



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN
GOVERNOR

DANIEL H. JOHNSON
SECRETARY

October 1, 2026

U.S. Army Corps of Engineers
Raleigh Regulatory Field Office
3331 Heritage Trade Dr., Suite 105
Wake Forest, NC 27587

N.C. Division of Water Resources
Transportation Permitting Branch
1617 Mail Service Center
Raleigh, NC 27699-1617

ATTN: Mr. Eric Alsmeyer
NCDOT Coordinator

Mr. Rob Ridings
NCDOT Coordinator

SUBJECT: Request for Modification of the Phased Section 404 Individual Permit and Section 401 Individual Water Quality Certification, Neuse River Riparian Buffer Authorization for the construction of the Triangle Expressway Southeast Extension from NC 55 Bypass in Apex to US 64/264 (I-87) in Knightdale, Federal Aid No. STP-0540(19), STP-0540(20), and STP-0540(21); WBS Nos. 37673.1.TA1, 35516.1.TA1, and 35517.1.TA1; STIP Project Nos. R-2721, R-2828, and R-2829

REFERENCE: USACE Section 404 Authorization SAW-2009-02240, issued October 24, 2019, modified February 4, 2020 (corrected revision issued February 7, 2020), April 29, 2020, January 7, 2021, March 19, 2021, March 3, 2022, July 1, 2022, September 13, 2022, February 17, 2023, June 21, 2023, July 19, 2023, August 4, 2023, August 11, 2023, December 13, 2023, January 22, 2024, May 29, 2024, October 28, 2024, December 13, 2024, May 19, 2025, June 6, 2025, August 26, 2025, October 8, 2025, October 27, 2025, October 31, 2025, December 3, 2025, December 5, 2025, and March 18, 2026.

NCDWR Water Quality Certification Number 4179 and Neuse River Riparian Buffer Authorization, issued February 15, 2019, modified January 30, 2020, April 20, 2020 (corrected revision issued April 23, 2020), June 1, 2020, December 29, 2020, March 9, 2021, April 8, 2021, November 1, 2021, May 18, 2022, July 22, 2022, February 15, 2023, June 19, 2023, July 19, 2023, August 4, 2023, August 11, 2023, December 12, 2023, January 22, 2024, May 29, 2024, October 7, 2024, December 10, 2024, May 15, 2025, June 2, 2025, August 20, 2025, October 2, 2025, October 24, 2025, October 30, 2025, December 1, 2025, December 4, 2025, and March 17, 2026.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
TURNPIKE AUTHORITY
1599 MAIL SERVICE CENTER
RALEIGH, NC 27699-1599

Telephone: (919) 707-2700
Fax: (919) 715-5511
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
2501 AERIAL CENTER PARKWAY
SUITE 200
MORRISVILLE, NC 27560

Dear Sirs:

As you are aware, the North Carolina Department of Transportation (NCDOT) applied for a phased Section 404 Individual Permit, Section 401 Individual Water Quality Certification (WQC), and Neuse River Riparian Buffer Authorization, and Non-404 Jurisdictional Wetlands and Waters Permit for the subject project in September 2018. The project, also known as Complete 540, encompasses three NCDOT State Transportation Improvement Plan (TIP) projects: R-2721 (NC 55 Bypass to US 401), R-2828 (US 401 to I-40), and R-2829 (I-40 to US 64/264 (I-87)). The permit and previous modification dates are listed in the reference section above.

We are requesting a modification to Section 404 Authorization (SAW-2019-02240) and the associated 401 Individual Water Quality Certification (Permit No. 20181249). This request is prompted by the sloughing of the existing southern bank of the Neuse River during a large storm event on July 24th, 2026. A section of the nearly vertical bank, measuring approximately 150 feet long, sloughed into the river, taking the existing vegetation with it. A plan to remove the sloughed material from the river bottom and stabilize the bank using rip rap and a 1.5:1 slope has been developed and is attached to this permit modification request. To perform the removal of the material from the river bottom and perform the bank stabilization, a temporary cofferdam will be installed in the Neuse River so that the area can be temporarily dewatered. This work will occur during the moratorium for in-water work in the Neuse River but will not block more than 50% of the flow area of the Neuse River, when combined with the currently installed temporary causeway. This work will result in additional permanent stream impacts where the bank stabilization rip rap is keyed into the riverbank and additional temporary stream impacts for installation of the temporary coffer dam.

Details of the revised impacts are outlined below and depicted on the updated permit drawing sheets. For ease of review, all modified impacts areas are shown in bold font in this submittal.

Summary of Impacts

Revised impacts for final design for R-2829B include: 8,485 linear feet of permanent stream impacts (including 1,483 linear feet of bank stabilization) and 1,134 linear feet of temporary stream impacts (Revised Table 5). There is no change to the buffer or wetland impacts on the project due to this modification.

Revised Table 5. R-2829B Jurisdictional Resources Impacts

Riparian Wetlands Temp./ Perm. (ac.)	Non-Riparian Wetlands Perm. (ac.)	Ponds (ac.)	Streams (lf)			Mitigable Riparian Buffer (sq. ft.) Zone 1/ Zone 2
			Perm.	Temp.	Bank Stab. ²	
1.021 ¹ / 9.132	0.459	14.104	8,485	1,134	1,483	Allowable: 93,428/54,468 Mitigable: 592,965/391,158

¹ Includes 0.398 acres of hand clearing.

² Includes countersunk riprap pads, which do not count toward mitigation

Impacts to Jurisdictional Resources

Revisions to proposed impacts are summarized below and reflected in the updated Table 21, which detail site specific impacts to streams. There are no changes to Table 20 or Table 22 impacts in this modification request. The revised permit drawings identify the station number, structure size and type, jurisdictional feature name and associated impact type for each location. All impacts occur within the Neuse River Basin (HUC 03020201). Detailed revisions are provided below.

Site 15: Neuse River

- Permanent Surface Water Impact: 0.050 ac (previously 0.011 ac – increase of 0.039 ac)
- Temporary Surface Water Impact: 0.058 ac (previously 0.012 ac – increase of 0.046 ac)
- Permanent Stream Impact: 203 lf (previously 51 lf – increase of 152 lf)
- Temporary Stream Impact: 30 lf (previously 73 lf – decrease of 43 lf)

The repair of the bank sloughing results in an increase in bank stabilization impacts to the Neuse River, which is a permanent impact; however, there is an overall decrease in linear feet of temporary stream impact from the conversion of previous temporary impacts to permanent impacts for this bank stabilization. The overall temporary acreage of surface water impacts will increase for the installation of the temporary water-filled coffer dam.

Revised Table 21. R-2829B Surface Water (Stream) Impacts

Permit Drawing Site Number	NRTR Label	Impact Type	Permanent Impacts (lf)	Temporary Impacts (lf)	Mitigation Required
4	SOR	Ditch Excavation	-	34	No
6	SAAM	Ditch Excavation	-	11	No
6	SGJ	Fill	160	-	Yes
7	SGJ	Bank Stabilization	28	23	No
7	SGJ	Countersunk Riprap	39	-	No
7	SGK	2@6'x8' RCBC	406	23	Yes

Revised Table 21. R-2829B Surface Water (Stream) Impacts

Permit Drawing Site Number	NRTR Label	Impact Type	Permanent Impacts (lf)	Temporary Impacts (lf)	Mitigation Required
7	SGK	Countersunk Riprap	55	-	No
7	SGK	Countersunk Riprap	44	47	No
8	SGJ	Bank Stabilization	32	42	No
8	SGJ	Ditch Excavation	7	7	Yes
10	SGJ	Bank Stabilization	32	57	No
12	SGI	Bank Stabilization	22	17	No
12	SGI	Countersunk Riprap	48	-	No
12	SGI	3@7'x8' RCBC	408	105	Yes
12	SGI	Countersunk Riprap	26	-	No
12	SGI	Bank Stabilization	61	5	No
14	SGR	Channel Realignment	500	-	Yes
15	Neuse River	Bridge	20	51	Yes
15	Neuse River	Bridge Causeway	-	220	No
15	Neuse River	Bank Stabilization	203	30	No
16	SGT	Ditch	10	12	Yes
18	SGU (Hinton's Creek)	Bridge Causeway	212	73	Yes
18	SGU (Hinton's Creek)	Bank Stabilization	94	36	No
20	SGV	Roadway Fill	793	12	Yes
22	SGY	Roadway Fill	309	-	Yes
22	SGY	Countersunk Riprap	28	10	No
24	SHA	1@ 6'x8' RCBC	290	-	Yes
24	SHA	Countersunk Riprap	15	11	No
25	SHB	1@ 6'x8' RCBC	48	-	Yes
25	SHB	Countersunk Riprap	8	13	No
27	SHD	Roadway Fill	1,804	-	Yes
27	SHD	Countersunk Riprap	10	10	No
28	SHC	2@ 12'x11'	174	-	Yes
28	SHC	Countersunk Riprap	83	9	No
28	SHC	Channel Change	39	-	Yes

Revised Table 21. R-2829B Surface Water (Stream) Impacts

Permit Drawing Site Number	NRTR Label	Impact Type	Permanent Impacts (lf)	Temporary Impacts (lf)	Mitigation Required
28	SHC	3@ 12'x11'	48	-	Yes
28	SHC	Countersunk Riprap	30	-	No
28	SHC	Bank Stabilization	65	10	No
29	SHE	Roadway Fill	173	-	Yes
32	SHC	Bridge	195	74	Yes
32	SHC	1@ 10'x8' RCBC	255	-	Yes
32	SHC	Roadway Fill/Channel Change	319	14	Yes
32	SHC	Roadway Fill	967	11	Yes
33	SHH	1@ 6'x8' RCBC	127	11	Yes
35	SHM	Roadway Fill	-	16	No
36	SAAJ	42" RCP-III	13	-	Yes
36	SAAJ	Countersunk Riprap	37	10	No
37	Neuse River	Riprap at Embankment	26	37	Yes
38	SHL	1@ 9'x6' RCBC Ext	31	-	Yes
38	SHL	Countersunk Riprap	33	-	No
38	SHL	Bank Stabilization	32	78	No
38	SAAL	Roadway Fill	46	-	Yes
39	SHL	1@ 9'x6' RCBC Extension	55	-	Yes
39	SHL	Countersunk Riprap	25	15	No
Total			8,485	1,134	
Bank Stabilization/Countersunk Riprap			1,483	534	
Total Requiring Mitigation			7,002	-	

Regulatory Approvals

Section 404:

We are requesting a modification to the USACE Permit Number SAW-2009-02240 Section 404 Individual Permit for the above-described activities.

Section 401:

We are requesting a modification to the Section 401 Individual WQC Permit Number 4179 from NCDWR and the Neuse Riparian Buffer Authorization.

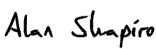
The individual permit modification package for the Complete 540 project (STIP

Projects R-2721, R-2828, and R-2829) is available at:

[https://xfer.services.ncdot.gov/pdea/EnvironmentalPermits/I-540%20\(R-2721%20R-2828%20R-2829\)/R-2721A_R-2721B_R-2828_R-2829A_R-2829B%20Wake%20Johnston/](https://xfer.services.ncdot.gov/pdea/EnvironmentalPermits/I-540%20(R-2721%20R-2828%20R-2829)/R-2721A_R-2721B_R-2828_R-2829A_R-2829B%20Wake%20Johnston/)

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Deanna Riffey at driffey@ncdot.gov or (919) 707-6151.

Sincerely,

DocuSigned by:

B149124683BD45D...

Alan Shapiro, P.E.
Chief Engineer
North Carolina Turnpike Authority

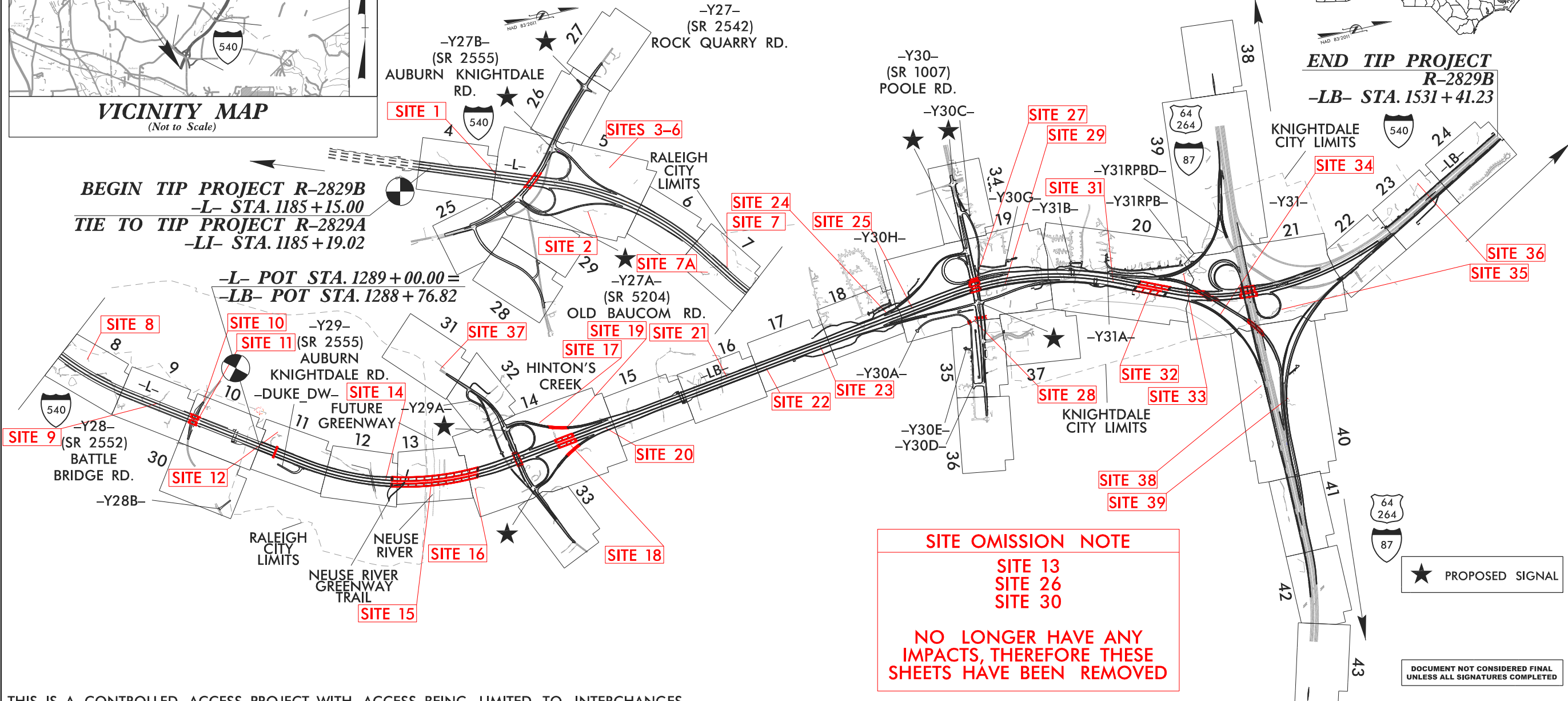
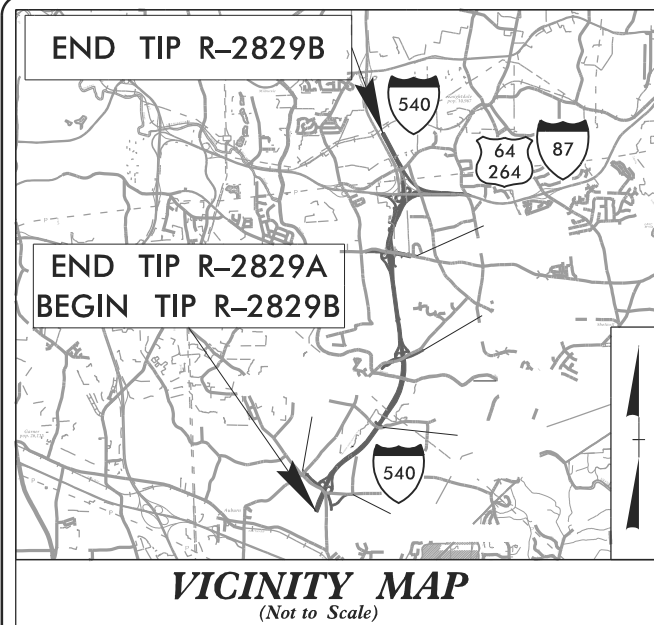
cc: NCDOT Permit Application Standard Distribution List

09/08/2025

TIP PROJECT: R-2829B

CONTRACT: C204825

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DGN\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$
\$\$\$\$\$



THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

GRAPHIC SCALES 50 25 0 50 100 PLANS 50 25 0 50 100 PROFILE (HORIZONTAL) 20 10 0 10 20 PROFILE (VERTICAL)	DESIGN DATA ADT 2025 = 34,800 ADT 2045 = 66,600 K = 12% D = 60/65% T = 10% * V = 75 MPH * TTST = 4% DUAL = 6% FUNC CLASS = INTERSTATE STATEWIDE TIER	PROJECT LENGTH LENGTH ROADWAY TIP PROJECT R-2829B = 5.967 MILES LENGTH STRUCTURE TIP PROJECT R-2829B = 0.595 MILES TOTAL LENGTH TIP PROJECT R-2829B = 6.562 MILES	Prepared In the Office of: ICE of CAROLINAS, PLLC ICE of Carolinas, PLLC 4555 Falls of Neuse Road, Suite 110 Raleigh, North Carolina 27609 Phone: 919-822-0333 License #: 21-0595 2018 STANDARD SPECIFICATIONS RIGHT OF WAY DATE: 8/29/2023 LETTING DATE: 8/29/2023	Prepared For: NORTH CAROLINA TURNPIKE AUTHORITY 1000 Birch Ridge Dr., Raleigh, NC 27610 BRIAN LUSK, P.E. PROJECT ENGINEER RON McCOLLUM, P.E. NCTA CONTACT EASTERN DEPUTY CHIEF ENGINEER	HYDRAULICS ENGINEER SIGNATURE: _____ P.E. ROADWAY DESIGN ENGINEER SIGNATURE: _____ P.E.	 NORTH CAROLINA Turnpike Authority
---	---	---	--	---	---	--

8/17/99

PERMIT DRAWING
SHEET 32 OF 112

REVISED 9/14/2026



- WETLAND EXCAVATION
- SURFACE WATER IMPACTS
- MECHANIZED CLEARING (GRUBBING)
- TEMPORARY SURFACE WATER IMPACTS
- FILL IN WETLAND

TEMPORARY ACCESS
FOR BRIDGE
CONSTRUCTION
ONLY

ICE of
CAROLINAS, PLLC

ICE of Carolinas, PLLC
4505 Falls of Neuse Road, Suite 110
Raleigh, North Carolina 27609
Phone: 803-822-0333
License #: P-0999

PROJECT REFERENCE NO. SHEET NO.

R-2829B 13

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NAD 83

40

WILLIAM E. ADAMS

SITE 15

SGS

(Non-404)

SITE 14

SITE 16

0.47%

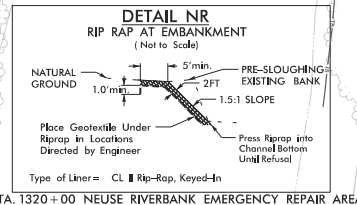
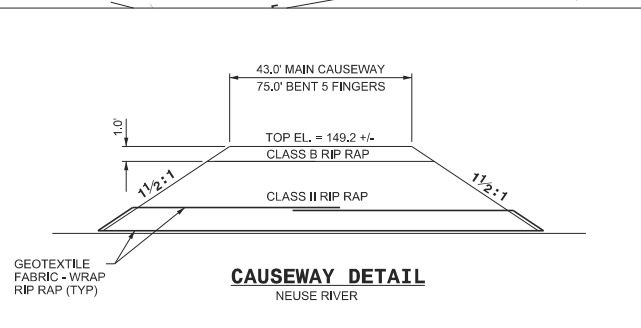
1.64%

MATCHLINE -LB- STA. 1315 + 00.00 SEE SHEET 12

MATCHLINE -LB- STA. 1328 + 00.00 SEE SHEET 14

SEE PERMIT DRAWING SHEET 33 OF 112 FOR ENLARGEMENT

SEE PERMIT DRAWING SHEET 34 OF 112 FOR ENLARGEMENT



-L- STA. 1320 + 00 NEUSE RIVERBANK EMERGENCY REPAIR AREA

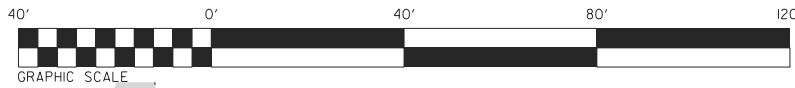
FOR -LB- CURVE DATA SEE SHT.3A-I
FOR -Y28A- CURVE DATA SEE SHT.3A-I

FOR -LB- PROFILE SEE SHT.48 & 49
FOR -Y28A- PROFILE SEE SHT.62

8/17/99

NAD 83

PERMIT DRAWING
SHEET 33 OF 112



ICE of
CAROLINAS, PLLC

ICE of Carolinas, PLLC
4505 Falls of Neuse Road, Suite 110
Raleigh, North Carolina 27609
Phone: 803-822-0333
License #: P-09999

PROJECT REFERENCE NO. <i>R-2829B</i>		SHEET NO. _____	
R/W SHEET NO. _____		_____	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
REVISI		9/14/2026	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

SITE 14 & 15
ENLARGEMENT

TEMPORARY ACCESS
FOR BRIDGE
CONSTRUCTION
ONLY

MATCHLINE -LB- STA. 1315+00.00 SEE SHEET 12

1315+00 PROP. CABLE
GUIDERAIL AU

15" RCP-III
TYPE
2GI B-77

TYPE
B-77

TIE WWF
TO BRIDGE

LAT. 2' BASE
DITCH W/
CL I RIP RAP
SEE DETAIL C
**GREENWAY
DETOUR**

SITE 14

60" RCP-III
(BURY 1')

CL II RIP RAP
FILL IN HOLE &
GRADE TO DRAIN
REMOVE

STD. 5' BASE DITCH
W/CL II RIP RAP
SEE DETAIL CK

STD. 5' BASE DITCH
W/CL II RIP RAP
SEE DETAIL X

RIP RAP AT EMBANKMENT
SEE DETAIL AH

RIP RAP AT
EMBANKMENT
SEE DETAIL NR

FILL IN EXISTING CHANNEL
-Y28A-RT Sta. 9+48.03

WIO

SGR

18" RCP-III

STD. V' DITCH W/CL B RIP RAP
SEE DETAIL AL

CL I
RIP RAP

RIP RAP AT
EMBANKMENT
SEE DETAIL NR

-LB-POC Sta. 1316+67.11

-Y28A-POT Sta. 10+33.71

-Y28A-PC Sta. 11+15.67

SITE 15

TEMPORARY ACCESS

\$DATE\$ \$TIME\$
\$FILE\$ \$REV\$ \$BY\$ \$APP\$
\$USER\$ \$NAME\$ \$\$\$\$

8/17/99

PERMIT DRAWING
SHEET 35 OF 112

REVISED 9/14/2026



- WETLAND EXCAVATION
- SURFACE WATER IMPACTS
- MECHANIZED CLEARING (GRUBBING)
- TEMPORARY SURFACE WATER IMPACTS
- FILL IN WETLAND

TEMPORARY ACCESS
FOR BRIDGE
CONSTRUCTION
ONLY

ICE of
CAROLINAS, PLLC

ICE of Carolinas, PLLC
4505 Falls of Neuse Road, Suite 110
Raleigh, North Carolina 27609
Phone: 803-822-0333
License #: P-0999

PROJECT REFERENCE NO. SHEET NO.

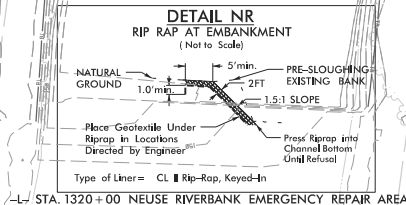
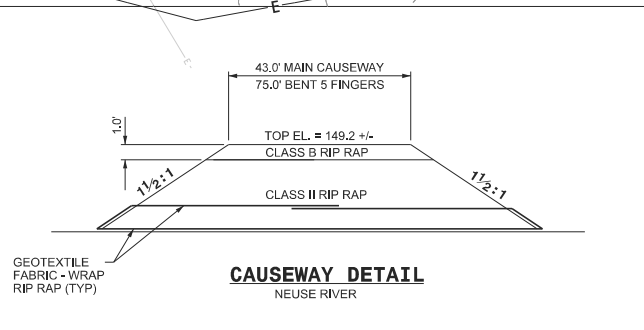
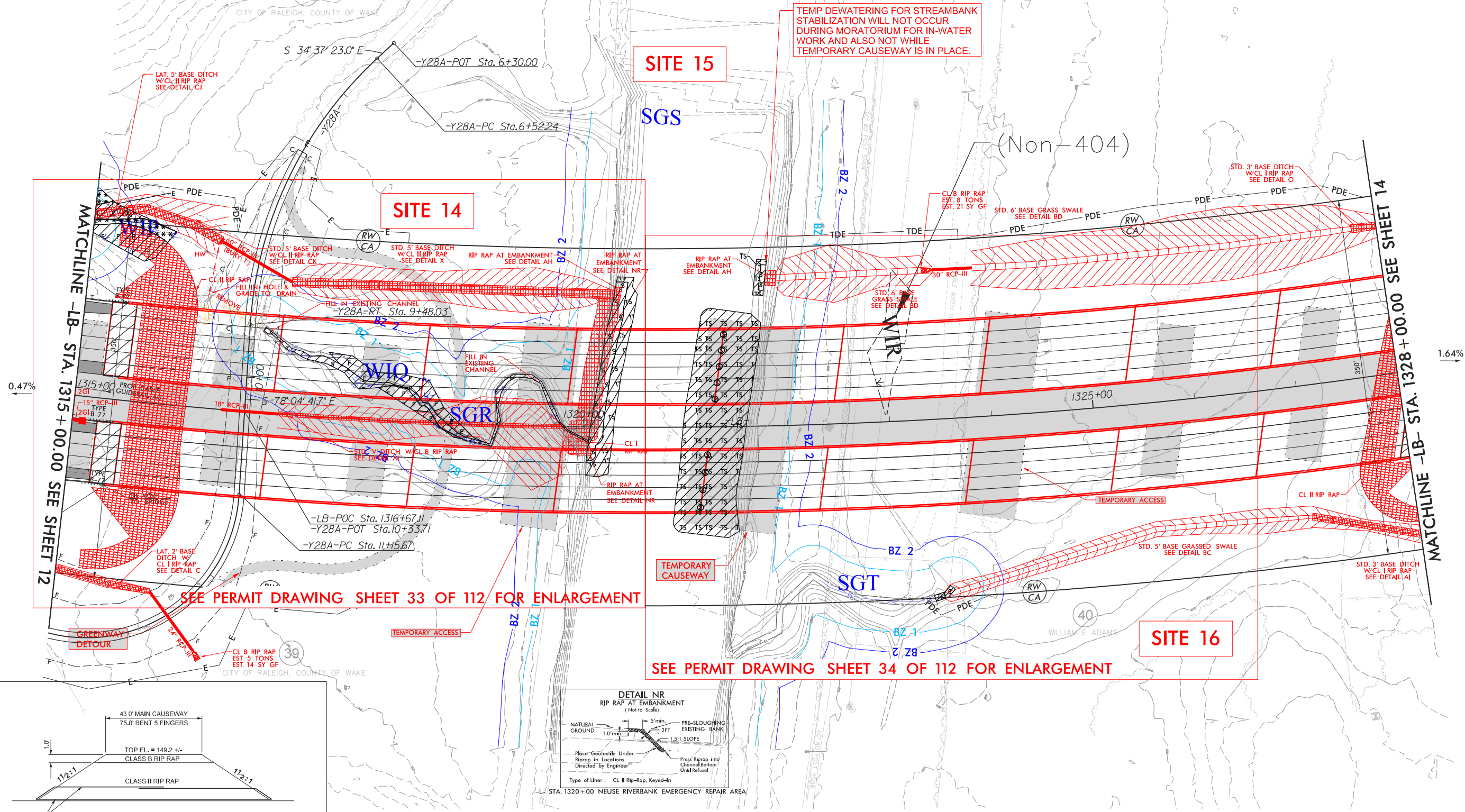
R-2829B 13

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



FOR -LB- CURVE DATA SEE SHT.3A-I
FOR -Y28A- CURVE DATA SEE SHT.3A-I

FOR -LB- PROFILE SEE SHT.48 & 49
FOR -Y28A- PROFILE SEE SHT.62



WETLAND AND SURFACE WATER IMPACTS SUMMARY													
Site No.	Station (From/To)	Structure Size / Type	Wetland and/or Stream ID	WETLAND IMPACTS					SURFACE WATER IMPACTS				
				Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 1197+22/1198+69, M	ROADWAY FILL	WHH	0.143									
2	-Y27-RPD- 18+86/20+85, LT	EMB. EXCAVATION	WHQ			0.021	0.031						
3	-Y27-RPA- 12+57/22+32, RT	FILL (POND)	WHR, PAH	0.037					7.078				
4	-Y27-RPA- 21+68/23+22, RT	DITCH EXCAVATION	WRV, SOR	0.043		0.040				0.002		34	
5	-Y27-RPA- 13+89/17+08, RT	FILL	WAAH	0.095									
6	-Y27-RPA- 11+97/12+09, RT	DITCH	WHS,SAAM	0.024			0.003			0.002		11	
6	-Y27-RPA- 11+81/12+99, RT	FILL	SGJ						0.022		160		
7	-L- 1241+61/1242+00, RT	BANK STABILIZATION	SGK						0.006	0.005	28	23	
7	-L- 1242+00/1242+30, RT	STRUCTURE STABILIZATION	SGK						0.006		39		
7	-L- 1243+18, M	2 @ 6'x8' RCBC	WHP, SGK	0.027					0.054	0.005	406	23	
7	-L- 1244+17/1244+44, LT	STRUCTURE STABILIZATION	SGK						0.013		55		
7	-L- 1244+19/1244+91, LT	STRUCTURE STABILIZATION	SGJ						0.009	0.009	44	47	
7A	-L- 1240+99/1241+32, RT	DITCH EXCAVATION	WHM				0.038						
8	-L- 1253+21/1253+29, LT	BANK STABILIZATION	SGJ						0.003	0.006	32	42	
8	-L- 1253+21/1253+29, LT	DITCH EXCAVATION	SGJ						0.001	0.001	7	7	
9	-L- 1268+92/1269+46, LT	ROADWAY FILL	WIC	0.052									
10	-Y28- 14+75, LT/RT	BANK STABILIZATION	SGJ						0.004	0.008	32	57	
11	-L- 1276+60/1277+19 RT	ROADWAY FILL	WIH	0.053									
12	-L- 1288+28/1288+34, LT	BANK STABILIZATION	SGI						0.004	0.003	22	17	
12	-L- 1288+34/1288+15, LT	STRUCTURE STABILIZATION	SGI						0.008		48		
12	-L- 1288+18, M	3 @ 7'x8' RCBC	SGI						0.087	0.023	408	105	
12	-L- 1288+11/1288+06, RT	STRUCTURE STABILIZATION	SGI						0.007		26		
12	-L- 1288+06/1288+28, RT	BANK STABILIZATION	SGI						0.014	0.002	61	5	
13	-Y27- 25+62, LT	DITCH EXCAVATION	WHG			0.002	0.006						
14	-LB- 1315+04 TO 1315+72 LT	CHANNEL REALIGNMENT	WIP, SGR	0.036		0.021	0.030		0.005		58		
14	-LB- 1316+80 TO 1320+05 M	CHANNEL REALIGNMENT	WIQ, SGR	0.044		0.011			0.036		442		
15	-LB- 1320+03 TO 1321+42 M	BRIDGE	Neuse River						0.005	0.009	20	51	
15	-LB- 1320+87 TO 1321+76 M	BRIDGE CAUSEWAY	Neuse River							0.300		220	
15	-LB- 1319+95 TO 1321+83 M	BANK STABILIZATION	Neuse River						0.050	0.058	203	30	
16	-LB- 1323+35 TO 1323+55 RT	DITCH	SGT						0.002	0.001	10	12	
TOTALS*:				0.554	0.000	0.095	0.108	0.000	7.414	0.434	2101	684	

*Rounded totals are sum of actual impacts

NOTES:

SITE 15 WETLAND WIR IS NON-404

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10/14/2024
(REV 7/18/2025, 10/14/2025, 9/14/2026)
WAKE COUNTY

R-2829B

SHEET
110
OF
112

WETLAND AND SURFACE WATER IMPACTS SUMMARY													
Site No.	Station (From/To)	Structure Size / Type	Wetland and/or Stream ID	WETLAND IMPACTS					SURFACE WATER IMPACTS				
				Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
17	-Y29RPA- 28+45 TO 27+03 LT	ROADWAY FILL	WIU	0.118			0.031						
18	-LB- 1343+75 TO 1348+35 M**	BRIDGE CAUSEWAY	SGU, WIW	0.615		0.028	0.113			0.007		73	
18	-LB- 1345+30 TO 1346+41 M	BANK STABILIZATION	SGU						0.071	0.016	306	36	
19	-Y29RPA- 19+91 TO 22+80 M ***	BRIDGE/CHANNEL CHANGE	WIV	0.066		0.133	0.115						
20	-LB- 1348+26 TO 1354+79 M	ROADWAY FILL	SGV, WIX	0.001		0.001	0.021		0.036	0.001	793	12	
21	-LB- 1373+42 TO 1374+06 RT	ROADWAY FILL	WIY	0.089			0.032						
22	-LB- 1377+53 TO 1382+16 M	ROADWAY FILL	SGY, WIZ	0.181					0.021		309		
22	-LB- 1381+13 TO 1381+24 LT	COUNTERSUNK RIPRAP	SGY						0.002	0.001	28	10	
22	-LB- 1381+15 TO 1381+55 LT	ROADWAY FILL	WJA	0.002		0.003	0.036						
22	-LB- 1377+53 TO 1380+76 RT	ROADWAY FILL (POND)	PAI						1.679				
23	-LB- 1390+22 TO 1390+64 RT	ROADWAY FILL	WJB				0.011						
23	-LB- 1388+53 TO 1394+71 M	ROADWAY FILL (POND)	PAK						4.543				
24	-LB- 1404+10 TO 1405+75 M	1 @ 6'x8' RCBC	SHA, WJD	0.357		0.039	0.044		0.023		290		
24	-LB- 1404+71 TO 1404+82 RT	COUNTERSUNK RIPRAP	SHA						0.001	0.001	15	11	
25	-LB- 1412+45 TO 1415+37 M	1 @ 6'x8' RCBC	SHB, WJD	1.232		0.039	0.102		0.003		48		
25	-LB- 1413+94 LT	COUNTERSUNK RIPRAP	SHB							0.001	8	13	
25	-Y30A- 10+58 TO 12+97 M	1 6'x8'	SHD	0.209		0.042	0.156						
27	-Y30- 22+73 TO 37+02 M	ROADWAY FILL	SHC	0.271					0.171		1804		
27	-Y30- 22+79 RT	COUNTERSUNK RIPRAP	SHC						0.001	0.001	10	10	
28	-Y30- 36+94 TO 37+96 M	2 @ 12'x11'	SHC						0.041		174		
28	-Y30- 37+24 TO 37+64 LT	COUNTERSUNK RIPRAP	SHC						0.029	0.003	83	9	
28	-Y30- 37+21 TO 38+01 RT	CHANNEL CHANGE	SHC						0.015		39		
28	-Y30A- 21+58 TO 22+00 M	3 @ 12'x11'	SHC						0.022		48		
28	-Y30A- 21+64 TO 21+94 RT	COUNTERSUNK RIPRAP	SHC						0.015		30		
28	-Y30A- 21+37 TO 22+00 RT	BANK STABILIZATION	SHC						0.031	0.005	65	10	
29	-Y30RPD- 25+73 TO 25+06 LT	ROADWAY FILL	SHE						0.024		173		
29	-LB- 1431+22 TO 1432+16 M	ROADWAY FILL (POND)	POND WJI						0.106				
TOTALS*:				3.141	0.000	0.285	0.661	0.000	6.834	0.036	4223	184	

*Rounded totals are sum of actual impacts

NOTES:

** SITE 18 Mechanized clearing total has been calculated for the worst-case scenario of losing entire wetland WIW

*** SITE 19 There will be temporary fill placed in the 0.003 ac. under the causeway which will be removed post-construction

SITE 26 CONTAINS NO WET IMPACTS AND HAS BEEN OMITTED FROM SUMMARY

SITE 30 CONTAINS NO WET IMPACTS AND HAS BEEN OMITTED FROM SUMMARY

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

10/14/2024 (REV 07/18/2025)
WAKE COUNTY

R-2829B

WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	Wetland and/or Stream ID	WETLAND IMPACTS					SURFACE WATER IMPACTS				
				Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
31	-LB- 1453+07 TO 1454+88 M	ROADWAY FILL	WJK	0.616			0.014						
32	-LB- 1456+41 TO 1461+83 M	BRIDGE / BANK STABILIZATION	SHC, WJJ(1)	0.008	0.623		0.270	0.39	0.02	0.009	195	74	
32	-LB- 1454+75 TO 1456+43 RT	ROADWAY FILL	WJJ(1)	0.013			0.034						
32	-Y31FLYDB- 51+90 TO 54+62 M	1 @ 10'x8' RCBC	SHC, WJJ(1)	0.218		0.048	0.101		0.032		255		
32	-Y31RPB- 23+56 TO 27+29 M	RDY FILL/CHANNEL CHANGE	SHC, WJL	0.407		0.094	0.119		0.045	0.002	319	14	
32	-Y31LPB- 17+74 TO 23+16 M	ROADWAY FILL	SHC, WJJ(1)	0.346		0.037	0.069		0.100	0.001	967	11	
32	-Y31LPB- 18+26 TO 18+67 RT	ROADWAY FILL	WJL	0.018									
33	-Y31RPB- 21+60 TO 24+06 M	1 @ 6'x8' RCBC	SHH, WJJ(1)			0.052	0.083		0.007	0.001	127	11	
34	-Y31RPC- 21+40 TO 26+00 M	ROADWAY FILL	WJJ(2)	1.052			0.120						
35	-Y31LPD- 19+31 TO 21+97 M	ROADWAY FILL	SHM, WJX	0.144						0.002		16	
35	-Y31LPD- 18+56 TO 19+86 LT	ROADWAY FILL (POND)	PAM						0.698				
35	-Y31RPD- 55+77 TO 56+11 LT	ROADWAY FILL	WJS	0.007			0.005						
36	-LB- 1516+53 TO 1516+56 LT	42" RCP-III	SAAJ								13		
36	-LB- 1516+45 TO 1516+56 LT	COUNTERSUNK RIPRAP	SAAJ						0.004		37	10	
37	-Y29- 8+37 TO 8+54 LT	RIPRAP AT EMBANKMENT	Neuse River						0.003	0.005	26	37	
38	-Y31- 76+81 TO 79+47 RT	1@9'x6' RCBC EXTENSION	SHL, WJJ(2)	0.128			0.091		0.013		31		
38	-Y31- 77+71 TO 78+03 RT	COUNTERSUNK RIPRAP	SHL						0.009		33		
38	-Y31- 77+16 TO 77+48 RT	BANK STABILIZATION	SHL						0.006	0.021	32	78	
38	-Y31- 76+91 TO 77+28 RT	ROADWAY FILL	SAAL						0.005		46		
39	-Y31RPD- 36+61 TO 40+84 RT	1@9'x6' RCBC EXTENSION	SHL, WJJ(1)	0.508		0.003	0.142		0.014		55		
39	-Y31RPD- 39+93 TO 40+03 RT	COUNTERSUNK RIPRAP	SHL						0.004	0.002	25	15	
	PAGE 110 TOTALS			0.554		0.095	0.108		7.414	0.434	2101	684	
	PAGE 111 TOTALS			3.141		0.285	0.661		6.834	0.036	4223	184	
TOTALS*:				7.160	0.623	0.614	1.817	0.390	15.209	0.513	8485	1134	

*Rounded totals are sum of actual impacts

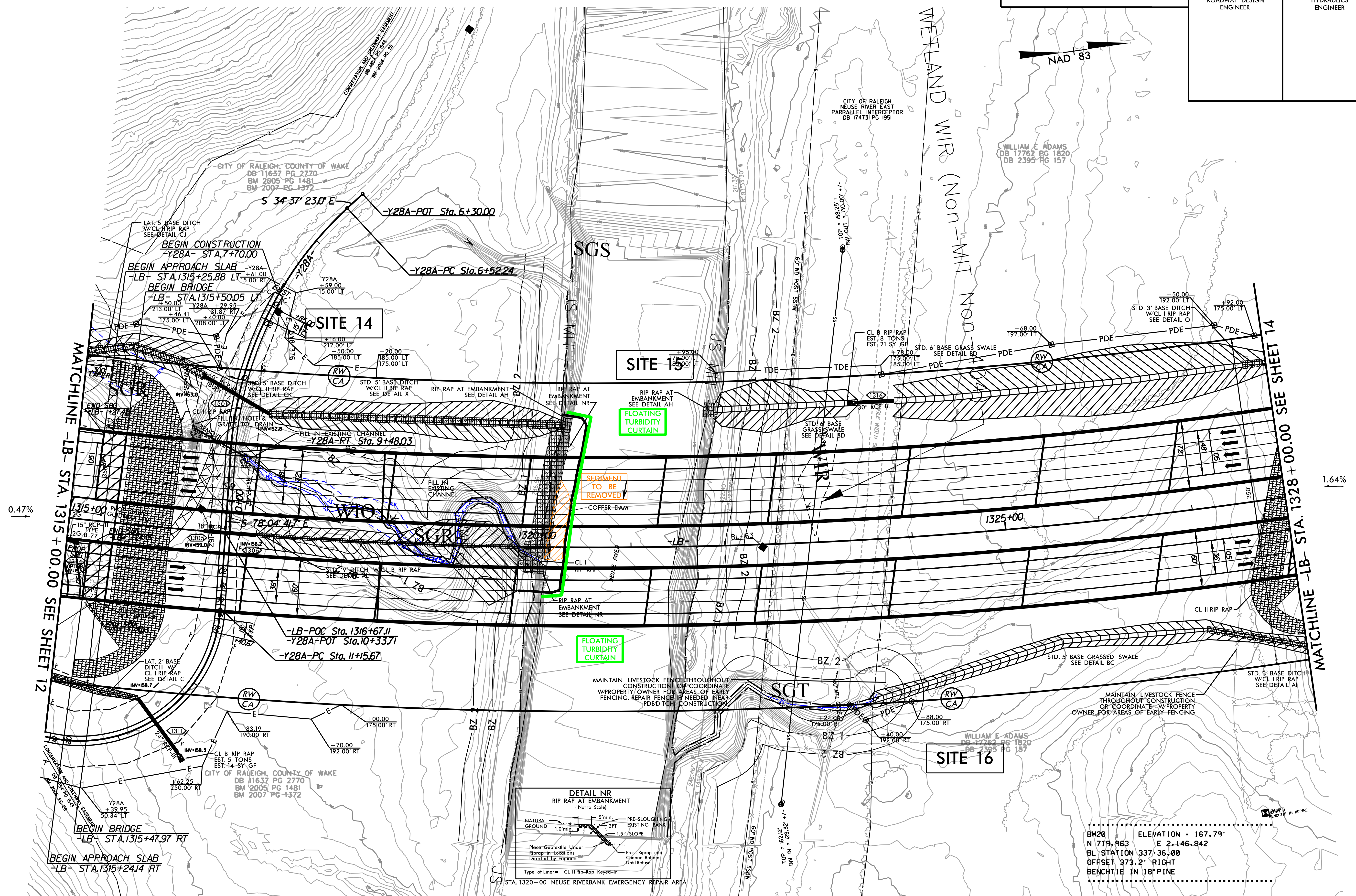
NOTES:

WETLAND WIT (former Site 37) ON PSH 32 HAS BEEN REMOVED AND OMITTED FROM WETLAND IMPACT SUMMARY

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10/14/2024
(REV 07/18/2025, 10/14/2025 & 9/14/2026)
WAKE COUNTY

R-2829B

SHEET 112 OF 112



FOR -LB- CURVE DATA SEE SHT.3A-1 FOR -LB- PROFILE SEE SHT.48 & 49
FOR -Y28A- CURVE DATA SEE SHT.3A-1 FOR -Y28A- PROFILE SEE SHT.62

8/17/99

ICE of
CAROLINAS, PLLC

ICE of Carolinas, PLLC
4505 Falls of Neuse Road, Suite 110
Raleigh, North Carolina 27609
Phone: 803-822-5333
License #: P-0999

PROJECT REFERENCE NO.

R-2829B

SHEET NO.

EC-13B/Const.-13

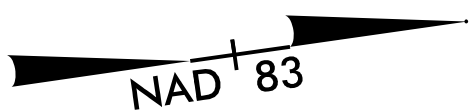
R/W SHEET NO.

ROADWAY DESIGN
ENGINEER

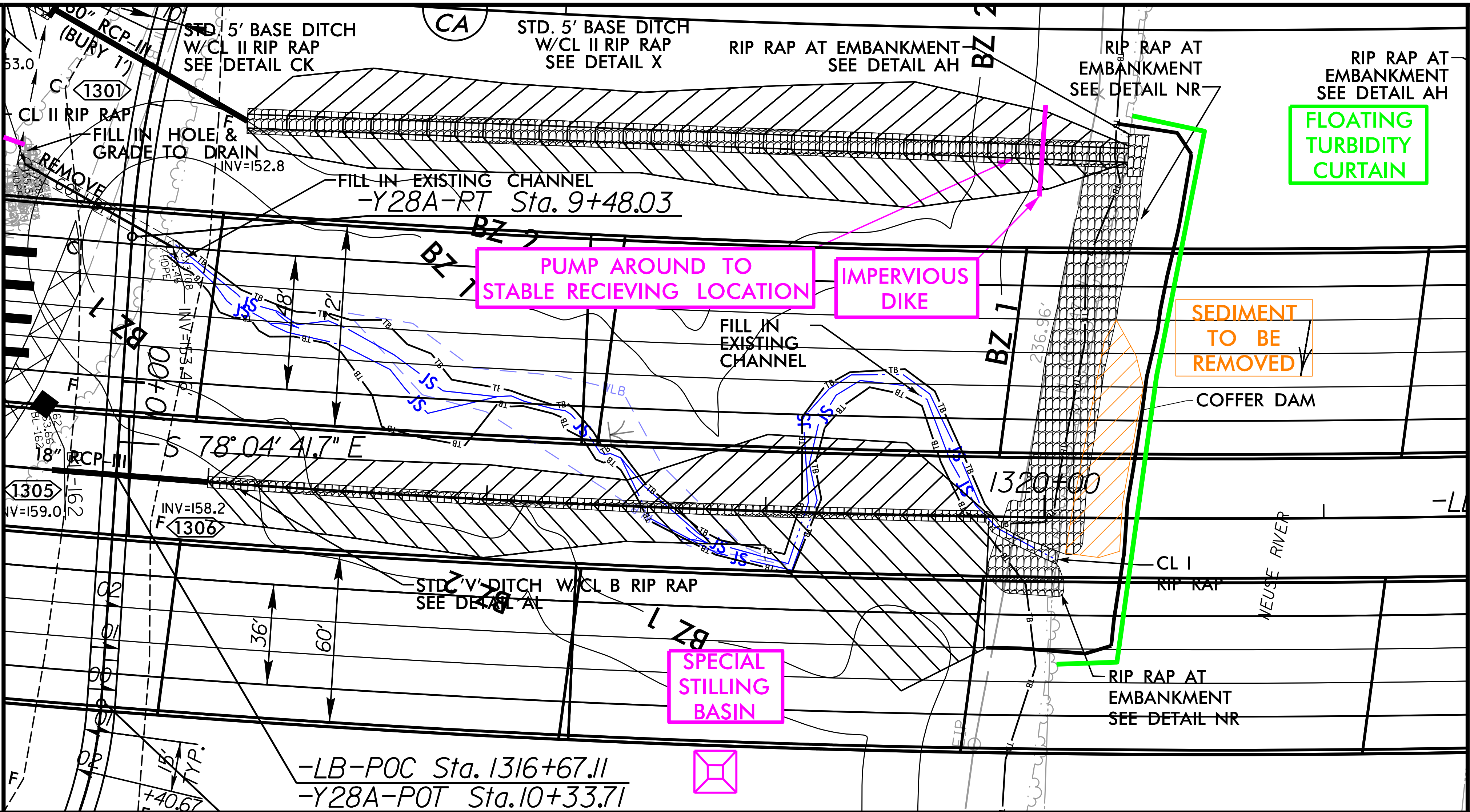
HYDRAULICS
ENGINEER

NEUSE RIVERBANK REPAIR CONSTRUCTION SEQUENCE STA. 1320+00 -LB-

1. CUT TREES BY HAND SEPARATE CANOPY FROM ROOTBALL. REMOVE CANOPY OF TREES FROM RIVER WITH CRANE. LEAVE ROOTBALL IN PLACE.
2. PROCEED TO NEXT STEP WHEN THE WEATHER FORECAST IS SHOWING LITTLE PRECIPITATION FORECASTED.
3. INSTALL TURBIDITY CURTAIN.
4. INSTALL PUMP AROUND FOR STREAM SGR IN 5' BASE DITCH BELOW THE 60" PIPE SO THE WATER IS NOT FLOWING INTO THE WORK AREA.
5. PREPARE STILLING BASIN TO DEWATER WORK AREA.
6. CHECK RIVER BOTTOM FOR COFFER DAM PLACEMENT. IF TREES OR OTHER LARGE IMPERFECTIONS ARE PRESENT COORDINATE WITH NCTA ENVIRONMENTAL.
7. INSTALL WATER FILLED COFFER.
8. DEWATER WORK AREA.
9. RECOVER SLOUGHED OFF MATERIAL FROM RIVER. SEDIMENT FROM RIVER MAY BE PLACED IN AN EVAPORATION CELL SURROUNDED BY SILT FENCE. THE LOCATION MAY BE COORDINATED IN THE FIELD WITH PROPOSED EROSION CONTROL AND GRADING. THE LOCATION OF THE CELL WILL BE AT LEAST 50 FEET AWAY FROM JURISDICTIONAL AREAS. PERFORM STREAMBANK REPAIR WORK AND INSTALL RIP RAP ALONG BANK PER PLAN.
10. REMOVE COFFER DAM.
11. REMOVE TURBIDITY CURTAIN



PLANS



9/29/2026 4:26:35 PM
c:\msa\ice-eng-pw-01\dms89107\AR-2829B.EC\ICE_Sec2_3Sheets.dgn
B. Frankino

Dam-It Dams Portable Water Filled Dams



Dam-It Dams is a World Class provider of water-filled cofferdams for numerous types of projects with varying needs. We are an Award-Winning leader of innovative solutions for de-watering a project site and diverting or damming water, which enables a project's initiation, safety, and completion. We also offer our services for home flood protection, making our dams ideal for the commercial industry and the private sector! With easy-to-use solutions that are environmentally friendly, reusable, portable, and cost-effective, you can't go wrong with Dam-It Dams!

Reasons to Choose Dam-It Dams, Inc.

Adaptable – Our product conforms to virtually every type of landscape and weather condition, making it ideal for countless uses.

Affordable – Our water-filled dams are reusable, making them more cost conscientious than the alternatives, as well as their predecessors, such as sandbags.

Durable – Dam-It Dams water inflated cofferdams are made of industrial strength geo-textile materials that can withstand tremendous water pressure, and are puncture resistant.

Environmentally friendly – We've engineered a cofferdam that uses on-site water, not imported earthen fill, which results in less impact being made on the landscape.

Expandable – Our water inflated cofferdams can be linked as needed to form any length barrier with heights of 1' to 12', widths of 2' to 23'

Immediately Available – You can contact our company for purchase or rental in cases of emergency, or pre-planned projects.

Portable – Because of the lightweight material used to create our cofferdams, and the simple usability of the product, it is easy to store in addition to moving from site to site.

Temporary – Once removed from the work site, there are minimal traces of it's existence, if any, and there is no structurally aesthetic changes to be seen/tolerated.



Our Services

- ✓ Bridge Repairs
- ✓ Boat Ramp Repairs
- ✓ Canal Repairs
- ✓ Cofferdam Dredging
- ✓ Pipeline Repairs
- ✓ River Crossings,
- ✓ River Diversion,
- ✓ Water Containment,
- ✓ Wetlands Preservations,
- ✓ Flood Protection,
- ✓ The Construction Industry
- ✓ Dewatering Work Sites
- ✓ Boat Ramps
- ✓ Culvert Repairs
- ✓ Diversion Pipes
- ✓ Emergency Response
- ✓ International Projects
- ✓ Pipe Crossing
- ✓ Pond Liner Repair
- ✓ Remediation & Hazmat
- ✓ Canals
- ✓ Stream and River Diversions
- ✓ Flood Control
- ✓ Flood Control for Governments
- ✓ Water Storage Dams

Our Cofferdam Technology

A portable cofferdam is any pre-fabricated water barrier that can be transported to and installed at a project site, oftentimes in response to an emergency rising water level situation, like a flood or the need for drier work environments. Cofferdams offer a reliable solution to many water damming or diversion necessities in the construction industry, as well as homes and businesses that need flood protection.

How Our Cofferdams Work

Our water inflated cofferdams use on-site water filled dual inner tubes that allow the dam's chambers to slowly and evenly inflate, forming a strong, stable cylindrical barrier. As the inner tubes fill and water pressure builds, the dam unrolls in a controlled and steady manner to create the cofferdam and provide an even and gradual build to make it more secure. This method offers a superior barrier as compared to sandbags, which are often ill-equipped to handle large amounts of water or flood walls which create a long-term barrier that alters the aesthetic of a home or business from its original intended appearance.

Environmentally Superior Water Filled Dams (Cofferdams)

Because our inflatable cofferdams work with the environment, they create effective water barriers that leave minimal or even no footprint on the environment. When the project is completed, the dam is then easily drained and rolled up for return, storage, or transport to another project site. They also don't require the relocation of earthen-fill from another site or location in order to provide the safe and secure environment you and your crew should absolutely expect of a water barrier. In addition, their ability to be re-used, as well as their durability against oftentimes destructive conditions, means they're less likely to become a burden that sits in a landfill somewhere instead of the handy and necessary tool and companion it's intended to be.



**Do you need a portable and
dependable damming solution?**



Dam-It Dams Inc

546 E Reid Road

Grand Blanc, MI 48439



810-695-1695



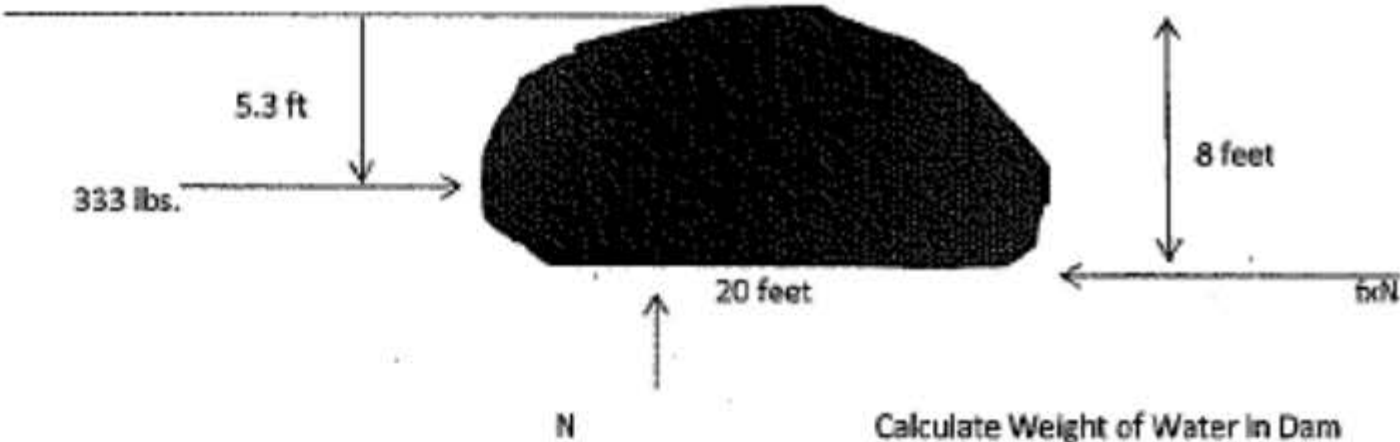
sales@damitdams.com



www.damitdams.com

Dam-It Dams Stability from Sliding Calculations

DAM-IT DAMS, INC.
12263 Center Road
Fenton, MI 48430
248-755-7383



Calculate Water Load

At point 2/3 depth from water surface

5.3328 Depth above point of load
62.4 lb/ cf weight of water

332.7667 lbs, total load

Calculate Weight of Water in Dam
Maximum 499.2 per foot
Minimum 374.4 at edges

These calculations based on Dam-it Dams on a flat surface with a friction factor equal or greater than granite.

Friction to resist load

Mirafi 600x
f= 0.6 TenCate Rich Sack
0.6 granite on granite

N for 1 ft width
499.2 8 X 62.4

F=f X N 299.52 One ft of dam

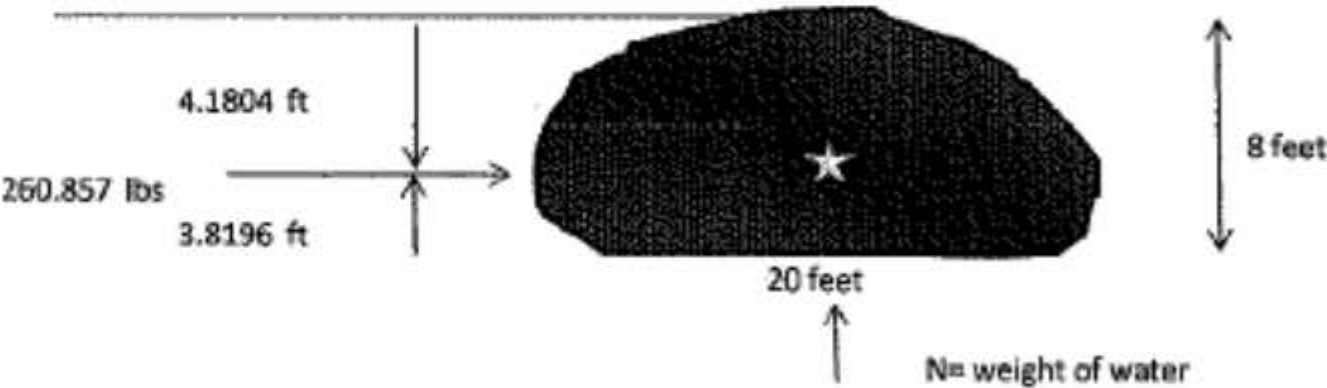
Use average height of 5 ft
F = 20 X ave ht. X 62.4 X f
F= 4492.8

Factor of Safety (F.of S.) F/Load
13.5

Dam-It Dams Stability from Rotation

Center of Gravity

0.4244 radius 8
3.3952 ft from bottom



Clockwise Rotation at 1/3 from top of dam:
Mo= 4.1804 times 260.857 1090.486 ft lbs.

Resisting Moment
Total Height 8
62.4
499.2 lbs
Arm 10 ft
Mr= 4992 ft. lbs

Factor of Safety against rotation
4992 Mr
divided by 1090.486 Mo
F.of S. 4.6





Providing Water Solutions Worldwide Since 1928

User Manual



www.damitdams.com

(313) 886-6761

546 E. Reid Rd. Grand Blanc, Michigan 48439

© 2015 All Rights Reserved

Introduction

Purpose

This Manual provides important information about Dam-It Dams' Award-Winning portable, water-filled Cofferdams and Cofferdam Systems.

has been prepared to help new, current and future users of Dam-It Dams' Cofferdams and Cofferdam Systems.

Although not designed to be a comprehensive guide, the following topics are addressed in significant detail to give you important information about our cofferdams, including installation, maintenance and removal:

- Applications
- Installation Example
- Specifications
- Installation Guidelines
- Small Cofferdam Installations
- Large Cofferdam Installations
- Cofferdam Connections
- Maintenance and Repairs
- Removal

If this Manual does not provide the information you need or if you have any questions, please do not hesitate to contact us.

Company Background and Information

Dam-It Dams, Inc. has been an innovator in cofferdams and cofferdam systems since 2000. We are dedicated to providing the best product and the best service in the industry. Our patented, portable cofferdams use on-site water to manage, move, dam or divert water with minimal or no impact on the environment. In addition, we offer a wide selection of various types of cofferdams that provide cost effective and highly adaptable solutions for virtually every contractor's need.

We are headquartered in Fenton, Michigan, about 45 miles northwest of downtown Detroit. We can be ready within a moment's notice to travel anywhere in the world to bring portable water solutions where they are needed...from projects we've completed in Alaska and Dubai to right in our own backyard.

Today, Dam-It Dams is the Midwest's Largest Manufacturer of portable water-filled cofferdams. They are made of a heavy-duty, geotextile woven polypropylene outer casing. Our dams create an effective water barrier that leaves no or only a minimal

footprint on the environment. They work with Mother Nature, not against her. And because of their industrial strength, our cofferdams are reusable.

Precautions

No two cofferdam projects are exactly the same. Soil and weather conditions alone can affect everything from initial transport to ultimate removal.

The descriptions, instructions, photos, procedures and other information contained in this User Manual are provided to help you with the success of your project. However, they are primarily Guidelines that may not provide definitive answers to all the specific issues that may arise.

If you need help or have any questions about the installation, maintenance or removal of Dam-It Dams' cofferdams or cofferdam systems, please contact us at (248) 755-7383 or visit www.damitdams.com.

Table of Contents

What Is a Cofferdam?	5
How Does a Cofferdam Work?	7
Applications	10
Installation Example	13
Specifications.....	17
Height, Width and Length.....	17
Height and Width Recommendations.....	17
Water Depth	17
Water Width	18
Length	18
Cofferdam Water Capacity	20
Installation Guidelines	22
Overview	22
Site Analysis and Preparation	22
Small Cofferdam Installations	23
Size.....	23
Equipment Needs.....	23
Project Personnel	23
Site Preparation	23

Installation Procedures	23
Large Cofferdam Installations	29
Size.....	29
Equipment Needs.....	29
Project Personnel	30
Site Preparation	30
Installation Procedures	31
Cofferdam Connections	37
Connection Procedures.....	37
Maintenance and Repairs.....	42
Maintenance Guidelines.....	42
Repair Procedures.....	42
Removal	43
Small Cofferdam Removal.....	43
Large Cofferdam Removal	43

What Is a Cofferdam?

A cofferdam is a temporary enclosure in or around a body of water that is constructed to allow dewatering, diversion or damming of an enclosed area. The primary purpose of a cofferdam is to create a dry environment for a project to proceed. They were first used in 1736.



Figure 1 – A fully inflated cofferdam holds back water from the work site.

Today's cofferdams are typically conventional embankment dams of both earth- and rock-fill, although concrete or some sheet piling also may be used.

Dam-It Dams' cofferdams use on-site water to fill dual inner tubes that cause the dam's chambers to slowly and evenly inflate, forming a strong, stable cylindrical tube. As the inner tubes continue to fill and the water pressure builds, the dam unrolls in a controlled manner to create the cofferdam.



Figure 2 – Workers unroll a cofferdam in preparation for inflation.

How Does a Cofferdam Work?

This is a cross section of a standard Dam-It Dams cofferdam:



Figure 3 – This is a cross section of a standard Dam-It Dams’ cofferdam.

Our cofferdams have three basic parts:

Part A – An outer casing that is made of heavy-duty, geotextile woven polypropylene contains two side-by-side inner tubes (Parts B & C).

Part B – This inner tube – in combination with Part C – acts as a stabilizer to keep the dam from rolling due to outside water pressure or other forces.

Part C – The companion to Part B. Acting together and when filled with on-site water, Parts B and C provide the ideal combination of weight, mass and pressure to stabilize the cofferdam while the project proceeds.

When water (onsite or otherwise) is pumped into the dual inner tubes, the outer casing confines the inner tubes to create counter-balanced pressure that stabilizes the cofferdam against external factors, such as lateral water movement.



Figure 4 – Dam-It Dams’ cofferdams can withstand tremendous lateral pressure.

The materials used in our cofferdams are very durable and flexible. They can be molded to perfectly fit a lake bed, river bed, watershed or any other type of physical setting. Not only does this make for an excellent seal, it also helps ensure minimal onsite water escape.



Figure 5 – Cofferdams mold to the environment to seal and prevent water escape.

Applications

There are hundreds of applications for which Dam-It Dams' Cofferdams are perfectly suited – too many to fully describe in this Manual. However, the following are some of the most frequently requested:

- Boat Ramp Dewatering
- Bridge/Pier Repairs
- Chemical Spills Control
- Construction Site Dewatering
- Dredging
- Environmental Remediation
- Environmentally Sensitive Area Protection
- Fish Habitat Protection
- Flood Barriers
- Foot Causeways
- Hazardous Material Contamination Control
- Levee Construction and Repairs
- Pipeline Crossings
- Pond Liners and Repairs
- Shoreline Restoration
- Water Storage
- Wetland Management

In today's highly regulated-environmental industry, alternatives to earth-filled barriers (for example, sandbags) are required. There currently is no better alternative than a water-filled, portable cofferdam. It is the most adaptable and least costly means of managing water while protecting the environment.



Figure 6 – A cofferdam holding back water so work can proceed.

Dam-It Dams has successfully worked with the US Army Corps of Engineers, the Department of Transportation and leading engineering firms throughout the United States and worldwide to solve complex dewatering and water containment challenges. With current weather and climate changes causing unpredictable water movement and an expanded need for flood control, the speed with which our Portable Cofferdams can be installed make them indispensable for emergency situations.



Figure 7 – A rolled up cofferdam arrives at the work site.



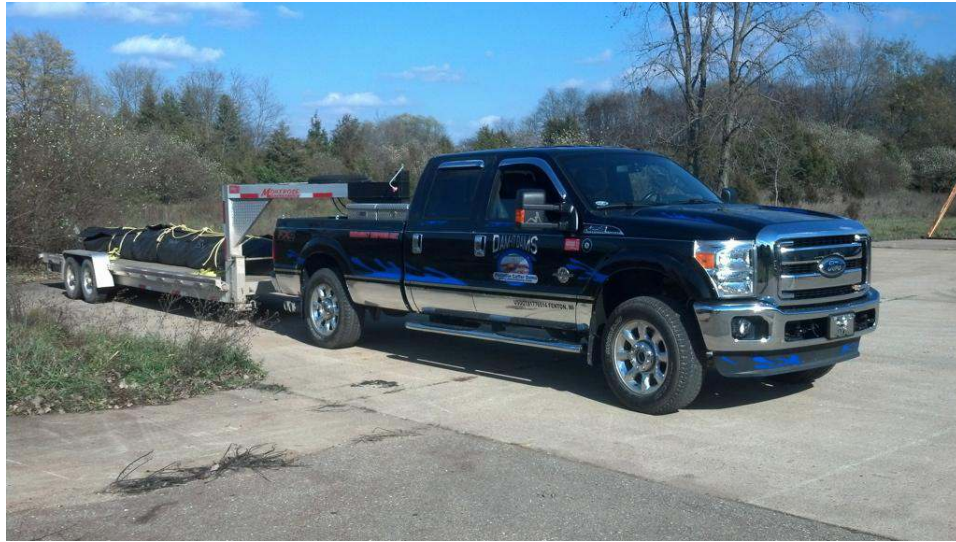
Figure 8 – Our cofferdams are portable and readily available for any situation, including emergencies.

The following sections will continue the description of Dam-It Dams' Cofferdams and Cofferdam Systems, including specifications, installation, maintenance, repairs and removal.

Installation Example

The 8-step process on the following pages shows a simple, uncomplicated installation of a Dam-It Dams cofferdam.

Step 1: The rolled-up Dam is delivered to the job site on a truck or trailer.



Step 2: The Dam is lifted from the trailer and placed at the shoreline.



Step 3: Two identical pumps are hooked up to fill the internal tubes with onsite water.



Step 4: As the pumps fill the Dam, the Dam unrolls and is guided into place.



Step 5: The Dam is nearly fully inflated as it reaches the opposite shore.



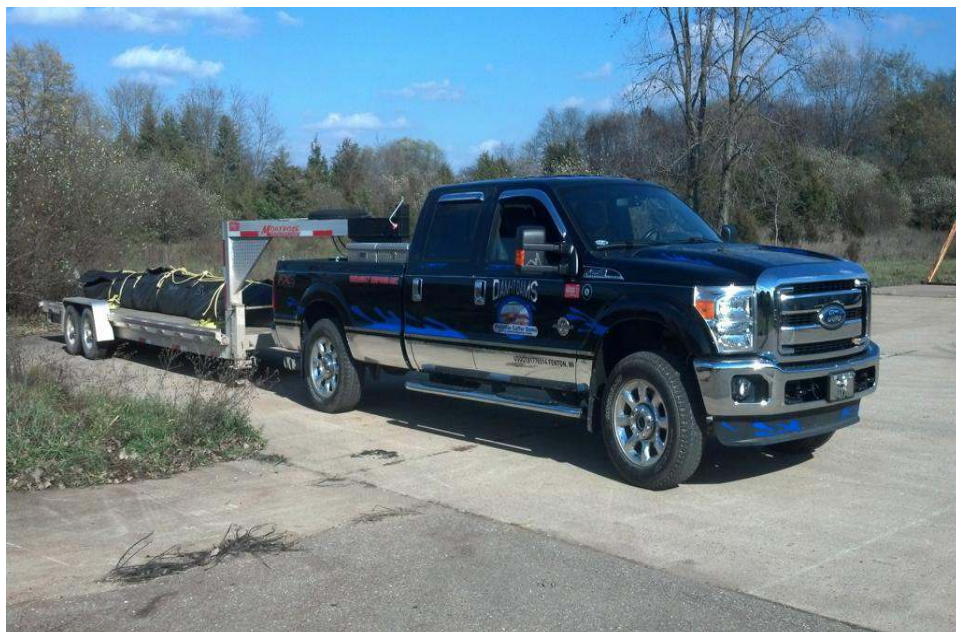
Step 6: The water is pumped from the dry side to the wet side of the Dam.



Step 7: The work for the project at hand can now get done on the dry side.



Step 8: Empty the dam, roll it up, put it on the trailer and move it to the next job.



Specifications

There are four key measurements you must know to make sure the cofferdam you order is right for your project – height, width, length and depth of the water to be contained/diverted.

Height, Width and Length

Dam-It Dams' Cofferdams are available in a wide range of heights and lengths:

- Inflated heights range from one foot to 12 feet
- Inflated widths range from two to 23 feet
- Standard lengths are 50 and 100 feet, although any length cofferdam can be fabricated to meet specific project needs

Height and Width Recommendations

The height and width of the cofferdam(s) you will need for your project depend on many factors, including water depth to be controlled, bank slope, waterbed slope and water velocity.

Water Depth

Depth of the water to be contained or diverted is a critical factor in determining correct cofferdam size. Use the following procedure to calculate water depth for your project:

- Step 1. Measure the **maximum** water depth at the installation site.
- Step 2. Calculate the **average** water depth at the installation site.
- Step 3. Calculate the **difference** in water level elevations between the installation site and the containment or diversion site.
- Step 4. Add these three numbers to find the projected maximum water depth after the cofferdam has been installed.

Knowing the projected maximum water depth will ensure your cofferdam is adequately sized for the project. Too often, this measurement is underestimated. The result can be a cofferdam this is too small, causing time delays, increased costs and avoidable unsafe working conditions.

The following chart provides guidelines for the height and width of a cofferdam from Dam-It Dams:

Height (inflated) (feet)	Width (inflated) (feet)	Maximum Water Depth (inches)
1	2	9
2	4	18
4	10	38
6	17	56
8	19	72
10	23	86
12	27	108

Note about Water Velocity

Water velocity must be taken into account when calculating the projected maximum water depth.

As a cofferdam fills with water and unrolls, the active water being diverted will begin to back up and rise. Water velocity at the end of the cofferdam increases. The water bed may erode at the end, increasing water depth at the spot. Faster-flowing water will exaggerate this condition.

Water Width

It only makes sense that a wide, shallow river is easier to dam than a narrow waterway. Wideness allows minimal fluctuations in water depth while narrowness encourages large increases.

As a general rule, the wider the water channel, the less water depth will increase.

Length

The longest cofferdam we have installed to date was 1,000 feet from end-to-end. It was accomplished by joining together individual cofferdams of varying lengths with coupling collar connections.

Using the same technique allows us to configure a Cofferdam System in a straight line, around corners and/or in a circle.



Figure 9 – A long cofferdam with coupling collar connections.

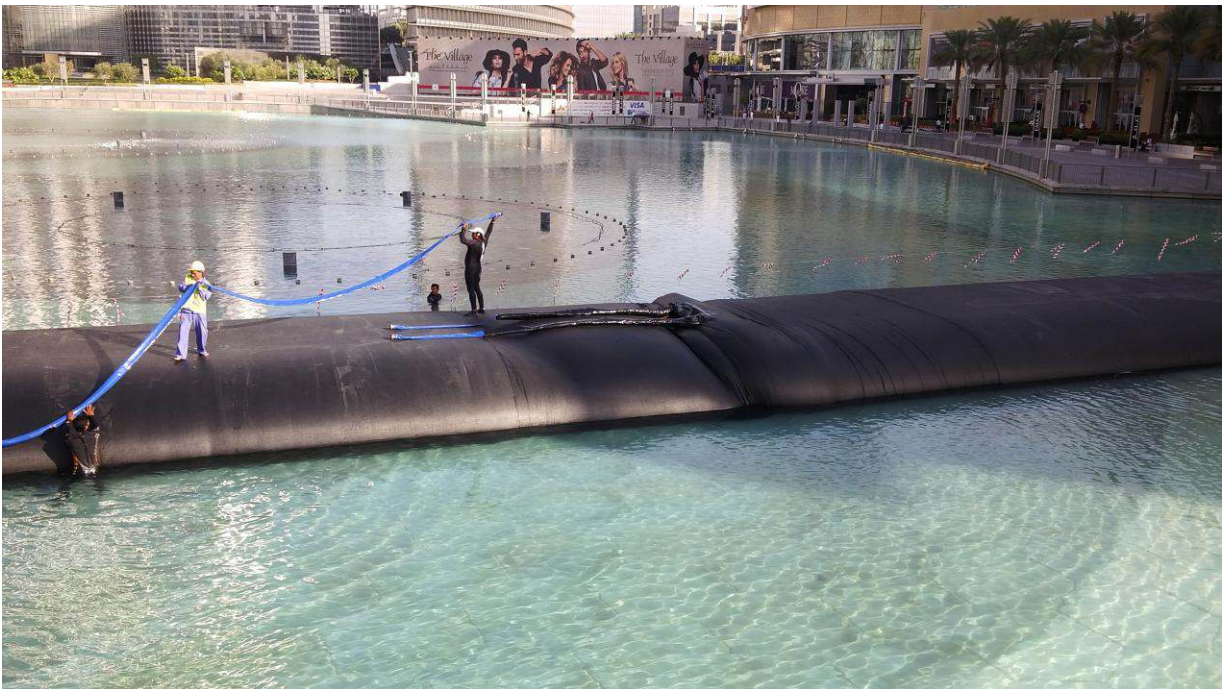


Figure 10 – Two cofferdams joined by a coupling collar.



Figure 11 – Cofferdams can accommodate several different angles to keep water out.



Figure 12 – Even in a circle...

Cofferdam Water Capacity

Finally, it is also important to know the water capacity of the cofferdam you will be using to determine project team size, equipment and the size and number of pumps needed.

The internal water capacity of a standard Dam-It Dams Cofferdam is 7.48 gallons per cubic foot. The following chart shows the water capacities of various-sized, fully filled cofferdams:

Dam-It Dams Cofferdams Water Capacity				
Height (feet)	Width (feet)	Length (feet)	Total Cubic Feet	Water Capacity (gallons)
1	2	50	100	748
		100	200	1,496
2	4	50	400	2,992
		100	800	5,984
4	10	50	2,000	14,960
		100	4,000	29,920
6	17	50	5,100	38,148
		100	10,200	76,296
8	19	50	7,600	56,848
		100	15,200	113,696
10	23	50	11,500	86,020
		100	23,000	172,040
12	27	50	16,200	121,176
		100		242,352

Dam-It Dams will gladly assist you in determining the Water Capacity of the specific cofferdam being used for your project.

Installation Guidelines

Overview

Dam-It Dams' cofferdams are typically fabricated at the factory and delivered – rolled and ready-to-use – to the project site. Larger cofferdams may be assembled at the site.

When delivered, the cofferdam comes on a solid core that aids installation and transportation and also allows for re-use.



Figure 13 – Workers guide the unrolling of a large cofferdam as it inflates.

Site Analysis and Preparation

In a perfect world, all cofferdam installations would occur on level water beds free of rocks, boulders and debris. In our world, these impediments must be addressed before a cofferdam can be properly installed.

Water beds with large boulders, jagged rocks and/or excessive debris must be cleared to ensure a good seal for the cofferdam. These impediments must be removed or relocated by hand or heavy equipment prior to installation.

Smaller rocks and debris may be removed or repositioned during installation. Rocks can be repositioned from the upstream side of the cofferdam to the downstream side to provide additional dam support.

Small Cofferdam Installations

Size

For purposes of this manual, a small cofferdam is no more than four feet high.

Equipment Needs

The following equipment is recommended for small cofferdam installations:

- Two portable 2"-3" water discharge pumps
- A discharge/suction hose for each pump
- (Other Equipment – Jack will provide list)

Project Personnel

Two to four workers are needed to install a small cofferdam. Individual project constraints (time, site availability, etc.) will dictate if additional workers are needed.

Site Preparation

Prepare the site by moving or removing boulders, rocks and debris that may interfere with proper installation of the cofferdam. If necessary, level the water bed. Keep excavation to a minimum. Also, do not install cofferdams on freshly removed materials.

Installation Procedures

The following procedures provide guidelines for installing a Small Cofferdam. Because each project is unique, contact Dam-It Dams if you have any questions about your specific project or need additional information.

Step 1. Delivery

Transport or have the Dam-It Dams' cofferdam(s) delivered to the project site.



Figure 14 – Rolled up cofferdams arrive on a flatbed at the project site.

Step 2. Position the Cofferdam

One end of the cofferdam has the long fill tubes. These are used to fill the cofferdam with water and for connecting multiple cofferdams, if necessary.



Figure 15 – Fill tubes carry water from the discharge pumps to inflate the cofferdam.

The actual cofferdam starts at the edge of the Casing that holds the fill tubes. Position the edge of the Casing on one bank of the project site at least as high as the cofferdam will be when fully inflated. This is called the Starting Point.

Taking into account the slope of the bank, make sure the Starting Point is higher than the water level inside the cofferdam after inflation. The cofferdam will be a maximum of three+ feet at the lowest point of installation.

(Note: If the bank is not steep enough to attain the needed Starting Point, use fill material to create a false bank.)



Figure 16 – A cofferdam is properly positioned at the Starting Point.

Step 3. Prepare the Cofferdam for Inflation

Place one end of a discharge hose inside each fill tube. Secure the hoses by wrapping the tubes with duct tape. If necessary, tie the end corners of the cofferdam to a stationary object (tree, boulder, etc.) to keep it from sliding down the bank.

Step 4. Initiate Cofferdam Inflation

Start pumping water into both fill tubes at the same time and at the same rate. Position workers at the rolled end of the cofferdam. As the cofferdam inflates and begins to unroll, the workers should wait for water pressure to build inside the cofferdam.



Figure 17 – A worker guides the cofferdam as it inflates and unrolls.

When the cofferdam reaches the desired height, the workers should take a step back, wait until the height is restored and take another step backward. Complete this process until the cofferdam is fully inflated.

The water level inside the cofferdam must be kept higher than the upstream water side. Remember, upstream water depth will increase as the cofferdam constricts water flow.

It is important that the workers step back in unison as the cofferdam unrolls to prevent injury.



Figure 18 – Workers work in unison as the cofferdam inflates and unrolls.

Step 5. Ensure a Good Seal

If you have not already removed boulders, rocks and debris from the project site, now is the time. These impediments oftentimes can only be located by feel. They must be removed before the cofferdam is unrolled or while it is unrolling to ensure a good seal, prevent leakage and avoid damage to the cofferdam.

Step 6. Inflate the Cofferdam

There are four important things to remember when inflating the cofferdam:

- Maintain water pressure inside the cofferdam at all times during inflation.
- A cofferdam that unrolls too quickly may not inflate above the surrounding water level and will move with the water flow.
- Move impediments to the downstream side of the cofferdam (they also may be used for support).
- Always inflate the cofferdam with the maximum amount of water to achieve desired height.



Figure 19 – A fully inflated cofferdam.

Large Cofferdam Installations

Size

For purposes of this manual, a large cofferdam is more than four feet high.

Equipment Needs

The following equipment is recommended for large cofferdam installations:

- Two portable 2"-3" water discharge pumps
- A discharge/suction hose for each pump
- In moving water, restraining ropes should be used to help control the cofferdam during installation. Every 100 feet of cofferdam requires 250 feet of ½-inch rope. The use of four ropes is highly recommended for the installation of cofferdam that are six feet or higher in rapidly flowing water.
- (Other Equipment – Jack will provide list)

Project Personnel

Stationary Water

Three to six workers are typically required to install large cofferdams in stationary water. Ropes are usually not needed but can be used to maneuver the cofferdam in deep water depths.

Moving Water

Three to seven workers are required to install large cofferdams in moving water. The following table shows personnel needs for typical installations of cofferdams that are four feet or higher:

Cofferdam Size (feet)	Ropes	Workers in the Water	Workers Manning Pumps
4	2	2-4	1
6	3	2-4	1
8	4	2-4	1
10+	4	2-6	1

Strong water currents require more personnel to ensure proper installation and the safety of all workers.

Site Preparation

Prepare the site by moving or removing boulders, rocks and debris that may interfere with proper installation of the cofferdam. If necessary, level the water bed. Keep excavation to a minimum. Also, do not install cofferdams on freshly removed materials.

Installation Procedures

Step 1. Delivery

Transport or have the Dam-It Dams' cofferdam(s) delivered to the project site.

Loading straps are provided for large Dam-It Dams Cofferdams. First, remove the cofferdam's protective wrapping by cutting the packing ropes. Then carefully attach the loading straps to the equipment being used to move the cofferdam from the transport vehicle to the project site.



Figure 20 – A large cofferdam is delivered to the project site using loading straps.

Step 2. Position the Cofferdam

One end of the cofferdam has the long fill tubes. These are used to fill the cofferdam with water and for connecting multiple cofferdams, if necessary.



Figure 21 – Fill tubes are inserted into a cofferdam resting on a bank.

The actual cofferdam starts at the edge of the Casing that holds the fill tubes. Position the edge of the Casing on one bank of the project site at least as high as the cofferdam will be when fully inflated. This is called the Starting Point.

Taking into account the slope of the bank, make sure the Starting Point is higher than the water level inside the cofferdam after inflation. The cofferdam will be a maximum of three+ feet at the lowest point of installation.

(Note: If the bank is not steep enough to attain the needed Starting Point, use fill material to create a false bank.)



Figure 22 – A large cofferdam properly positioned at the Starting Point.

Step 3. Prepare the Cofferdam for Inflation

Place one end of a discharge hose inside each fill tube. Secure the hoses by wrapping the tubes with duct tape. If necessary, tie the end corners of the cofferdam to a stationary object (tree, boulder, etc.) to keep it from sliding down the bank.



Step 4. Initiate Cofferdam Inflation

Start pumping water into both fill tubes at the same time and at the same rate. Position workers at the rolled end of the cofferdam. As the cofferdam inflates and begins to unroll, the workers should wait for water pressure to build inside the cofferdam.



Figure 23 – Workers standing against rolled end of a cofferdam as it inflates.

When the cofferdam reaches the desired height, the workers should take a step back, wait until the height is restored and take another step backward. Complete this process until the cofferdam is fully inflated.

The water level inside the cofferdam must be kept higher than the upstream water side. Remember, upstream water depth will increase as the cofferdam constricts water flow.

It is important that the workers step back in unison as the cofferdam unrolls to prevent injury.

Step 5. Ensure a Good Seal

If you have not already removed boulders, rocks and debris from the project site, now is the time. These impediments oftentimes can only be located by feel. They must be removed before the cofferdam is unrolled or while it is

unrolling to ensure a good seal, prevent leakage and avoid damage to the cofferdam.

Step 6. Use Restraining Ropes

Cofferdams that are higher than four feet typically require restraining ropes to control the unrolled portion during installation, especially in moving water. Without these ropes, the water pressure in the inner fill tubes could cause the cofferdam to prematurely unroll.

If restraining ropes are used, they should be positioned under the cofferdam prior to inflation. Attach one end of them to the base of a metal post or tree and run them over the top of the cofferdam and back to the metal post or tree.

During installation, the ropes should be held in a way that will allow them to be let out as the cofferdam unrolls.

Restraining ropes should be twice as long as the fully inflated cofferdam plus an additional 50 feet.



Figure 24 – Restraining ropes should be used to control large cofferdam installations.

Step 7. Inflate the Cofferdam

Project site conditions can quickly change in moving water. Water depths can widely fluctuate from one side of the cofferdam to the other side.

Large cofferdams should be unrolled at the rate of 2-3 feet at a time, waiting for inside water pressure to reach the desired level before continuing.

There are five important things to remember when inflating a large cofferdam:

- Large cofferdams using restraining ropes must be installed in a straight line. They can be properly positioned after full inflation.
- Maintain water pressure inside the cofferdam at all times during inflation.
- A cofferdam that unrolls too quickly may not inflate above the surrounding water level and will move with the water flow.
- Move impediments to the downstream side of the cofferdam (they also may be used for support).
- Always inflate the cofferdam with the maximum amount of water to achieve desired height.



Figure 25 – A fully inflated large cofferdam.

Cofferdam Connections

Many projects require the coupling of two or more cofferdams to form a longer continuous water barrier.

Dam-It Dams' cofferdams are available with coupling collars at the closed end (the other end has the fill tubes). The end with the fill tubes is designed to snugly fit into the coupling collar.

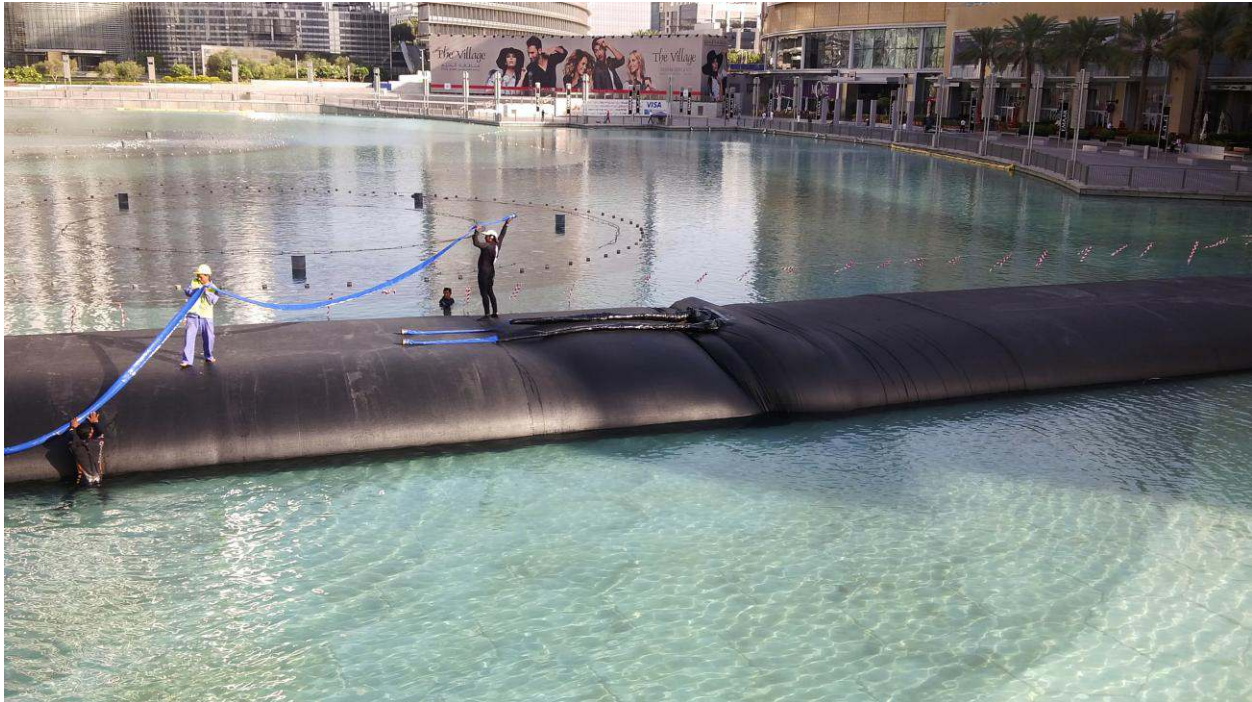


Figure 26 – Two cofferdams are connected with a coupling collar.

Connection Procedures

Follow these procedures to connect an additional cofferdam:

Step 1. Alignment

Position the additional cofferdam directly behind and in line with the already inflated cofferdam.

Unroll about 10 feet of the additional cofferdam plus the length of the inner fill tubes.



Figure 27 – An additional cofferdam is being prepared for coupling.

Step 2. Prepare Inner Fill Tubes

Gather the end of one fill tube on the additional cofferdam and twist. Wrap with duct tape. Perform the same procedure on the other inner fill tube.

The wrapped inner tubes can now easily be inserted into and pulled through the round holes on the top of the coupling collar.



Step 3. Cut Holes in Coupling Collar

Cut two round holes six inches in diameter in the top of the coupling collar attached to the Casing on the inflated cofferdam. The holes should be cut midway between the sides of the cofferdam.

The holes should be 1-2 feet apart on a four-foot high cofferdam and four feet apart on a six foot high cofferdam.

Each hole must be big enough to accept one of the wrapped inner fill tubes.

Step 4. Make the Coupling Connection

Insert the wrapped right inner tube through the hole on the right side of the coupling collar and the wrapped left inner tube through the hole on the left side of the coupling collar. To do this, work your way inside the coupling collar and push the inner tube toward the hole.

Have a second person reach through the hole from the outside, grab the tube and pull it through the hole. About four feet of the inner fill tube should be pulled through for a four foot high cofferdam.

Pull the Casing of the additional cofferdam inside the coupling collar and around the inner fill tubes to totally enclose it in the coupling collar. The Casing of the additional cofferdam should be pulled up to be in contact with the end of the inflated cofferdam.

Pull excess inner fill tube material through the holes.

Step 5. Insert Discharge Hoses

Remove the tape from around the bunched inner fill tubes and insert the discharge hoses deeply inside them. Make sure the discharge hoses extend past the coupling collar.

If necessary, remove any fittings on the discharge hoses. If they cannot be removed, cover metal ones with duct tape.

To keep the discharge hoses from sliding out, bunch the inner fill tubes around them and secure with duct tape.



Figure 28 – Discharge hoses are fully inserted into inner fill tubes.

Step 6. Inflate Additional Cofferdam

Inflate the additional cofferdam by following the same procedures used to inflate the original cofferdam.

***Step 7. Remove Discharge Hoses***

Remove the discharge hoses from the inner fill tubes on the additional cofferdam when fully inflated.

Tightly re-wrap the inner fill tubes with duct tape so the tubes will stand upright by themselves. You may wrap together the inner fill tubes to make them more stable and leak proof.

Step 8. Connect Additional Cofferdams

Follow the same procedures to connect each additional cofferdam.

Maintenance and Repairs

Maintenance Guidelines

Dam-It Dams' portable, water-filled Cofferdams are incredibly durable and will last a long time with minimal maintenance.

There are four important observations that should be made on a regular basis:

- Check for any leaks in the Cofferdam, especially in the Casing or inner fill tubes
- Check for seepage under the Cofferdam that could indicate a bad or failing seal
- Check to see if any inner fill tubes have fallen over and/or are draining water; make necessary adjustments
- Note any lateral movement of the Cofferdam and make necessary adjustments

Repair Procedures

Minor Leaks

Most minor leaks can be addressed by pumping additional water into the cofferdam on a periodic basis.

Identify which of the inner fill tubes is leaking, untie and unwrap the tube, insert the discharge hose from the water pump and fill as necessary.

Larger Leaks

Occasionally, a leak is large enough to require a patch.

To repair such a leak, first identify and isolate the area around it. Then, using a utility knife, cut an "X" through the Casing and pull the material apart to expose the leak, being careful not to further damage the inner fill tube.

Cover the leak with repair tape and cover the "X" cut in the Casing with the same repair tape.

In most cases, it's best to just add water on a regular basis until the cofferdam can be taken out of service and patched properly from the inside or the inner tubes replaced.

Removal

Small Cofferdam Removal

Most small cofferdams can be removed by pumping out or draining the water from the inner fill tubes and rolling up the empty cofferdam.

If two or more cofferdams are connected by coupling collars, drain the outermost or downstream cofferdam first and disassemble the coupling collar. Remove that cofferdam, roll it up and proceed to the next connection. Repeat until all cofferdams have been drained, removed and rolled up.



Figure 29 – Workers draining water during removal of a small cofferdam.

Large Cofferdam Removal

Large cofferdams should be removed using equipment such as an excavator or a backhoe to pull the cofferdam from the water.

Pump out or drain as much of the water as possible and put a loading strap around the closed end of the cofferdam. Place the strap as near to the closed end as possible or water will remain trapped inside.

Very slowly lift up on the strap. Drain water out the open end. If the fill tubes are not draining, they might need to be pulled further off the bank. Proceed slowly so that you do not lift the water any higher than is necessary for it to drain.

Remove the drained cofferdam from the water. Re-roll the cofferdam for storage and reuse.