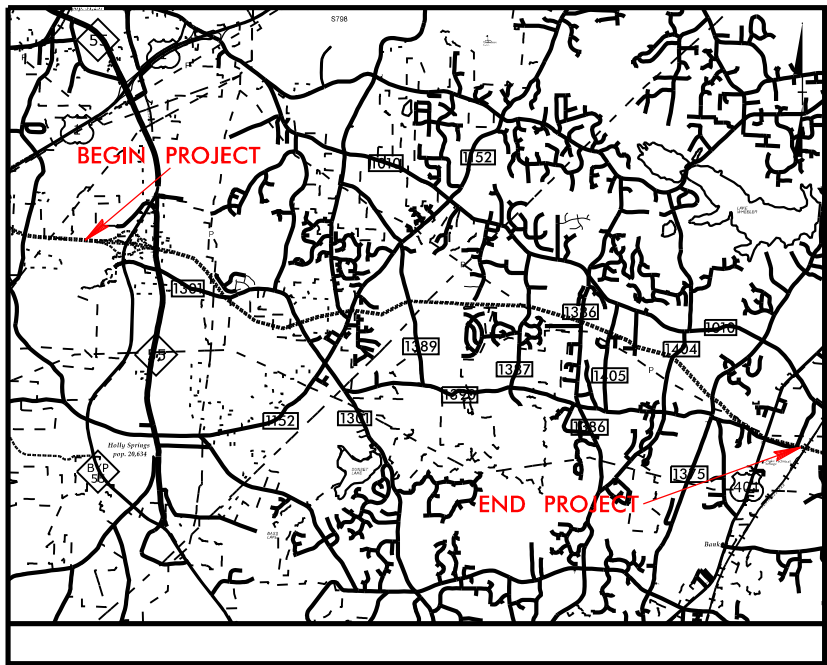


TIP PROJECT: R-2721

CONTRACT:



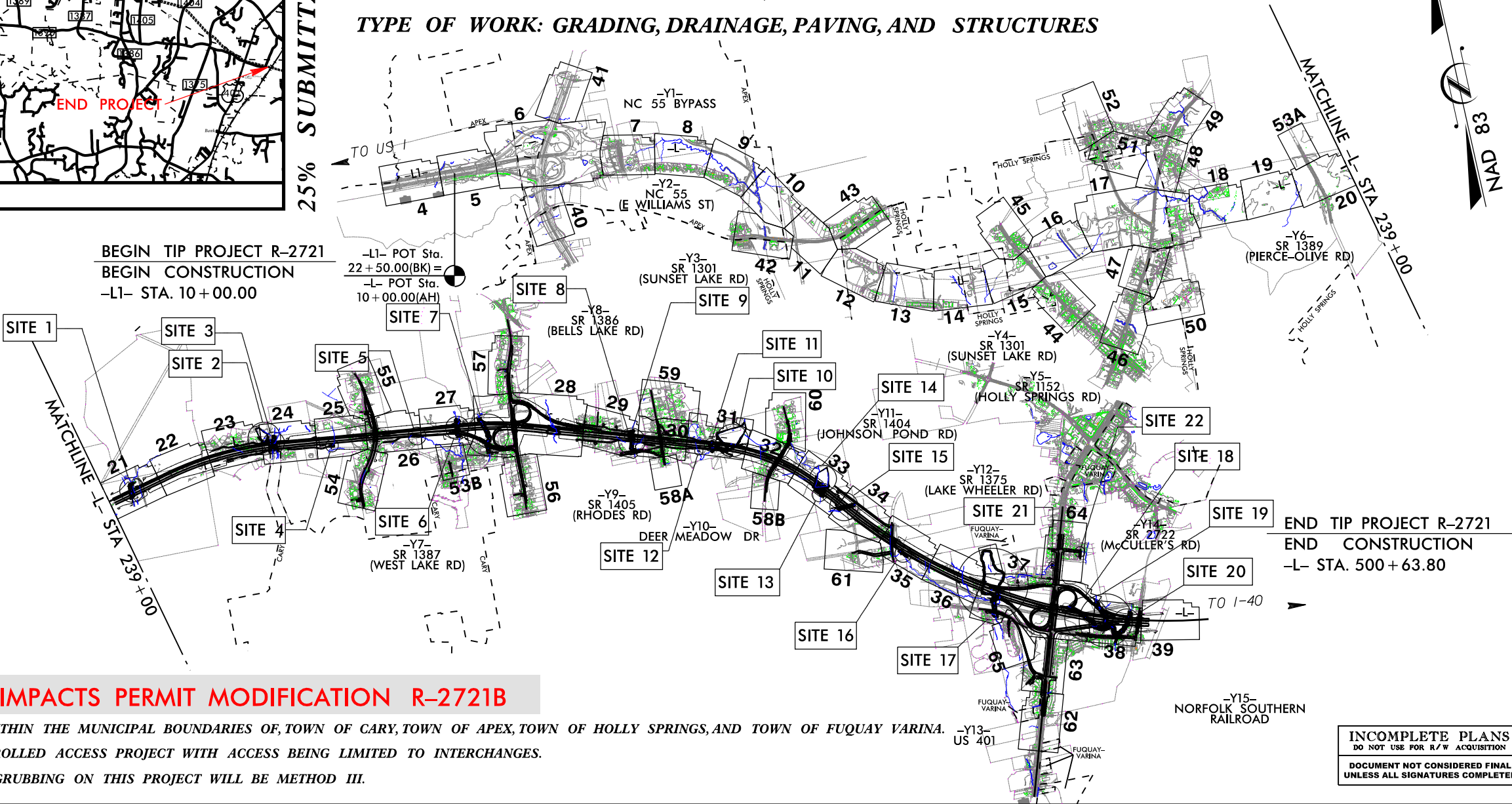
25% SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

LOCATION: COMPLETE 540 - FROM WEST OF NC55 TO EAST OF HWY 401

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES

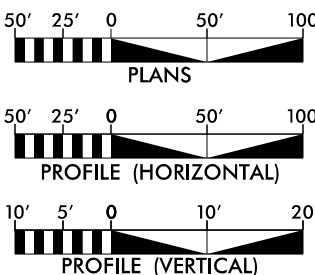


BUFFER IMPACTS PERMIT MODIFICATION R-2721B

THIS PROJECT WITHIN THE MUNICIPAL BOUNDARIES OF, TOWN OF CARY, TOWN OF APEX, TOWN OF HOLLY SPRINGS, AND TOWN OF FUQUAY VARINA.
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
CLEARING AND GRUBBING ON THIS PROJECT WILL BE METHOD III.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2018 = 28,200
ADT 2040 = 66,400
K = 12 %
D = 65 %
T = 11 % *
V = 75 MPH
* TTST = 7% DUAL 4%
FUNC CLASS = INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2721 = 9.529 Miles
LENGTH STRUCTURES = 0.178 Miles
TOTAL LENGTH TIP PROJECT R-2721 = 9.351 Miles

Prepared in the Office of:

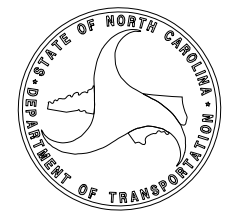


2018 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE:
February 18, 2020
LETTING DATE:
February 18, 2020

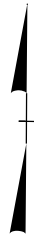
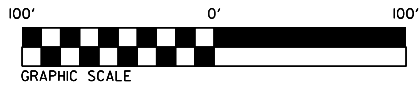
Brian K. Eason, PE
PROJECT ENGINEER
Christina L. Yokeley, EI
PROJECT DESIGN ENGINEER
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.
ROADWAY DESIGN ENGINEER
SIGNATURE: _____ P.E.



51499



**BUFFER DRAWING
SHEET 3 OF 19**

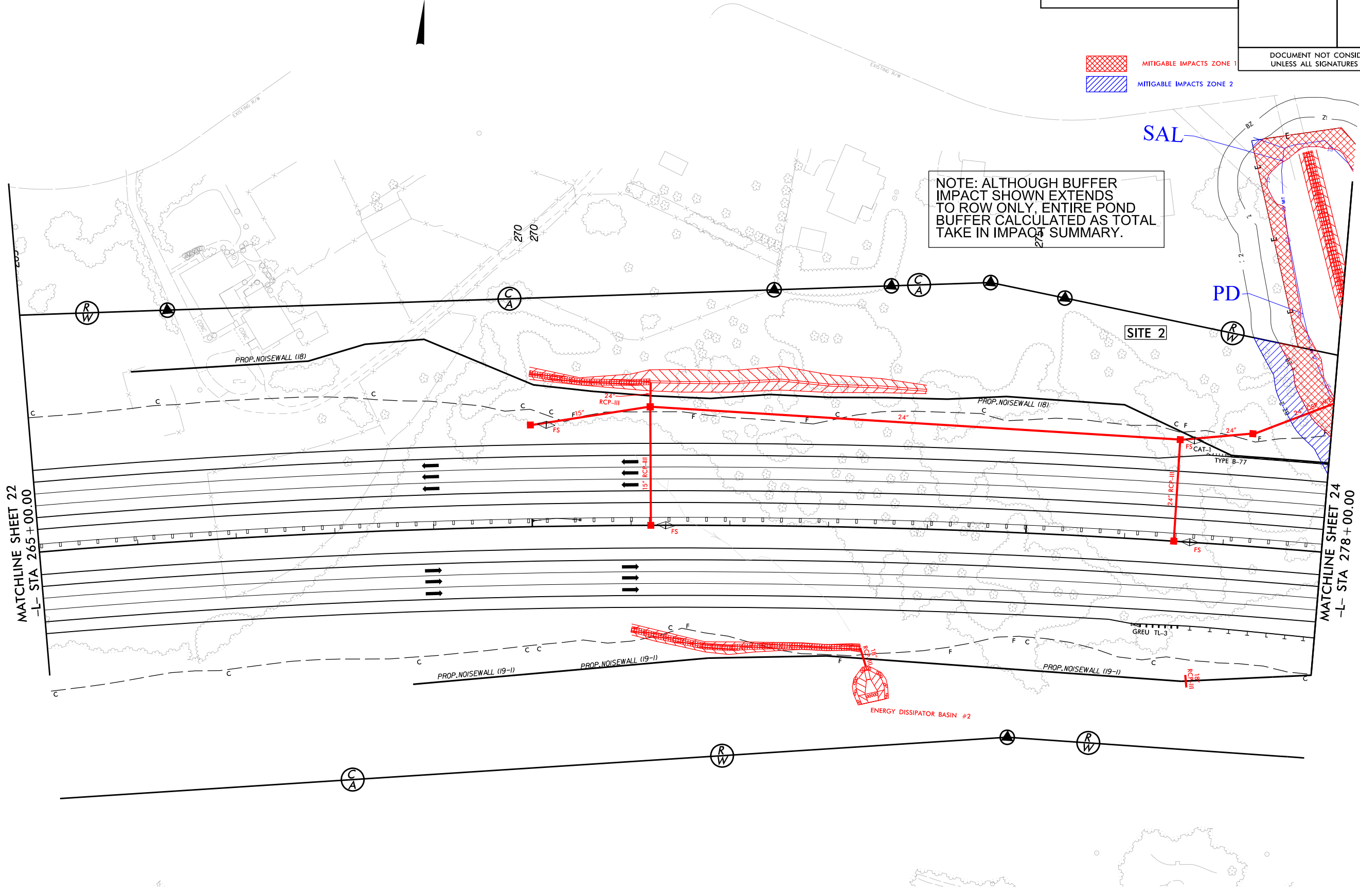


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555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.		SHEET NO.
R-2721		23
R-2721B ROADWAY SHEET NO. 7		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2

NOTE: ALTHOUGH BUFFER IMPACT SHOWN EXTENDS TO ROW ONLY, ENTIRE POND BUFFER CALCULATED AS TOTAL TAKE IN IMPACT SUMMARY.



51499
8/6/2019 10:00 AM R2721_PSH_24_04buf.dgn
\$\$\$\$\$USERNAM\$\$\$\$\$

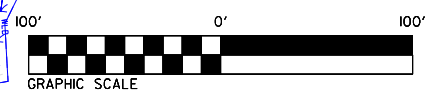
NOTE: ALTHOUGH BUFFER
IMPACT SHOWN EXTENDS
TO ROW ONLY, ENTIRE POND
BUFFER CALCULATED AS TOTAL
TAKE IN IMPACT SUMMARY.



PROJECT REFERENCE NO.		SHEET NO.
R-2721		24
R-2721B ROADWAY SHEET NO. 7 & 8		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

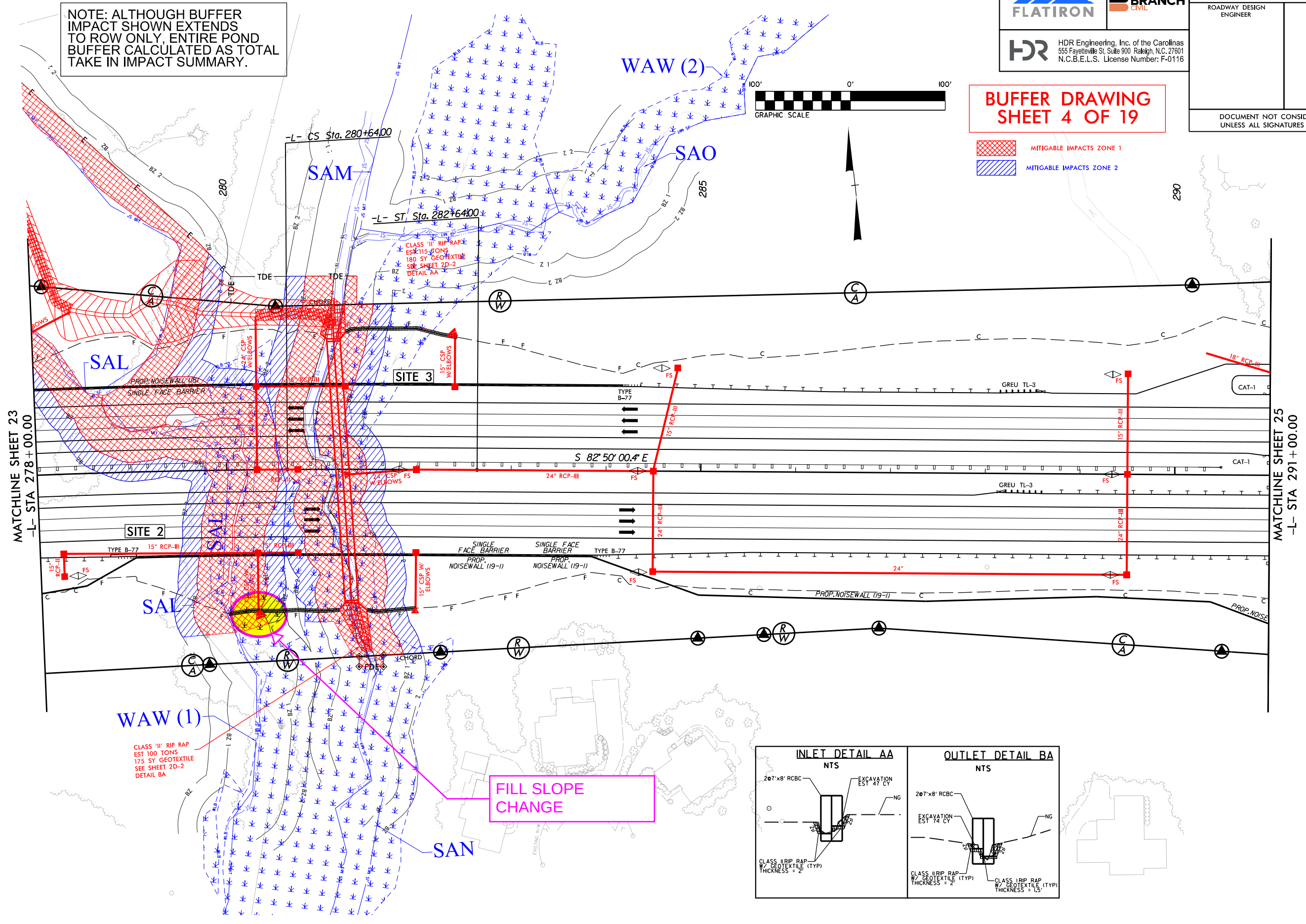
**BUFFER DRAWING
SHEET 4 OF 19**

-  MITIGABLE IMPACTS ZONE 1
-  MITIGABLE IMPACTS ZONE 2

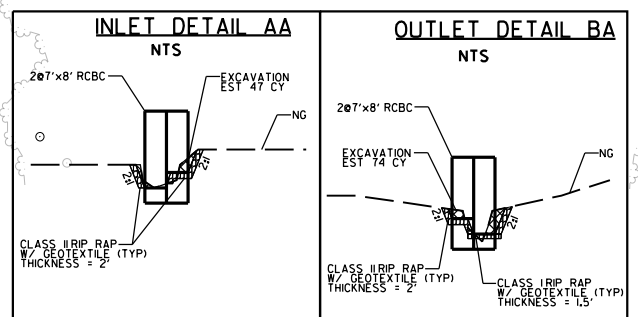


MATCHLINE SHEET 23
-L- STA 278+00.00

MATCHLINE SHEET 25
-L- STA 291+00.00

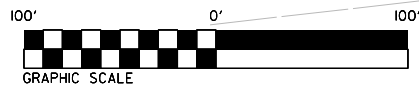


FILL SLOPE
CHANGE



51499

8/20/19 R2721_PSH_25_05buf.dgn
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**BUFFER DRAWING
SHEET 5 OF 19**

- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2

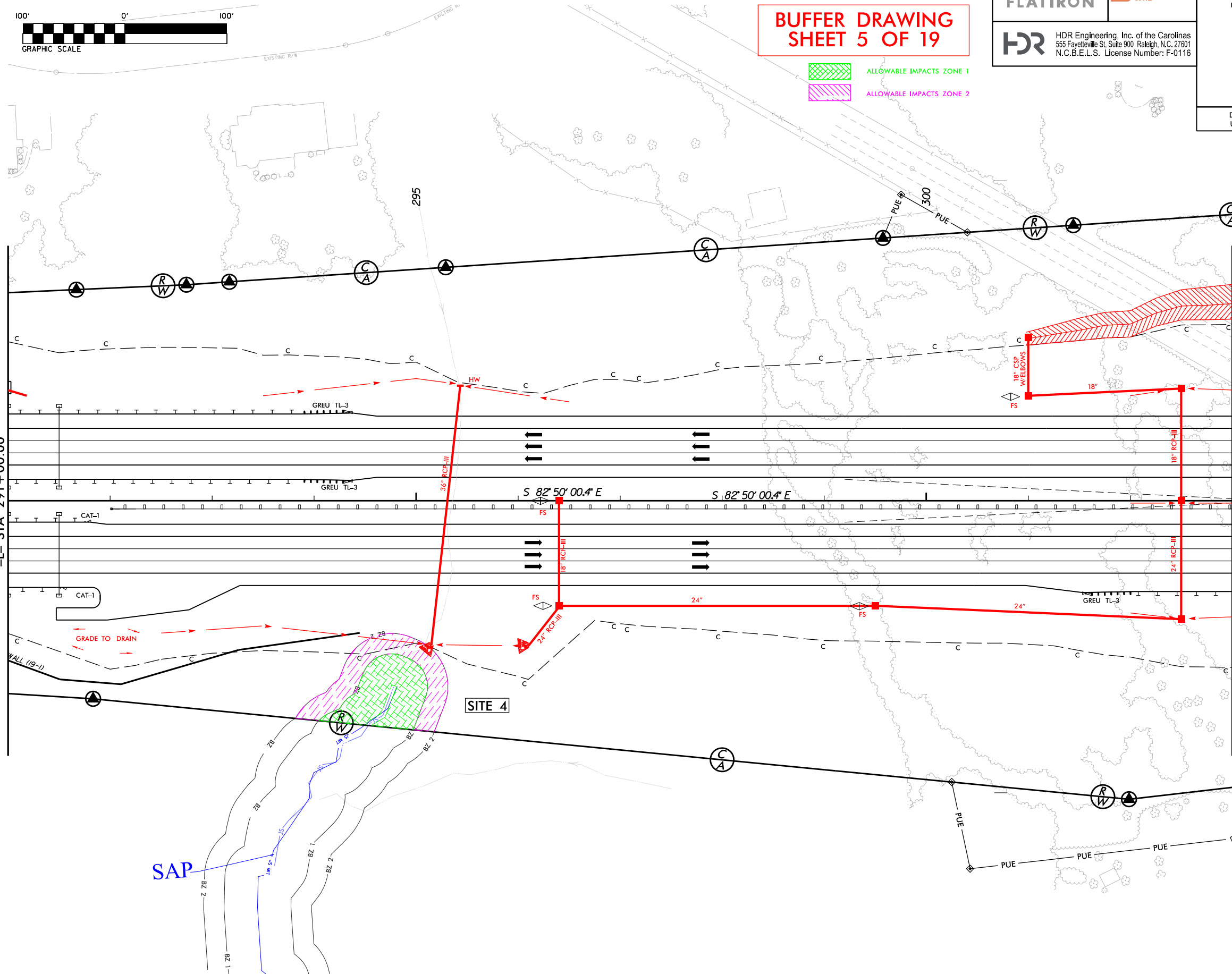


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PROJECT REFERENCE NO.		SHEET NO.
R-2721		25
R-2721B ROADWAY SHEET NO. 8 & 9		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

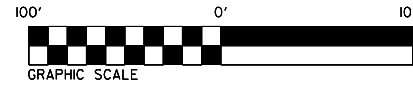
MATCHLINE SHEET 24
-L- STA 291+00.00

MATCHLINE SHEET 26
-L- STA 303+00.00



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8/20/19 R2721_PSH_26_06buf.dgn
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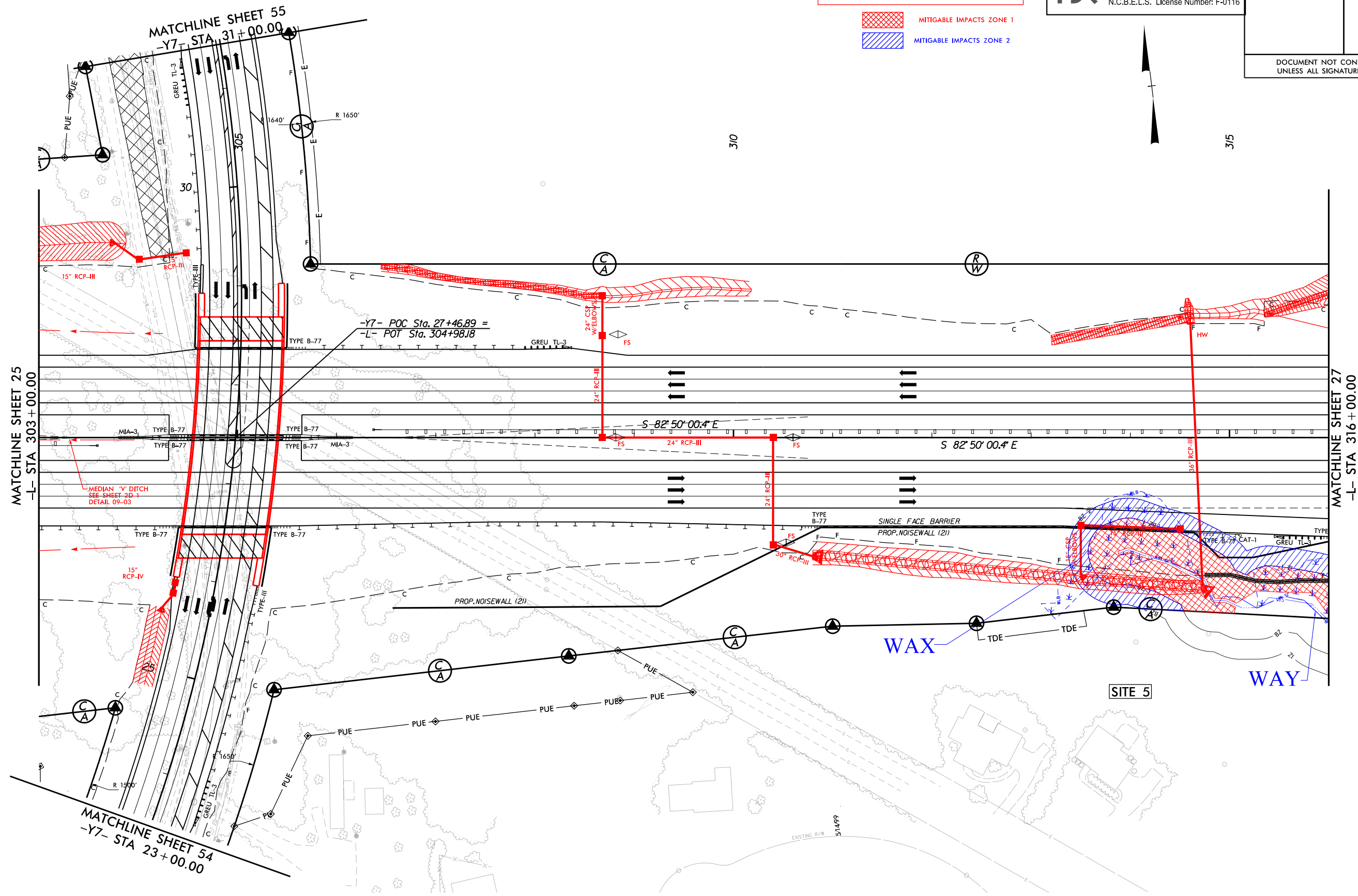
BUFFER DRAWING SHEET 6 OF 19

- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2

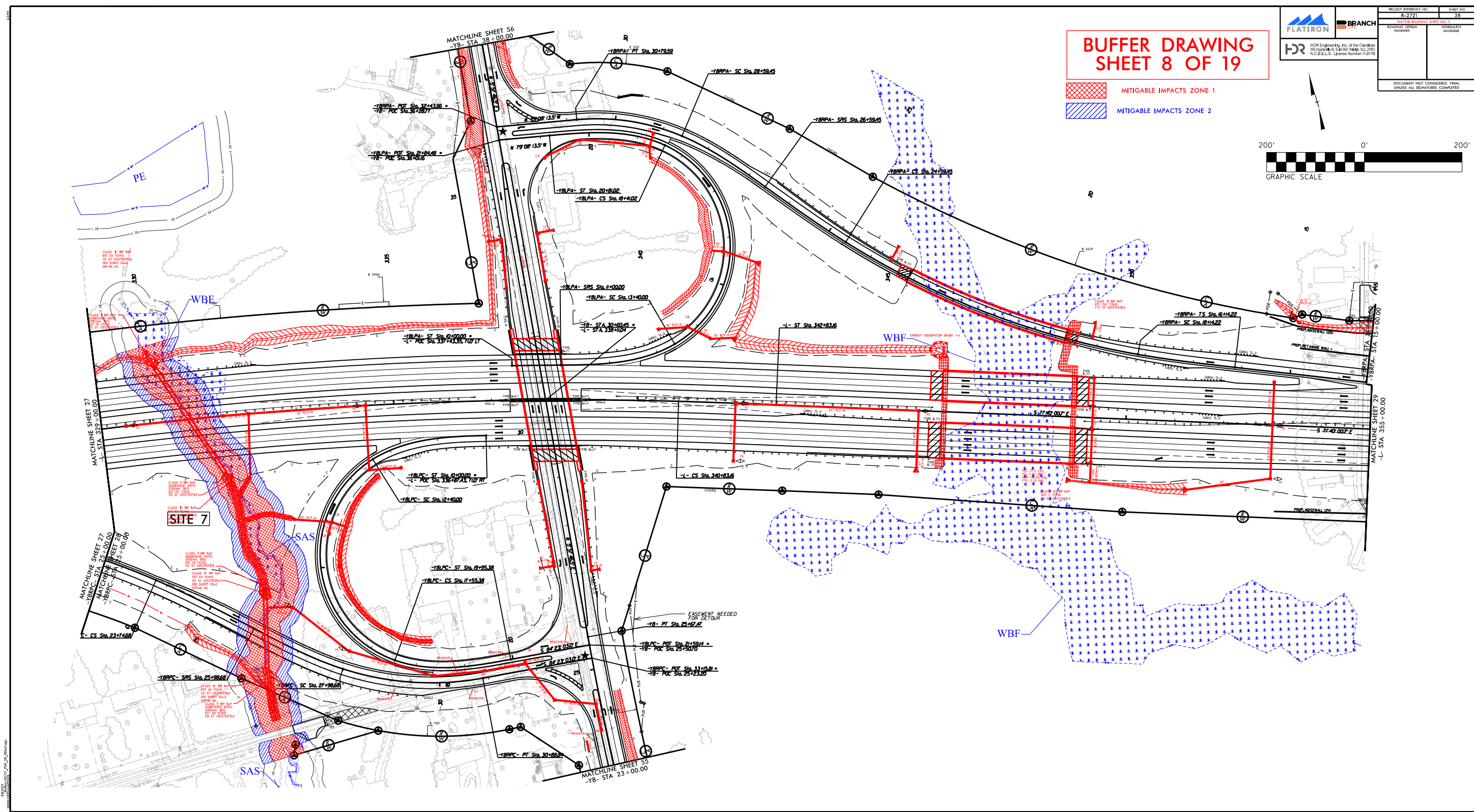


HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.		SHEET NO.
R-2721		26
R-2721B ROADWAY SHEET NO. 9 & 10		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



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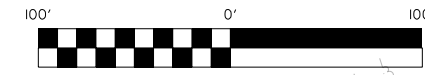
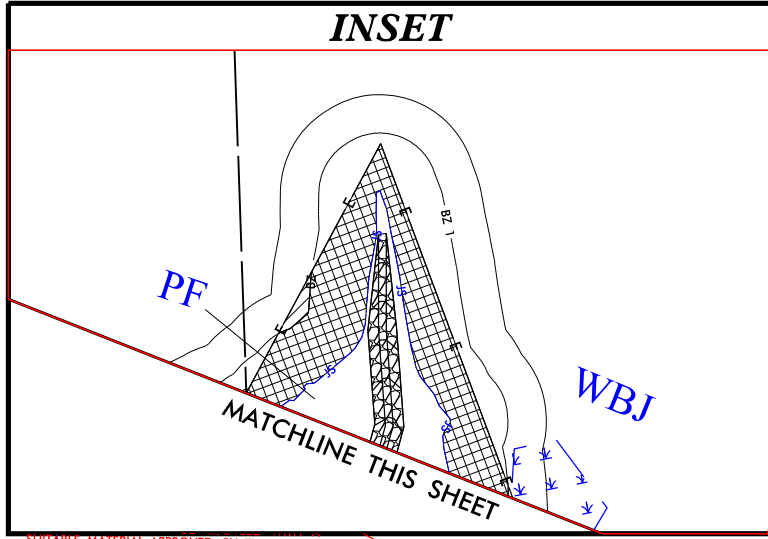
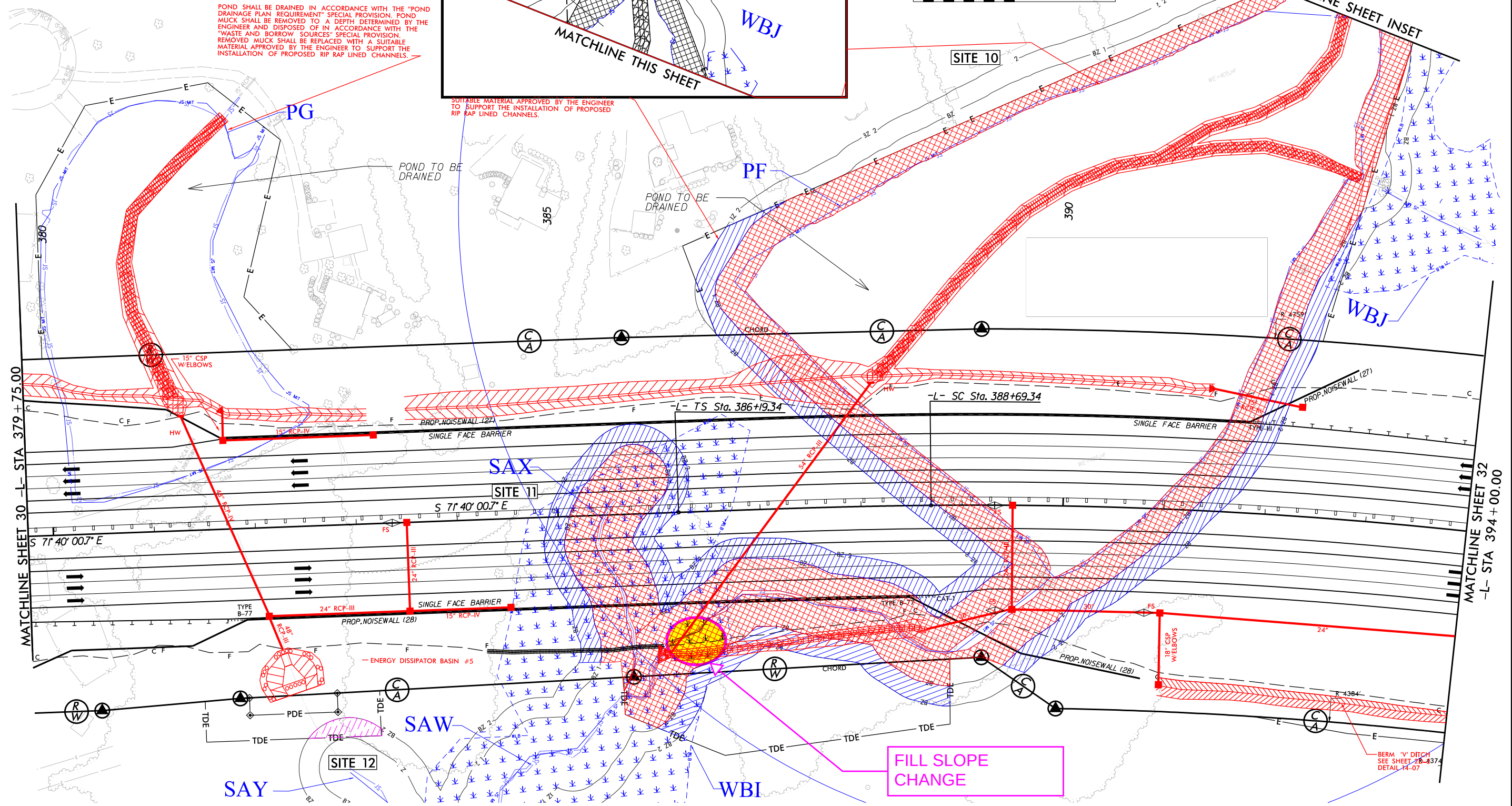


**BUFFER DRAWING
SHEET 10 OF 19**

- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2
- ALLOWABLE IMPACTS ZONE 2



		PROJECT REFERENCE NO. R-2721		SHEET NO. 31	
ing, Inc. of the Carolinas Suite 900 Raleigh, N.C. 27601 License Number: F-0116		R-2721B ROADWAY SHEET NO. 14			
		ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



SITE 10

SITE 11

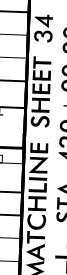
SITE 12

FILL SLOPE
CHANGE

POND SHALL BE DRAINED IN ACCORDANCE WITH THE "POND DRAINAGE PLAN" REQUIREMENT. SPECIAL PROVISION: POND MUCK SHALL BE REMOVED TO A DEPTH DETERMINED BY THE ENGINEER AND DISPOSED OF IN ACCORDANCE WITH THE "WASTE AND BORROW SOURCES" SPECIAL PROVISION. REMOVED MUCK SHALL BE REPLACED WITH A SUITABLE MATERIAL APPROVED BY THE ENGINEER TO SUPPORT THE INSTALLATION OF PROPOSED RIP RAP LINED CHANNELS.

SUITABLE MATERIAL APPROVED BY THE ENGINEER TO SUPPORT THE INSTALLATION OF PROPOSED RIP RAP LINED CHANNELS.

BERM 'Y' DITCH
SEE SHEET 28-4374
DETAIL 14-07

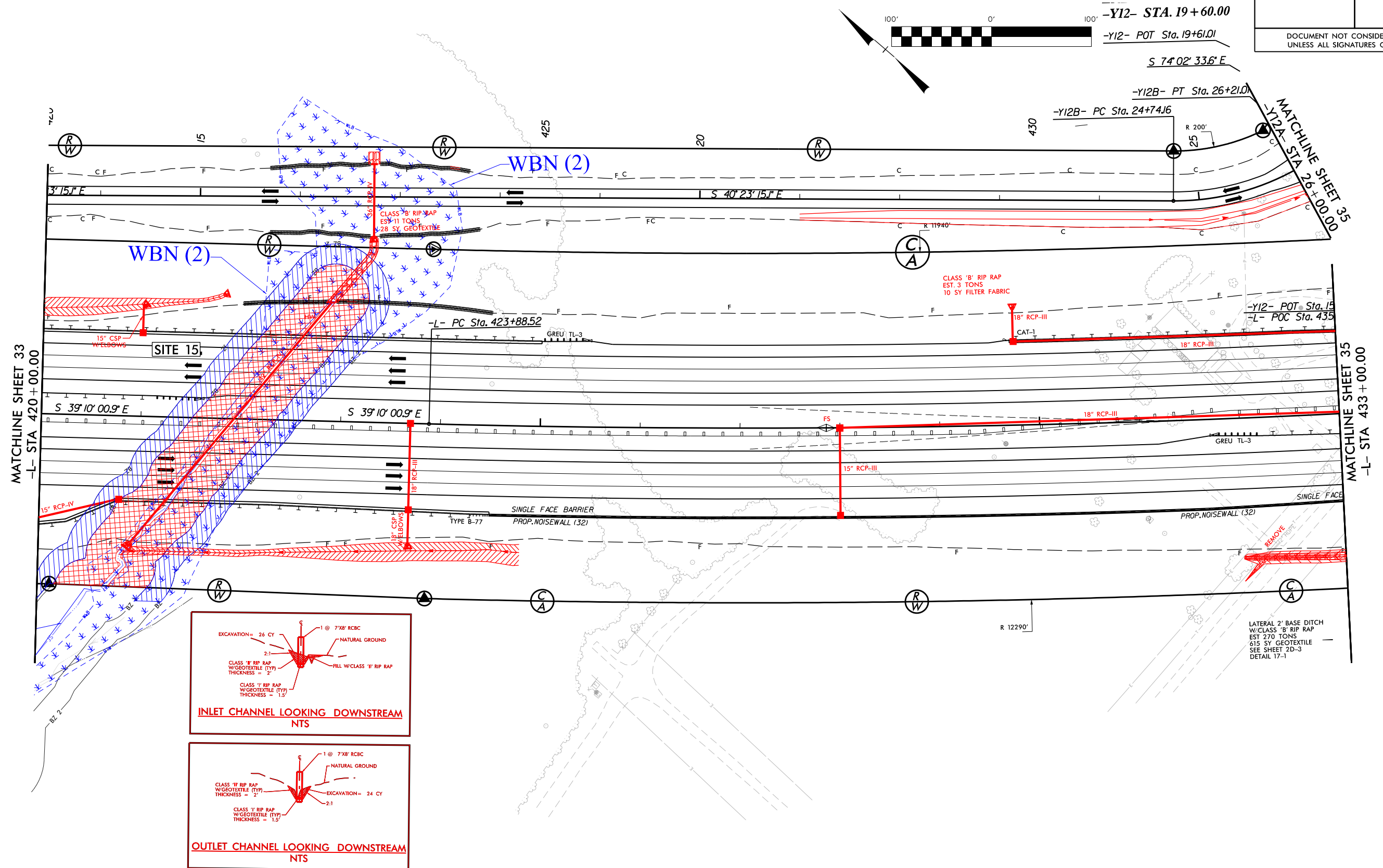
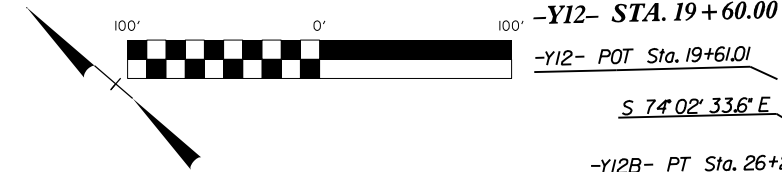


NOTE: ALTHOUGH BUFFER
IMPACT SHOWN EXTENDS
TO ROW ONLY, ENTIRE POND
BUFFER CALCULATED AS TOTAL
TAKE IN IMPACT SUMMARY.

PROJECT REFERENCE NO.	SHEET NO.
R-2721	34
R-2721B ROADWAY SHEET NO. 16 & 17	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

 MITIGABLE IMPACTS ZONE 1

 MITIGABLE IMPACTS ZONE 2



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8/6/2019 10:06:00 R2721_PSH_35_13b.dgn
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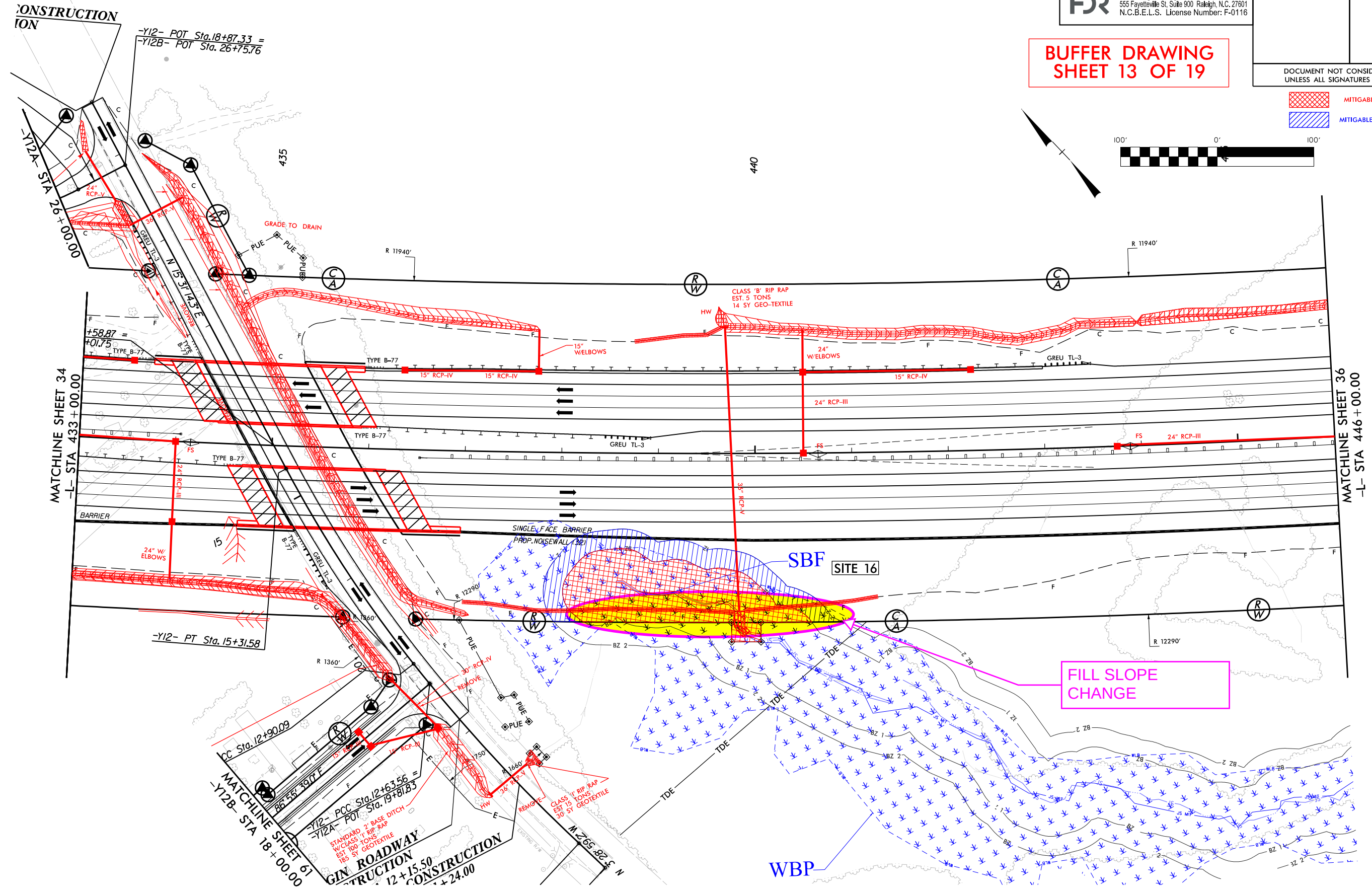
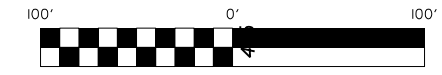


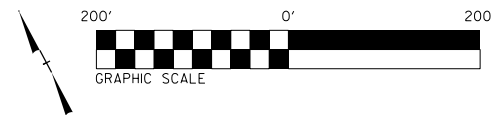
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.		SHEET NO.
R-2721		35
R-2721B ROADWAY SHEET NO. 17 & 18		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

**BUFFER DRAWING
SHEET 13 OF 19**

MITIGABLE IMPACTS ZONE 1
 MITIGABLE IMPACTS ZONE 2





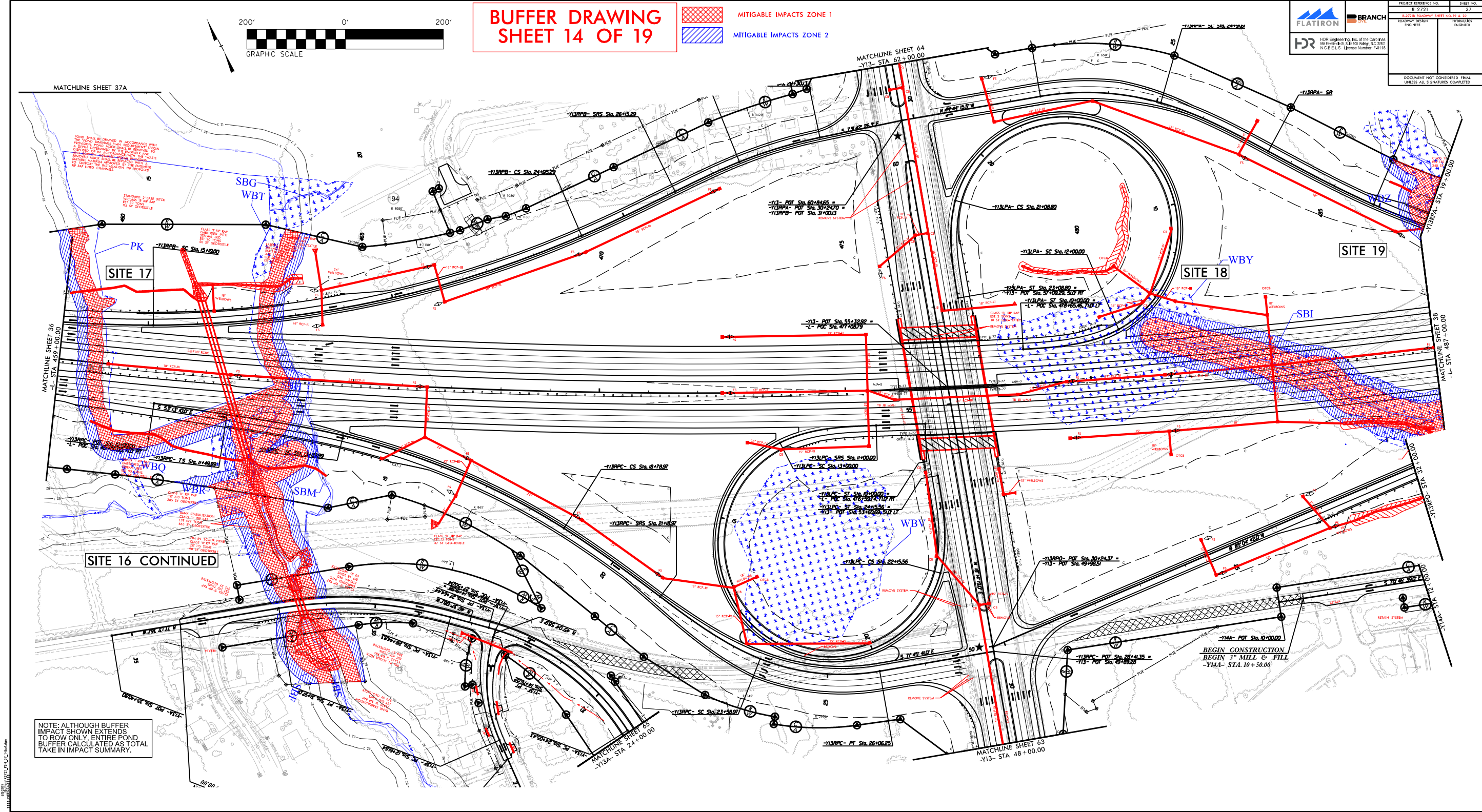
BUFFER DRAWING SHEET 14 OF 19

- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2

PROJECT REFERENCE NO. 8-2721
SHEET NO. 37

FLATIRON BRANCH
ROADWAY DESIGN
INVOICES

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



**BUFFER DRAWING
SHEET 16 OF 19**

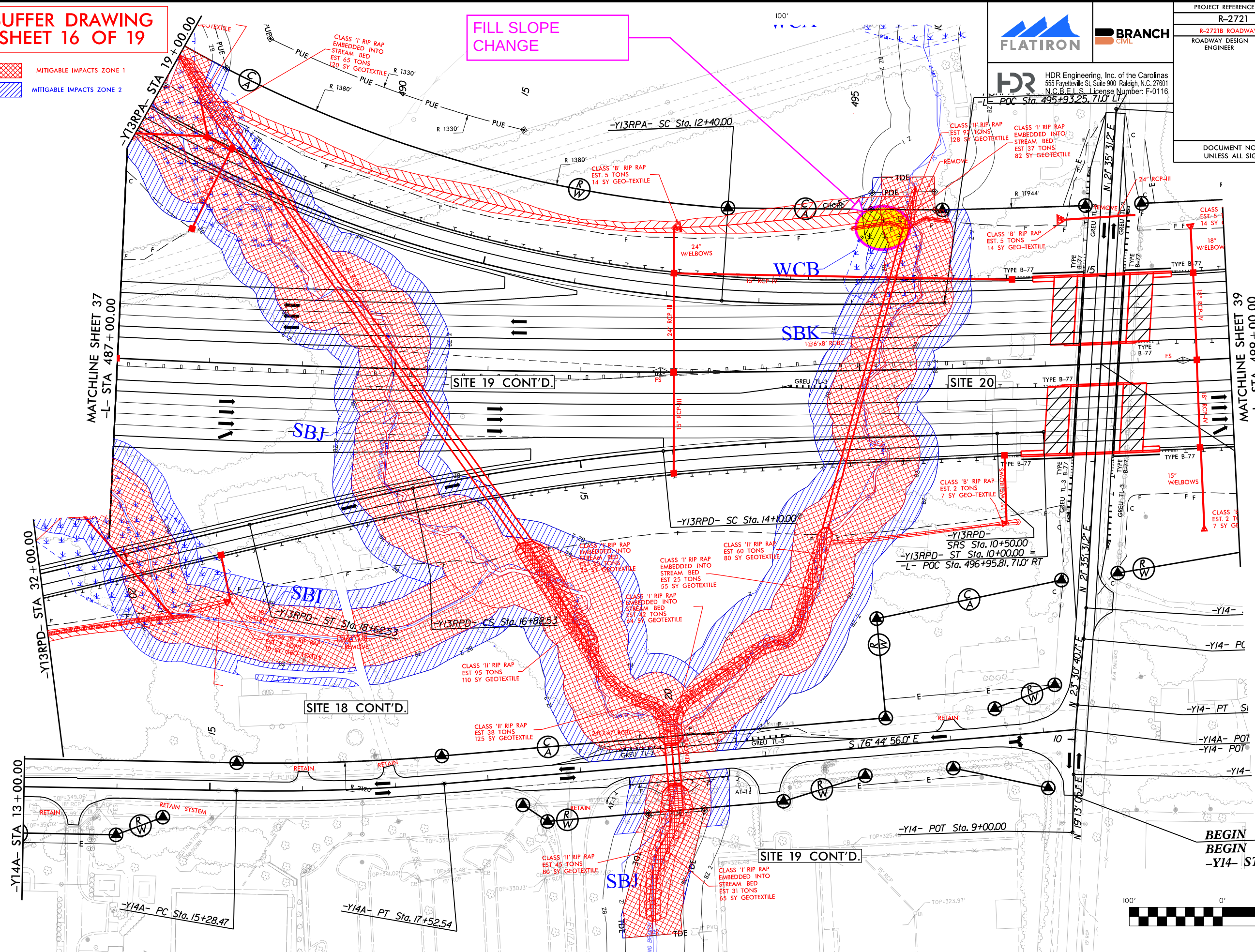


**FILL SLOPE
CHANGE**



HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900, Raleigh, N.C. 27601
N.C. Professional Engineer License Number: F-0116

PROJECT REFERENCE NO.		SHEET NO.	
R-2721		38	
R-2721B ROADWAY SHEET NO. 20 & 21			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



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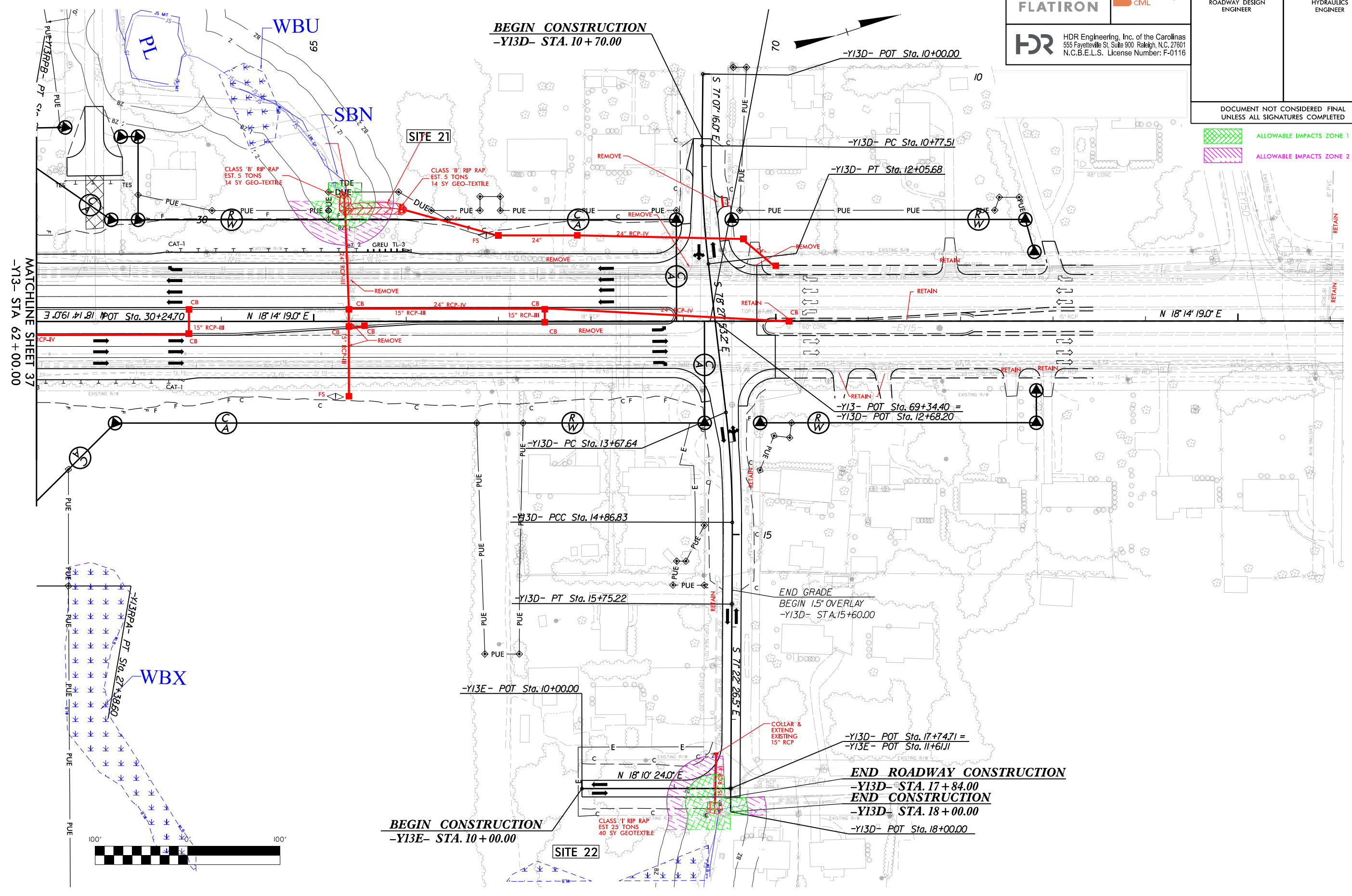
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51499
8/20/19
R2721_PSH_64_17.bvd.dgn
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PROJECT REFERENCE NO.		SHEET NO.
R-2721		64
R-2721B ROADWAY SHEET NO. 33		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2



RIPARIAN BUFFER IMPACTS SUMMARY

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT									BUFFER REPLACEMENT	
			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	3@8'X10' RCBC	244+00 - 248+00 -L-	X					0	25550	16098	41648		
2**	ROADWAY FILL	277+00 - 280+50 -L-	X					0	53612	31141	84753		
3	2@7'X8' RCBC	280+50-L-/282+00-L-	X					0	27871	13501	41372		
4	NOISEWALL & E.C. ACCESS, FENCE	294+00 - 295+00 -L-	X			4514	4637	9151			0		
5	30" RCP	313+00 - 318+00 -L-			X			0	12760	9950	22710		
6	1@6'X8' RCBC	324+00 - 326+00 -L-	X					0	32648	18451	51099		
7	1@6'X8' RCBC (TWO)	329+00 - 333+00 -L-, 28+00 - 30+00 -Y8RPC-	X					0	60417	37018	97435		
8	ROADWAY FILL	365+50-L-/366+00-L-	X					0	4317	3633	7950		
9	1@6'X8' RCBC, 66" RCP	366+00-L-/367+50-L-	X					0	43026	16583	59609		
10**	48" RCP	384+50 - 393+00 -L-	X					0	92463	58490	150953		
11	ROADWAY FILL	384+50-L-/386+50-L-	X					0	12732	9284	22016		
12	EASEMENT	382+00-L-/383+00-L-	X			0	1033	1033			0		
13**	1@7'X8' RCBC	411+00 - 416+00 -L-	X					0	59098	34901	93999		
14	ROADWAY FILL	412+00 - 415+00 -L-			X			0	12570	3371	15941		
15	42" RCP	420+00-L-/422+00-L-	X					0	25536	20063	45599		
16	30" RCP, 2@7'X7' RCBC	438+00-L-/30+00-Y13A-	X					0	44644	26800	71444		
17	2@7'X8' RCBC	459+00-L-/464+00-L-	X					0	99039	61848	160887		
18	48" RCP	481+00-L-/491+00-L-			X			0	67075	44679	111754		
19	2@6'X8' RCBC, 2@7'X7' RCBC	486+00-L-/493+00-L-	X					0	90601	44578	135179		
20	1@ RCBC	493+00-L-/496+00-L-	X					0	45963	25860	71823		
21	24" RCP	65+00 - 66+00 -Y13-	X			2129	2577	4706			0		
22	15" RCP	10+90 - 11+60 -Y13B-	X			2720	2485	5205			0		
TOTAL:						9363	10732	20095	809922	476250	1286172	0	0

**Site includes calculated impacts to entire pond buffers outside ROW

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: TIP R-2721B

8/7/2019
SHEET 18 OF 19

Rev. SEP 2016

Rev. May 2006

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS	
			ZONE 1 (ft ²)	ZONE 2 (ft ²)
1	244+00 - 248+00 -L-		0	2148
2	277+00 - 280+50 -L-		12145	3987
3	280+50-L-/282+00-L-		15225	5267
4	294+00 - 295+00 -L-		0	0
5	313+00 - 318+00 -L-		5244	3677
6	324+00 - 326+00 -L-		12811	8240
7	329+00 - 333+00 -L-, 28+00 - 30+00 -Y8RPC-		18916	3794
8	365+50-L-/366+00-L-		2518	862
9	366+00-L-/367+50-L-		18201	2248
10	384+50 - 393+00 -L-		8611	2996
11	384+50-L-/386+50-L-		12073	6870
12	382+00-L-/383+00-L-		0	0
13	411+00 - 416+00 -L-		11560	2642
14	412+00 - 415+00 -L-		8228	2196
15	420+00-L-/422+00-L-		17377	10182
16	438+00-L-/30+00-Y13A-		14093	5154
17	459+00-L-/464+00-L-		2771	1828
18	481+00-L-/491+00-L-		42132	16140
# 19	486+00-L-/493+00-L-		17540	3825
20	493+00-L-/496+00-L-		3649	1742
21	65+00 - 66+00 -Y13-		0	0
22	10+90 - 11+60 -Y13B-		0	0
TOTAL:			223094	83798

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: TIP R-2721B

DATE 08/07/2019
SHEET 19 OF 19

Rev. Jan 2009