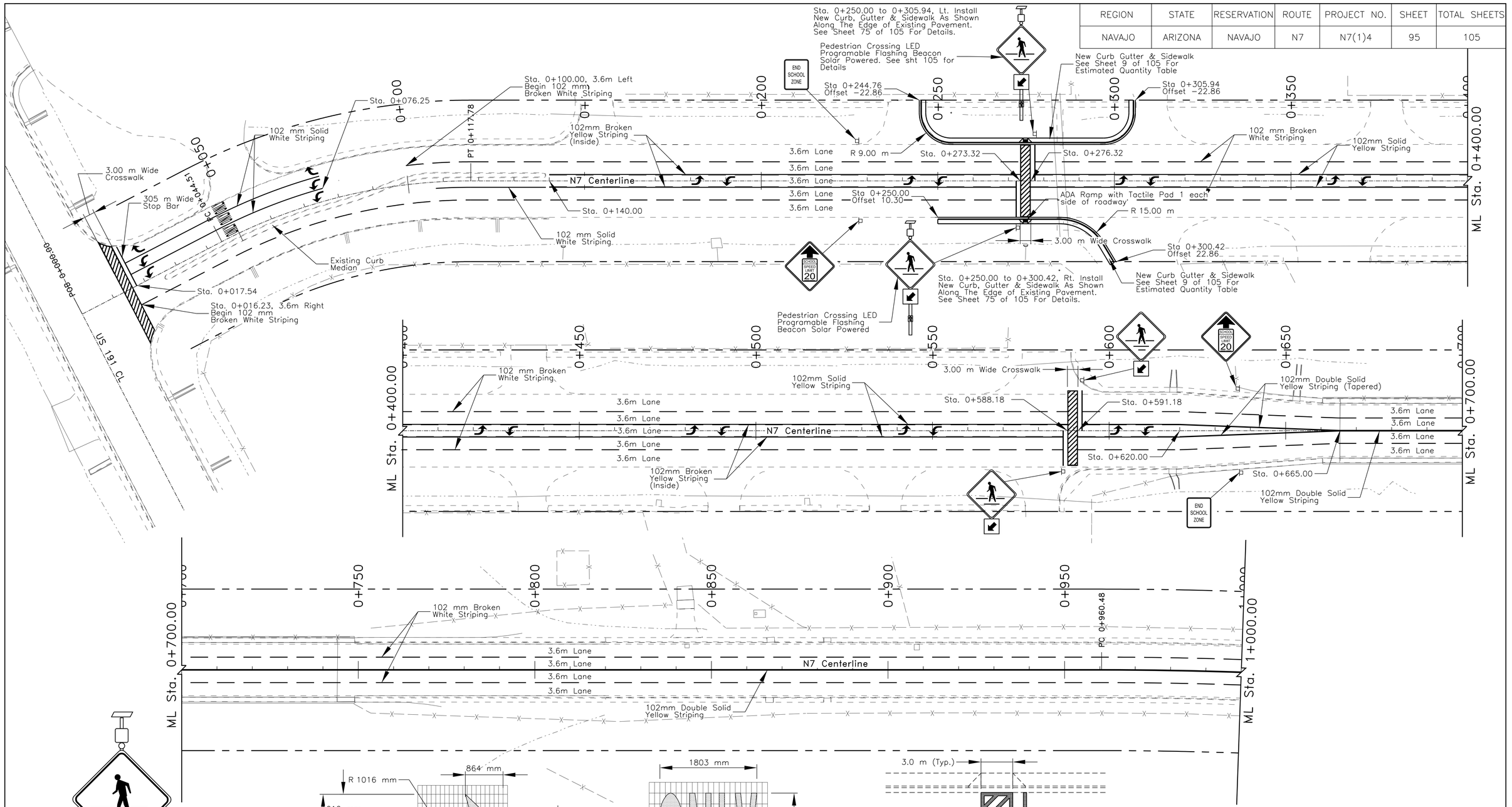
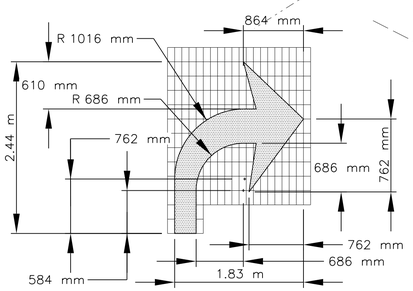
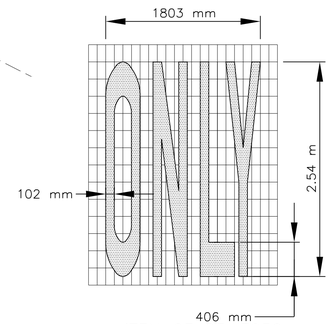
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(1)4	95	105



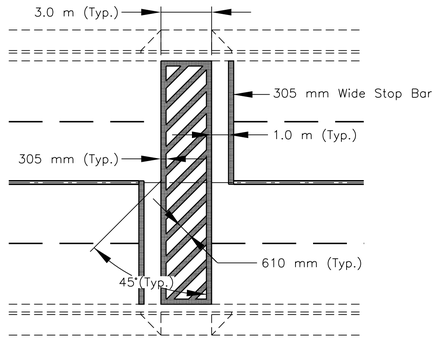
ITEM 63600-1100
Pedestrian Crossing LED
Programable Flashing Beacon
Solar Powered, 2 Each Req'd
At Sta. 0+272.32 Rt. & 0+277.32 Lt.



ITEM 63405-2900
Pavement Marking, Elongated
Turn Lane-Use Arrow,
Type "H"
22 Each Req'd



ITEM 63405-3050
Pavement Marking Word
"ONLY", Type "H"
3 Each Req'd



ITEM 63405-3280
Typical Pavement Marking, Crosswalk,
Type "H", 8 Each Req'd

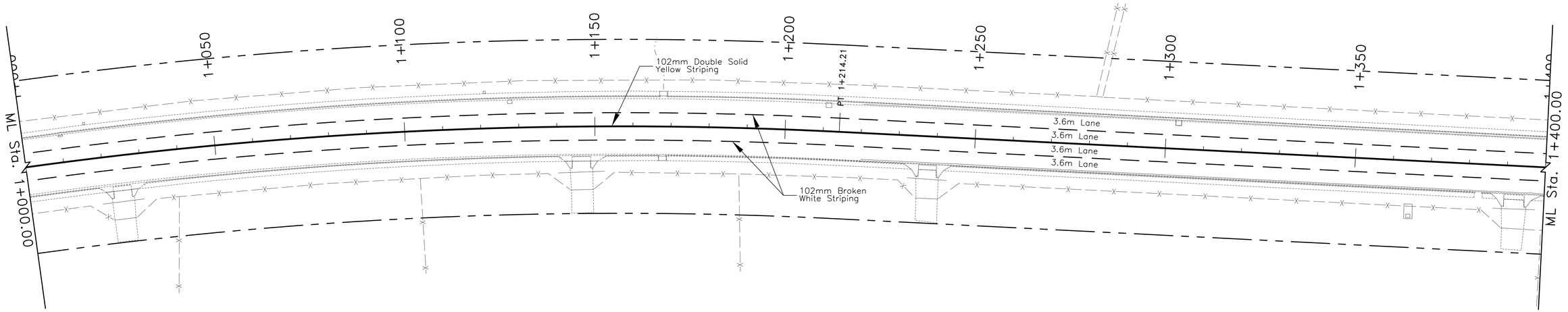
UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

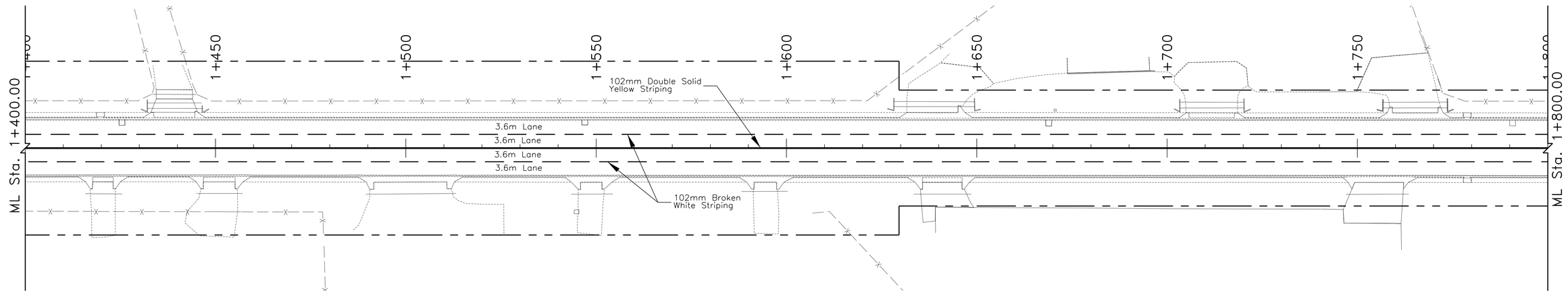
NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

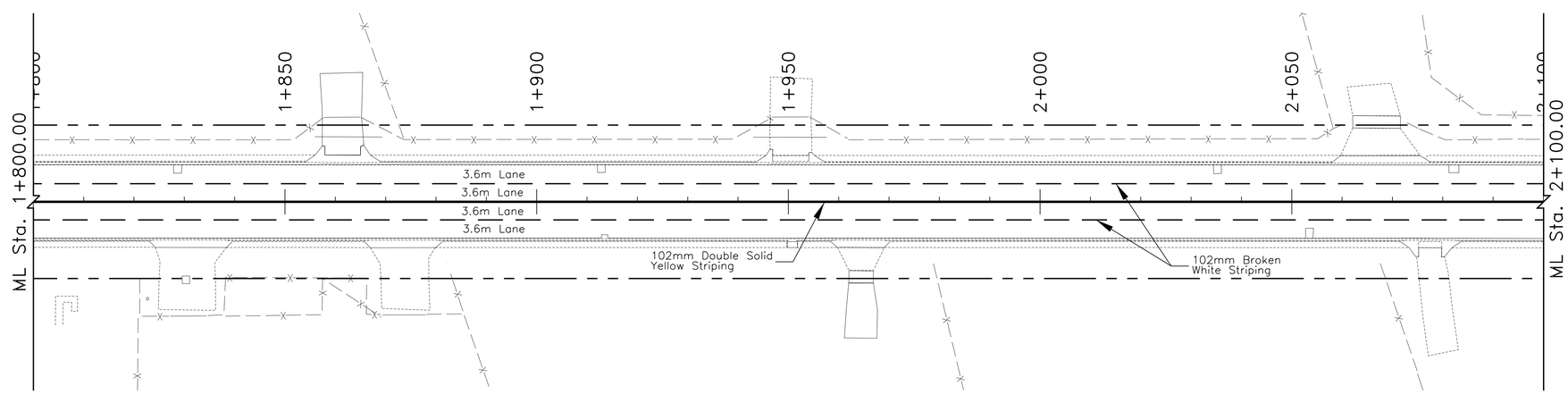
N7 PERMANENT PAVEMENT MARKING LAYOUT DETAIL

DRAWN BY: NRDOT	DATE: 8/4/2017
DESIGNED BY: NRDOT	DATE: 8/4/2017
REVISED: 8/7/2017	BY: Leroy.Toledo
Sht 95 REV N7 Striping 1 rev 082417.dgn	

REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(1)4	96	105







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

N7 PERMANENT PAVEMENT MARKING LAYOUT DETAIL

DRAWN BY: NRDOT	DATE: 8/24/2017
DESIGNED BY: NRDOT	DATE: 8/24/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 96 REV N7 Striping 2 rev 082417.dgn	

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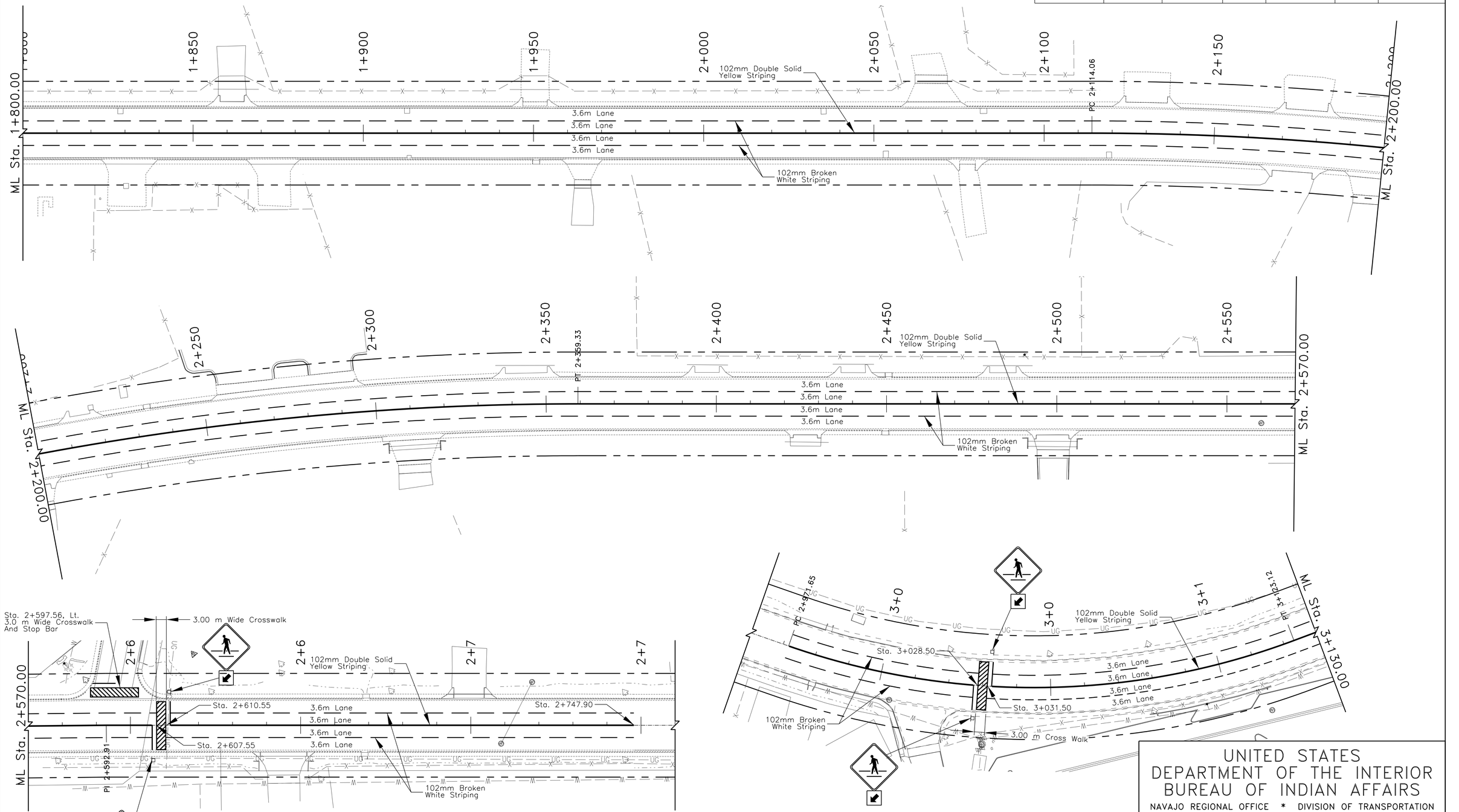
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(1)4	97	105



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

N7 PERMANENT PAVEMENT MARKING LAYOUT DETAIL

DRAWN BY: NRDOT	DATE: 8/24/2017
DESIGNED BY: NRDOT	DATE: 8/24/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 97 REV N7 Striping 3 rev 082417.dgn	

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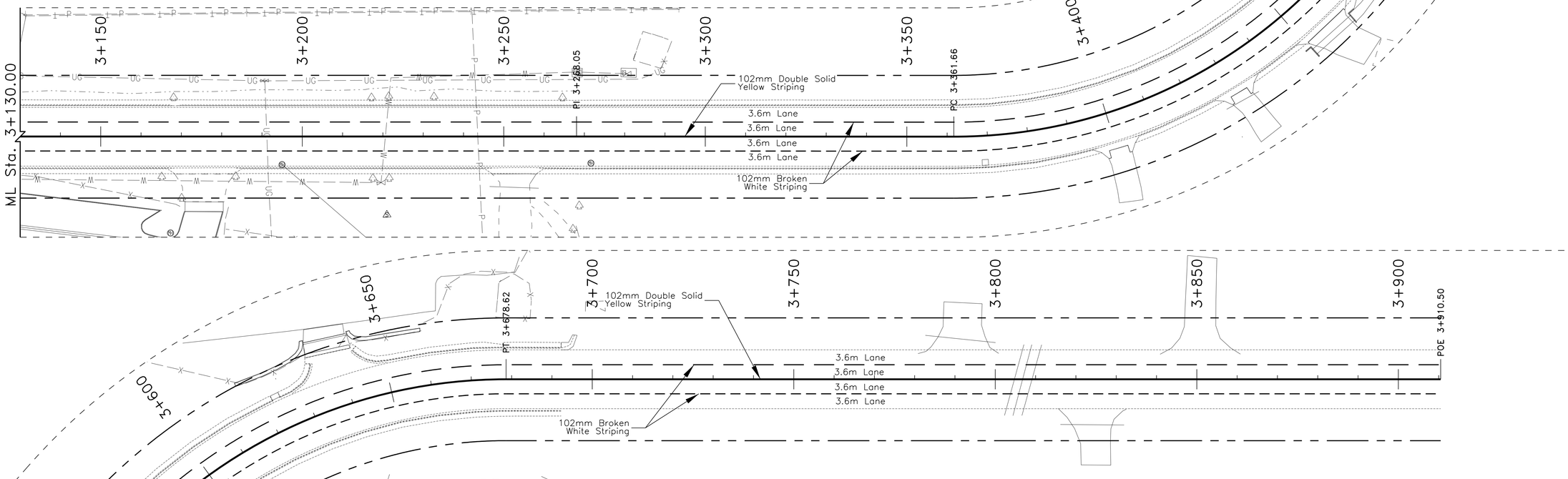
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(1)4	99	105

N7(1)4 PERMANENT TRAFFIC CONTROL – Sign, Post, & Hardware

Station	Location	Detail No.	Description	Sign Panel Size	Area of Sign (sq/m)	Number of Square Tube Post	Square Tube Post Size	No. of Panel	Total Area (sq/m)
0+227.60 0+636.90	Rt. Lt.	S4-5		914 x 914 mm	0.84	1	57 x 57 mm	2	1.680
0+227.60 0+636.90	Lt. Rt.	S5-3		610 x 762 mm	0.46	1	44 x 44 mm	2	0.920
0+587.18 0+592.18 2+607.55 2+610.55 3+027.50 3+032.50	Rt. Lt. Rt. Lt. Rt. Lt.	W11-2 W16-7P		914 x 914 mm 610 x 305 mm	0.84 0.17	2	57 x 57 mm	6 6	5.010 0.990
63302-2002 – Sign Installation, 1 post – 44 mm x 44 mm Square Steel Tube									0.92 sq/m
63302-2007 – Sign Installation, 2 post – 57 mm x 57 mm Square Steel Tube									7.68 sq/m



ITEM 63401-1510: PAVEMENT MARKINGS, TYPE H, SOLID YELLOW

Station	to	Station	Location	Length (m)	Remarks
0+140.00	to	0+272.02	1.80 m Rt.	132.02	Solid Yellow Striping
0+140.00	to	0+273.326	1.80 m Lt.	133.33	Solid Yellow Striping
0+276.32	to	0+586.88	1.80 m Rt.	310.56	Solid Yellow Striping
0+277.63	to	0+588.18	1.80 m Lt.	310.55	Solid Yellow Striping
0+591.18	to	0+620.00	1.80 m Rt.	28.82	Solid Yellow Striping
0+592.49	to	0+620.00	1.80 m Lt.	27.51	Solid Yellow Striping
0+620.00	to	0+665.00	1.80 m to CL Rt. Tapered	90.00	Double Solid Yellow Striping
0+620.00	to	0+665.00	1.80 m to CL Lt. Tapered	90.00	Double Solid Yellow Striping
0+665.00	to	2+606.25	CL Lt. & Rt.	3,882.50	Double Solid Yellow Striping
2+611.86	to	2+747.90	CL Lt. & Rt.	272.08	Double Solid Yellow Striping
2+971.65	to	3+017.20	CL Lt. & Rt.	91.10	Double Solid Yellow Striping
3+022.81	to	3+910.50	CL Lt. & Rt.	1,775.38	Double Solid Yellow Striping
			Total	7,143.85	

ITEM 63401-1610: PAVEMENT MARKING, TYPE H BROKEN YELLOW

Station	to	Station	Location	Length (m)	Remarks
0+140.00	to	0+272.02	1.80 m Rt.	132.02	Broken Yellow Striping
0+140.00	to	0+273.326	1.80 m Lt.	133.33	Broken Yellow Striping
0+276.32	to	0+586.88	1.80 m Rt.	310.56	Broken Yellow Striping
0+277.63	to	0+588.18	1.80 m Lt.	310.55	Broken Yellow Striping
0+591.18	to	0+620.00	1.80 m Rt.	28.82	Broken Yellow Striping
0+592.49	to	0+620.00	1.80 m Lt.	27.51	Broken Yellow Striping
0+620.00	to	0+665.00	1.80 m to CL Rt. Tapered	90.00	Broken Yellow Striping
0+620.00	to	0+665.00	1.80 m to CL Lt. Tapered	90.00	Broken Yellow Striping
			Total	1,122.79	

ITEM 63401-1520: PAVEMENT MARKING, TYPE H, SOLID WHITE

Station	to	Station	Location	Length (m)	Remarks
0+017.54	to	0+076.25	3.60 m Lt.	58.71	Solid White Striping
0+017.54	to	0+076.25	7.20 m Lt.	58.71	Solid White Striping
0+107.76	to	0+140.00	1.80 m Rt.	32.24	Solid White Striping
			Total:	149.66	

ITEM 63401-1620: PAVEMENT MARKINGS, TYPE H, BROKEN WHITE

Station	to	Station	Location	Length (m)	Remarks
0+016.24	to	0+272.02	5.40 m Rt.	255.78	Broken White Striping
0+100.00	to	0+273.32	5.40 m Lt.	173.32	Broken White Striping
0+276.32	to	0+586.88	5.40 m Rt.	310.56	Broken White Striping
0+277.63	to	0+588.184	5.40 m Lt.	310.55	Broken White Striping
0+591.18	to	0+620.00	5.40 m Rt.	28.82	Broken White Striping
0+592.49	to	0+620.00	5.40 m Lt.	27.51	Broken White Striping
0+620.00	to	0+665.00	5.40 m to 3.60 m Rt. Tapered	45.00	Broken White Striping
0+620.00	to	0+665.00	5.40 m to 3.60 m Lt. Tapered	45.00	Broken White Striping
0+665.00	to	2+606.25	3.60 m Rt.	1,941.25	Broken White Striping
0+665.00	to	2+607.55	3.60 m Lt.	1,942.55	Broken White Striping
2+610.55	to	2+747.90	3.60 m Rt.	137.35	Broken White Striping
2+611.86	to	2+747.90	3.60 m Lt.	136.04	Broken White Striping
2+971.65	to	3+027.20	3.60 m Rt.	55.55	Broken White Striping
2+971.65	to	3+028.50	3.60 m Lt.	56.85	Broken White Striping
3+031.50	to	3+910.50	3.60 m Rt.	879.00	Broken White Striping
3+032.81	to	3+910.50	3.60 m Lt.	877.69	Broken White Striping
			Total	7,222.82	

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

N7 PERMANENT PAVEMENT MARKING LAYOUT DETAIL

DRAWN BY: NRDOT	DATE: 8/24/2017
DESIGNED BY: NRDOT	DATE: 8/24/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 98 REV N7 Striping 4 rev 082417.dgn	

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REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N7	N7(1)4	99	105

GENERAL NOTES

1. All workmanship and materials shall be conform to the Standard Specifications for Construction ofRoads and Bridges on Federal Highway Projects (FP-03). The Contractor shall furnish the Pedestrian Crossing Flashing Beacon system that meets or exceeds the requirements below.
2. For installation procedures, see Section 636- Signal, Lighting, and Electrical Systems on this sheet.
3. The locations of Solar Led beacons shown on the plan are approximate. All lighting units shall be installed and paid for as a complete unit including solar panel, beacon, controls, signs, 114mm dia pole, 610mm dia foundations, lockable pull box, backup batteries, pedestrian push button system, operation manual, training on its use, and all wiring and diagrams as shown or required by manufacture. Two crosswalk beacons required.
4. The Contractor shall verify all beacon locations with the COR/COTR prior to any construction activity.
5. The Poles shall be mounted on break-a-way bases meeting the manufacturer's requirements.
6. Unstable soil may require deeper foundation. The COR/COTR shall work with the Contractor during construction to insure the drilled holes are stable before installing the foundations. Any unstable soils encountered that require additional work shall be covered under section 109.02(m).
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 (at 28 days) poured against undisturbed compacted earth.
9. The Contractor shall submit detailed drawings of the beacons to be used to the COR/COTR for review and approval. The beacons shall meet the minimum technical requirements.

TECHNICAL SPECIFICATION:

a) Meet or exceed ITE specifications
b) Must be capable of 24/7 operation with programmable module to control the push button for 60 sec Crosswalk time flashing of beacon then off until push button is activated again.
c) All external hardware shall be stainless steel
d) Operating voltage is 12/24 v. DC.
e) Operating temperature -40° F ~ 125° F.
f) Special lock and key control system pole mounted pull box with batteries or the control system can be installed into the sidewalk with lockable pull box
g) Power consumption of the LED system is 12/24v DC / 5W
h) 8 inch (203mm) dia (YELLOW) flashing beacons at 5-watt power with visor
i) Charging battery system shall be approximately 5 hours of strong direct sunshine to enable a full charge.
j) Illumination time shall be up to 12 hours or more, generally dusk to dawn.
k) Typically dusk to dawn illumination in most geographic locations.
l) Up to 5 days reserve power to allow for successive cloudy weather and days without sunshine.
m) Several successive cloudy or alternating overcast days typically should not affect illumination time.
n) The COR/COTR and Contractor shall test the system when installed with a BIA NRDOT Agency Engineer present to insure all the requirements are meet before the system is accepted. The test phase shall include instructions on how to operate the system.

SOLAR PANEL

a) Highly efficient polycrystalline solar panel.
b) Aluminum frame with anti-aging and encapsulated.
c) Low reflecting tempered glass.
d) Wattage of solar panel is 280 Watts or as recommended by the manufacture.
e) Solar panels are typically supplied in a dual format (2 x 140w = 280w).
f) 140w solar panel dimensions are approximate 1143mm x 1016mm x 51mm (LxWxD).
g) Typical solar panel life is approximately 15-20 years subject to environmental factors.
h) The geographic location of the street light will affect the size/wattage of the solar panel required per manufacture specifications.
i) The dimensions of the solar panel can vary and is subject to the wattage and manufacture specifications.
j) The panel shall be oriented for maximum sunlight per manufacturer recommendations.

POLE

a) Galvanized steel Pole to accommodatethe lamp units (light head).
b) Control box may be attached to the street light pole.

BATTERY BOX

a) Control system box will accommodate the rechargeable battery.
b) Welded anchor plates or pre-drilled holes to enable secure installation if pole mounted.
c) Silver/gray color finish.
d) Battery box will fit two 12 volt 200 Amp/Hour or 220 Amp/Hour batteries.
e) Connection wiring between the battery box, solar panel and lamp unit is included.

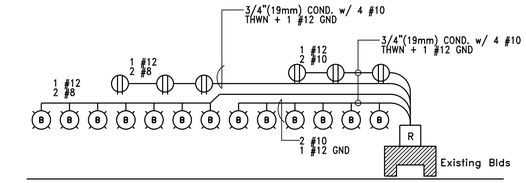
BATTERY CAPACITY

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 shall be approximately 3-5 years subject to environmental factors.

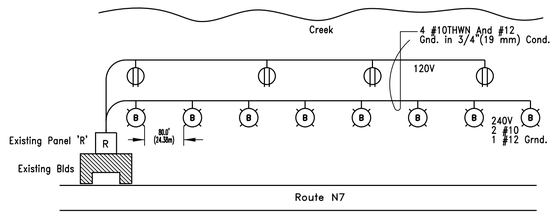
Please note, if you do not install or use this product for several months the battery may discharge naturally on its own. By allowing a battery to deep discharge it may cause irreversible damage as the battery may then lose the ability to recharge or hold a full charge. Periodic charging is always recommended when a product is not being used or when the solar panel is disconnected.

Warranty of Flashing Beacon System

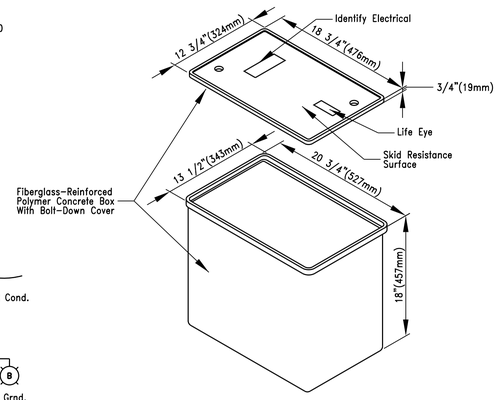
1. All manufacture warranties shall be furnished to the COR/COTR for the BIA Maintenance Program.
2. The warranties shall be in the name of the BIA Navajo Region DOT and shall be equal to or exceed the life of each system part above.



8 ELEVATION: LIGHT POLE
Not To Scale



5 DETAIL: SCHEMATIC DIAGRAM N7
Not To Scale

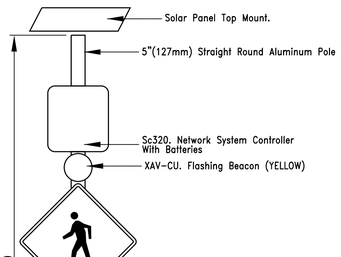


4 DETAIL: PULL/SPLICE BOX Lock & Key Type
Not To Scale

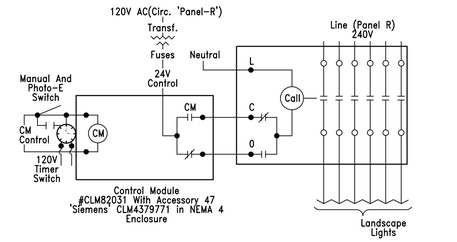
PANEL 'K'	120/240V, 10.3w.										NEMA - 3R SURFACE MOUNTED
LOAD	CB B	CB C	CB P.	CB A			CB A	CB P.	B B	B C	LOAD
					1	2					
					3	4					
					5	6					
					7	8					
					9	10					
					11	12					
Existing											
					New	New					
Walkway Lts.	0.31			20	11	12	20	1	0.60		Walkway Recept.
Walkway Lts.		0.31	2		13	14	20	1		0.60	Controls
Total New Load=	0.31	0.31			6ø				0.60	0.60	
NEW LOAD DEMAND	Bø = 0.91 KVA				Cø = 0.41 KVA					TOTAL= 1.32 KVA	

NOTE:
1. New 2-Pole And 1-Pole Circuit Breakers Shall Be Ground-Fault Insolation(GF) Type With 10000-Amp Interrumpting "UL" Rating.

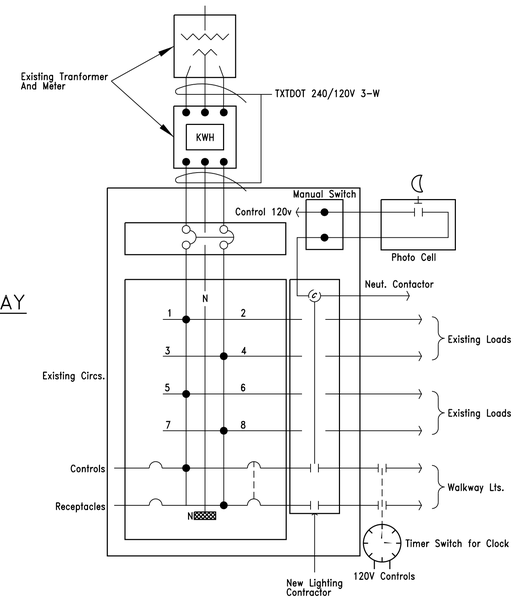
2 DETAIL: ELECTRICAL PANEL
Not To Scale



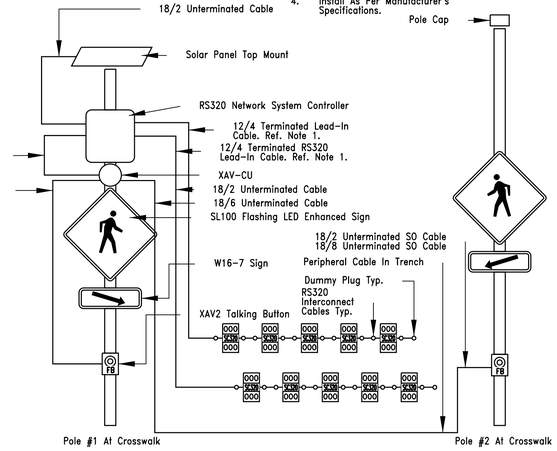
9 ELEVATION: LIGHT POLE
Not To Scale



2 DETAIL: TWO WIRE CONTROL N7 WALKWAY
Not To Scale



3 DETAIL: POWER DISTRIBUTION AND CONTROL
Not To Scale

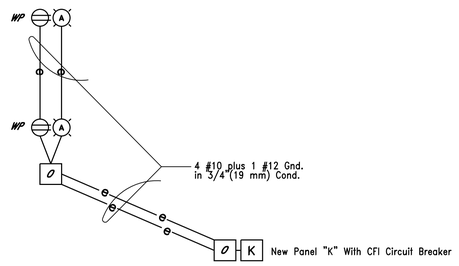


6 DETAIL: CROSSWALK LIGHTS SCHEMATIC
Not To Scale

PANEL 'R' (Route N7)	120/240V, 10.3w. 100 A.										NEMA - 3R SURFACE MOUNTED
LOAD	CB B	CB C	CB P.	CB A			CB A	CB P.	B B	B C	LOAD
Lights, ____	1.09			20	1	2	20		1.25		Lights, ____
Lights, ____		1.09	2		3	4		20		1.25	Lights, ____
Lights, ____	0.94			20	5	6	20		0.00		Spare
Lights, ____		0.94	2		7	8		2		0.00	Spare
Receptacles, ____	1.20		1	20	9	10	20	1	1.20		Receptacles, ____
Receptacles, ____		1.20	1	20	11	12	20	1		0.00	Spare
SUB-TOTAS	3.23	3.23							2.45	1.25	
NEW LOAD DEMAND	B=5.60 KVA				C=4.40 KVA					TOTAL= 10.16 KVA	

NOTE:
1. ALL CIRCUIT BREAKER SHALL BE GFCI

10 DETAIL: ELECTRICAL PANEL
Not To Scale



7 DETAIL: SCHEMATIC DIAGRAM
Not To Scale

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF INDIAN AFFAIRS

NAVAJO REGIONAL OFFICE * DIVISION OF TRANSPORTATION

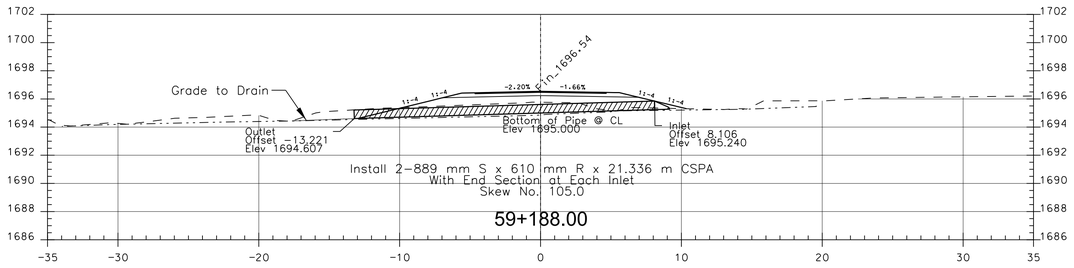
TS50 LED SCHOOL CROSSING SIGN WITH FLASHING BEACON DETAILS

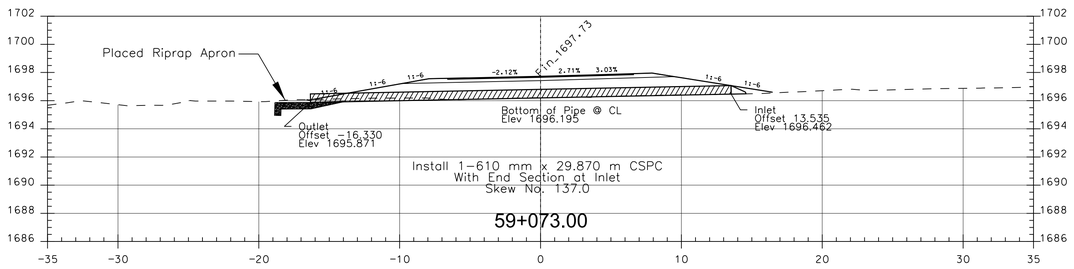
DRAWN BY: NRDOT	DATE: 8/24/2017
DESIGNED BY: NRDOT	DATE: 8/24/2017
REVISED: 9/22/2017	BY: Leroy.Toledo
Sht 99 Solar Powered Sign System.dgn	

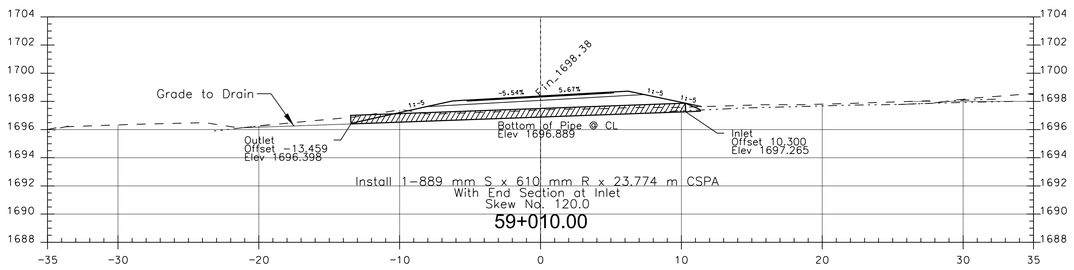
I:\DESIGN\Users\DESIGN3\CURRENT PROJECTS\N35_Chinle\N27(2-3)\DESIGN DATA_072413\CADD Drawings - North\Sht 99 Solar Powered Sign System.dgn

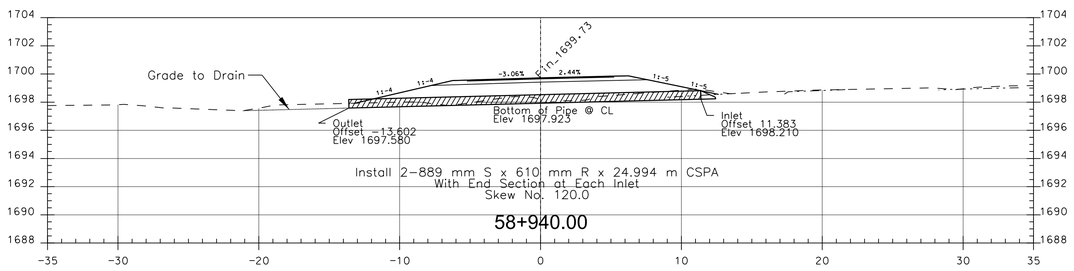
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NAVAJO	ARIZONA	NAVAJO	N27	N27(2-3)1,2&4	100	105

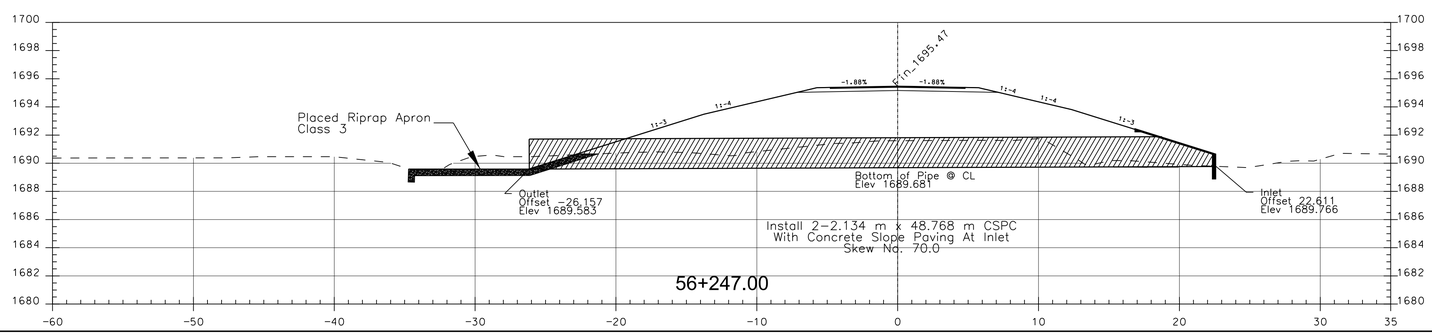
N27(2-3)1,2&4 STA. 56+247.00 to STA. 60+110.00



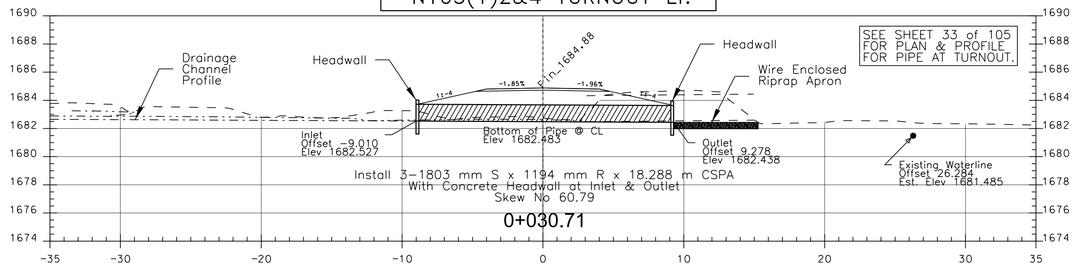


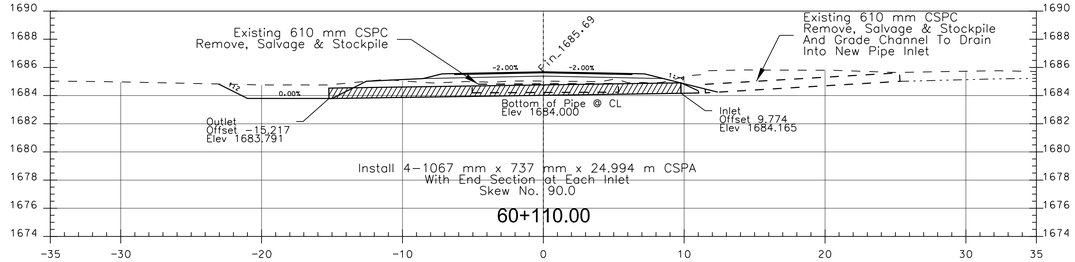


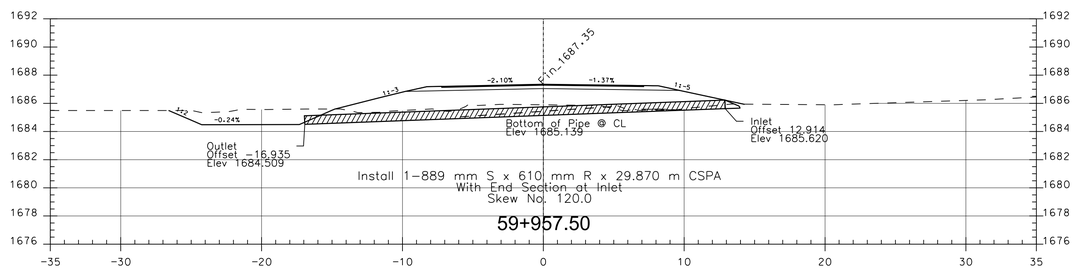


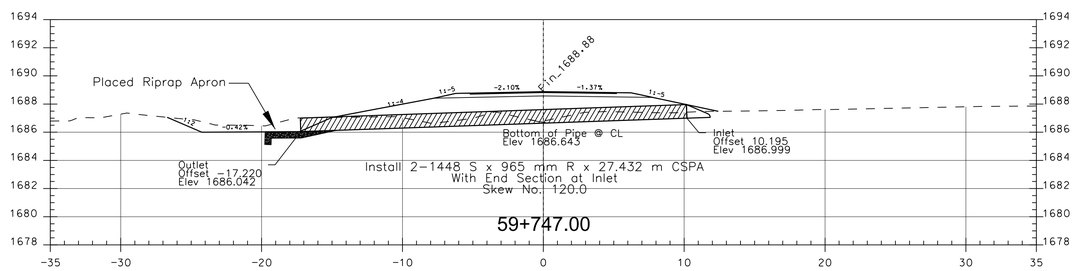


N105(1)2&4 TURNOUT Lt.



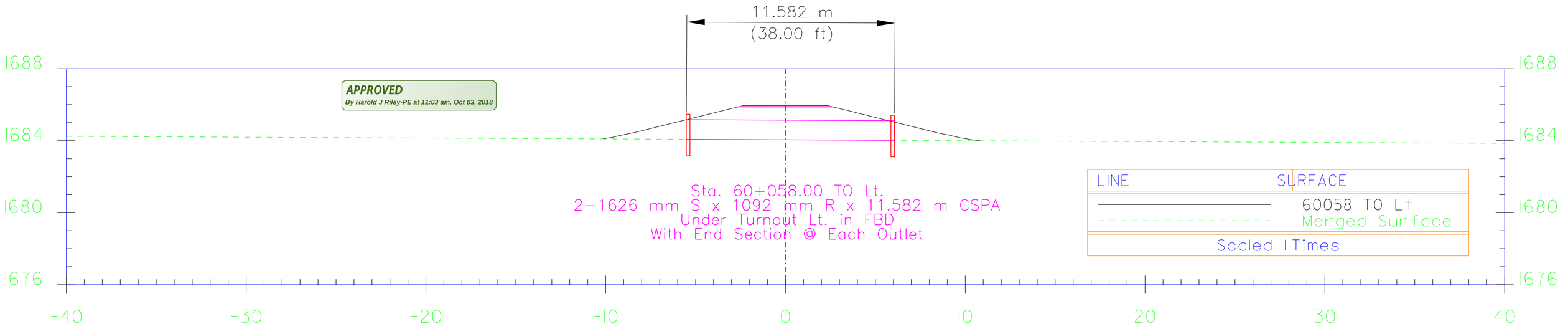






REVISED
11:01 am, Oct 03, 2018

APPROVED
By Harold J Riley-PE at 11:03 am, Oct 03, 2018



REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
NAVAJO	AZ	NAVAJO	N27	N27(2-2)(2-3)	B1	105

TABLE OF ESTIMATED QUANTITIES

ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	AS-BUILT
25101-2000	Placed Riprap, Class 2	27	m^3	
55201-0200	Structural Concrete, Class (AE)	32	m^3	
55207-0000	Repair Concrete, Epoxy Injection and Patching	All Reqd.	L.S.	
55210-0000	Seal Concrete Surface	366	m^2	
55401-2000	Reinforcing Steel, Epoxy Coated	2,928	kg	
61707-0000	Structure Transition Railing	31	m	
63308-3000	Object Marker, Type 3	4	Each	

ITEM 25101-2000: PLACED RIPRAP, CLASS 2

STATION	LOCATION	* DOWNDRAIN LENGTH (m)	VOLUME (m^3)
53+822.035	Downdrain, Left side, end of Expansion Joint.	9.656	3.53
53+822.035	Downdrain, Right side, end of Expansion Joint.	8.876	3.25
53+826.638	Abutment No. 1, Front face and sides.	n/a	6.81
53+865.042	Abutment No. 2, Front face and sides.	n/a	6.81
53+869.644	Downdrain, Left side, end of Expansion Joint.	8.536	3.12
53+869.644	Downdrain, Right side, end of Expansion Joint.	9.393	3.44
	* DOWNDRAIN LENGTH = 1.0 m + Slope Distance	TOTAL	26.96

ITEM 55201-0200
STRUCTURAL CONCRETE, CLASS A(AE)

QUANTITY	LOCATION
Abutment 1, Sleeper Slab	4.7 m^3
Abutment 1, Approach Slab	11.2 m^3
Abutment 2, Sleeper Slab	4.7 m^3
Abutment 2, Approach Slab	11.2 m^3
TOTAL	31.8 m^3

ITEM 55210-0000
SEAL CONCRETE SURFACE

LOCATION	WIDTH	LENGTH	AREA
Bridge Deck	9.220 m	39.624 m	365.3 m^2
		TOTAL	366 m^2

ITEM 55401-2000
REINFORCING STEEL, EPOXY COATED

QUANTITY	LOCATION
Abutment 1, Sleeper Slab	286 kg
Abutment 1, Approach Slab	1178 kg
Abutment 2, Sleeper Slab	286 kg
Abutment 2, Approach Slab	1178 kg
TOTAL	2928 kg

ITEM 61707-0000
STRUCTURE TRANSITION RAILING

QUANTITY	LOCATION
Abutment 1, Lt.	7.620 m
Abutment 1, Rt.	7.620 m
Abutment 2, Lt.	7.620 m
Abutment 2, Rt.	7.620 m
TOTAL	30.48 m

ITEM 63308-3000
OBJECT MARKER, TYPE 3

QUANTITY	LOCATION
Abutment 1, Lt.	1 EA
Abutment 1, Rt.	1 EA
Abutment 2, Lt.	1 EA
Abutment 2, Rt.	1 EA
TOTAL	4 EA

GENERAL NOTES:

1. Design Criteria: Material strengths: f'c = 27.6 MPa for reinforced concrete; fy = 413.7 MPa for reinforcing steel; fy = 248 MPa for structural steel.

2. Concrete: Cast in place concrete shall be Class A(AE) with the minimum design strength indicated in Note 1 above at 28 days. The air content for Class A(AE) concrete shall not be less than that specified in the FP-03. All concrete cast on or below grade shall be made with Type II cement. The Contractor may also use concrete containing Type II cement elsewhere on the structure at no additional cost to the Government. Provide a 19 mm chamfer on all corners of exposed concrete unless otherwise shown. The concrete discharge time limits specified in the FP-03 shall apply. If concrete cannot be discharged within the specified time limits, alternatives such as dry batching, a site batching plant conforming to specifications, or set retarding admixtures shall be used. Such alternatives, if used, shall be discussed at the pre-construction conference. Approval of alternative methods shall be based on review of historical data for identical strength concrete placed at similarly remote locations. Historical data shall show conformance to the required specifications. Alternative methods shall be approved in writing by the Contracting Officer (CO).

3. Finishing Concrete Surfaces: The following concrete surfaces, as applicable, shall receive a Class 2 surface finish as specified in Section 552.16 of the FP-03: vertical and bottom surfaces of the bridge deck overhang, exposed surfaces of the substructure, down to 300 mm below the ground line. Driving surfaces of the bridge deck, approach slabs and sleeper slabs shall be given a finish in accordance with Sections 552.14 (a), (b) and (c)(1) of the FP-03. All other concrete surfaces not listed above shall be given a Class 1 ordinary finish.

4. Reinforcing Steel: All conventional reinforcing steel shall conform to AASHTO M 31M, Grade 420 and epoxy coated reinforcing steel shall conform to AASHTO M 284M and AASHTO M 31M, Grade 420. All reinforcing steel in the deck and approach/sleeper slabs, or protruding into the deck and approach/sleeper slabs shall be epoxy coated. The minimum concrete cover of any reinforcing steel shall be 51 mm unless otherwise specified. Lengths of reinforcing steel bars shown in the plans include necessary bar length for splices shown. Splices for the convenience of the Contractor (ie; those not shown on the plans) may be requested in writing to the CO with justification for the request, and shall not be used until written approval by the CO is granted. Additional bar length for spliced for the convenience of the Contractor shall not be measured for payment.

5. Structure Excavation and Backfill: All structure excavation and backfill shall be performed according to the FP-03, Section 208 - Structure Excavation and Backfill for Select Major Structures. Payment for structure excavation and backfill shall be in accordance with the details shown in the plans and as directed in the FP-03 and/or supplemental specifications.

6. Contractor Verification: The Contractor shall verify, in the field, all dimensions, elevations and details which will be involved in new construction before proceeding with new work.

7. Welding: All welding on bridge elements or components shall be in conformance with the AASHTO/AWS D1.5M/D1.5 2008 Bridge Welding Code, including the inspection of all welds. Any welding (except tack welding that is allowed by the Contract) on any structural member (member designed to carry or resist traffic or pedestrian loads) shall be subject to visual inspection and magnetic particle testing by an approved American Welding Society (AWS) Certified Welding Inspector (CWI), and shall pass testing prior to acceptance of the work, unless otherwise directed by the CO. All labor, equipment, materials and work required for testing by an AWS CWI shall be measured and paid for under Item 15301-0000. Refer to Special Contract Requirement paragraph 16(k).

SEAL CONCRETE SURFACE NOTES:

1. The specified concrete surface shall be sealed with a High Molecular Weight Methacrylate (HMWM) concrete sealant such as the HSC Crack Sealer ULV, or an approved equal. Concrete surface sealing shall be in strict accordance with these plans and with the sealant manufacturer's recommendations, requirements and guidelines.

2. The Contractor shall submit for review and approval prior to beginning of work a complete work plan addressing all aspects of the scope of work for the preparation, furnishing, application and cleanup of the proposed HMWM concrete sealant (including all items of these notes). The work plan shall also include traffic control details for all phases of work including, preparation, application, curing and clean up. Traffic control shall be in accordance with the MUTCD, latest edition. The work plan shall indicate the brand name of the proposed product to be used and shall include the proposed product information and manufacturer's recommendations for use of the product as a concrete sealant. No work shall commence until written approval of the work plan and the proposed product is granted by the Contracting Officer (CO).

3. All traffic control devices and/or personnel shall be in place prior to the beginning of the sealant work.

4. Delineate the area of the sealant application. Assure adequate amount of material is immediately available based on the manufacturer's recommended application rate and the area to be sealed.

5. Prior to sealant application, the concrete surface shall be thoroughly cleaned by high pressure water washing, and/or compressed air blasting. Should the product manufacturer recommend a different method of cleaning of the concrete surface, that method shall be utilized.

6. All environmental and ambient condition limits specified by the product manufacturer shall be adhered to. These shall include, but not be limited to, ambient temperature, concrete surface temperature, humidity, wind velocity, expected temperature extremes, concrete surface conditions (presence of moisture, oil, or other foreign material), or any other condition that may prevent successful application and performance of the sealant.

7. Prepare and apply sealant in strict accordance with the manufacturer's recommendations and/or instructions. Application of the sealant shall cease if any of the conditions indicated by the manufacturer's recommendations, or those listed in *6 above, change beyond the recommended or specified limit.

8. Prior to curing, apply anti-skid material (usually clean sand) at the manufacturer's recommended coverage rate. Moisture content of sand shall not exceed the manufacturer's recommended value.

9. Traffic shall not be allowed on the sealed concrete surface until the curing time has elapsed, or as recommended by the manufacturer.

10. All work involved for furnishing and applying concrete surface sealant shall be paid under item 55210-0000, Seal Concrete Surface.

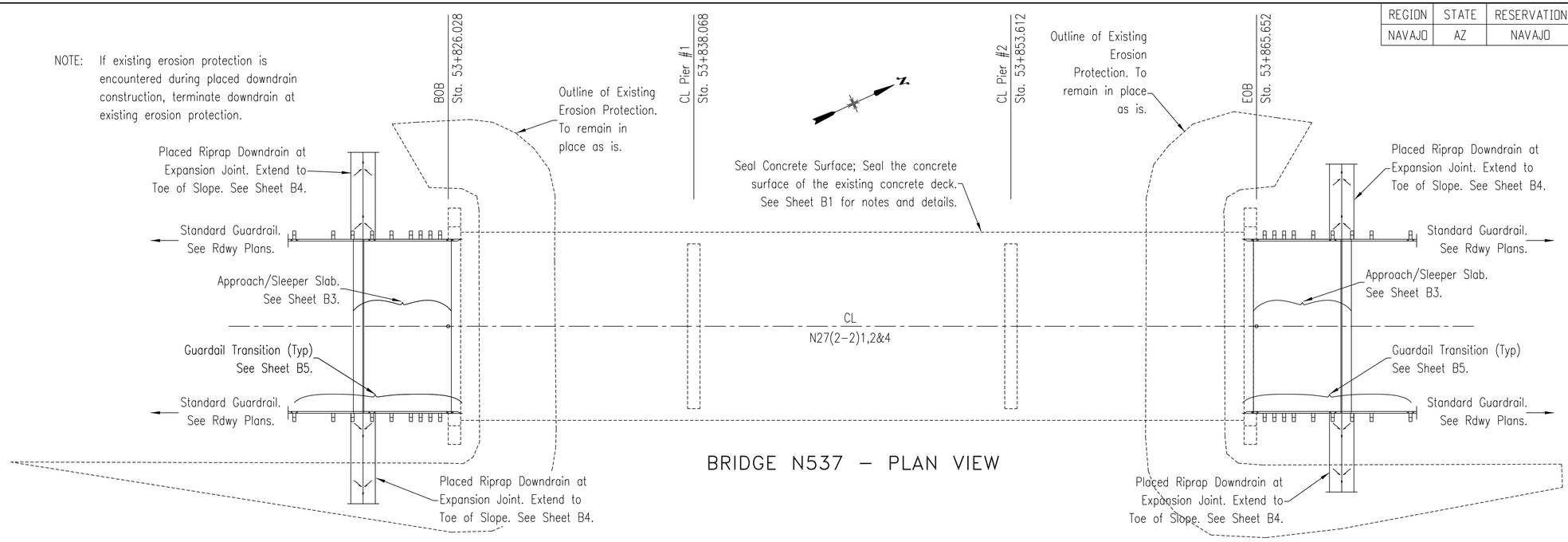
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
NAVAJO REGIONAL OFFICE - DIVISION OF TRANSPORTATION

BRIDGE N537
QUANTITIES AND NOTES

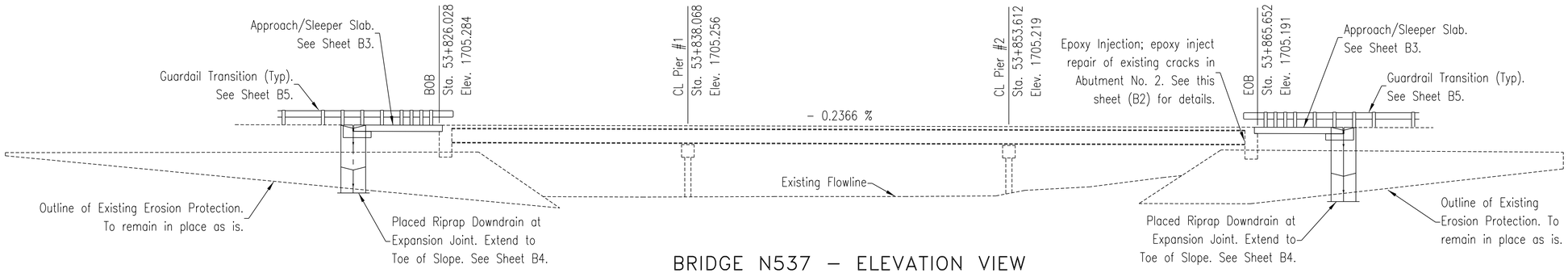
Designed by: BIA NRO-DOT Structural Unit	
Drawn by: rsh, cdh	Date: 2014-05-07
Revised by: HRiley	Date: 08/24/17
File Name: B1_N27_Qtys Notes_2014-05-07	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
NAVAJO	AZ	NAVAJO	N27	N27(2-2)(2-3)	B2	105

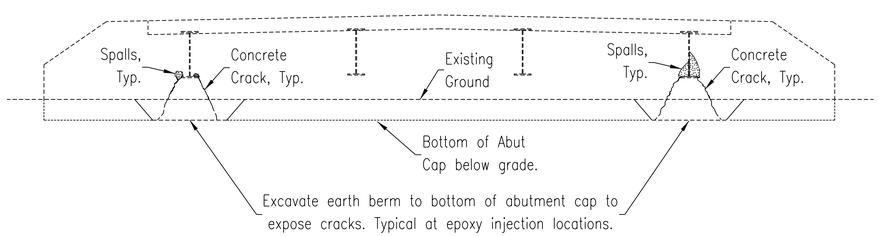
NOTE: If existing erosion protection is encountered during placed downdrain construction, terminate downdrain at existing erosion protection.



BRIDGE N537 – PLAN VIEW



BRIDGE N537 – ELEVATION VIEW



BRIDGE N537 – ABUTMENT NO. 2
EPOXY INJECTION AND PATCHING LOCATIONS

EPOXY INJECTION AND EPOXY MORTAR PATCHING NOTES:

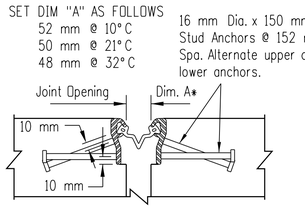
1. Epoxy Injection work and Epoxy Mortor Patching work shall conform to Section 561 of the Supplemental Specifications and to the details shown on these plans. Epoxy injection and patching work is to be performed at the outside beam locations at Abutment No. 2 of Bridge N537.
2. Excavate earthen berm to the bottom of abutment cap elevation to expose cracks in the abutment cap. Per existing bridge As-Built plans, the existing erosion protection is placed a distance of 914 mm away from the abutment cap face. Do not damage or remove existing erosion protection when excavating earthen berm.
3. Perform epoxy injection work to fill cracks in abutment cap concrete. Perform epoxy mortar patching of spalled concrete locations.
4. After the curing period for the Epoxy Injection work and Epoxy Mortor Patching work has elapse, replace earthen berm to the elevation of the as-built elevations. Perform Placed Riprap work as shown elsewhere in these plans.
5. All work, including labor, workmanship, equipment and materials, shall be paid for under the unit bid price for Item 55207-0000 Repair Concrete Epoxy Injection and Patching.

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

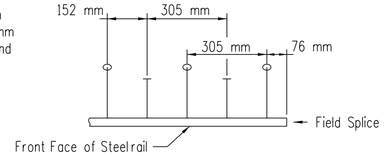
BRIDGE N537
QUANTITIES AND NOTES

Designed by: BIA NRO-DOT Structural Unit	
Drawn by: rsh, cdh	Date: 2014-05-07
Revised by: HRiley	Date: 08/24/17
File Name: B1_N27_Qtys Notes_2014-05-07	

REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
NAVAJO	AZ	NAVAJO	N27	N27(2-2)(2-3)	B3	105

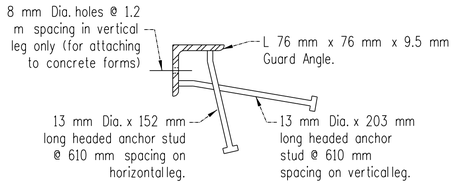


EXPANSION JOINT TYPICAL SECTION



1) Install anchor studs on rail according to the layout details shown on the approved shop drawings.
2) Minimum distance from stud to end of rail is 152 mm.

16 mm DIA. STUD LAYOUT FROM SPLICE FROM EXPANSION JOINT FIELD SPLICE

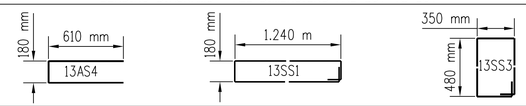


GUARDRAIL DETAIL

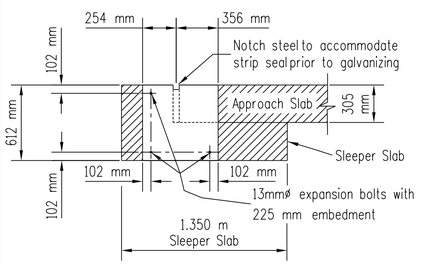
ITEM 55401-1000 – REINFORCING STEEL
QUANTITIES SHOWN ARE FOR 2 APPROACH SLABS AND 2 SLEEPER SLAB

	STRAIGHT BARS				BENT BARS				
LOCATION	MARK	QTY.	SIZE	LENGTH	MARK	QTY.	SIZE	LENGTH	SPACING
APPROACH SLAB									
Longitudinal, bottom mat	25AS1	74	25	4.190 m					230 mm
Longitudinal, top mat	13AS2	38	13	4.190 m					460 mm
Trans., top & bottom mat, Phase I	16AS3	60	16	5.040 m					295 mm
Trans., top & bottom mat, Phase II	16AS3a	60	16	4.190 m					295 mm
Edge bars					13AS4	76	13	1.400 m	460 mm
SLEEPER SLAB									
Stirrup, slab					13SS1	56	13	3.140 m	305 mm
Trans., end block & slab, Phase I	16SS2	20	16	5.040 m					As Shown
Trans., end block & slab, Phase II	16SS2a	20	16	4.190 m					As Shown
Stirrup, end block					13SS3	56	13	2.000 m	305 mm

BENDING DIAGRAMS - ALL DIMENSIONS ARE OUT TO OUT

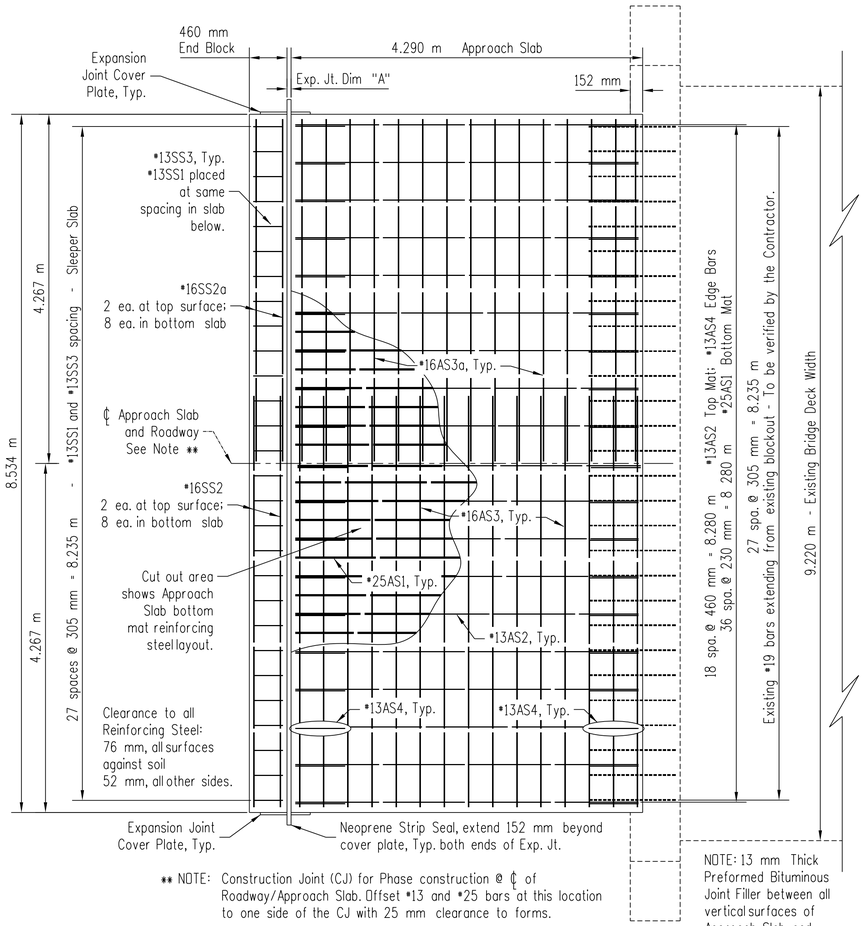


Longitudinal = Parallel to Roadway and Approach Slab ℄
Trans. = Transverse = Perpendicular to Roadway and Approach Slab ℄



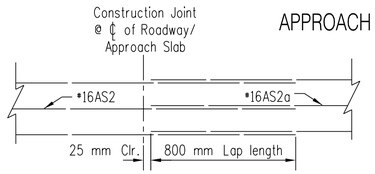
Expansion Joint Cover Plate shall be 9.5 x 610 x 612 mm steel plate conforming to AASHTO M 270, Grade 245, and galvanized per AASHTO M 111. Four (4) cover plates required.

EXPANSION JOINT COVER PLATE

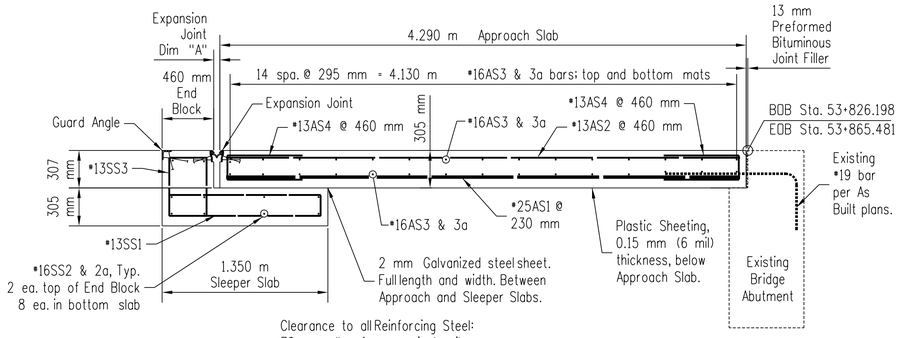


** NOTE: Construction Joint (CJ) for Phase construction @ ℄ of Roadway/Approach Slab. Offset *13 and *25 bars at this location to one side of the CJ with 25 mm clearance to forms.

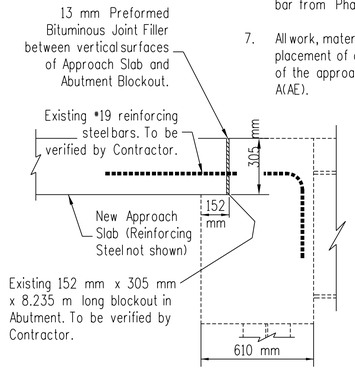
APPROACH AND SLEEPER SLAB – PLAN VIEW



BAR SPLICE DETAILS @ CONSTRUCTION JOINT



APPROACH AND SLEEPER SLAB – ELEVATION VIEW



EXISTING ABUTMENT DETAILS

EXPANSION JOINT NOTES:

1. Expansion Joints shall be one of the following, or an approved equal:
   (a) Watson, Bowman and Acme Corp. joint with a Type P Steel Rail and a SE-400 strip seal.
   (b) D.S. Brown, inc. joint with a Type SSPA steel rail and A2R-400 strip seal.
2. Joints other than those listed above may be submitted for approval provided they are similar to that shown in the expansion joint typical section and can demonstrate by test, the design movements shown in the expansion joint typical section detail from an initial setting as specified dependent upon the ambient temperature at time of installation.
3. The Contractor is responsible for assuring that joint rails conform to the roadway crown, profile grade and superelevation slopes, as applicable, of the concrete driving surface at the location of installation. Breaks in joint rail alignment necessary to conform the lines and grades of the concrete driving surface shall be fabricated in the shop prior to galvanizing. If approved and shown in the shop drawings, the break in rail alignment may be constructed in the field as long as the Contractor provides galvanizing, or coating with zinc or galvanizing paint if the rail is cut after shop galvaninzing. Any cutting in the field shall be in accordance with the manufacturer's recommendation and requirements.
4. Contractor shall submit shop drawings for the joints showing all fabrication details and material specifications according to specification requirements. (See Note No.6) Fabrication of expansion joints shall not commences until the shop drawings are approved in writing by the Contracting Officer.
5. The joints shall be installed in accordance with the manufacturer's instructions. A representative of the manufacturer shall be present at the site during installation to assure that all installation procedures are correct per the manufacturer's requirements. The manufacturer's representative shall provide a letter of certification that the installation is correct before leaving the project site.
6. Steel rails shall conform to AASHTO M 270M, Grade 250 and shall be galvanized in accordance with AASHTO M298, Class 50 or M232 after fabrication. Neoprene Strip Seal shall conform to the physical properties prescribed in Table 1 AASHTO M220. Neoprene strip seal shall extend 152 mm beyond steel cover plate at all ends of the expansion joint.
7. All labor, materials, equipment and workmanship required to furnish, fabricate and install expansion joints according to these plans shall be incidental to Item 55201-0200, Structural Concrete, Class A(AE).

APPROACH SLAB / SLEEPER SLAB NOTES:

1. See General Notes on Sheet B-1 for additional notes applicable to Approach and Sleeper Slab construction.
2. Steel for guard angles shall conform to AASHTO M 270M, Grade 245. Anchor studs for guard angles shall conform to AASHTO M 169. Other miscellaneous steel shall be as specified in the plans. Guard angles shall be galvanized in accordance with AASHTO M 111.
3. The Contractor is responsible for assuring that guard angles conform to the roadway crown, profile grade and superelevation slopes, as applicable, of the concrete driving surface at the location of installation. Breaks in guard angle alignment necessary to conform the lines and grades of the concrete driving surface shall be fabricated in the shop prior to galvanizing. If approved and shown in the shop drawings, the break in guard angle alignment may be constructed in the field provided the Contractor provides an approved corrosion inhibiting coating at the field cut and welding location. Torch cutting shall not be allowed.
4. Contractor shall submit shop drawings in accordance with the Special Contract Requirements of the Contract for the guard angles showing all fabrication details and material specifications. (See Note No.2) Fabrication of guard angles shall not commence until the shop drawings are approved in writing by the Contracting Officer.
5. Approach Slab and Sleeper Slab construction shall be performed using phase construction in order to provide one lane open to traffic at all times. At the Contractor's option and expense the Contractor may propose an alternate method of construction to the phase construction method. At least one lane of traffic shall be provided at all times with traffic control in accordance to the MUTCD.
6. Phase I construction of Approach Slab shall utilize *16AS2 bars with ends protruding out of forms at Construction Joint/℄ Approach Slab. Phase II construction of Approach Slab shall utilize *16AS2a bars lap spliced to in place *16AS2 bar from Phase I construction. See BAR SPLICE DETAILS @ CONSTRUCTION JOINT detail on this sheet.
7. All work, materials, labor and equipment necessary for the construction of the approach slabs, sleeper slabs and placement of guardangles, epoxy anchors and all other miscellaneous hardware and materials necessary for construction of the approach slabs and sleeper slabs shall be considered incidental to Item 55201-0200, Structural Concrete, Class A(AE).

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

APPROACH /SLEEPER SLAB DETAILS

Designed by: BIA NRO-DOT Structural Unit	
Drawn by: rsh, cdh	Date: 2014-05-06
Revised by: - - -	Date: - - -
File Name: B3_N27_Appr Slpr Slabs_rev 082417.dgn	

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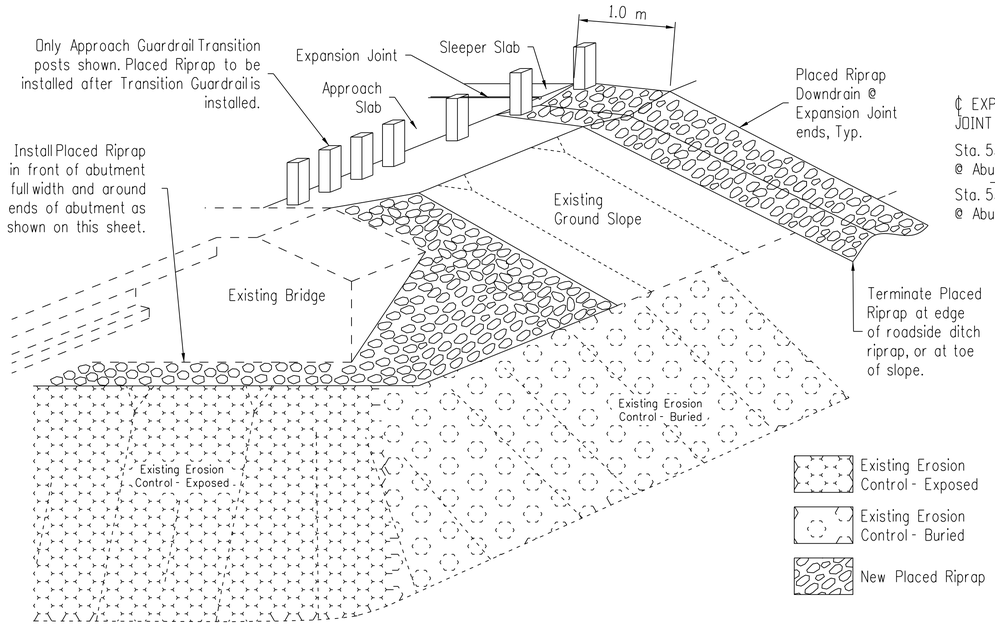
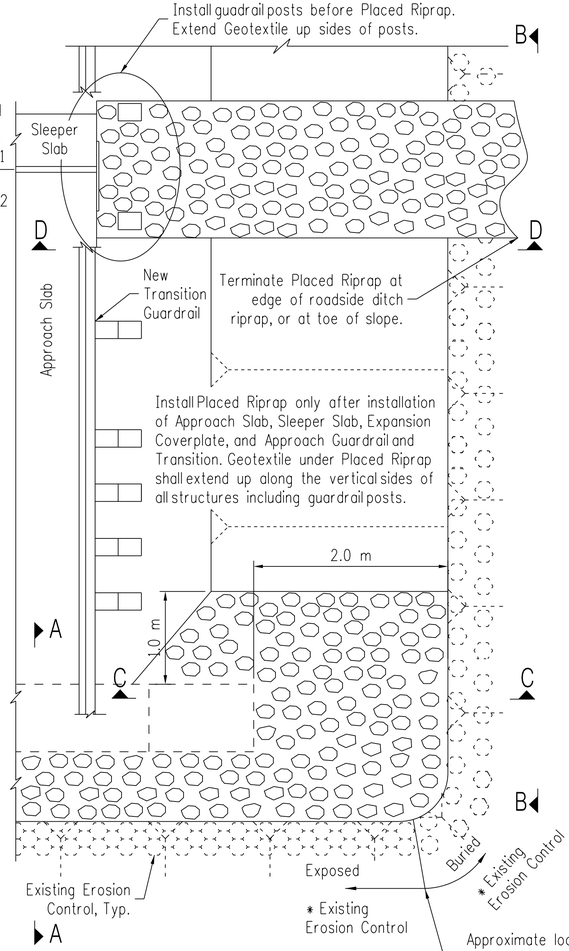
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
NAVAJO	AZ	NAVAJO	N27	N27(2-2)(2-3)	B4	105



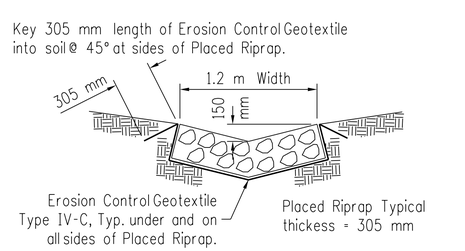
ISOMETRIC VIEW – ALL CORNERS SIMILAR



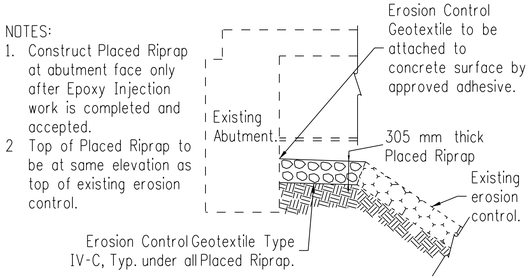
PLACED RIPRAP LOCATIONS
PLAN VIEW

PLACED RIPRAP NOTES:

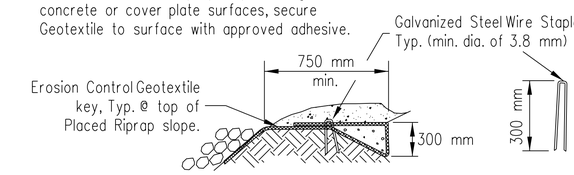
1. Placed Riprap shall conform to Section 251 of the FP-03, the Supplemental Specifications, and to the details shown in these construction plans.
2. The quantities shown are only an estimate. Actual quantities shall be determined in the field. The Contractor will be required to make any necessary adjustments in the field to match existing field conditions. These field adjustments are incidental obligations of Contractor.
3. Existing erosion protection at the front face of abutment is exposed and minor soil erosion is present. Existing erosion protection at abutment side slopes are buried under existing soil and are not exposed. New Placed Riprap shall be installed to edge of existing erosion protection where it is exposed. New Placed Riprap shall be placed to the dimensions and lines shown on the plans and to the slopes of the existing ground where existing erosion protection is not encountered (buried).
4. In areas adjacent to abutments where soil erosion is present, embankment (foundation) material shall be placed for New Placed Riprap, and it shall conform to Section 204 of the FP-03. Excavation necessary to install New Placed Riprap shall conform to Section 209 of the FP-03. All embankment (foundation) and excavation for New Placed Riprap installation shall be considered incidental to Item 25101-2000, Placed Riprap, Class 2.
5. Rock size for New Placed Riprap shall conform to FP-03, Section 705, Table 705-1, Class 2.
6. Erosion Control Geotextile shall be installed under all New Placed Riprap as shown on these plans and shall be considered incidental to Item 25101-2000, Placed Riprap, Class 2. Erosion Control Geotextile shall conform to Section 714.01 (a) (4) Type IV-C of the FP-03.
7. Slope designations, where shown, are in accordance with Section 101.03 (d) of the FP-03 (vertical : horizontal).



PLACED RIPRAP DOWNDRAIN – TYPICAL SECTION



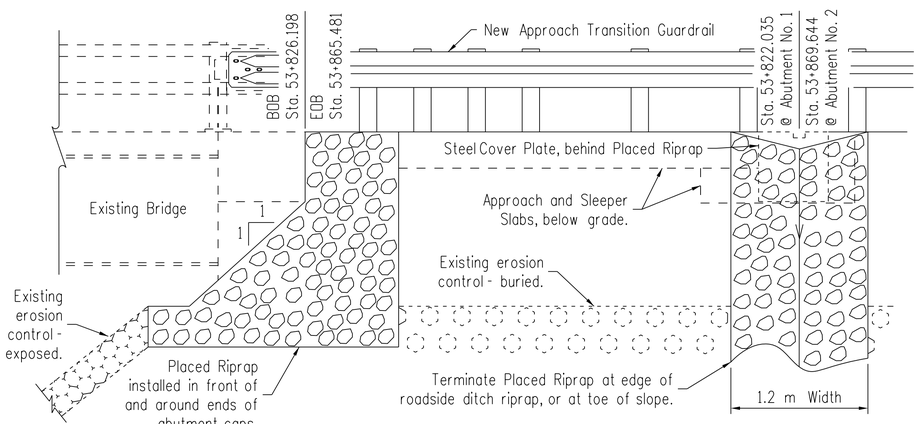
SECTION A–A @ FACE OF ABUTMENT



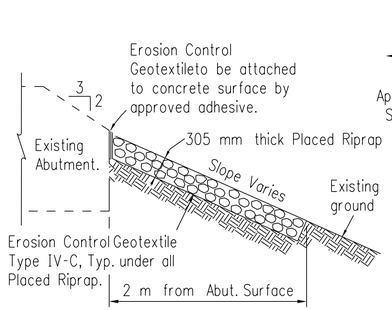
EROSION CONTROL GEOTEXTILE KEY DETAIL
@ TOP OF RIPRAP IN SOIL ONLY

ITEM 25101–2000: PLACED RIPRAP, CLASS 2

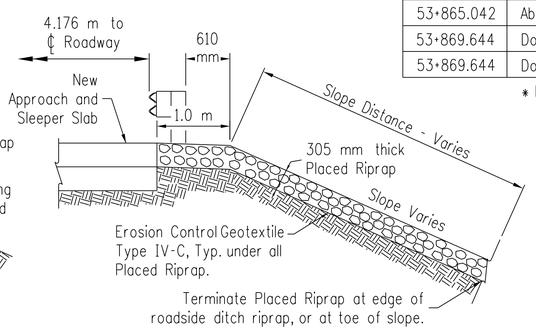
STATION	LOCATION	* DOWNDRAIN LENGTH (m)	VOLUME (m^3)
53+822.035	Downdrain, Left side, end of Expansion Joint.	9.656	3.53
53+822.035	Downdrain, Right side, end of Expansion Joint.	8.876	3.25
53+826.638	Abutment No. 1, Front face and sides.	n/a	6.81
53+865.042	Abutment No. 2, Front face and sides.	n/a	6.81
53+869.644	Downdrain, Left side, end of Expansion Joint.	8.536	3.12
53+869.644	Downdrain, Right side, end of Expansion Joint.	9.393	3.44
	* DOWNDRAIN LENGTH = 1.0 m + Slope Distance	TOTAL	26.96



SECTION B–B – ELEVATION VIEW OF SIDE SLOPE



SECTION C–C @ ABUTMENT ENDS



SECTION D–D @ EXPANSION JOINT DRAIN

UNITED STATES
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PLACED RIPRAP AND
EROSION PROTECTION DETAILS

Designed by: BIA NRO-DOT Structural Unit	
Drawn by: rsh, cdh	Date: 2014-05-07
Revised by: - - -	Date: - - -
File Name: B4_N27_Placed Riprap_rev 082417.dgn	

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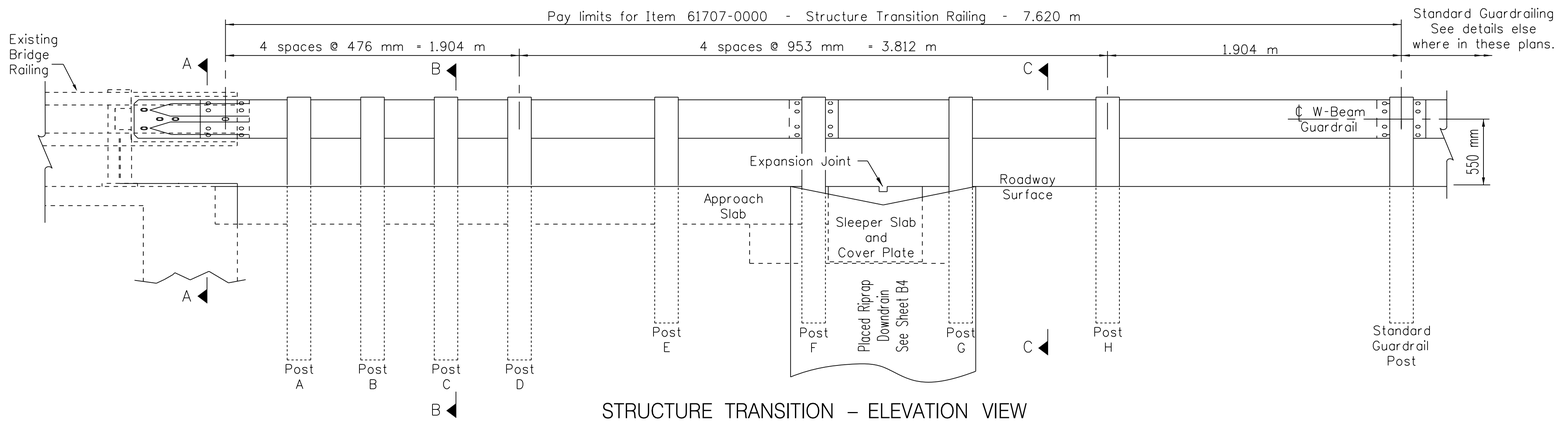
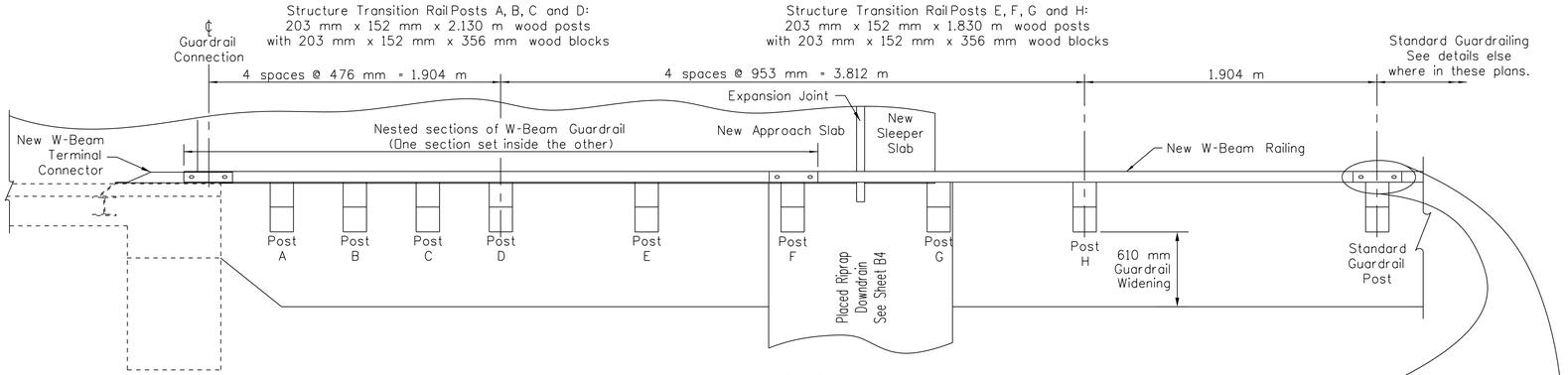
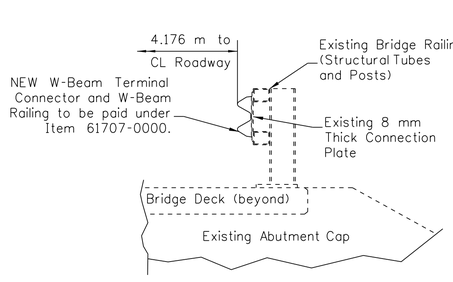
REGION	STATE	RESERVATION	ROUTE	PROJECT	SHEET	TOTAL SHEETS
NAVAJO	AZ	NAVAJO	N27	N27(2-2)1,2&4	B5	105



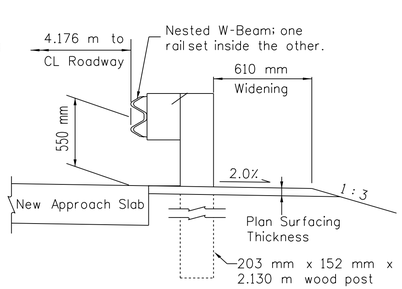
STRUCTURE TRANSITION – ELEVATION VIEW



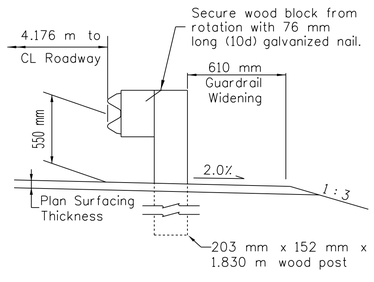
STRUCTURE TRANSITION – PLAN VIEW



SECTION A–A



SECTION B–B



SECTION C–C

STRUCTURE TRANSITION RAILING NOTES.

1. Standard roadside barrier hardware as detailed in "A Guide to Standardized Highway Barrier Rail Hardware", latest edition, AASHTO-AGC-ARTBA Joint Committee has been used to develop this Structure Transition.
2. Dimensions and hardware sizes are given in SI (metric) units. For hardware specified in SI (metric) units, English unit hardware may be substituted provided they are of equal or greater strength.
3. All W-Beams shall be galvanized in accordance with AASHTO M 111M and furnishing, fabricating and installing these W-Beams shall be included in the unit bid price for Item 61707-0000, Structure Transition Railing.
4. All high strength hex bolts and carriage bolts shall be galvanized in accordance with AASHTO M 232M and furnishing, fabricating and installing all high strength hex bolts and carriage bolts shall be considered incidental to Item 61707-0000, Structure Transition Railing.
5. W-Beams shall conform to AASHTO M 180, Class A, Type 1.
6. Wood blocks and posts shall be rough sawn lumber or surfaced on four sides (S4S) having a minimum bending strength of 8.27 MPa. All posts and blocks shall be treated in accordance with AASHTO M 133.
7. W-Beams are not bolted to posts and blocks at Post A, B, C, E, G, and H. Wood blocks are bolted directly to posts for the indicated posts.
8. All embankment and surfacing materials necessary for the structure transition guardrail widening shall be compacted to in accordance with Sections 204, 301 and 402 of the FP-03. The furnishing of embankment and surfacing material, and the placing thereof, shall be paid for under the appropriate bid Item shown in these plans.
9. Certificates of Compliance shall be submitted, reviewed and approved for all guardrail components and hardware, including wood post and block materials, prior to their installation.
10. All guardrail structure transitions, as detailed on this sheet, shall be installed parallel to the roadway centerline, beginning at the attachment to the steel bridge railing. Installation at a taper or angle shall not be performed unless approved in writing by the CO.
11. Height of centerline of structure transition w-beam and centerline of standard guardrail w-beam may differ slightly. The structure transition shall be constructed to linearly vary from the specified structure transition height to the specified standard guardrail height. This work shall be considered incidental to the completion of Item 61707-0000, Structure Transition Railing.

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BRIDGE RAIL /GUADRAIL TRANSITION

Designed by: BIA NRO-DOT Structural Unit	
Drawn by: cdh	Date: 2014-05-06
Revised by: - - -	Date: - - -
File Name: B5_N27_Tranrail_rev 082417.dgn	

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