



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

November 3, 2017

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

ATTN: Mr. Eric Alsmeyer
NCDOT Division 5 Coordinator

SUBJECT: **Request for Modification of the Section 404 Individual Permit, Section 401 Water Quality Certification, Isolated Waters State General Permit, and Neuse River Riparian Buffer Certification** for the proposed East End Connector from NC 147 (Durham Freeway/Buck Dean Expressway) to north of NC 98 (Holloway Street) in Durham, Durham County, North Carolina, Division 5. Federal Aid Project No. NHF-76-1(2), TIP No. U-0071.

Debit \$570.00 from WBS Element No. 34745.1.1

REFERENCE: 1) USACE Individual Permit, Action ID No. SAW-2011-00796, dated March 24, 2014.
2) USACE Individual Permit Modifications, Action ID No. SAW-2011-00796, dated May 7, 2015; December 7, 2015; and May 17, 2016.
3) NCDWR Section 401 Water Quality Certification, Neuse River Buffer Authorization, and Isolated Wetlands Permit, NCDWR Project No. 20131282, Certification No. 3980, dated January 28, 2014.
4) Modifications to the NCDWR Section 401 Water Quality Certification, Neuse River Buffer Authorization, and Isolated Wetlands Permit, NCDWR Project Nos. 20131282 ver. 2 (dated April 15, 2015); 20131282 ver. 3 (dated October 26, 2015); and 20131282 ver. 4 (dated May 5, 2016).

Dear Sir:

The purpose of this letter is to request a modification to the United States Army Corps of Engineers (USACE) Section 404 Individual Permit and North Carolina Division of Water Resources (NCDWR) Section 401 Water Quality Certification, Isolated Waters State General Permit, and Neuse River Riparian Buffer Certification for the above-referenced project.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL ANALYSIS UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

Telephone: (919) 707-6000
Fax: (919) 212-5785
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

In addition to this cover letter, please find enclosed revised Wetland Permit Drawing Sheet Nos. 20, 21, 43, 44, 75, 90, and 91 of 91; revised Buffer Permit Drawing Sheet Nos. 5, 9, 10, 17, and 18 of 18; and the revised Mitigation Acceptance Letter from the N.C. Division of Mitigation Services (DMS).

IMPACTS TO WATERS OF THE UNITED STATES

Surface Waters

All revisions occur within the Neuse River Basin (HUC 03020201). Stream impact revisions occur at Site 23. A review of the Erosion Control diversion plan indicates that the tie-in point for the diversion channel at this site is upstream of the previously-depicted rip rap on the streambank. The Division asked the culvert subcontractor to see if they can tighten the diversion channel to fall within the previously-depicted and permitted rip rap bank stabilization. The subcontractor indicated that the topography and grade changes at the site will not allow them to bring in the diversion tie-in point any closer to the culvert. Therefore, additional Class II rip rap bank stabilization is proposed to cover the tie-in point and the opposite bank, since there are concerns that the soil at this location is poor and there is no way to backfill, seed, and matt the area to create an effective stable streambank. Please see Table 1, which has been revised to reflect these modifications. Revised Sites, sub-totals, and totals are in bold.

Table 1. Revised Surface Water Impacts within the Neuse River Basin (HUC 03020201)

Permit Site No.	Stream Name	Stream ID ¹	Intermittent /Perennial	Impact Type	Impacts (lin. ft.) (Change)	Impacts Requiring USACE mitigation (lin. ft.)	USACE Mitigation Ratio	Impacts Requiring 1:1 DWR mitigation (lin. ft.)
1	UT of Goose Creek	S-B	Intermittent	Perm. Fill	412	0 ²		0 ³
2	UT of Goose Creek	S-A	Intermittent	Temp. Fill	14	0		0
				Perm. Fill	673	0 ²		0 ³
				Bank Stabil.	20	0 ⁵		0 ³
3	UT of Goose Creek	S-35	Intermittent	Perm. Fill	410	0 ²		0 ³
4	UT of Little Lick Creek	S-26	Intermittent (Isolated)	Temp. Fill	20	0		0
				Perm. Fill	349	0 ⁴		0 ³
				Bank Stabil.	175	0 ⁴		0 ³
6	UT of Little Lick Creek	S-25	Intermittent	Bank Stabil.	25	0 ²		0 ³
7	UT of Little Lick Creek	S-18	Perennial	Temp. Fill	104	0		0
				Perm. Fill	665	665	2:1	665
				Bank Stabil.	305	0 ⁵		305

Table 1. Revised Surface Water Impacts within the Neuse River Basin (HUC 03020201) (Continued)

Permit Site No.	Stream Name	Stream ID ¹	Intermittent /Perennial	Impact Type	Impacts (lin. ft.) (Change)	Impacts Requiring USACE mitigation (lin. ft.)	USACE Mitigation Ratio	Impacts Requiring 1:1 DWR mitigation (lin. ft.)
8	UT of Little Lick Creek	S-19	Intermittent	Perm. Fill	443	0 ²		0 ³
9	UT of Little Lick Creek	S-24	Intermittent	Perm. Fill	29	0 ²		0 ³
				Bank Stabil.	43	0 ⁵		0 ³
12	UT of Little Lick Creek	S-16	Intermittent	Temp. Fill	72	0		0
				Perm. Fill	789	0 ²		0 ³
				Bank Stabil.	18	0 ⁵		0 ³
17	UT of Little Lick Creek	S-6	Perennial	Temp. Fill	33	0		0
				Perm. Fill	479	479	2:1	479
				Bank Stabil.	140	0 ⁵		140
17A	UT of Little Lick Creek	S-12	Intermittent	Temp. Fill	37	0		0
				Bank Stabil.	25	0 ⁵		0 ³
17B	UT of Little Lick Creek	S-14	Intermittent	Temp. Fill	7	0		0
23	UT of Little Lick Creek	S-6	Perennial	Temp. Fill	49 (-16)	0		0
				Perm. Fill	270	270	2:1	270
				Bank Stabil.	152 (+12)	0 ⁵		140 ⁷
24	UT of Little Lick Creek	S-7	Intermittent	Temp. Fill	23	0		0
				Perm. Fill	104	0 ²		0 ³
25	UT of Little Lick Creek	S-2	Intermittent	Temp. Fill	10	0		0
				Perm. Fill	168	0 ²		0 ³
				Bank Stabil.	35	0 ⁵		0 ³

Table 1. Revised Surface Water Impacts within the Neuse River Basin (HUC 03020201) (Continued)

Permit Site No.	Stream Name	Stream ID ¹	Intermittent /Perennial	Impact Type	Impacts (lin. ft.) (Change)	Impacts Requiring USACE mitigation (lin. ft.)	USACE Mitigation Ratio	Impacts Requiring 1:1 DWR mitigation (lin. ft.)
26	UT of Little Lick Creek	S-2	Intermittent	Temp. Fill	23	0		0
				Perm. Fill	50	0 ²		0 ³
				Bank Stabil.	50	0 ⁵		0 ³
27	UT of Little Lick Creek	S-6	Perennial	Bank Stabil.	10	0 ⁵		10 ⁶
U-1	UT of Little Lick Creek	S-25	Intermittent	Utility/ Bank Stabil.	20	0 ⁵		0 ³
Temporary Fill Impacts (Non-isolated)					372 (-16)	0		0
Temporary Fill Impacts (Isolated)					20	0		0
Permanent Fill Impacts (Non-isolated)					4,492	1,414		1,414
Permanent Fill Impacts (Isolated)					349	0 ⁴		0
Bank Stabilization Impacts (Non-isolated)					843 (+12)	0		595 ⁷
Bank Stabilization Impacts (Isolated)					175	0 ⁴		0
TOTAL TEMPORARY IMPACTS					392 (-16)	0		0
TOTAL PERMANENT IMPACTS					5,859 (+12)	1,414		2,009 ⁷

¹Stream IDs are from the JD re-verification packet, dated April 7, 2011.

²Per USACE, no compensatory mitigation is required for permanent impacts (including bank stabilization) to USACE-regulated intermittent streams associated with this project.

³Per the NCDWQ Public Memorandum dated August 14, 2009, any NCDOT project within the Merger 01 process that has reached CP 4A prior to the effective date of October 16, 2009 is not subject to the NCDWR Intermittent Stream Mitigation Policy. This project reached CP 4A on December 13, 2007 and is not subject to this policy. Therefore, no compensatory mitigation for permanent impacts along intermittent streams is required by NCDWR for this project.

⁴Isolated streams are not regulated by USACE.

⁵Per USACE, bank stabilization impacts do not require compensatory mitigation.

⁶Although this Site does not individually exceed the 150 linear foot threshold set by NCDWR for requiring compensatory mitigation, when combined with other Sites along the same stream, the cumulative impact to the stream exceeds that threshold.

⁷NCDWR no longer requires mitigation for bank stabilization. Therefore, the additional 12 linear feet that was added to Site 23 did not increase the NCDWR mitigation required for that site.

Wetlands

The only changes to wetland impacts occurs in the Neuse River Basin (HUC 03020201). At Site 10, 0.03 acre of mechanized clearing was added to Wetland W-25. Site 11, which was formerly <0.01 acres of mechanized clearing to Wetland W-24, has been removed as an impact.

Table 2. Revised Wetland Impacts within the Neuse River Basin (HUC 03020201)

Permit Site No.	Wetland ID	Wetland Type	Impact Type	Permanent Impacts (ac.) (Change)	Impacts Requiring USACE mitigation (ac.) ¹ (Change)	Temporary Impacts (ac.)
2	W-B	Riparian	Fill	0.08	0.08	0
3	W-30	Riparian	Fill	0.06	0.06	0
4	W-29	Riparian (Isolated)	Fill	0.05	0 ²	0
5	W-39	Riparian (Isolated)	Fill	0.06	0 ²	0
8	W-28	Riparian	Fill	0.04	0.04	0
10	W-25	Riparian	Fill	0.01	0.01	0.01
			Mechanized Clearing	0.03 (+0.03)	0.03 (+0.03)	
11	W-24	Riparian	Mechanized Clearing	0.00 (-<0.01)	0.00 (-<0.01)	0
14	W-10A	Riparian (Isolated)	Fill	0.08	0 ²	0
15	W-PX	Non-Riparian (Isolated)	Fill	0.03	0 ²	0
16	W-11	Non-Riparian (Isolated)	Fill	0.05	0 ²	0
33	WA ⁴	Riparian	Fill	0.09	0.09	0
Riparian, Non-Isolated Impacts				0.31 (+0.03)	0.31 (+0.03)	0.01
Riparian, Isolated Impacts				0.19	0 ²	0
Non-Riparian, Isolated Impacts				0.08	0 ²	0
TOTAL IMPACTS				0.58³ (+0.03)	0.31³ (+0.03)	0.01

¹ Mitigation ratio for all applicable wetland sites is 2:1.

² Isolated wetlands are not regulated by the USACE. Additionally, NCDOT does not anticipate compensatory mitigation being required by NCDWR for isolated wetlands because total wetland impacts for the project do not exceed 1.0 acre.

³ Rounded total is based on the sum of the actual impacts.

⁴ This wetland is associated with the ABF Freight property.

Riparian Buffers

All revisions occur within the Neuse River Basin (HUC 03020201). Riparian buffer impact revisions occur at Sites 9 and 10. Descriptions of the changes at each site are below. Please also see Table 3, which has been revised to reflect these modifications. Revisions are in bold.

Permit Site 9

- Due to right-of-way/construction changes, there will be an increase of 2,115 square feet of Zone 1 and 507 square feet of Zone 2 mitigable Impacts Other than Road Crossings (Parallel Impacts) at this site.

Permit Site 10

- Due to right-of-way/construction changes, there will be a decrease of 977 square feet of Zone 1 and 904 square feet of Zone 2 mitigable Impacts Other than Road Crossings (Parallel Impacts) at this site. This change completely eliminates all Zone 1 impacts at this site.

Table 3. Revised Riparian Buffer Impacts within the Neuse River Basin (HUC 03020201)

Impact Type¹	Zone 1 Impacts (sq. ft.) (Change)	Zone 2 Impacts (sq. ft.) (Change)	Buffer Impact Total (sq. ft.) (Change)
Allowable Stormwater Management Impacts	5,584	3,789	9,373
Allowable Utility Impacts	2,599	1,960	4,559
Allowable Road Crossing Impacts	20,076	12,601	32,677
Mitigable Utility Impacts	329	0	329
Mitigable Parallel Impacts	6,455 (+1,138)	7,470 (-397)	13,925 (+741)
Mitigable Road Crossing Impacts	355,113	236,440	591,553
Total Allowable Impacts	28,259	18,350	46,609
Total Mitigable Impacts	361,897 (+1,138)	243,910 (-397)	605,807 (+741)
Wetlands in Buffer Within Mitigable Impacts	8,302 (+1,303)	2,343 (+8)	10,645 (+1,311)
Total Mitigable Impacts, Minus Wetlands In Buffer	353,595 (-165)	241,567 (-405)	595,162 (-570)
TOTAL IMPACTS	390,156 (+1,138)	262,260 (-397)	652,416 (+741)
TOTAL WETLANDS IN BUFFER	8,302 (+1,303)	2,343 (+8)	10,645 (+1,311)
TOTAL IMPACTS, MINUS WETLANDS IN BUFFER	381,854 (-165)	259,917 (-405)	641,771 (-570)

¹ See Buffer Impact Summary Sheet in the attached revised buffer drawings for site-by-site impacts.

Compensatory Mitigation

Compensatory mitigation requirements for permanent stream, wetland, and riparian buffer impacts associated with U-0071 within the Neuse River Basin (HUC 03020201) are summarized below in Table 4. Revised sub-totals and totals are in bold. Mitigation for the revised totals will be provided by DMS. Please see the attached DMS Mitigation Acceptance Letter.

Stream Impacts

A total of 5,859 linear feet of permanent warm water stream impacts will occur within the Neuse Basin. This is an overall increase of 12 linear feet since the last (3rd) permit modification. This change is due to the increase in bank stabilization at Site 23.

A total of 1,414 linear feet of permanent warm water stream impacts will require compensatory mitigation per USACE at a 2:1 ratio. This is unchanged since the 3rd permit modification. The amount of permanent stream impacts requiring compensatory mitigation per NCDWR remains at 2,009 linear feet and will be mitigated for at a 1:1 ratio. The NCDWR mitigation did not increase due to the increase in bank stabilization at Site 23 since NCDWR no longer requires mitigation for bank stabilization impacts.

Wetland Impacts

A total of 0.58 acres of permanent wetland impacts will occur within the Neuse Basin. This is an increase of 0.03 acres compared to the last permit modification and is due to the addition of mechanized clearing at Site 10. Of that 0.58 acres, 0.27 acres are isolated and do not require mitigation. The remaining 0.31 acres will require compensatory mitigation per USACE at a 2:1 ratio.

Riparian Buffer Impacts

A total of 353,595 square feet of mitigable Zone 1 Riparian Buffer impacts and 241,567 square feet of mitigable Zone 2 Riparian Buffer impacts will occur within the Neuse Basin. This is a decrease of 165 square feet of mitigable Zone 1 buffer impacts and 405 square feet of mitigable Zone 2 buffer impacts when compared to previously-permitted amounts. Zone 1 impacts will be mitigated for at a 3:1 ratio, while Zone 2 impacts will be mitigated for at a 1.5:1 ratio.

Table 4. Revised Neuse River Basin Compensatory Mitigation Summary

	Stream Impacts (lin. ft.)	Riparian Wetland Impacts (ac.) (Change)	Mitigable Zone 1 Buffer Impacts (sq. ft.) (Change)	Mitigable Zone 2 Buffer Impacts (sq. ft.) (Change)
Impacts Requiring Mitigation	1,414	0.31 (+0.03)	353,595 (-165)	241,567 (-405)
Mitigation Ratio	2:1	2:1	3:1	1.5:1
Total DMS Mitigation Required	2,828	0.62 (+0.06)	1,060,785 (-495)	362,351 (-608)

A copy of this permit modification application and its distribution list will be posted on the NCDOT website at <https://connect.ncdot.gov/resources/Environmental/Pages/default.aspx>, under *Quick Links > Permit Applications*. Thank you for your time and assistance with this project. Please contact James Mason at either jsmason@ncdot.gov or (919) 707-6136 if you have any questions or need additional information.

Sincerely,



Philip S. Harris III, P.E., C.P.M., Unit Head
Environmental Analysis Unit

cc:
NCDOT Permit Application Standard Distribution List



ROY COOPER
Governor

October 26, 2017

Mr. Philip S. Harris, P.E., PLS
Project Development & Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

U-0071, East End Connector from NC 147 (Buck Dean Freeway) to North of NC 98, Durham County

References: USACE 404 Individual Permit issued March 24, 2014 (USACE Action ID 2011-00796) and 404 Individual Permit Modifications issued May 7, 2015 and May 24, 2016

NCDWR 401 Water Quality Certification issued January 28, 2014 (NCDWR Project ID 2013-1282) and 401 Water Quality Certification modifications issued April 15, 2015 and May 5, 2016

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the additional stream, riparian wetland and buffer mitigation for the subject project. Based on the information supplied by you on October 24, 2017, the additional impacts are located in CU 03020201 of the Neuse River Basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Table 1 – Additional Impacts (feet / acres)

Neuse 03020201 CP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1 (3:1)	Zone 2 (1.5:1)
Impacts (feet/acres)	0	0	3.0	0.03	0	0	0	0

These additional impacts and associated mitigation needs were not projected by the NCDOT in the 2017 impact data. DMS is currently providing stream and riparian wetland mitigation for the impacts associated with this project located in cataloging unit 03030002 of the Cape Fear River basin and cataloging unit 03020201 of the Neuse River basin as required by the 404 and 401 permits that were issued in 2014, 2015 and 2016, as shown in the below table (in mitigation credits):



Table 2 – Current Permitted Impacts and Mitigation Requirements (based on 2014 permits and 2015 and 2016 permit modifications) and Revised Anticipated Impacts (based on mitigation request)

Neuse 03020201

Impact Type	Total Permitted Impacts (feet / acre)	Mitigation Provided by DMS per Issued Permits (Credits)	Additional Impact (for approval)	Revised Total Impacts*
Stream	2,006.0	3,030.0	3.0	2,009.0
Riparian Wetland	0.28	0.56	0.03	0.31
Buffer – Zone 1	353,760.0 sq ft	1,061,280.0 sq ft	0	353,760.0 sq ft
Buffer – Zone 2	241,972.0 sq ft	362,959.0 sq ft	0	241,972.0 sq ft

Cape Fear 03030002

Impact Type	Total Permitted Impacts (feet / acre)	Mitigation Provided by DMS per Issued Permits (Credits)	Additional Impact (for approval)	Revised Total Impacts*
Stream	440.0	880.0	0	440.0

*Some of the stream and wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details. DMS will provide the amount of mitigation as determined by the regulatory agencies.

This mitigation acceptance letter replaces the mitigation acceptance letters issued on December 10, 2013, March 28, 2014, March 31, 2015, and May 3, 2016. DMS has previously made debits for the stream and riparian wetland mitigation requirements to mitigation sites available in the cataloging units based on the amounts required in the 404 and 401 permits issued in 2014, 2015 and 2016. NCDOT has made payment for all riparian buffer mitigation as required by DWR. Upon issuance of the permit modifications for the project, DMS will make appropriate adjustments to the existing mitigation debits.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-707-8420.

Sincerely,

James B. Stanfill
DMS Asset Management Supervisor

Cc: Mr. Eric Alsmeyer, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NC Division of Water Resources
File: U-0071 Additional 3





North Carolina Department of Transportation
Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR LINEAR ROADWAY PROJECTS



(Version 1.2; Released July 2012)

Project/TIP No.: U-0071

County(ies): Durham

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of

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Preformed Scour Holes and Energy Dissipators

Sheet No.	Station	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)
6	-L- 38+21 RT (172')	PFSH	Class 'B'	1.85	Pipe	18	7.5	< 2
9	-Y7- 25+36 LT (71')	PFSH	Class 'B'	0.33	Pipe	18	1.0	< 2
9	-Y7- 28+59.80 LT (89')	PFSH	Class 'B'	0.96	Pipe	18	5.1	< 2
9	-Y7RPD- 1+95 RT (64')	PFSH	Class 'B'	1.28	Pipe	18	5.9	< 2
9	-Y7RPD- 6+28 RT (55')	PFSH	Class 'B'	0.76	Pipe	18	3.0	< 2
9	-Y6- 12+08 RT (63')	PFSH	Class 'B'	0.46	Pipe	15	2.4	< 2
9	-Y6- 13+98 RT (59')	PFSH	Class 'B'	1.15	Pipe	18	5.1	< 2
10	-US70FLY- 35+50 RT (80')	PFSH	Class 'B'	0.74	Pipe	15	3.7	< 2
11	-L- 128+34 LT (180')	PFSH	Class 'B'	1.80	Pipe	18	8.0	< 2
11	-L- 129+71 LT (187')	PFSH	Class 'B'	1.40	Pipe	18	7.1	< 2
11	-L- 131+20 LT (210')	PFSH	Class 'B'	1.85	Pipe	18	9.4	< 2
12	-LDFWB- 12+50 RT (79.4')	PFSH	Class 'B'	1.86	Pipe	18	9.5	< 2
12	-LDFWB- 15+17 RT (70.3')	PFSH	Class 'B'	0.31	Pipe	15	1.6	< 2
20	-US70FLY- 46+88 LT (101')	PFSH	Class 'B'	2.82	Pipe	18	8.5	< 2
20	-EEC70E- 32+45 RT (72')	PFSH	Class 'B'	1.47	Pipe	18	7.1	< 2
22	-Y9- 29+25 LT (52')	PFSH	Class 'B'	1.72	Pipe	18	7.5	< 2
24R	-Y12- 21+96 RT (44')	PFSH	Class 'B'	2.25	Pipe	18	8.5	< 2

☒ YES

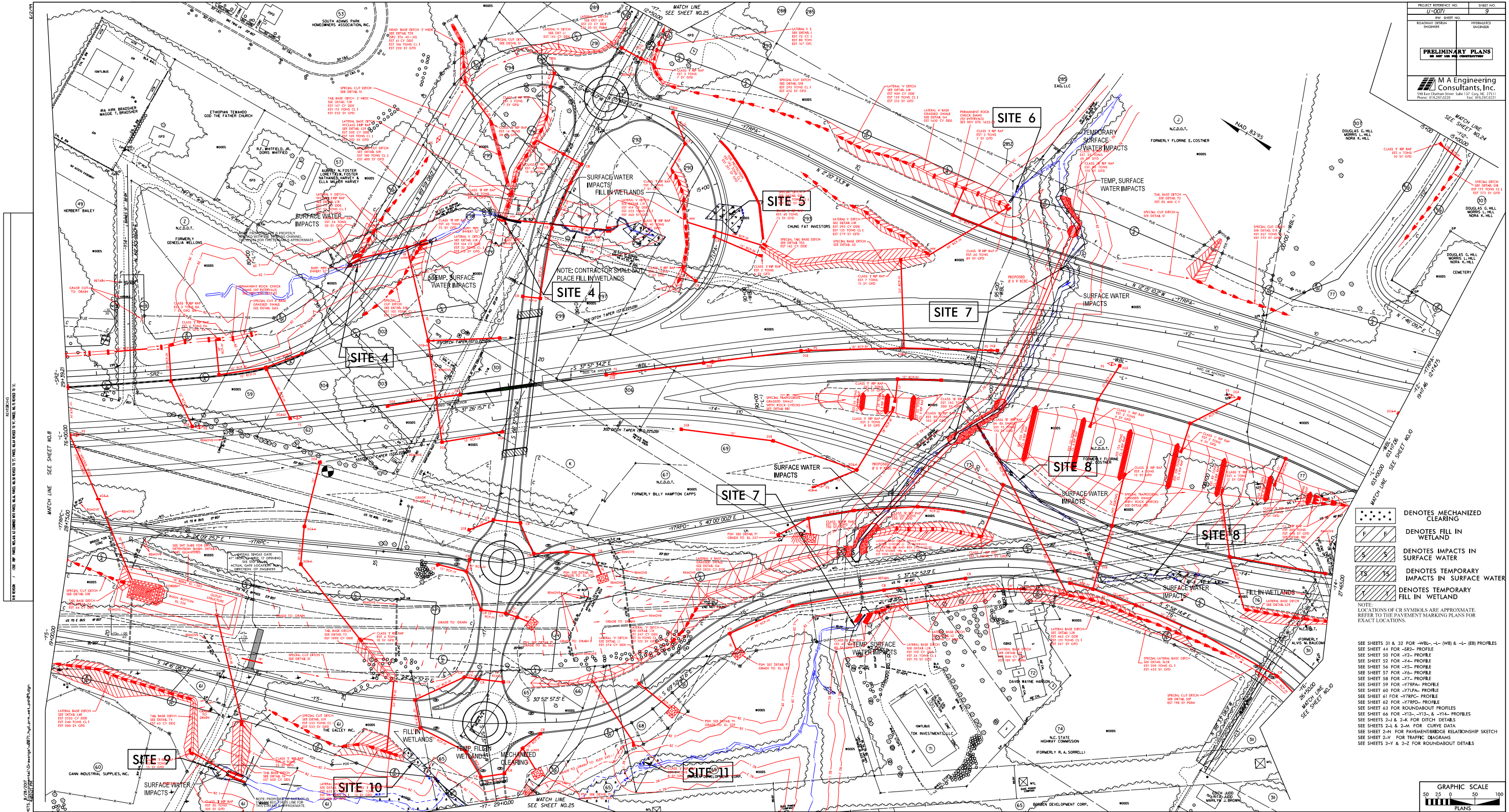
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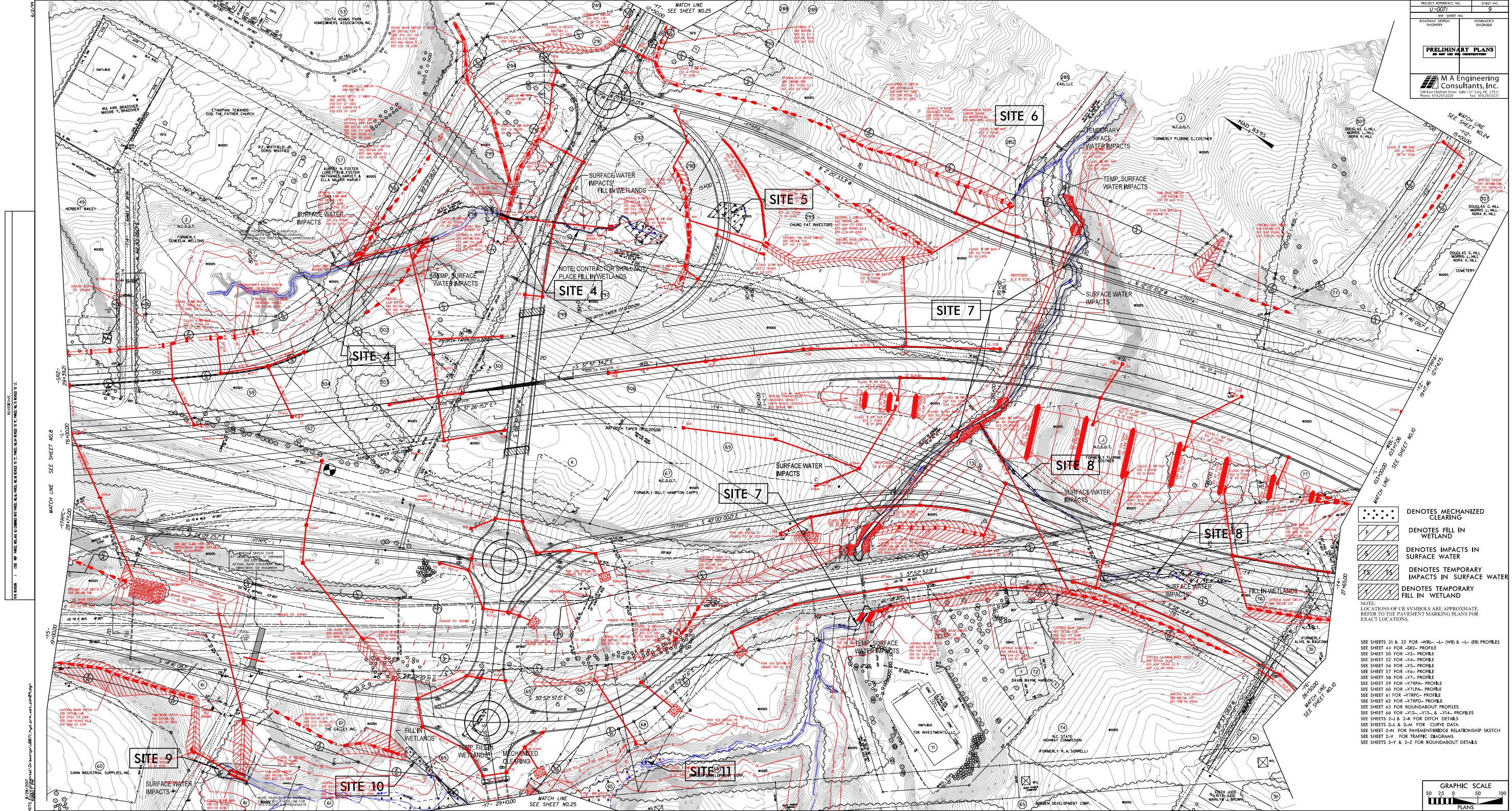
Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox (2008), NCDOT Standard Details, or FHWA HEC-14 (July 2006), been met and verified, as applicable? If No, provide further explanation of why design criteria was not met.

Additional Comments

The performed scour holes for U-0071 have been implemented in areas that are flat to encourage the most dissipation of flow. If the receiving areas weren't flat enough they have been regraded to appropriate elevations per design. The result is that all designed PFSH will have minimal outlet velocities less than 2 fps.

* Refer to the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), NCDOT Standard Details, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.





PROJECT REFERENCE NO. 17-0071 SHEET NO. 21

ROADWAY DESIGN HYDRAULICS

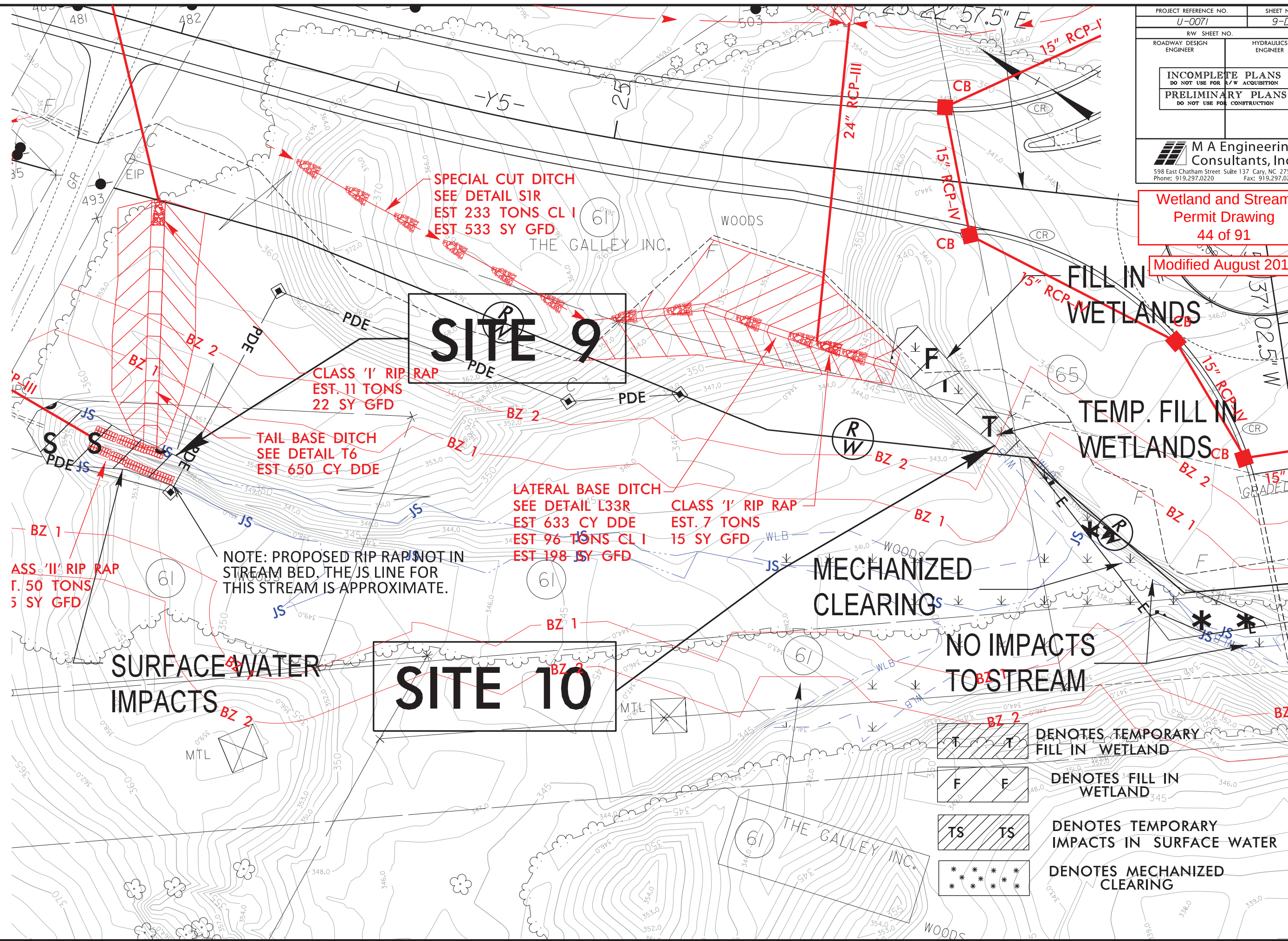
PRELIMINARY PLANS
NO IMP. USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.279.2020 Fax: 919.279.0221

REVISIONS

NO.	DATE	DESCRIPTION
1	08/27/2017	ISSUED FOR PERMIT

17-0071-21.dwg
17-0071-21.dwg
17-0071-21.dwg



PROJECT REFERENCE NO.
U-0071

SHEET NO.
20

ROADWAY DESIGN
ENGINEER

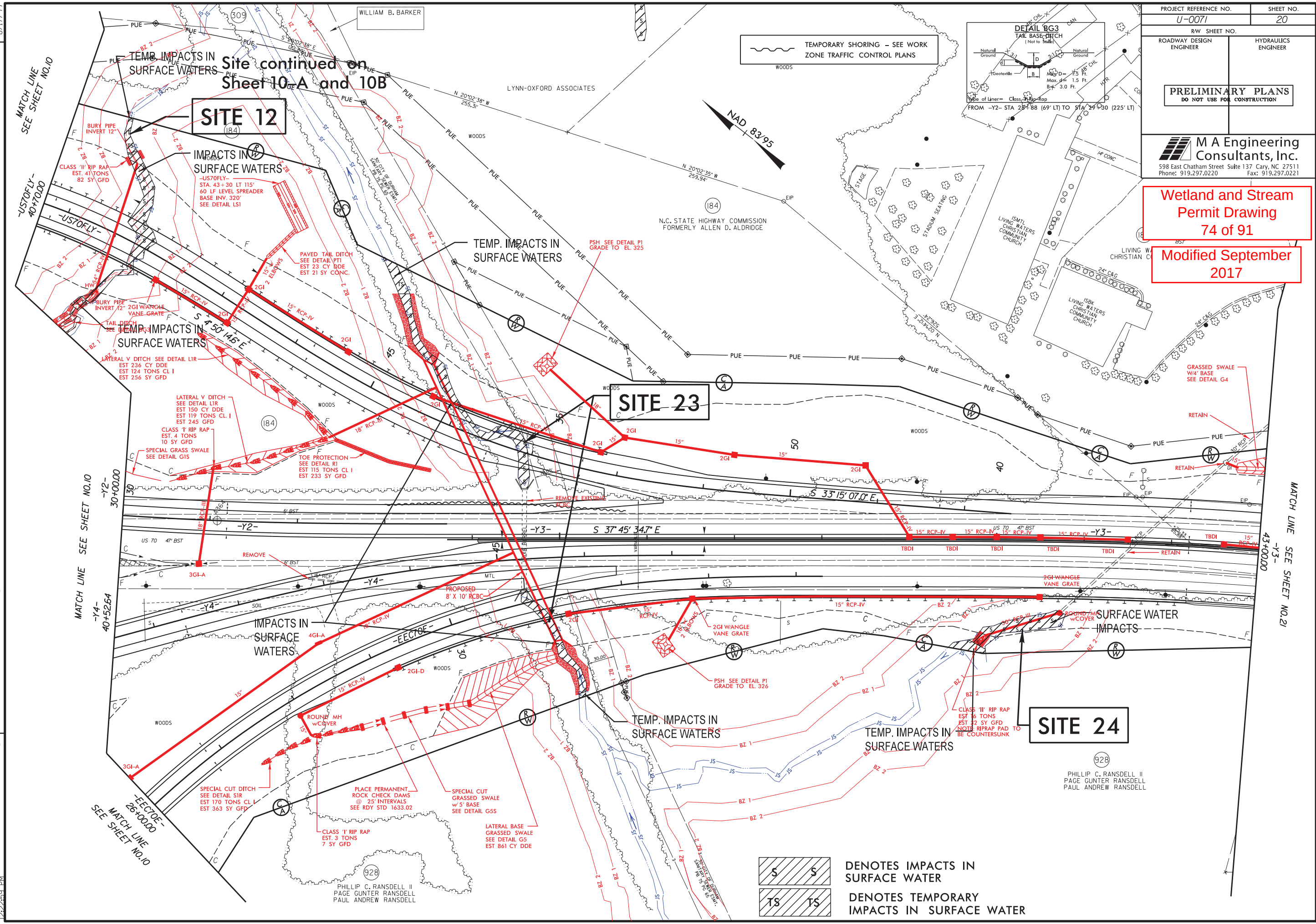
HYDRAULICS
ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering
Consultants, Inc.

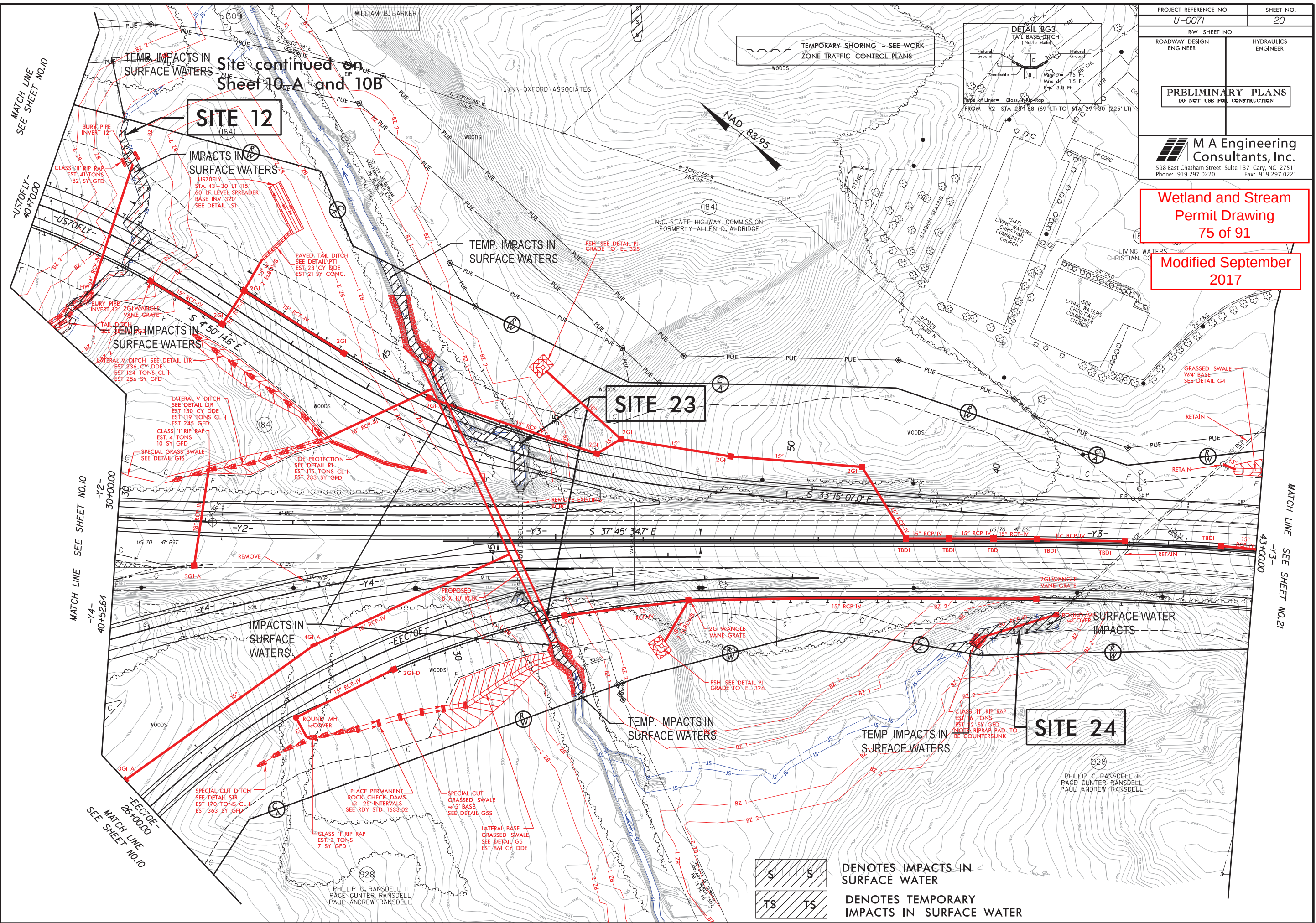
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Wetland and Stream
Permit Drawing
74 of 91
Modified September
2017



	Denotes IMPACTS IN SURFACE WATER
	Denotes TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS
1/7/2017
12:25:56 PM
B:\Hydro\Projects\PERMITS\Environmental\Drawings\20170925\0071_hyd.prm.wet.psh20.dgn
P/W REVISION / 2002 RMP ALL ADJACENT PARCELS OWNED BY WILLIAM B. BARKER COMBINED INTO PARCEL NO. 303. PARCEL NO. 185 REVISED TO 328.



PROJECT REFERENCE NO.	SHEET NO.
U-0071	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
 M A Engineering Consultants, Inc. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

Wetland and Stream
Permit Drawing
75 of 91

Modified September
2017

REVISIONS	
R/W REVISION	/ 2002 R/WP ALL ADJACENT PARCELS OWNED BY WILLIAM B. BARKER COMBINED INTO PARCEL NO. 309. PARCEL NO. 185 REVISED TO 928.

9/26/2017
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WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	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 32+58 to 36+64	FILL						0.04		412		
2	L 37+75 - SR1 34+84 Y17 11+14	66" RCP-IV, 48"RCP-III, 24"RCP-III	0.08					0.07	<0.01	673	14	
		BANK STABILIZATION								20		
3	L 44+53	30" RCP-III	0.06					0.06		410		
* 4	SR2 36+89 Y7 17+24	48" RCP-III, 60" RCP-III	0.05					0.03	<0.01	349	20	
		BANK STABILIZATION								175		
* 5(T)	Y7LPA 13+98	60" RCP-III	0.06									
6	Y7RPA 21+78	BANK STABILIZATION						< 0.01		25		
7	Y7RPA 20+75 to Y6 15+90	8'x9' RCBC						0.17	0.01	665	104	
		BANK STABILIZATION								305		
8	Y4 19+63 to 22+30 and Y4 23+04 to 25+59	30" RCP-III, FILL	0.04					0.07		443		
9	Y5 23+20 RT.	30" RCP-III						0.03	<0.01	29		
		BANK STABILIZATION								43		
10	Y5 26+62 RT.	FILL	0.01	0.01		0.03						
11**	Y6 11+15 off 104 RT.	18" RCP-III										
12	Y2 26+53 to 27+90 LT.	48" RCP-III & RECHANNELIZATION						0.12	0.02	789	72	
		BANK STABILIZATION								18		
13(T)	Y4 35+48	36" RCP-IV						0.78				
* 14(T)	L 122+93	30" RCP-V	0.08									
* 15(T)	L 132+13	FILL	0.03									
* 16(T)	L 132+33 RT.	FILL	0.05									
17	L 133+41	6'x7' RCBC						0.06	<0.01	479	33	
		BANK STABILIZATION								140		
17A	L 133+26 264' LT	FILL						< 0.01	<0.01	25	37	
TOTALS:			0.46	0.01		0.03		1.43	0.03	5000	354	

*Rounded totals are sum of actual impacts

NOTES:

* indicates isolated wetland

** Site 11 Mechanized Clearing Wetland Impacts have been removed

(T) Indicates Total Take

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
WBS - 34745.1.1 (U-0071)

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	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)
17B	L 133+69 263' RT	FILL							<0.01		7	
18(T)	L 134+53 LT.	FILL						0.19				
19	not jurisdictional	0										
20	DFLW 27+34 to 38+06	42" RCP-III						0.02	<0.01	218	17	
21	DFLW 39+19	FILL						0.01		28		
22	DFLW 41+62	FILL						0.01		23		
23	Y3 34+45	8'x10' CULVERT						0.09	0.01	270	49	
		BANK STABILIZATION								152		
24	Y3 40+16.69 RT	30" RCP-III						0.04	0.01	104	23	
25	Y9 28+10 LT to 26+85 RT	66" RCP-III						0.01	<0.01	168	10	
		BANK STABILIZATION								35		
26	Y3 57+75 LT to RT	60" RCP-III						0.01	<0.01	50	23	
		BANK STABILIZATION								50		
27	L 129+77 414LT.	BANK STABILIZATION								10		
28	DFLW 52+08 LT & RT	36" RCP						0.02	0.01	121	20	
29	DFLW 72+35 LT	FILL						< 0.01		40		
30	DFLW 73+72 LT	FILL						< 0.01		10		
31	DFLW 78+76 LT& 81+14 RT	BANK STABILIZATION								61		
		Construction Activity							<0.01		22	
32	DFLW 78+79 LT	Construction Activity							<0.01		9	
TOTALS (page 2 of 2):			0.00	0.00		0.00		0.39	0.04	1340	180	
TOTALS (page 1 of 2):			0.46	0.01		<0.01		1.43	0.03	5000	354	
TOTALS:			0.46	0.01		<.0.01		1.83	0.07	6340	534	

*Rounded totals are sum of actual impacts

NOTES:

* indicates isolated wetland

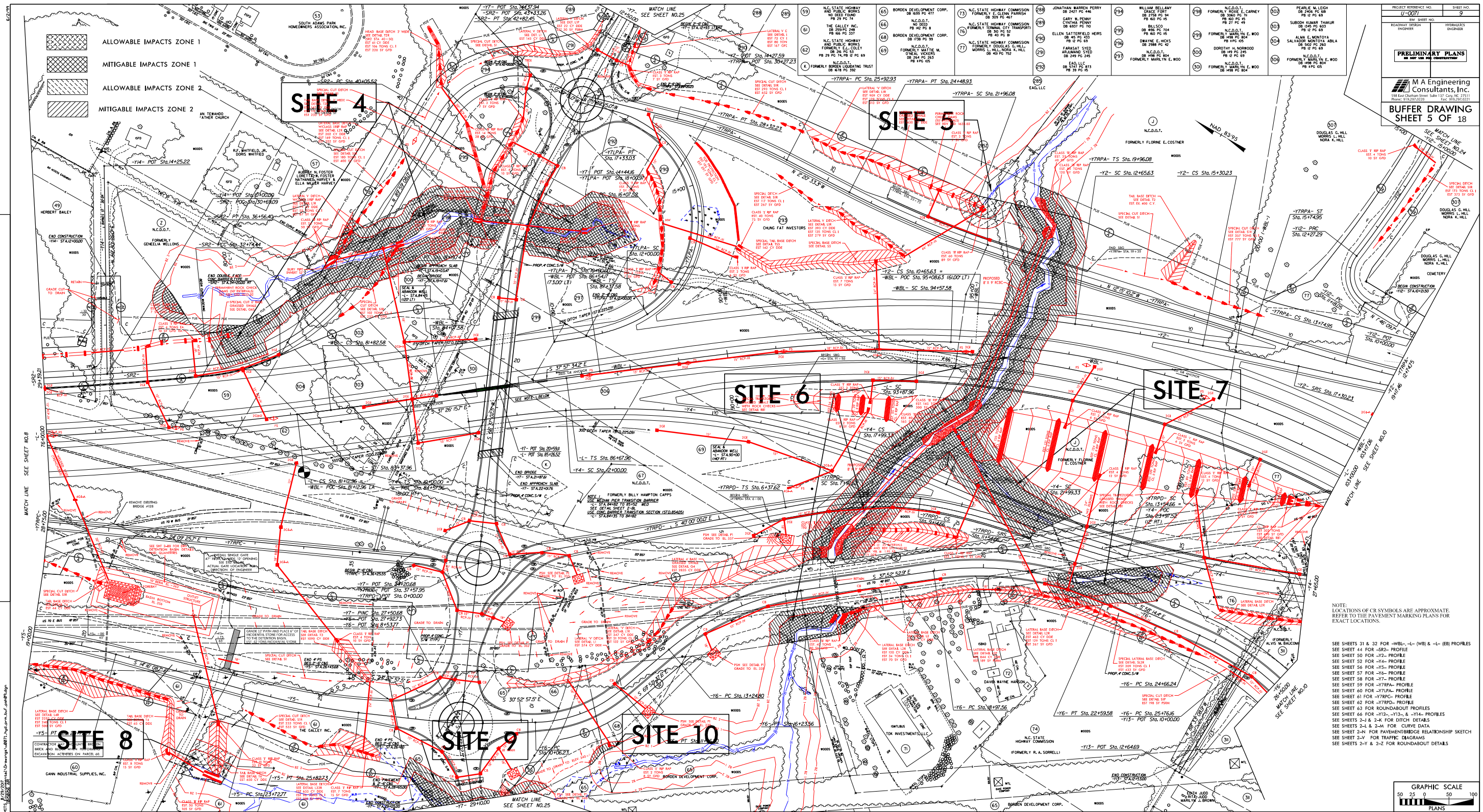
(T) Indicates Total Take

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
WBS - 34745.1.1 (U-0071)

SHEET 91 of 91

9/27/2017



PROJECT REFERENCE NO. 17-0071 SHEET NO. 2

ROADWAY DESIGN INNOVATION

PRELIMINARY PLANS
NO WAY USE HAS BEEN CONSIDERED

M A Engineering Consultants, Inc.
598 East Chatham Street, Suite 117, Cary, NC 27511
Phone: 919.237.0020 Fax: 919.237.0021

BUFFER DRAWING
SHEET 5 OF 18

NOTE: LOCATIONS OF CR SYMBOLS ARE APPROXIMATE. REFER TO THE PAVEMENT MARKING PLANS FOR EXACT LOCATIONS.

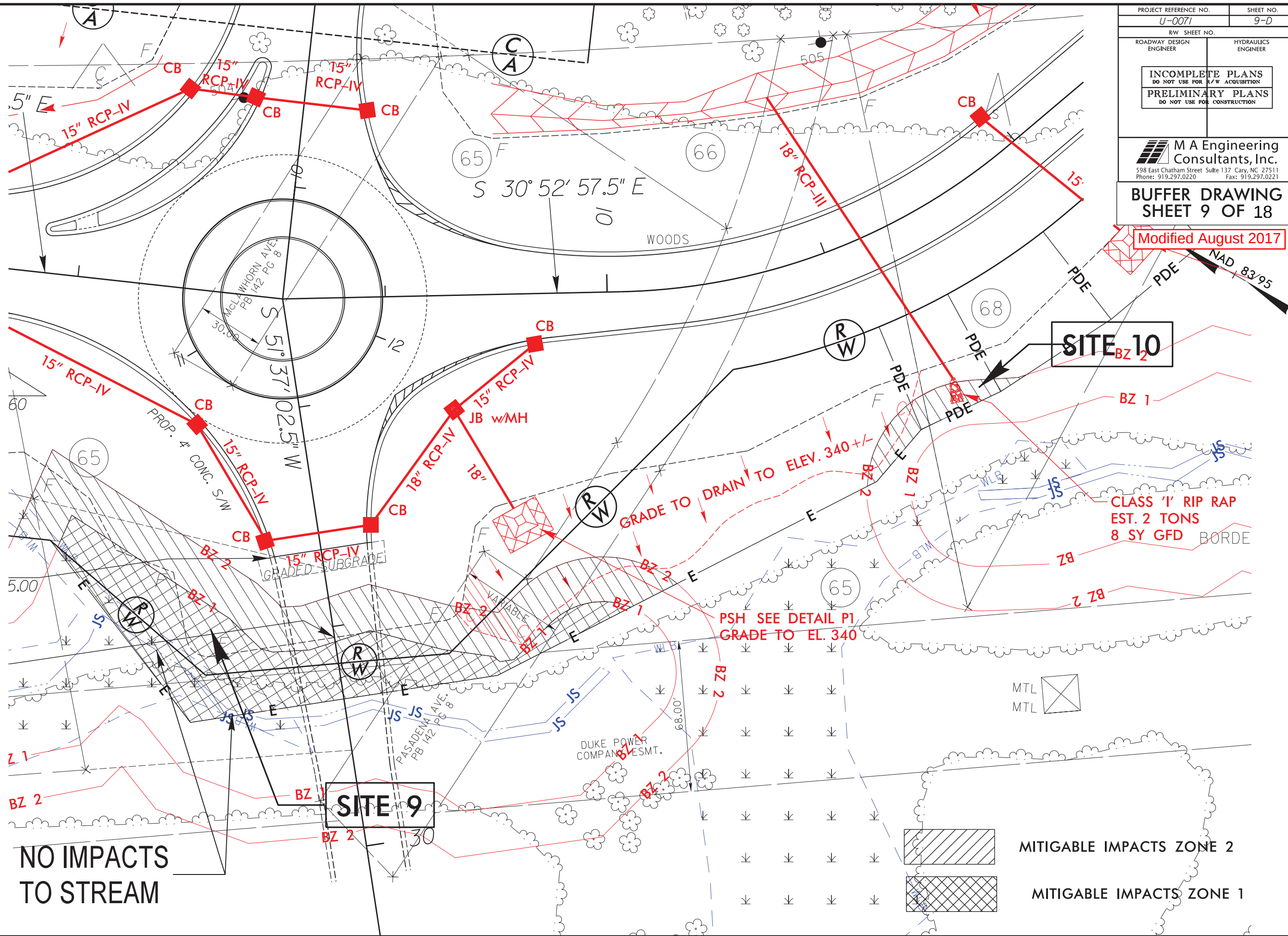
SEE SHEETS 31 & 32 FOR -WB-, -L-, (WB) & -L- (EB) PROFILES
SEE SHEET 44 FOR -SR2- PROFILE
SEE SHEET 50 FOR -Y2- PROFILE
SEE SHEET 52 FOR -Y4- PROFILE
SEE SHEET 56 FOR -Y5- PROFILE
SEE SHEET 57 FOR -Y6- PROFILE
SEE SHEET 58 FOR -Y7- PROFILE
SEE SHEET 59 FOR -Y7RA- PROFILE
SEE SHEET 60 FOR -Y7PA- PROFILE
SEE SHEET 61 FOR -Y7RC- PROFILE
SEE SHEET 62 FOR -Y7PD- PROFILE
SEE SHEET 63 FOR ROUNDABOUT PROFILES
SEE SHEET 64 FOR -Y7S-, -Y7T-, & -Y7L- PROFILES
SEE SHEETS 2-1 & 2-2 FOR CURVE DATA
SEE SHEET 2-3 FOR PAVEMENT/RELATIONSHIP SKETCH
SEE SHEET 2-4 FOR TRAFFIC DIAGRAMS
SEE SHEETS 2-5 & 2-6 FOR ROUNDABOUT DETAILS

GRAPHIC SCALE
50 25 0 25 50 100
PLANS

8/17/99

8/29/2017
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REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-D
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
M A Engineering Consultants, Inc. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

BUFFER DRAWING
SHEET 9 OF 18

Modified August 2017

SITE 10

SITE 9

NO IMPACTS
TO STREAM

MITIGABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 1

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS	
			ZONE 1 (ft ²)	ZONE 2 (ft ²)
1	L 36+86RT to 38+71LT		2986	431
2	L 44+95 to 49+16 LT		2431	268
4	SR2 32+99 to Y7 16+51		899	969
7	Y4 21+14		616	535
9	Y7 29+00		1370	140
10	Y6 11+09		0	0
TOTAL:			8302	2343

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
PROJECT: 34745.2.8 (U-0071)

10/2/2017
SHEET 17 OF 18

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	TYPE			ALLOWABLE			MITIGABLE			ZONE 1 (ft²)	ZONE 2 (ft²)
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft²)	ZONE 2 (ft²)	TOTAL (ft²)	ZONE 1 (ft²)	ZONE 2 (ft²)	TOTAL (ft²)		
1	66" RCP-V	L 36+86RT to 38+71LT	X						41408	26834	68242		
2	30" RCP & 15"RCP	L 44+95 to 49+16 LT	X						22801	15534	38335		
3	30" RCP-III	Y17 12+93 to 13+97	X			2222	997	3219					
4	18", 48" & 60" RCP	SR2 32+99 to Y7 16+51	X						45253	35088	80341		
5	66" RCP-III	Y7RPA 21+27 to 22+32	X			2342	3142	5484					
6	TWO 8'x9' RCBC	Y7RPA 20+32 to Y7RPD 7+62	X						63171	38576	101747		
7	30" RCP-III	Y4 21+14	X						24286	16780	41066		
8	DITCH	Y5 23+24	STORMWATER MANAGEMENT			3438	1805	5243					
9	15" RCP-III	Y7 29+00			X				6455	6594	13049		
10	18" RCP-III	Y6 11+09			X					876	876		
11	PREFORMED SCOUR HOLE	Y12 10+00	STORMWATER MANAGEMENT				87	87					
12	15", 24", & 36" RCP	L 109+80 to Y2 29+08	X						77205	50757	127962		
13	8'x10' RCBC	Y3 34+44	X						27871	20229	48100		
14	30" RCP	Y3 40+73	X			7822	3210	11032					
15	60" RCP	Y9 27+33	X						13171	8861	22032		
16	60" RCP	Y3 57+71	X			7690	5252	12942					
17	6'x7' RCBC	L 133+41	X						39947	23781	63728		
18	DITCH	L 129+60	STORMWATER MANAGEMENT			2146	1897	4043					
TOTAL:						25660	16390	42050	361568	243910	605478		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
PROJECT: 34745.2.8 (U-0071)

8/28/2017
SHEET 18 OF 18