Clean Water Act Section 401 Water Quality Certification Application

Please refer to the "Clean Water Act Section 401 Water Quality Certification Application Guidance" document for assistance with completing this application.

A. Pre-Filing Meeting	
Please provide the date that a pre-filing meeting was requested from Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning (BWQP). *Note: If a pre-filing meeting has not been requested, please schedule a pre-filing meeting with NDEP BWQP.*	The Pre-Filing Meeting was requested on 10/24/24. The Pre-Filing Meeting was held on 11/7/24.

B. Contact Information			
Project Proponent Information			
Company Name: Nevada Department of Transportation		Address: 1263 South Stewart Street	
Applicant Name: My-Linh Nguyen		City: Carson City	
Phone: 775-888-7686	Fax:	State: Nevada	
Email: mnguyen@dot.nv.gov		Zip Code: 89712	
Agent Information			
Company Name:		Address:	
Agent Name:		City:	
Phone:	Fax:	State:	
Email:		Zip Code:	

C. Project General Information			
Project Location			
Project/Site Name: US-395 Carson Valley Project		Name of receiving waterbody: Heybourne Ditch and an unnamed, relatively permanent, tributary to Carson River	
Address: US-395 (MP DO 30.374) & SR-759 (MP DO 0.998)		Type of waterbody present at project location (*select all that apply*): ☐ Perennial River or Stream ☒ Intermittent River or Stream ☐ Ephemeral River or Stream ☐ Lake/Pond/Reservoir ☐ Wetland ☒ Other: Heybourne Ditch (Irrigation Ditch)	
City: Minden			
County: Douglas			
State: Nevada			
Zip Code: N/A			
Latitude (UTM or Dec/Deg): DO 30.374) 39.0616576°N DO 0.998) 39.0010664°N		Longitude (UTM or Dec/Deg): DO 30.374) 119.7799644°W DO 0.998) 119.7612166°W	
Township: DO 30.375) 014N	Range: DO 30.375) 020E	Section: DO 30.375) 019	¼ Section: DO 30.375) SW

DO 0.998) 013N	DO 0.998) 020E	DO 0.998) 008	DO 0.998) SW

Project Details	
Project purpose:	Mill and Overlay with Hydraulic improvements which include installation of class 400 riprap apron on US-395 at milepost DO 30.374 and culvert extension and type II headwall installation on SR-759 at milepost DO 0.998.
Describe current site conditions: Attachments can include, but are not limited to, relevant site data, photographs that represent current site conditions, or other relevant documentation.	US-395 at milepost DO 30.374 conveys an unnamed, relatively permanent, tributary to the Carson River via 8' x 3' and 10' x 4' reinforced concrete box culverts. A scour hole has formed at the outfall of these box culverts. The proposed riprap apron will help address erosion at this outfall. SR-759 at milepost DO 0.998 conveys Heybourne Ditch via a 10' x 5' reinforced concrete box culvert. This irrigation ditch diverts Carson River water to support agricultural fields and returns the excess irrigation water to the Carson River via Ambrosetti Pond/Creek. The culvert requires extension to support road widening to accommodate increased traffic to the Minden Airport. See Attachment B for more details.
Describe the proposed activity including methodology of each project element:	Improvements include installation of class 400 riprap apron on US-395 at milepost DO 30.374 and culvert extension and type II headwall installation on SR-759 at milepost DO 0.998. Class 400 riprap apron will be constructed at the outfalls to the existing 8' x 3' reinforced concrete box culvert (CLH778) and 10' x 4' reinforced box culvert (CLH779) at milepost DO 30.374 on US-395. An unnamed, relatively permanent, tributary to the Carson River (thus a presumed Waters of the United States) will be impacted below the ordinary high watermark from excavation and grading for the installation of the riprap apron. Work will be conducted within the ordinary high watermark (OHWM) of Waters of the U.S. (WOUS), warranting Section 404 authorization and 401 Water Quality Certification. Construction will proceed during dry channel conditions, which is expected during late summer/fall. As part of the culvert extension for the existing 10' x 5' culvert (PIP19195) at milepost DO 0.998 on SR-759, the culvert will be extended 12' at the outlet and a new type II headwall will be installed at the outlet. This culvert conveys Heybourne Ditch which will be impacted below the ordinary high watermark from the culvert lengthening, and type II headwall installation. This irrigation ditch diverts water from the Carson River and returns it to the Carson River (via Ambrosetti Pond/Creek), thus considered a Waters of the United States. Work will be conducted within the ordinary high watermark (OHWM) of Waters of the U.S. (WOUS), warranting Section 404 authorization and 401 Water Quality Certification. Irrigation gates will be closed to facilitate dry channel during construction.

	1) Project improvements will excavate native material in the stream channel to place geotextile fabric, class 400 riprap bedding and class 400 riprap apron at the reinforced concrete box culvert outlets. The reinforced concrete box culverts (CLH778 & CLH779) are located at Douglas County (DO) milepost 30.374 (DO 30.374) and conveys an unnamed, relatively permanent, tributary to the Carson River. 2) Project improvements will extend the existing box culvert 12' and install a type II headwall at the extension outlet. Project improvements will excavate native material to place granular backfill (culvert bedding) and install a 12' box culvert extension. A type II headwall will be installed at the outlet of the new culvert extension. The headwall will be cast in place, while the culvert extension may be either pre-cast or cast in place per contractor preference. The reinforced concrete box culvert (PIP19195) is located at Douglas County (DO) milepost 0.998 (DO 0.998) on SR-759 and conveys the Heybourne Ditch. Improvements require excavation, grading, installation of geotextile, class 400 riprap bedding, class 400 riprap apron, granular backfill (culvert bedding), culvert extension, native material backfill and type II headwall within the OHWM of the channel. The expected equipment for this project includes an excavator, loader, concrete truck, vactor truck and legal haul trucks.
Estimate the nature, specific location, and number of discharge(s) expected to be authorized by the proposed activity:	The project will result in a discharge of fill material within the ordinary highwater mark at the following two locations: 1) At US-395 MP DO 30.374 within an unnamed relatively permanent tributary to the Carson River to install a Class 400 riprap apron. 2) At SR-759 MP DO 0.998 within Heybourne Ditch to facilitate a reinforced concrete box culvert extension and type II headwall installation.
Provide the date(s) on which the proposed activity is planned to begin and end and the approximate date(s) when any discharge(s) may commence:	Project construction is expected to begin in July 2025 and anticipated to be complete in October 2026; however, work within the ordinary highwater mark at US-395 MP DO 30.374 and SR-759 MP DO 0.998 is expected to be completed in 2 and 10 days respectively and be performed during dry stream channel conditions, which is expected during late summer/fall.
Provide a list of the federal permit(s) or license(s) required to conduct the activity which may result in a discharge into regulated waters (see mandatory attachments):	Department of Army Nationwide Permit 3 issued by the U.S. Army Corps of Engineers (non-notification).
Provide a list of all other federal, state, interstate, tribal, territorial, or local agency authorizations required for the proposed activity and the current status of each authorization:	Stormwater Construction General Permit issued by the Nevada Division of Environmental Protection (NDEP). Temporary Working in Waterways Permit issued by the NDEP. Contractor to procure permits prior to construction.

Total area of impact to regulated waterbodies (acres):	0.02 See attached Tables 1-3 for more details.	
Total distance of impact to regulated waterbodies (linear feet):	33 See attached Tables 1-3 for more details.	
Amount excavation and/or fill discharged within regulated waters (acres, linear feet, and cubic yards):	Temporary: 0 See attached Tables 1-3	Permanent: 0 See attached Tables 1-3
Amount of dredge material discharged within regulated waters (acres, linear feet, and cubic yards):	Temporary: 0 See attached Tables 1-3	Permanent: 136 cu yds See attached Tables 1-3
Describe the reason(s) why avoidance of temporary fill in regulated waters is not practicable (if applicable):	N/A	
Describe the Best Management Practices (BMPs) to be implemented to avoid and/or minimize impacts to regulated waters: Examples include sediment and erosion control measures, habitat preservation, flow diversions, dewatering, hazardous materials management, water quality monitoring, equipment or plans to treat, control, or manage discharges, etc.	The project was designed to minimize disturbance by providing minimal net loss below the ordinary high watermark. Construction site BMP implementation, notably temporary sediment control and good housekeeping measures (including concrete and material stockpile management), will follow the "Nevada Department of Transportation 2017 Construction Site Best Management Practices (BMPs) Manual", which can be found at https://www.dot.nv.gov. Specific BMP details and locations of installation are outlined in the Storm Water Pollution Prevention Plan (SWPPP). Note, scheduling construction for late summer/fall and closing of irrigation gates will provide a 'dry' channel for construction purposes. Construction activities will also adhere to the requirements of the Stormwater Construction General Permit and Temporary Working in Waterways Permits (as applicable), both of which are issued by the NDEP and include routine construction site inspections and requirements for pollution control measure implementation. Construction access ingress, egress, stockpile areas, equipment fueling locations and concrete clean out areas have not been identified at the 60% plan level and are generally determined during construction by request of the contractor and approval by the NDOT Resident Engineer (R.E.) depending on the sequence of work and the project schedule. The contractor will implement nonstructural BMPs such as weather monitoring via the National Weather Service to help forecast potential precipitation events and prepare accordingly to prevent material from entering the waterways during runoff events. Construction will be performed from paved surfaces and road shoulders when feasible. The contractor will remove construction equipment from waterways in preparation for	

	precipitation events and monitor site BMPs before and after for structural integrity. Waste materials to be transported off site and not permitted to discharge into Waters of the U.S. Concrete wash outs and equipment clean-up will be located a minimum of 100 ft from the waterways. Materials will not be stockpiled in the channels. Appropriate mitigation measures for stockpile management will be implemented (e.g., material stockpiles will be located a minimum of 100 ft of waterways).
Describe how the activity has been designed to avoid and/or minimize adverse effects, both temporary and permanent, to regulated waters:	While excavation and fill activities occur within the OHWM and is considered an aquatic resource "loss", the class 400 riprap apron installation, culvert extension and type II headwall installation will match the existing channel grades. Pre-construction stream flow paths will be maintained whenever possible. Class 400 riprap apron reduces scour at the culvert outlet and sediment deposition downstream.
Describe any compensatory mitigation planned for this project (if applicable):	N/A

D. Signature		
Name and Title (Print): My-Linh Nguyen, P.E., Ph.D. Chief, Environmental Division	Phone Number: 775-888-7686	Date: 12/03/2024
X DocuSigned by: My-Linh Nguyen 500EF9E7EA1D438... Signature of Responsible Official		

Mandatory Attachments:

- **Federal Permit or License Identification:**
  - Project proponents seeking a federal general permit or license must include a copy of the draft federal license or permit and any readily available water quality-related materials that informed the development of the draft federal license or permit, or;
  - Project proponents seeking a federal individual permit or license must include a copy of the federal permit or license application and any readily available water quality-related materials that informed the development of the federal license or permit application.
- **Site Map** - A map or diagram of the proposed project site including project boundaries in relation to regulated waters, local streets, roads, and highways.
- **Engineered Drawings** - Engineered drawings are preferred to be submitted at the 70% design level. If only conceptual designs are available at the time of application, plans for construction should be submitted prior to

the start of the project. Specific locations of the proposed activities and details of specific work elements planned for the project should be identified (e.g., staging areas, concrete washouts, perimeter controls, water diversions, or other BMPs).

Submit the completed application materials to NDEP (ndep401@ndep.nv.gov) with the appropriate U.S. Army Corps of Engineers Regulatory Office copied on the communication (http://www.spk.usace.army.mil/Missions/Regulatory/Contacts/Contact-Your-Local-Office/).

Table 1. Quantity of wetlands, streams, or other types of waters directly affected by proposed Section 404/401 permitting activities. DO 30.374, US-395 (MP DO 30.374)

Area	Linear Ft.	Dredged or Discharged (Yd^3)	Permanent WOUS Impact[1] (Acres)	Temporary WOUS Impact (Acres)	Fill Material
Class 400 Riprap Apron	18	90	0.014	0	Class 400 Riprap, Riprap Bedding, Geotextile
Impact Totals	18	90	0.014	0	Class 400 Riprap, Riprap Bedding, Geotextile

[1] Aquatic Resource "Loss"

Table 2. Quantity of wetlands, streams, or other types of waters directly affected by proposed Section 404/401 permitting activities. DO 0.998, SR-759 (MP DO 0.998)

Area	Linear Ft.	Dredged or Discharged (Yd^3)	Permanent WOUS Impact [2] (Acres)	Temporary WOUS Impact (Acres)	Fill Material
Outlet Culvert Extension	11	34	0.005	0	Native Material, Concrete, Reinforcing Steel, Granular Backfill
Outlet Type II Headwall	4	12	0.001	0	Concrete, Reinforcing Steel, Granular Backfill
Impact Totals	15	46	0.006	0	Native material, Concrete, Reinforcing Steel, Granular Backfill

[2] Aquatic Resource "Loss"

Table 3. Waters of the U.S. Impacts Summary Table US-395 Carson Valley

Area	Linear Ft.	Dredged or Discharged (Yd^3)	Permanent WOUS Impact [3] (Acres)	Temporary WOUS Impact (Acres)	Fill Material
DO 30.374 US-395 (MP DO 30.374)	18	90	0.014	0	Class 400 Riprap, Riprap Bedding, Geotextile
DO 0.998 SR-759 (MP DO0.998)	15	46	0.006	0	Native material, Concrete, Reinforcing Steel, Granular Backfill
Total Impacts US-395 Carson Valley	33	136	0.02	0	Class 400 Riprap, Riprap Bedding, Geotextile, Native material, Concrete, Reinforcing Steel, Granular Backfill

[3] Aquatic Resource "Loss"

Attachment B Figures and Pre-Construction Photos

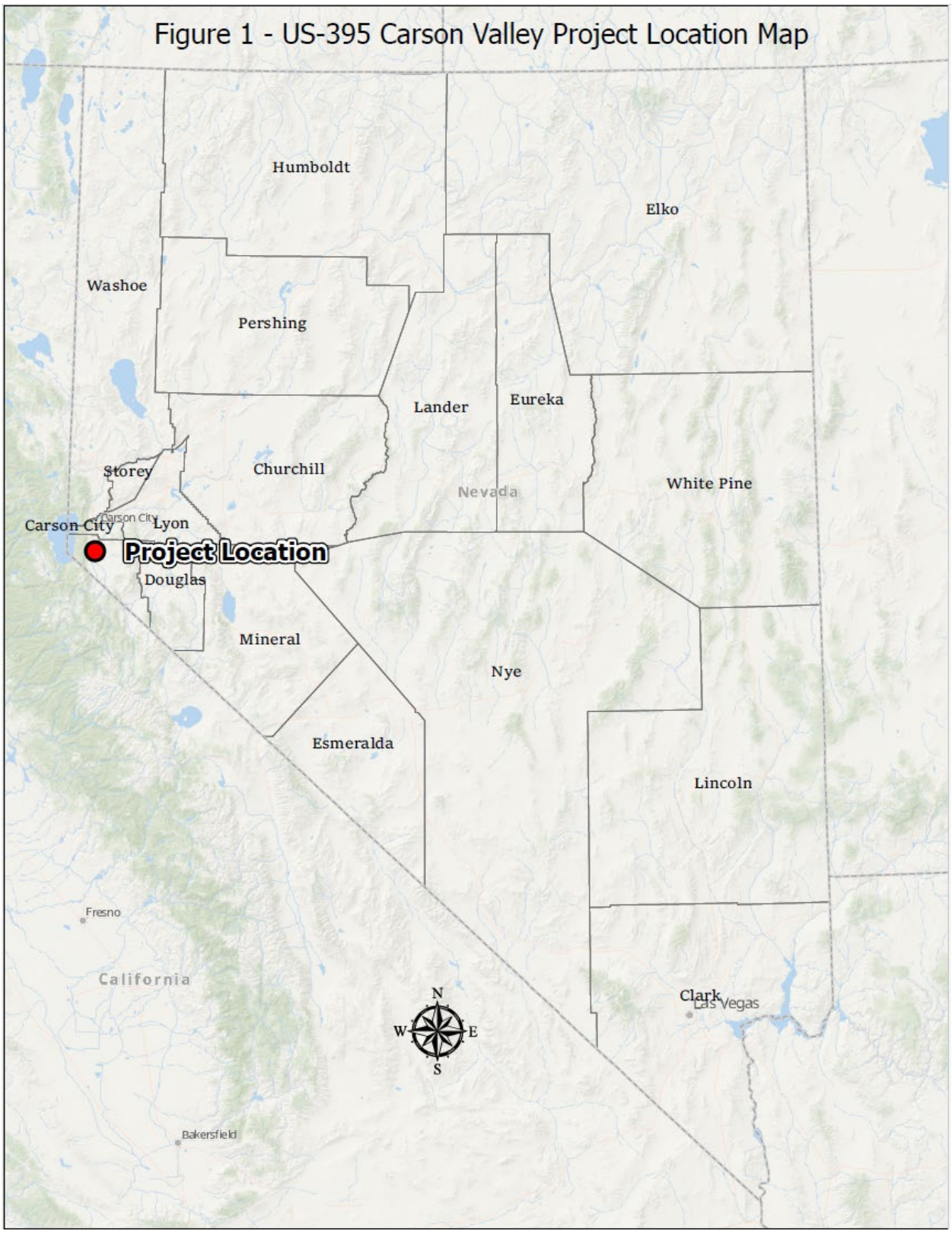


Figure 1. Location Map

Figure 2. Vicinity Map

Figure 3. DO 30.374 Aerial Map

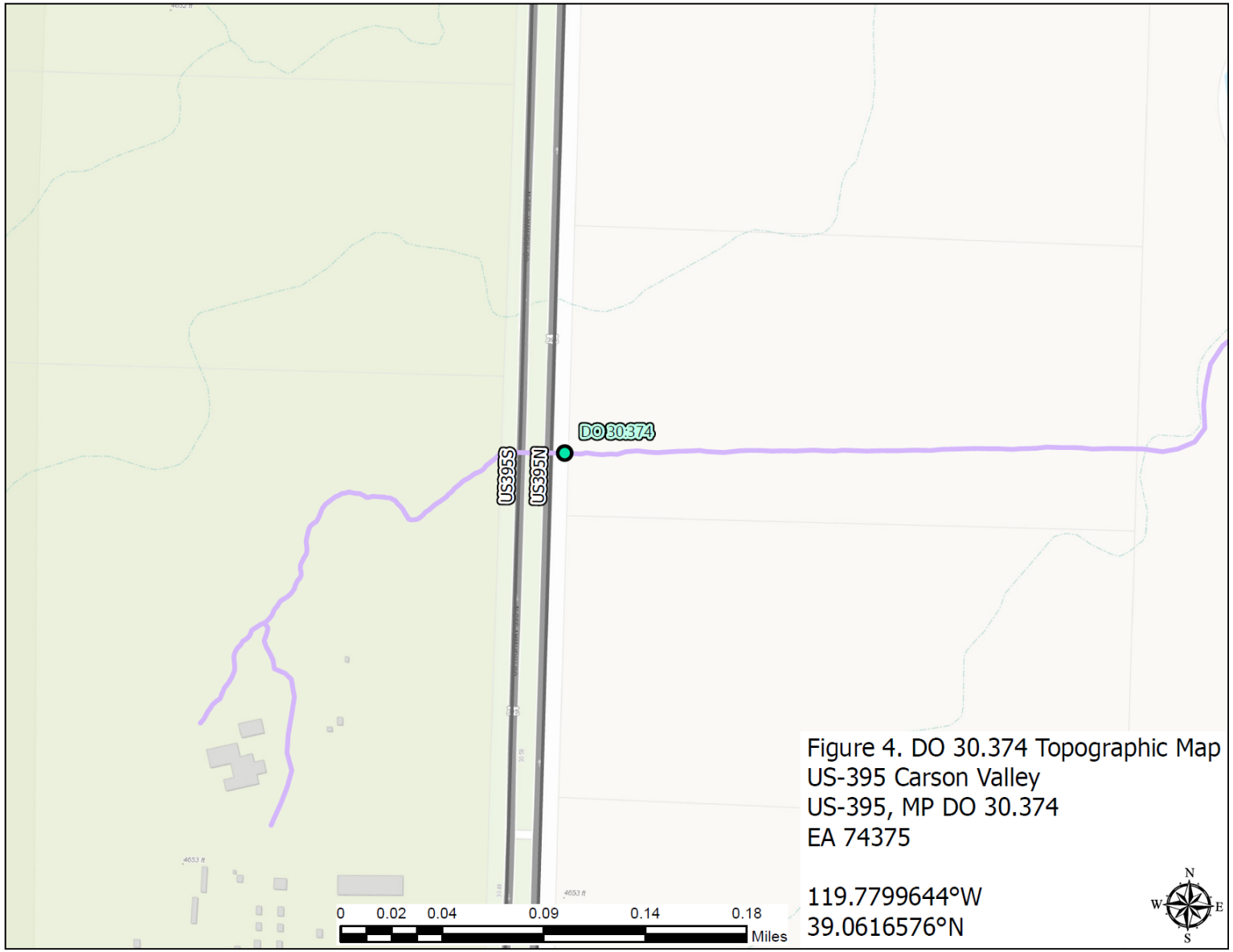


Figure 4. DO 30.374 Topographic Map

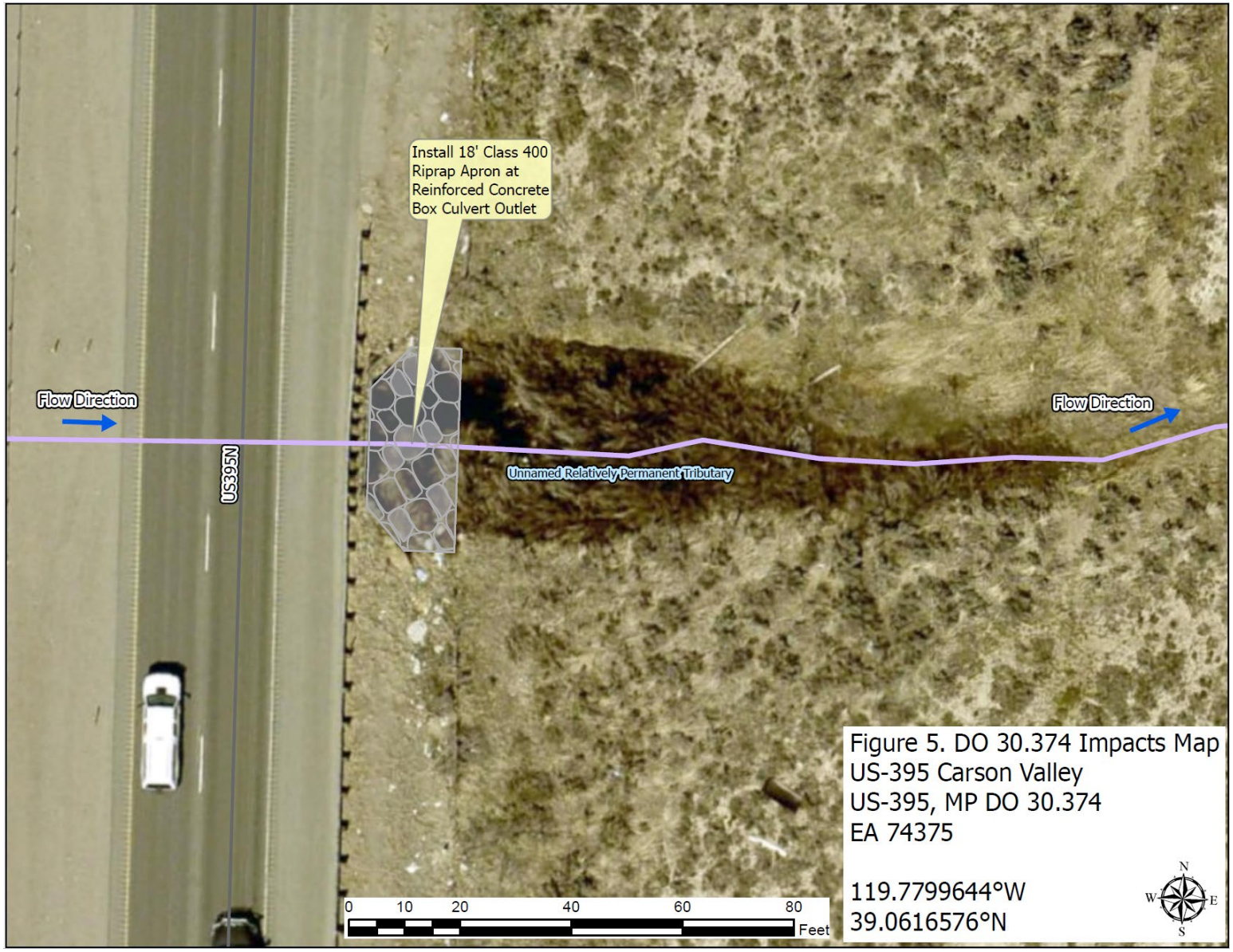


Figure 5. DO 30.374 Impacts Map

Figure 6. DO 0.998 Aerial Map

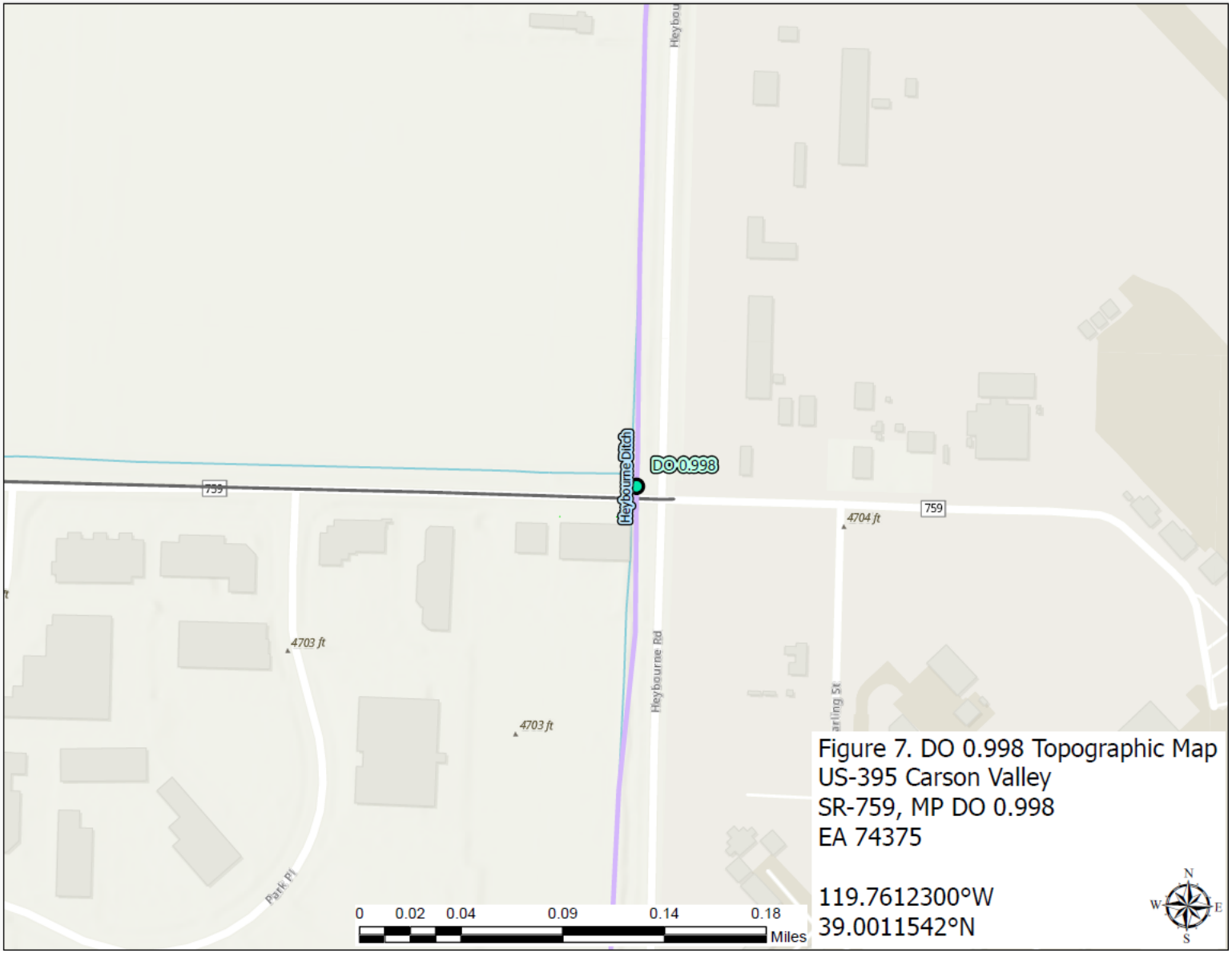


Figure 7. DO 0.998 Topographic MapSR-759

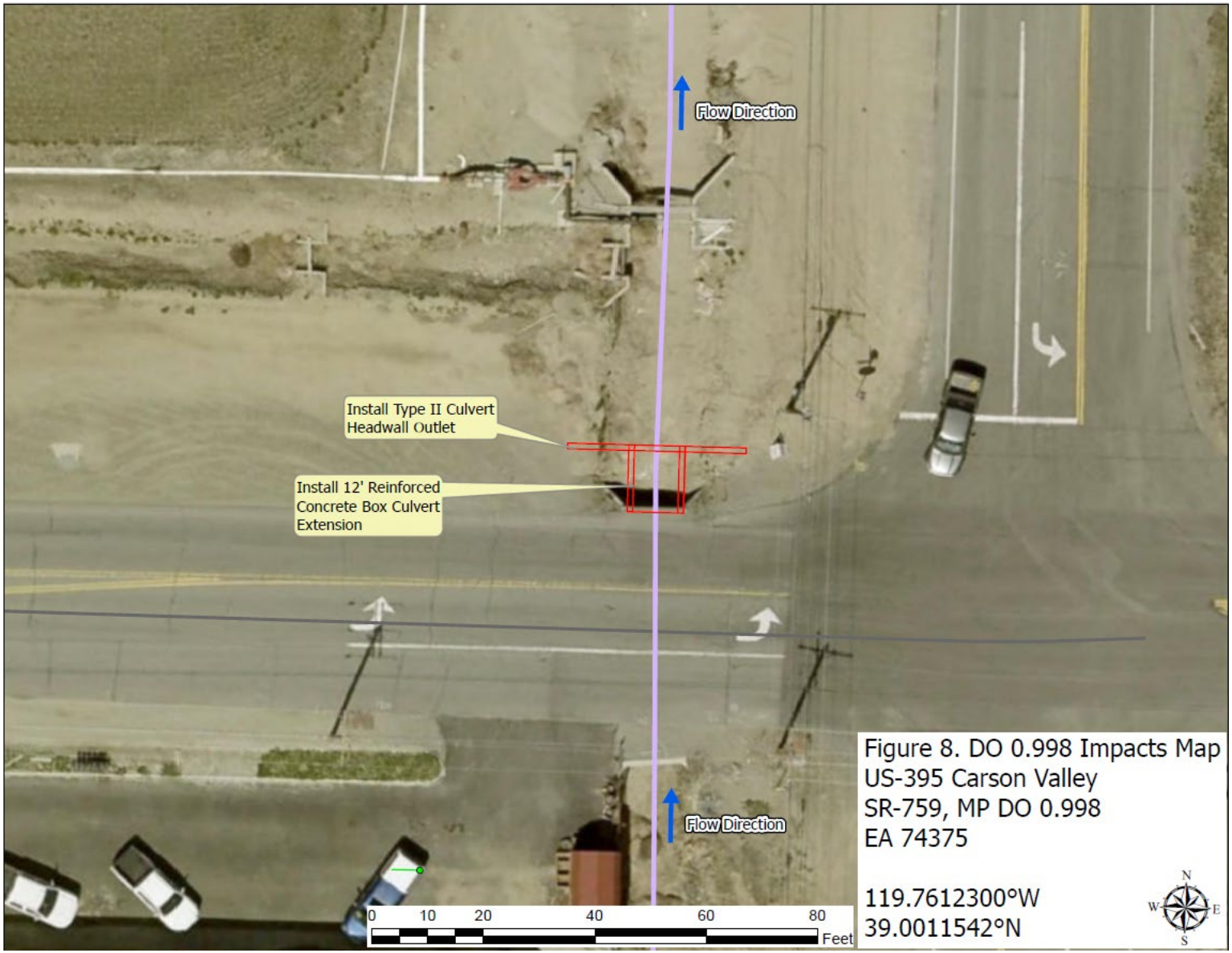


Figure 8. DO 0.998 Impacts Map

US-395 Carson Valley Project Figures

Photopoint 1 – DO 30.374 Outlet looking West (upstream).

Approximate ordinary high watermark depicted in red.

Photopoint 2 – DO 30.374 Outlet looking East (downstream).

Approximate ordinary high watermark depicted in red.

Photopoint 3 – Heybourne Ditch outlet looking South (upstream).

Approximate ordinary high watermark depicted in red.

Photopoint 4 – Heybourne Ditch outlet looking North (downstream).

Approximate ordinary high watermark depicted in red.

Attachment C Plan Sheets

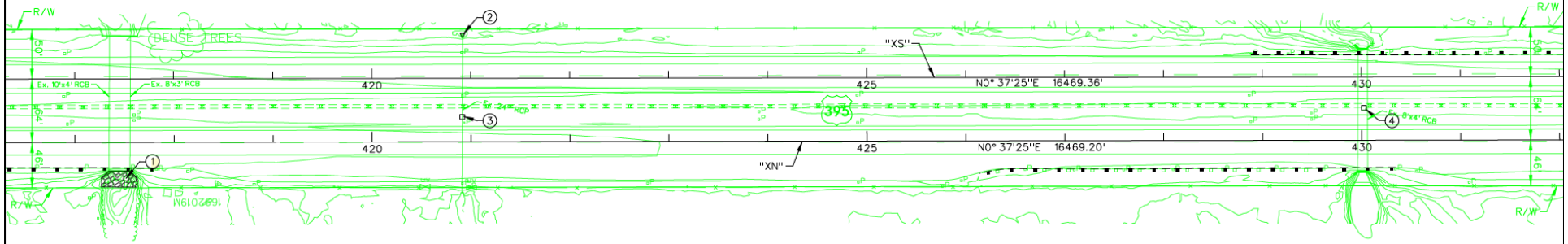
PRELIMINARY

SUBJECT TO REVISION
$$$$date$$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	STBG-395-1(032)	DOUGLAS	D13

NOTE: DEPICTED UTILITY LOCATIONS ARE APPROXIMATE ONLY. CONTRACTOR TO VERIFY EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. USE CAUTION. PROTECT ALL UTILITIES IN PLACE.

CONTRACTOR TO FIELD VERIFY ALL EXISTING STORM DRAIN FEATURES AND PROTECT IN PLACE.



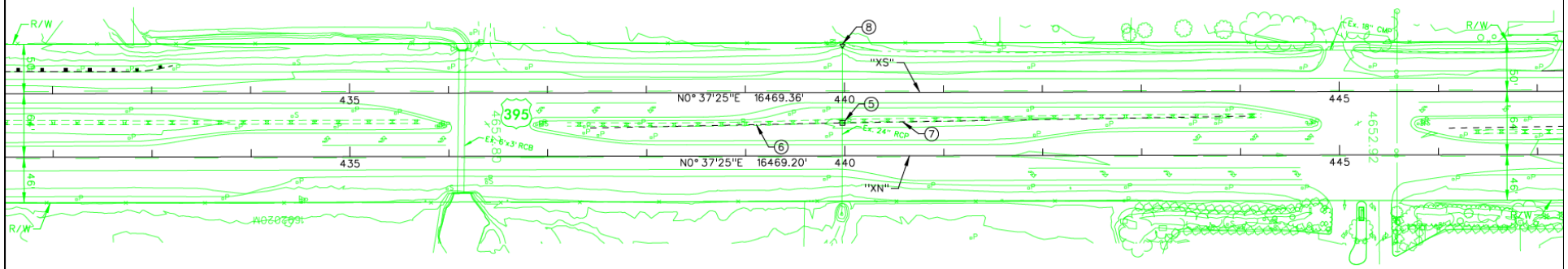
① "XN" 417+45 OUTLET OF EXISTING DOUBLE RCB, 29.1' RT. CONSTRUCT CLASS 400 RIPRAP APRON (A = 9.0')

② "XS" 420+92 INLET OF EXISTING 24" RCP, 41.4' LT. REMOVE EXISTING END SECTION. INSTALL PRECAST END SECTION.

③ "XN" 420+91 REMOVE X' SECTION OF 24" RCP WITHIN INSIDE WALLS OF PROPOSED DROP INLET, XX.X' XT. CONSTRUCT TYPE 8 DROP INLET, 25.0' LT. (GRATE ELEV. = XXXX.XX', H = X.XX') AND CONNECT TO EXISTING RCP. CONSTRUCT CONCRETE APRON.

④ "XN" 430+02 REMOVE EXISTING DROP INLET, XX.X' XT. CONSTRUCT TYPE 2A DROP INLET, 32.6' LT OVER RCB (GRATE ELEV. = XXXX.XX', A = X.XX', H = X.XX'). (SEE SHEET DDX)

⑧ "XS" 439+98 INLET OF EXISTING 24" RCP, 44.7' LT. REMOVE EXISTING END SECTION. INSTALL PRECAST END SECTION.



⑤ "XN" 439+98 REMOVE EXISTING DROP INLET, 33.3' LT. REMOVE X' SECTION OF 24" RCP WITHIN INSIDE WALLS OF PROPOSED DROP INLET, XX.X' XT. CONSTRUCT TYPE 8 DROP INLET, 33.3' LT. (GRATE ELEV. = XXXX.XX', H = X.XX') AND CONNECT TO EXISTING RCP. CONSTRUCT CONCRETE APRON.

⑥ "XN" 437+43 / "XN" 439+98 CONSTRUCT EARTHEN V-TYPE DITCH FROM "XN" 437+43, 28.5' LT (IE = XXXX.XX') TO "XN" 439+98, 33.3' LT (IE = XXXX.XX'). (LSS = VARIES TO EOP, RSS = VARIES TO EOP, H = VARIES)

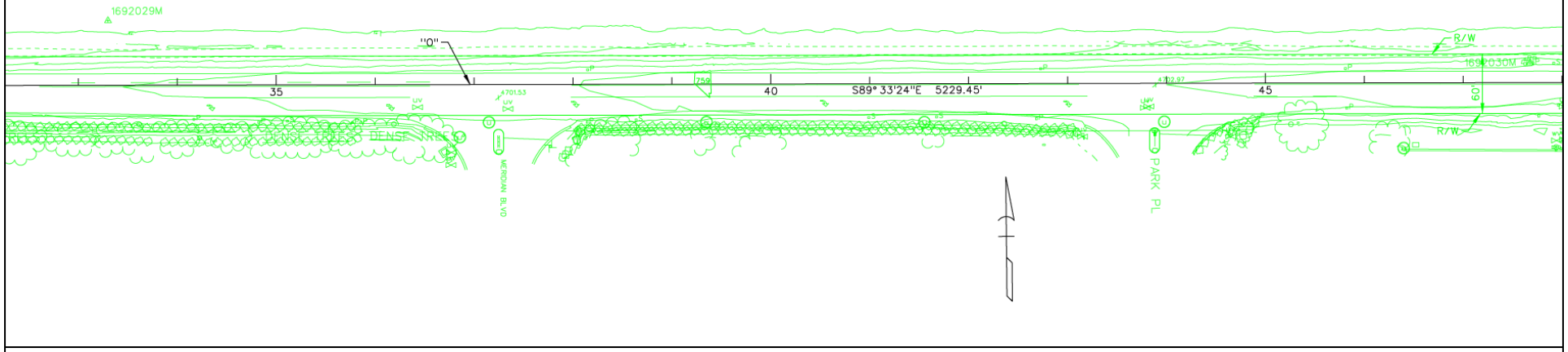
⑦ "XN" 439+98 / "XN" 444+05 CONSTRUCT EARTHEN V-TYPE DITCH FROM "XN" 439+98, 33.3' LT (IE = XXXX.XX') TO "XN" 444+05, 39.4' LT (IE = XXXX.XX'). (LSS = VARIES TO EOP, RSS = VARIES TO EOP, H = VARIES)

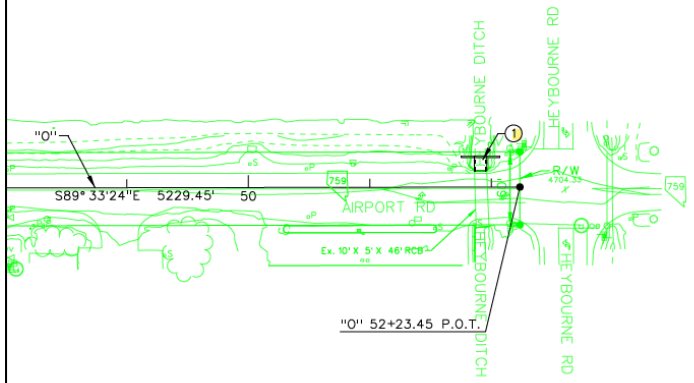
PRELIMINARY
SUBJECT TO REVISION
$$$$date$$$$

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	STBG-395-1(032)	DOUGLAS	D27

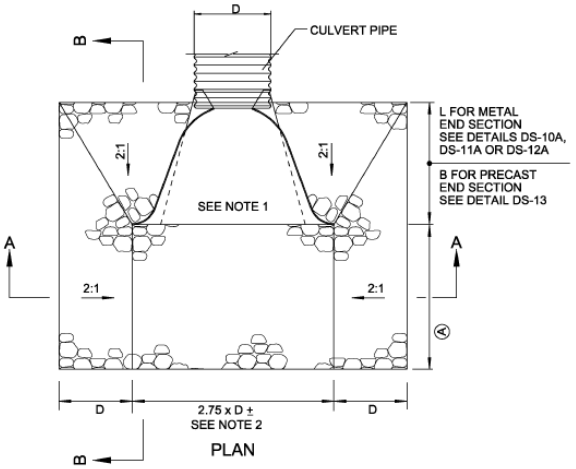
NOTE: DEPICTED UTILITY LOCATIONS ARE APPROXIMATE ONLY. CONTRACTOR TO VERIFY EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. USE CAUTION. PROTECT ALL UTILITIES IN PLACE.

CONTRACTOR TO FIELD VERIFY ALL EXISTING STORM DRAIN FEATURES AND PROTECT IN PLACE.

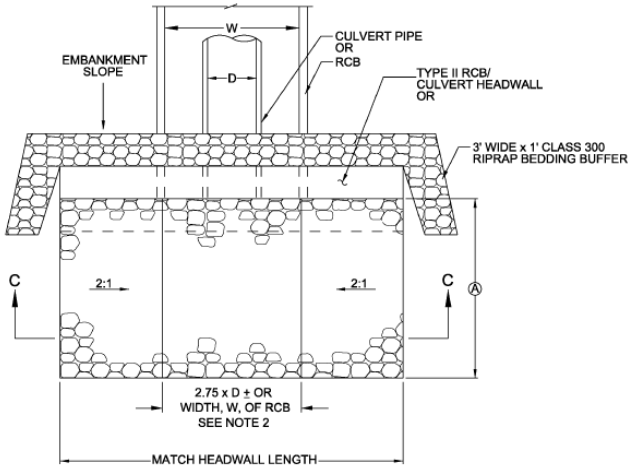




① "O" 51+91 EXISTING 10' X 5' X 46' RCB REMOVE EXISTING HEADWALL 13.6' LT. EXTEND 12' AT OUTLET. CONSTRUCT TYPE II HEADWALL AT OUTLET.



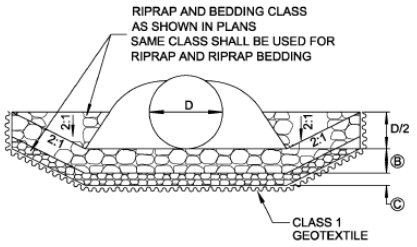
PLAN



PLAN

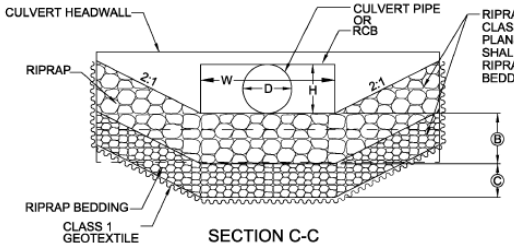
NOTES:

1. When no end section is used, additional riprap shall be as required by the Hydraulic Engineer.
2. For multiple pipe or RCB installations, this dimension shall be adjusted according to the pipe separation information on detail DS-6 or in the headwall details.
3. Transition end of riprap apron to down stream channel. Apron may be skewed and dimensions adjusted to match and line up with down stream channel.



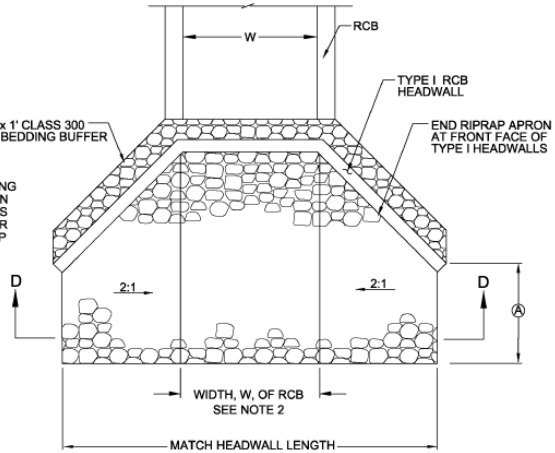
SECTION A-A

RIPRAP APRON
FOR END SECTIONS

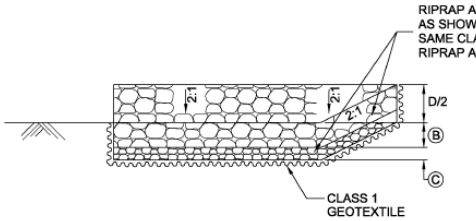


SECTION C-C

RIPRAP APRON
FOR CULVERT HEADWALLS
OR TYPE II RCB HEADWALLS



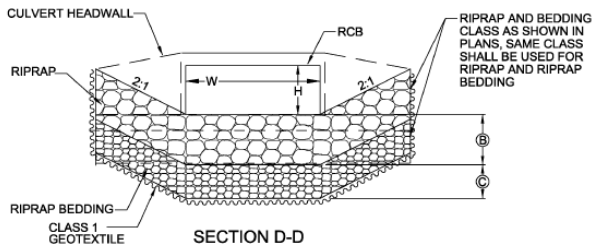
PLAN



SECTION B-B
RIPRAP APRON
FOR END SECTIONS

RIPRAP AND BEDDING CLASS	★Ⓐ	Ⓑ IN.	Ⓒ IN.
150	4D OR 4H	12	8
300	5D OR 5H	24	8
400	6.5D OR 6.5H	36	10
550	8D OR 8H	48	12
700	8D OR 8H	60	12
900	9D OR 9H	72	24

★OR AS SPECIFIED



SECTION D-D

RIPRAP APRON
FOR TYPE I RCB HEADWALLS

NEVADA DEPARTMENT OF TRANSPORTATION

CHIEF HYDRAULICS ENGR.
SIGNED ORIGINAL ON FILE

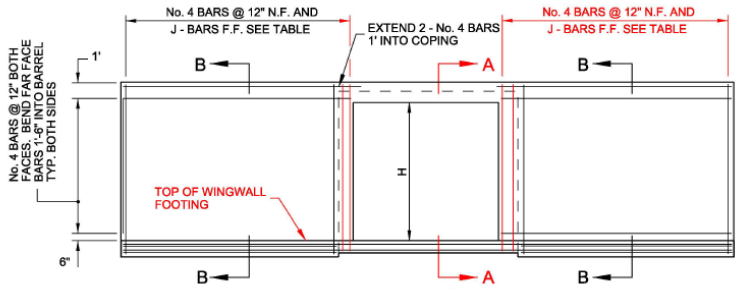
ADOPTED
5/2009

REVISED
10/2015

RIPRAP APRON FOR CULVERT HEADWALLS TYPE 1 AND 2 RCB HEADWALLS AND END SECTIONS

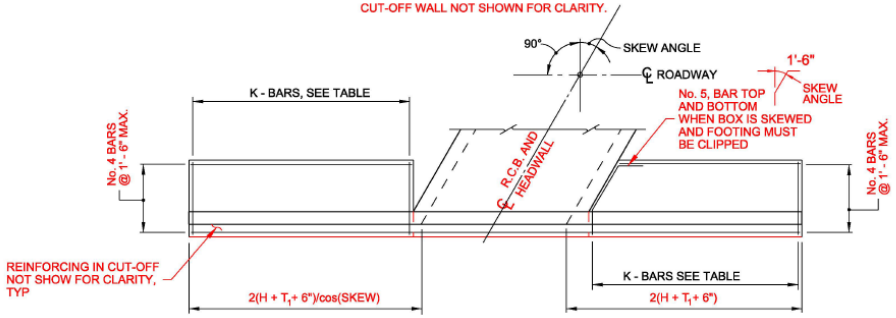
SPEC. #
610

DETAIL NUMBER
DS-31



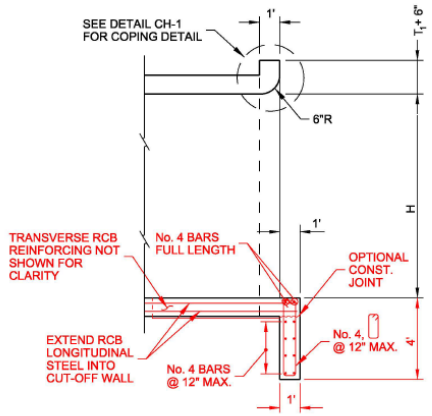
ELEVATION

AT FRONT FACE OF STEM.
CUT-OFF WALL NOT SHOWN FOR CLARITY.

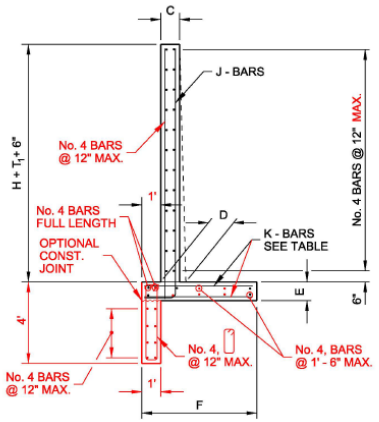


WALL B WALL A

PLAN



SECTION A-A



SECTION B-B

NOTES:

1. DESIGN SPECIFICATIONS "AASHTO LRFD Bridge Design Specifications 2012".
2. For quantities see detail CH-7B.
3. CONSTRUCTION SPECIFICATIONS: State of Nevada Department of Transportation "Standard Specifications for Road and Bridge Construction, 2014".
4. WALL LOADS:

Case 1	Case 2
Surcharge Depth = 2 ft	Surcharge Depth = 0 ft
Lateral Earth Pressure = 36 pcf	Lateral Earth Pressure = 60 pcf
Soil Dead Load = 120 pcf	Soil Dead Load = 120 pcf
Concrete Dead Load = 150 pcf	Concrete Dead Load = 150 pcf
Earthquake Load = N/A	Earthquake Load = N/A

5. CONCRETE: Class DA Modified (Major) F'c = 4,500 psi @ 28 Days, Class DA Modified in Clark County.

   Where traffic loads will be placed directly on the top surface of the culvert, and/or up to 2-feet of fill (at edge of pavement), provide epoxy coated reinforcement, except in Clark County. Use EA Modified (Major) concrete, Class E Modified in Clark County, in lieu of class DA. F'c = 4,500 PSI @ 28 Days.

   Approved waterproofing membrane may be used in lieu of EA/E Concrete and epoxy coated reinforcings at the discretion of the NDOT Structures Division.
6. REINFORCING STEEL: All reinforcing steel to be ASTM A 615 grade 60 or A706 grade 60. Dimensions relating to bar spacing are center to center. Reinforcing steel shall be embedded 3-inches clear of bottom of footing, and 2-inches clear of all other concrete surfaces.
7. FOUNDATION PRESSURE: Headwalls are designed to the following soil bearing pressures:

RCB HEIGHT, H	Ton/ft^2
≤ 6 ft	1.6
≤ 8 ft	1.7
≤ 10 ft	1.8
≤ 12 ft	1.9
≤ 14 ft	2.0

8. SLIDING RESISTANCE:
   Coefficient of Friction between Concrete Footing and Soil = 0.450
   Cohesion = 0.200 ksf
   Passive Earth Pressure = 360 pcf
   Passive Resistance = Per design specifications ignoring top 2-feet of soil

TABLE

H = HEIGHT FEET	C = INCHES	D = INCHES	E = FEET INCHES	F = FEET INCHES	J = SIZE	J = SPACING	K = SIZE	K = SPACING
3	12	12	1-0	5-0	5	12	5	12
4	12	12	1-0	6-3	5	12	5	12
5	12	12	1-0	7-6	6	12	5	12
6	12	12	1-0	9-0	5	6	5	6
7	12	14	1-0	10-3	5	6	5	6
8	12	14	1-3	11-6	5	6	5	6
9	12	16	1-3	12-9	6	6	5	6
10	12	16	1-3	13-9	6	6	6	6
11	12	18	1-3	15-0	6	6	6	6
12	12	18	1-3	16-0	7	6	8	6
13	12	20	1-6	17-6	8	6	7	6
14	12	20	1-6	18-6	8	5	8	5

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REVISED 9/2022

RCB CULVERTS TYPE II HEADWALLS

SPEC. # 502,505

DETAIL NUMBER CH-7A

NOTES:

1. Quantities shown are cubic yards of concrete and pounds of steel for one Type II Headwall.
2. For culverts with more than three cells, quantities may be determined by adding the difference between the triple box and double box concrete/reinforcing quantities for each additional cell.

SPAN (S)	HEIGHT (H)	SINGLE BOX								DOUBLE BOX								TRIPLE BOX							
		0 SKEW		15 SKEW		30 SKEW		45 SKEW		0 SKEW		15 SKEW		30 SKEW		45 SKEW		0 SKEW		15 SKEW		30 SKEW		45 SKEW	
		CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.
5	3	9.35	1015.1	9.50	1019.8	10.10	1077.3	11.44	1211.3	10.79	1176.9	10.98	1192.0	11.75	1271.9	13.45	1443.8	12.07	1340.4	12.31	1356.3	13.23	1454.9	15.26	1670.4
	4	12.99	1372.9	13.15	1377.8	13.92	1437.9	15.67	1619.4	14.44	1539.4	14.66	1554.7	15.59	1637.7	17.70	1858.2	15.72	1706.6	15.98	1723.0	17.07	1831.5	19.51	2090.2
	5	17.29	1901.8	17.47	1897.4	18.43	2010.7	20.64	2234.8	18.76	2073.4	18.99	2079.7	20.12	2210.0	22.70	2480.7	20.04	2244.4	20.32	2251.9	21.60	2408.1	24.51	2718.0
6	3	9.71	1097.7	9.86	1104.3	10.50	1171.0	11.92	1318.9	11.26	1296.3	11.47	1314.3	12.29	1404.2	14.12	1607.0	12.78	1501.4	13.05	1524.3	14.05	1640.3	16.27	1888.7
	4	13.36	1465.0	13.54	1471.9	14.34	1548.3	16.17	1738.6	14.91	1668.1	15.15	1686.6	16.14	1780.2	18.37	2033.0	16.43	1877.7	16.72	1901.2	17.89	2021.4	20.52	2321.0
	5	17.68	2003.9	17.88	2008.3	18.87	2125.6	21.17	2366.3	19.24	2211.5	19.48	2221.1	20.67	2369.1	23.37	2667.0	20.75	2425.5	21.06	2440.3	22.42	2609.0	25.52	2961.3
	6	22.94	3186.2	23.14	3195.1	24.34	3355.5	27.19	3700.2	24.49	3398.3	24.74	3419.0	26.14	3604.1	29.38	4000.7	26.01	3616.7	26.32	3636.4	27.89	3855.6	31.53	4307.8
7	3	9.96	1196.6	10.12	1205.5	10.79	1280.2	12.27	1451.7	12.21	1474.9	12.46	1497.2	13.38	1604.6	15.42	1865.6	14.04	1731.7	14.35	1760.3	15.49	1898.9	18.01	2219.3
	4	13.61	1575.2	13.80	1591.2	14.63	1669.7	16.53	1885.3	15.92	1861.0	16.18	1884.1	17.28	2020.4	19.74	2282.8	17.75	2122.9	18.08	2152.6	19.39	2320.6	22.33	2650.2
	5	17.93	2125.5	18.13	2132.6	19.16	2259.3	21.53	2526.8	20.29	2419.8	20.57	2434.3	21.86	2601.8	24.81	2935.6	22.12	2686.9	22.47	2708.1	23.98	2907.9	27.40	3310.3
	6	23.19	3319.2	23.39	3331.0	24.63	3501.5	27.54	3868.1	25.61	3622.4	25.89	3675.3	27.40	3853.9	30.89	4323.3	27.44	3894.5	27.79	3954.4	29.51	4165.9	33.48	4705.2
	7	29.74	4124.7	29.96	4124.7	31.48	4313.0	35.10	4787.5	32.23	4435.7	32.53	4481.6	34.33	4705.7	38.54	5225.0	34.06	4713.0	34.43	4765.9	36.44	5023.6	41.13	5614.2
8	3	10.31	1324.9	10.49	1343.4	11.19	1428.5	12.76	1636.0	13.40	1703.9	13.67	1748.8	14.71	1878.2	17.01	2159.9	15.57	2021.5	15.93	2077.9	17.23	2244.9	20.09	2616.3
	4	13.99	1718.5	14.19	1737.8	15.06	1851.9	17.04	2067.8	17.19	2108.4	17.49	2158.8	18.71	2300.3	21.43	2630.4	19.37	2431.8	19.74	2493.8	21.22	2673.7	24.51	3094.9
	5	18.33	2284.1	18.54	2294.9	19.61	2433.9	22.06	2728.1	21.65	2687.8	21.97	2736.2	23.39	2897.4	26.61	3316.7	23.83	3017.0	24.22	3079.3	25.90	3277.4	29.68	3783.0
	6	23.61	3493.4	23.83	3509.1	25.10	3699.3	28.10	4122.8	27.06	3968.1	27.38	3996.5	29.02	4234.5	32.80	4759.5	29.23	4303.0	29.63	4343.5	31.53	4621.2	35.88	5233.9
	7	30.19	4313.9	30.43	4356.1	31.99	4558.5	35.69	5032.4	33.80	4808.2	34.15	4826.0	36.08	5083.6	40.60	5686.6	35.97	5148.9	36.40	5179.0	38.59	5477.0	43.68	6169.3
	8	40.43	5241.0	40.63	5287.5	42.55	5501.3	47.24	6105.6	44.25	5754.9	44.56	5809.5	46.86	6079.3	52.39	6783.2	46.42	6101.5	46.81	6168.5	49.38	6479.4	55.47	7274.0
10	3	11.10	1535.9	11.30	1556.6	12.09	1668.8	13.85	1924.4	15.17	2128.3	15.50	2165.6	16.73	2330.4	19.43	2715.7	17.98	2557.7	18.41	2616.6	19.97	2834.2	23.40	3331.4
	4	14.81	1948.3	15.03	1970.2	15.99	2112.7	18.17	2379.1	18.19	2437.4	18.53	2496.4	19.87	2667.3	22.86	3080.4	20.87	2878.1	21.30	2955.5	22.96	3179.6	26.64	3702.9
	5	19.18	2533.4	19.42	2547.1	20.58	2715.7	23.23	3063.1	22.65	3035.4	23.01	3094.9	24.55	3291.1	28.03	3789.8	25.33	3483.3	25.78	3561.4	27.64	3805.2	31.82	4422.4
	6	24.49	3762.2	24.74	3814.8	26.11	4002.3	29.31	4475.3	28.06	4334.4	28.42	4372.2	30.18	4648.6	34.22	5255.7	30.74	4789.5	31.19	4846.1	33.27	5170.9	38.01	5898.4
	7	31.11	4601.8	31.38	4654.2	33.04	4882.2	36.96	5408.1	34.80	5193.2	35.19	5220.8	37.24	5511.6	42.02	6199.5	37.48	5655.4	37.96	5702.1	40.33	6042.1	45.81	6858.7
	8	41.40	5547.9	41.63	5605.0	43.66	5845.5	48.57	6504.6	45.25	6158.7	45.60	6223.4	48.02	6527.7	53.82	7319.3	47.93	6628.0	48.37	6718.5	51.12	7073.0	57.60	7982.1
	9	50.94	7031.5	51.18	7089.2	53.59	7413.3	59.50	8234.4	54.92	7679.3	55.29	7751.5	58.11	8142.1	64.92	9091.3	57.60	8155.7	58.06	8247.6	61.21	8689.1	68.71	9764.2
	10	59.66	9306.9	59.91	9353.8	62.69	9769.5	69.52	10717.4	63.74	9998.6	64.12	10060.4	67.31	10474.3	75.05	11630.2	66.42	10482.2	66.89	10563.8	70.40	11029.5	78.84	12313.2
12	3	12.29	1837.6	12.52	1889.1	13.43	2023.5	15.44	2323.5	17.27	2603.3	17.67	2653.1	19.11	2891.1	22.29	3357.7	20.78	3195.7	21.30	3261.7	23.17	3568.5	27.25	4191.5
	4	16.09	2276.8	16.35	2334.3	17.43	2476.2	19.87	2835.1	21.26	3073.2	21.69	3150.4	23.32	3376.6	26.96	3906.4	24.78	3674.0	25.32	3767.7	27.38	4070.3	31.92	4752.2
	5	20.55	2890.8	20.83	2948.9	22.12	3116.8	25.05	3562.5	25.92	3731.1	26.37	3809.6	28.22	4057.1	32.37	4685.2	29.43	4340.4	30.01	4442.2	32.27	4760.6	37.34	5542.9
	6	25.96	4205.7	26.25	4248.8	27.76	4490.9	31.26	5046.4	31.54	5133.7	32.00	5197.5	34.08	5528.6	38.83	6264.4	35.06	5751.5	35.63	5832.3	38.13	6235.4	43.79	7134.2
	7	32.71	5080.4	33.02	5113.5	34.83	5370.6	39.06	6008.2	38.56	6048.7	39.05	6102.9	41.44	6450.7	46.97	7318.0	42.08	6674.9	42.68	6746.5	45.50	7173.7	51.93	8199.7
	8	43.17	6061.8	43.44	6132.2	45.62	6409.9	50.87	7145.9	49.36	7071.0	49.82	7126.9	52.61	7527.0	59.19	8458.0	52.88	7705.7	53.46	7779.3	56.67	8259.8	64.16	9351.7
	9	52.85	7598.3	53.13	7669.9	55.71	8034.5	61.98	8935.9	59.36	8685.9	59.84	8733.7	63.05	9185.8	70.70	10335.9	62.88	9329.0	63.48	9394.9	67.11	9921.9	75.86	11241.5
	10	61.66	9933.6	61.97	9994.9	64.92	10383.4	72.12	11492.9	68.39	11111.1	68.89	11133.2	72.49	11681.3	81.09	12989.3	71.91	11762.7	72.53	11803.1	76.54	12433.6	86.06	13906.9
	11	73.74	11494.9	74.07	11535.0	77.52	12032.1	85.99	13292.1	80.81	12720.8	81.34	12716.7	85.46	13374.6	95.39	14844.0	84.33	13380.8	84.98	13395.4	89.52	14136.7	100.36	15773.6
	12	84.36	18008.9	84.71	17952.0	88.60	18720.7	98.20	20514.1	91.66	19482.7	92.21	19450.4	96.78	20187.5	107.87	22325.3	95.17	20151.2	95.84	20137.9	100.84	20959.3	112.83	23266.8
14	6	27.42	4698.9	27.74	4739.9	29.38	5024.9	33.18	5652.4	33.68	5688.8	34.20	5771.0	36.50	6151.1	41.74	7038.9	37.90	6468.2	38.57	6579.1	41.38	7055.2	47.71	8141.6
	7	34.29	5612.3	34.64	5649.6	36.59	5951.4	41.13	6671.2	40.80	6628.9	41.35	6701.9	43.98	7132.9	50.00	8088.0	45.02	7418.1	45.73	7520.2	48.86	8048.4	55.98	9211.0
	8	44.90	6633.0	45.22	6671.2	47.54	7032.2	53.12	7854.7	51.72	7676.3	52.25	7788.1	55.28	8210.2	62.38	9309.0	55.95	8475.3	56.62	8616.5	60.16	9137.0	68.36	10445.9
	9	54.72	8226.4	55.06	8255.8	57.79	8662.7	64.41	9709.3	61.84	9320.8	62.39	9435.2	65.84	9949.3	74.03	11233.9	66.06	10129.6	66.76	10273.7	70.72	10887.3	80.00	12384.7
	10	63.63	10625.3	63.99	10628.2	67.10	11123.0	74.67	12327.8	70.95	11771.5	71.52	11876.6	75.37	12480.5	84.52	13926.5	75.17	12590.1	75.89	12725.3	80.25	13429.9	90.50	15091.1
	11	75.86	12229.3	76.24	12282.3	79.87	12825.4	88.73	14175.8	83.49	13406.7	84.09	13491.6	88.47	14145.4	98.97	15818.2	87.72	14235.1	88.47	14350.4	93.35	15106.1	104.94	16990.2
	12	86.58	18884.5	86.98	18841.1	91.06	19530.8	101.06	21540.3	94.41	20201.3	95.04	20190.5	99.89	21121.9	111.55	23383.3	98.64	21039.4	99.42	21059.5	104.77	22093.9	117.52	24575.5
	13	111.11	20524.7	111.37	20550.0	116.26	21374.3	128.54	23529.7	119.50	21890.0	120.00	21949.0	125.69	23020.3	139.71	25434.2	123.73	22738.0	124.38	22826.1	130.57	24003.6	145.69	26640.3
	14	125.10	29443.9	125.38	29407.9	130.84	30532.1	144.59	33540.0	133.59	31199.2	134.10	31197.8	140.36	32441.2	155.85	35724.5	137.82	32057.0	138.48	32087.0	145.24	33435.8	161.83	36944.5

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ADOPTED 11/1970

REVISED 9/2022

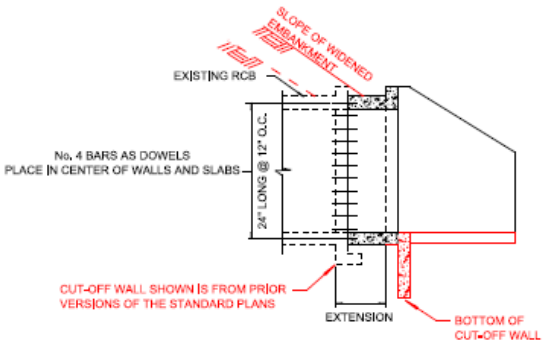
ESTIMATE OF QUANTITIES TYPE II HEADWALLS

SPEC. # 502,505

DETAIL NUMBER CH-7B

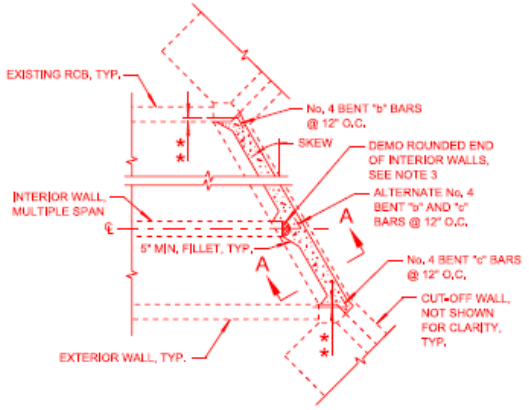
NOTES:

1. For additional notes see detail CH-1.
2. Dowel holes shall be drilled 12-inches into existing concrete. Diameter of hole shall be ⅛-inch larger than diameter of bar. Hole may be inclined no more than 5° off the horizontal. Dowels shall be epoxied into clean holes. Epoxy shall conform to the requirement of Section 728.
3. To remove rounded ends of interior culvert walls, sawcut a vertical line 1/2" deep where the curved portion of the wall ends. Demolish the rounded end of the wall while protecting any existing reinforcing.



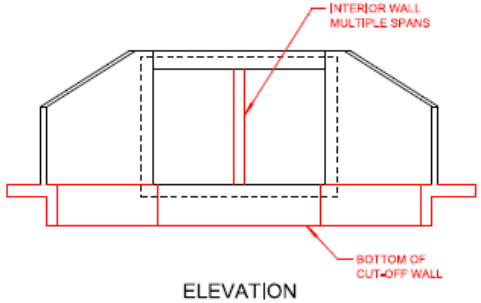
OLD HEADWALLS TO REMAIN IN PLACE UNLESS OTHERWISE NOTED

PART LONGITUDINAL SECTION

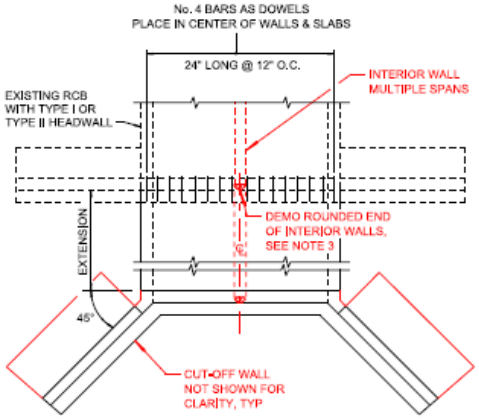


★ ★ – 3" TO CENTER OF HOLE FROM INSIDE FACE OF CONCRETE

PLAN VIEW

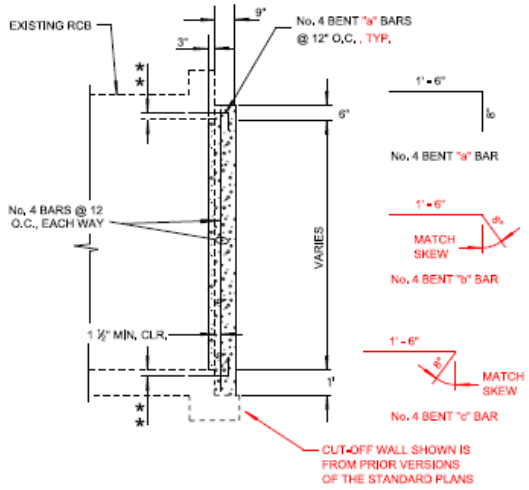


ELEVATION



PLAN

RCB CULVERT EXTENSION



SECTION A-A

WIDTH AND HEIGHT VARIES

METHOD OF PLUGGING RCB

NEVADA DEPARTMENT OF TRANSPORTATION

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ADOPTED 11/1970

REVISED 9/2022

RCB CULVERTS METHOD OF EXTENDING AND PLUGGING

SPEC. # 502

DETAIL NUMBER CH-9