

CONSTRUCTION DRAWINGS FOR KNIGHTDALE STATION R7 NORTH

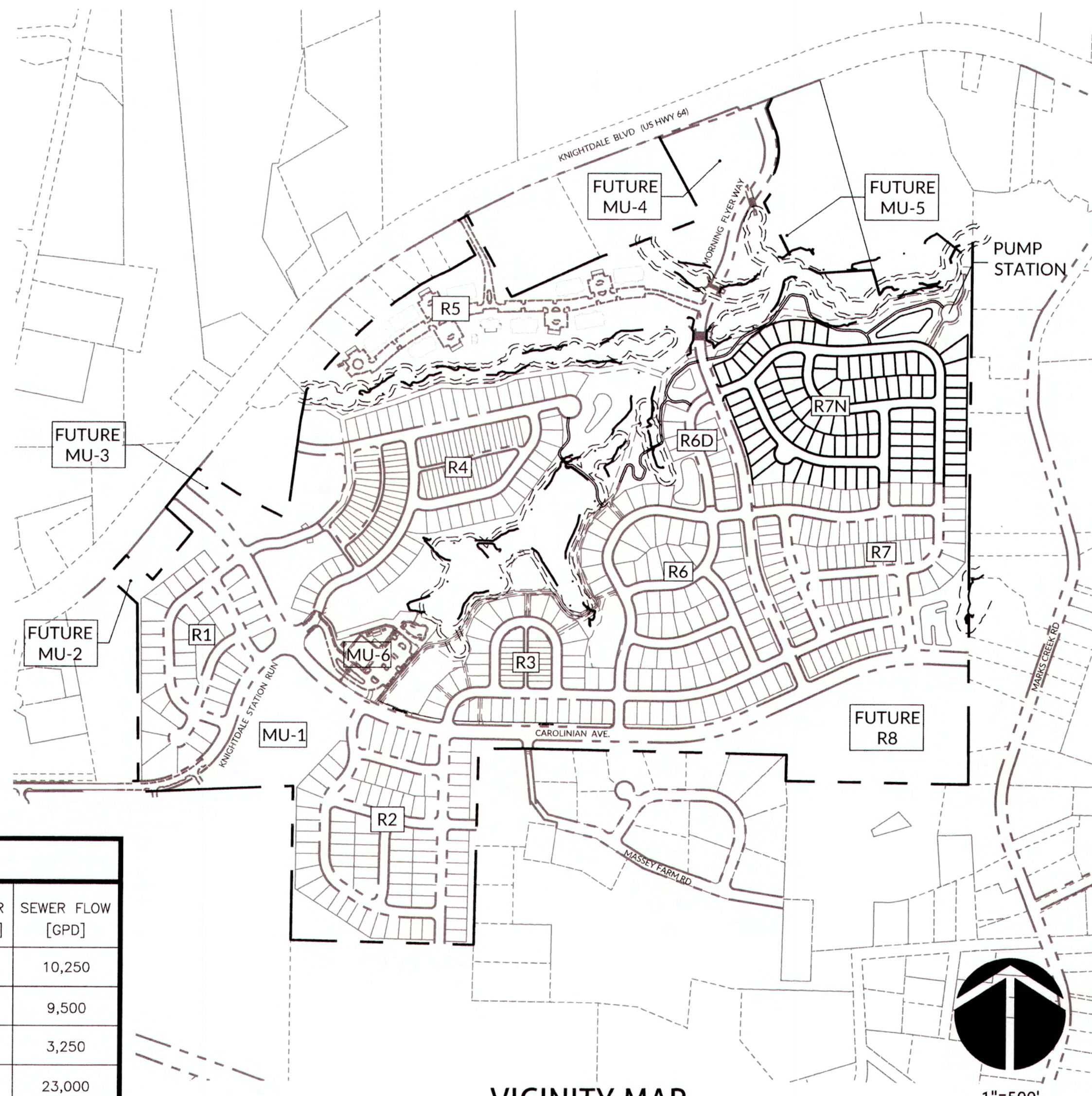
KNIGHTDALE, WAKE COUNTY, NORTH CAROLINA

JUNE 21, 2019

CONSTRUCTION DRAWINGS
FOR: KNIGHTDALE STATION
WR PROJECT NO.: 2019025193

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SITE DATA TABLE - PHASE R7N	
KNIGHTDALE PROJECT No.	S-3-13-R7N
OWNER	KNIGHTDALE INVESTORS, LLC.
PARCEL PIN No.	1764065984
EXISTING ZONING	GR8
PROPOSED ZONING	GR8
PROPOSED USE	SINGLE FAMILY
TOTAL PHASE AREA	32.16 AC
RECREATIONAL OPEN SPACE (ACTIVE)	1.10 AC
RECREATIONAL OPEN SPACE (PASSIVE)	0.38 AC
TOTAL OPEN SPACE	1.48 AC
MAXIMUM DENSITY ALLOWED (UNITS/ACRE)	12
PROPOSED DENSITY (UNITS/ACRE)	2.84
TOTAL NUMBER OF LOTS ALLOWED	N/A
TOTAL NUMBER OF LOTS PROVIDED	92
TOTAL LINEAR FEET IN STREETS (PUBLIC)	4,275 LF
TOTAL LINEAR FEET OF CURB & GUTTER (30")	8,345 LF
TOTAL LINEAR FEET OF SIDEWALK	8,208 LF
TOTAL LINEAR FEET OF GREENWAY	1,637 LF
LINEAR FEET IN WATERLINES (6 IN)	256 LF
LINEAR FEET IN WATERLINES (8 IN)	4,312 LF
LINEAR FEET IN WATERLINES (12 IN)	0 LF
TOTAL LINEAR FEET IN STORM DRAINAGE	4,849 LF
TOTAL LINEAR FEET IN SEWER LINES (8 IN)	3,254 LF
PROJECTED WATER USAGE (GPD) (250 GPD/UNIT)	23,000
PROJECTED SEWER USAGE (GPD) (250 GPD/UNIT)	23,000
	LOTS 481-572
MINIMUM LOT WIDTH REQUIRED	60 LF
LOT WIDTH (TYP.)	60 LF
MINIMUM LOT AREA PROVIDED	6,676 SF
MEDIAN LOT AREA PROVIDED	7,920 SF
AVERAGE LOT AREA PROVIDED	8,166 SF
LOT SETBACKS	
FRONT YARD	10 FT
REAR YARD	25 FT
SIDE YARD	5 FT MIN. SETBACK PER SIDE (WIDTH 60' OR GREATER) -3 FT MIN. SETBACK PER SIDE (WIDTH LESS THAN 60')
REAR SETBACK FROM LANE/ALLEY	15 FT FROM CENTERLINE
ACCESSORY STRUCTURE SIDE/REAR SETBACK	5 FT
* PER UDO SECTION 4.6(C)(3), ACCESSORY BUILDINGS SHALL BE A MINIMUM OF 5' FROM ANY PRINCIPAL BUILDING OR OTHER ACCESSORY BUILDING.	
** PER UDO SECTION 4.6(C), ACCESSORY BUILDINGS SHALL NOT EXCEED 800 SF; COLLECTIVELY COVER MORE THAN 20% OF THE TOTAL COMBINED AREA OF THE LOTS' REAR AND SIDE YARDS; INDIVIDUALLY EXCEED THE HEIGHT OF THE PRINCIPAL BUILDING.	
*** DRIVEWAY LENGTH FROM GARAGE TO EDGE OF ASPHALT SHALL BE A MINIMUM OF 20' ALONG ALLEYS.	



INFRASTRUCTURE DATA											
SECTIONS	AREA [AC]	UNITS	STREETS [LF]	30" CURB & GUTTER [LF]	SIDEWALK [LF]	6" WATER MAIN [LF]	8" WATER MAIN [LF]	12" WATER MAIN [LF]	STORM DRAINAGE [LF]	8" SEWER MAIN [LF]	SEWER FLOW [GPD]
PHASE R7N SECTION D	20.4	41	2,294	4,490	4,399	185	2,320	-	2,564	1,950	10,250
PHASE R7N SECTION E	8.7	38	1,527	2,947	2,901	54	1,528	-	1,652	892	9,500
PHASE R7N SECTION F	3.1	13	454	908	908	17	464	-	633	412	3,250
TOTAL	32.2	92	4,275	8,345	8,208	256	4,312	-	4,849	3,254	23,000

DEVELOPER/OWNER

KNIGHTDALE INVESTORS, LLC.
P.O. BOX 3557
CARY, NC 27519

ATTN: THAD MOORE
TELEPHONE: (919) 481-3000
FAX: (919) 677-8600

*Prior to the issuance of building permits by the Town of Knightdale, a plat of the subdivision must be submitted to COMPUID for review prior to plat recordation.

9/3/19
MS

PREPARED BY:

WithersRavenel
Engineers | Planners | Surveyors

115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

ATTENTION CONTRACTORS

THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER AS SHOWN IN THESE PLANS IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 996-4361 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # W-3638

AUTHORIZATION TO CONSTRUCT James M. Sample

DATE 9/3/19

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # 5-4561

AUTHORIZATION TO CONSTRUCT James M. Sample

DATE 9/3/19

TOWN CERTIFICATION. THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

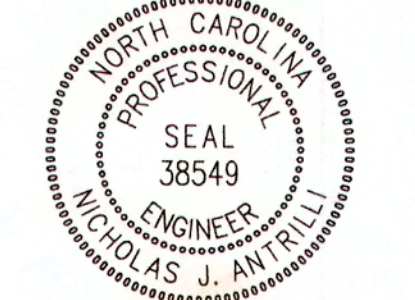
BY: MS DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVICE CONSTRUCTION PLANS FOR THIS PROJECT.

BY: MS DATE: 7-9-19
ADMINISTRATOR

TOWN APPROVED STANDARDS SHALL CONTROL IN THE EVENT OF A CONFLICT OR INCONSISTENCY BETWEEN THESE CONSTRUCTION DRAWINGS AND THE TOWN OF KNIGHTDALE'S APPROVED STANDARDS FOR THIS PROJECT. THE APPROVED STANDARDS SHALL CONTROL. TOWN OF KNIGHTDALE APPROVED STANDARDS SHALL MEAN ALL DEVELOPMENT DOCUMENTS NECESSARY FOR APPROVAL FOR THE PROPERTY INCLUDING, BUT NOT LIMITED TO, ANY SPECIAL USE PERMIT, SUBDIVISION PLAN, SITE PLAN, SUBDIVISION (S), PHASING SCHEDULE, DEVELOPMENT AGREEMENT, UTILITY ALLOCATION AGREEMENT ANNEXATION AGREEMENT, THE TOWN OF KNIGHTDALE STANDARD SPECIFICATION AND DETAILS MANUAL AND SAID APPLICABLE PROVISIONS OF THE NORTH CAROLINA STATE BUILDING CODE.

PROFESSIONAL DESIGN ENGINEER CERTIFICATION. THESE IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING DRAWINGS AND WITH THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE. I, MS, CERTIFY THAT THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE HAVE BEEN THOROUGHLY CHECKED AND FOUND TO BE APPLICABLE TO THIS PROJECT. ALL EXCEPTIONS TO THE APPLICABLE TOWN STANDARDS HAVE BEEN PREVIOUSLY APPROVED BY THE TOWN OF KNIGHTDALE AND SAID EXCEPTIONS ARE SHOWN ON SHEET(S) 1/1 OF THESE DRAWINGS.



K:\03\09-0250\090251-03-Knightdale Station - R7 North\040\0401\040101\04010101.dwg - 17 Knightdale Station - R7 North\040\0401\040101\04010101.dwg - Wednesday, June 26, 2019 1:42:02 PM - D:\RICK COLLIER



LINE#	BEARING	DISTANCE	LINE#	BEARING	DISTANCE	LINE#	BEARING	DISTANCE
L1	N 002°29' E	59.68'	L33	N 82°58'24" W	18.28'	L105	N 35°17'08" W	32.64'
L2	N 89°51'15" E	25.63'	L34	N 15°53'58" W	11.19'	L106	S 63°40'02" W	52.60'
L3	N 48°34'21" E	104.44'	L35	N 48°02'28" W	81.31'	L107	S 17°53'37" W	30.82'
L4	N 50°32'31" E	59.85'	L36	N 56°54'29" W	9.57'	L108	S 64°57'50" W	18.37'
L5	N 50°09'01" E	104.37'	L37	S 82°02'31" W	13.30'	L109	N 55°48'35" W	25.58'
L6	N 60°47'31" E	73.83'	L38	S 46°02'11" W	28.86'	L110	N 70°45'29" W	16.62'
L7	N 64°39'57" E	105.54'	L39	S 46°00'13" W	48.52'	L111	N 74°36'14" W	36.71'
L8	N 69°27'12" E	127.74'	L40	N 89°40'23" W	21.84'	L112	N 20°25'44" W	36.19'
L9	N 02°29'58" E	69.53'	L41	N 89°39'38" W	31.08'	L113	S 76°20'00" W	65.12'
L10	S 02°29'58" E	33.77'	L42	S 72°17'29" W	35.45'	L114	S 89°58'43" W	20.11'
L11	S 17°15'32" W	36.21'	L43	N 49°40'02" W	51.18'	L115	N 23°48'01" W	18.65'
L12	S 48°43'53" W	54.97'	L44	S 51°15'10" W	20.62'	L116	N 89°44'17" W	24.50'
L13	N 04°31'51" W	22.08'	L45	S 87°20'31" W	35.84'	L117	S 40°32'27" W	20.21'
L14	S 73°59'54" W	13.92'	L46	S 62°52'51" W	42.97'	L118	N 87°46'41" W	3.15'
L15	N 50°53'58" W	54.20'	L47	N 74°50'41" W	59.76'	L119	S 01°08'31" W	85.66'
L16	N 08°31'51" W	22.08'	L48	S 72°22'12" W	17.67'	L120	N 50°58'10" E	3.14'
L17	N 50°41'49" W	20.04'	L49	N 82°12'58" W	33.48'	L121	N 34°54'58" E	22.43'
L18	N 28°47'22" W	23.41'	L50	N 81°41'08" W	20.32'	L122	N 31°17'10" E	13.42'
L19	N 82°53'53" W	20.45'	L51	S 52°14'42" W	23.52'	L123	N 61°32'47" E	19.81'
L20	N 41°08'34" W	18.42'	L52	S 77°17'29" W	36.88'	L124	S 30°38'54" E	14.50'
L21	S 69°29'28" W	17.09'	L53	N 33°04'48" W	19.48'	L125	S 49°04'08" E	6.96'
L22	N 63°40'12" W	21.24'	L54	N 80°18'23" W	29.24'	L126	N 76°45'33" E	21.66'
L23	S 46°04'39" W	27.78'	L55	S 08°20'30" W	36.83'	L127	N 00°41'52" E	15.64'
L24	N 41°05'32" W	61.10'	L56	S 53°45'31" W	31.72'	L128	N 64°19'57" E	21.82'
L25	S 81°53'57" W	13.96'	L57	S 82°25'30" W	11.01'	L129	S 85°48'12" E	23.02'
L26	S 74°46'32" W	41.09'	L58	S 02°35'11" W	51.08'	L130	N 75°48'20" E	24.23'
L27	S 00°20'37" E	32.13'	L59	S 84°40'31" W	12.45'	L131	N 80°17'21" E	31.84'
L28	S 40°28'35" W	30.51'	L60	S 84°00'43" W	25.86'	L132	N 88°11'45" E	31.68'
L29	S 18°04'14" E	18.63'	L61	S 87°55'14" W	49.80'	L133	N 88°14'52" E	31.68'
L30	S 36°19'20" W	17.56'	L62	N 53°17'29" W	13.97'	L134	S 68°43'52" E	28.48'
L31	S 08°58'58" W	37.25'	L63	S 82°07'58" W	43.83'	L135	N 79°27'58" E	58.20'
L32	S 36°35'35" W	39.85'	L64	S 60°04'36" W	20.77'	L136	N 39°33'27" E	58.30'
L33	S 31°12'51" W	36.85'	L65	N 67°49'04" W	44.28'	L137	N 87°19'08" E	22.82'
L34	S 70°51'19" W	78.44'	L66	S 56°47'52" W	23.50'	L138	N 27°13'21" E	27.53'
L35	N 36°19'20" W	17.56'	L67	N 71°24'54" W	57.45'	L139	N 01°34'30" W	33.94'
L36	S 08°58'58" W	37.25'	L68	S 82°07'58" W	43.83'	L140	N 13°45'00" W	27.28'
L37	N 78°15'11" W	41.45'	L69	S 62°12'44" W	36.41'	L141	N 25°45'01" E	75.79'
L38	S 67°02'26" W	70.91'	L70	N 49°30'30" W	6.51'	L142	N 67°32'44" E	24.74'
L39	N 38°43'58" W	25.78'	L71	S 70°13'51" W	17.00'	L143	N 33°12'22" E	37.58'
L40	S 70°38'12" W	9.74'	L72	S 59°32'56" W	66.89'	L144	N 65°15'43" E	48.28'
L41	S 64°48'55" W	14.31'	L73	N 77°13'23" W	50.23'	L145	N 38°12'05" W	115.27'
L42	S 02°18'08" W	18.51'	L74	N 08°52'36" W	22.63'	L146	S 00°12'38" W	123.18'
L43	S 48°01'05" W	42.25'	L75	N 87°20'13" W	71.49'	L147	S 00°25'26" E	114.07'
L44	S 64°48'55" W	14.31'	L76	S 01°17'51" W	53.35'	L148	S 00°25'26" E	129.44'
L45	N 48°41'18" W	29.35'	L77	S 08°30'42" W	20.15'	L149	S 15°11'14" E	140.92'
L46	S 77°24'44" W	100.00'	L78	S 40°14'59" W	16.38'	L150	N 87°39'18" E	77.48'
L47	S 82°47'15" W	124.79'	L79	S 87°10'27" W	39.41'			
L48	S 54°21'12" W	64.74'	L80	S 26°18'42" W	50.46'			
L49	N 59°01'39" W	27.59'	L81	S 02°45'45" W	36.96'			
L50	N 59°01'39" W	27.59'	L82	N 69°45'05" W	10.17'			
L51	N 77°14'52" W	63.28'	L83	S 47°10'59" W	44.16'			
L52	S 54°16'37" W	60.25'	L84	N 86°16'59" W	42.87'			

WithersRavenel
Engineers | Planners | Surveyors

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**KNIGHTDALE STATION
R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

**OVERALL EXISTING
CONDITIONS**

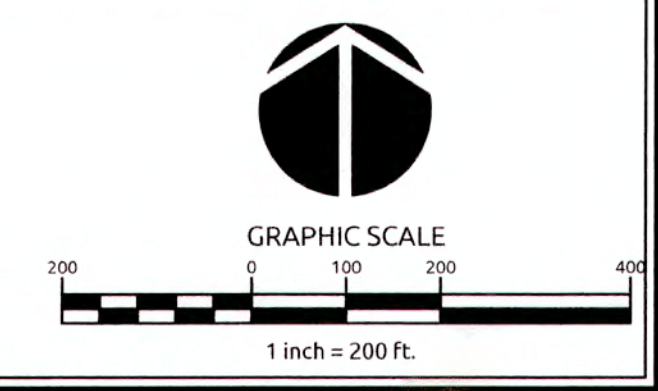
Public Utility Department
DATE: 7/8/19
BY: [Signature]

TOWN CERTIFICATION, THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: [Signature] DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: [Signature] DATE: 7-9-19
ADMINISTRATOR



Revisions

1	TOK Comments	06/21/19
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Sheet No. 1.0

K:\0109\020519\020519 Knightdale Station - R7 North\CAD\Drawings\10 OVERALL EXISTING CONDITIONS.dwg Friday, June 21, 2019 12:21:10 PM - CURTISA COLLIEN



TREE LEGEND

- MAPLE
- HICKORY
- PINE
- OAK
- GUM
- HOLLY
- POPLAR
- CEDAR
- SYCAMORE
- PERSIMMON
- ELM

NOTE:
 - SEE SHEET 2.0 KNIGHTDALE STATION SITE PLAN FOR TREE PROTECTION AND REPLACEMENT CALCULATIONS.
 - SEE SHEET 1.0 - L1.1 FOR LOCATIONS OF REPLACEMENT TREES

TREE LEGEND

- TREE DESCRIPTION**
- 90% YOUNG PINE
10% OAK & SWEETGUM
 - 50% MATURE PINE
40% OAK & GUM
10% YOUNG PINE
 - 70% OAK, SWEETGUM & POPLAR
20% MATURE PINE
10% YOUNG PINE
 - SCATTERED OAK & POPLAR

EXISTING SLOPE LEGEND

- SLOPE DESCRIPTION**
- SLOPES 15% - 25%
 - SLOPES > 25%

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

TOWN CERTIFICATION, THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: W. Massey DATE: 7-8-2019
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: W. Massey DATE: 7-9-19
 ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
 PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
 PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

City of Raleigh
 Public Utilities Department
 DATE: 8/2/19
 BY: [Signature]

GRAPHIC SCALE
 1 inch = 60 ft.

WithersRavenel
 Engineers | Planners | Surveyors

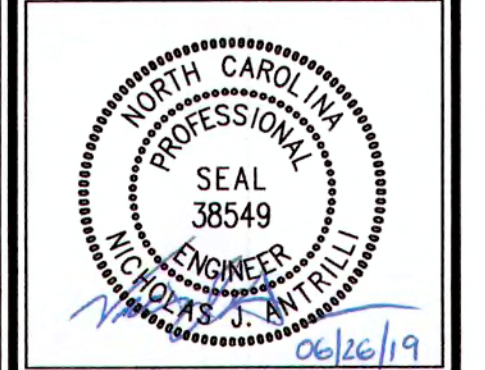
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**KNIGHTDALE STATION
 R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

EXISTING CONDITIONS

Job No. 0209025193 | Drawn By: WR
 Date: 01/25/19 | Designer: WR

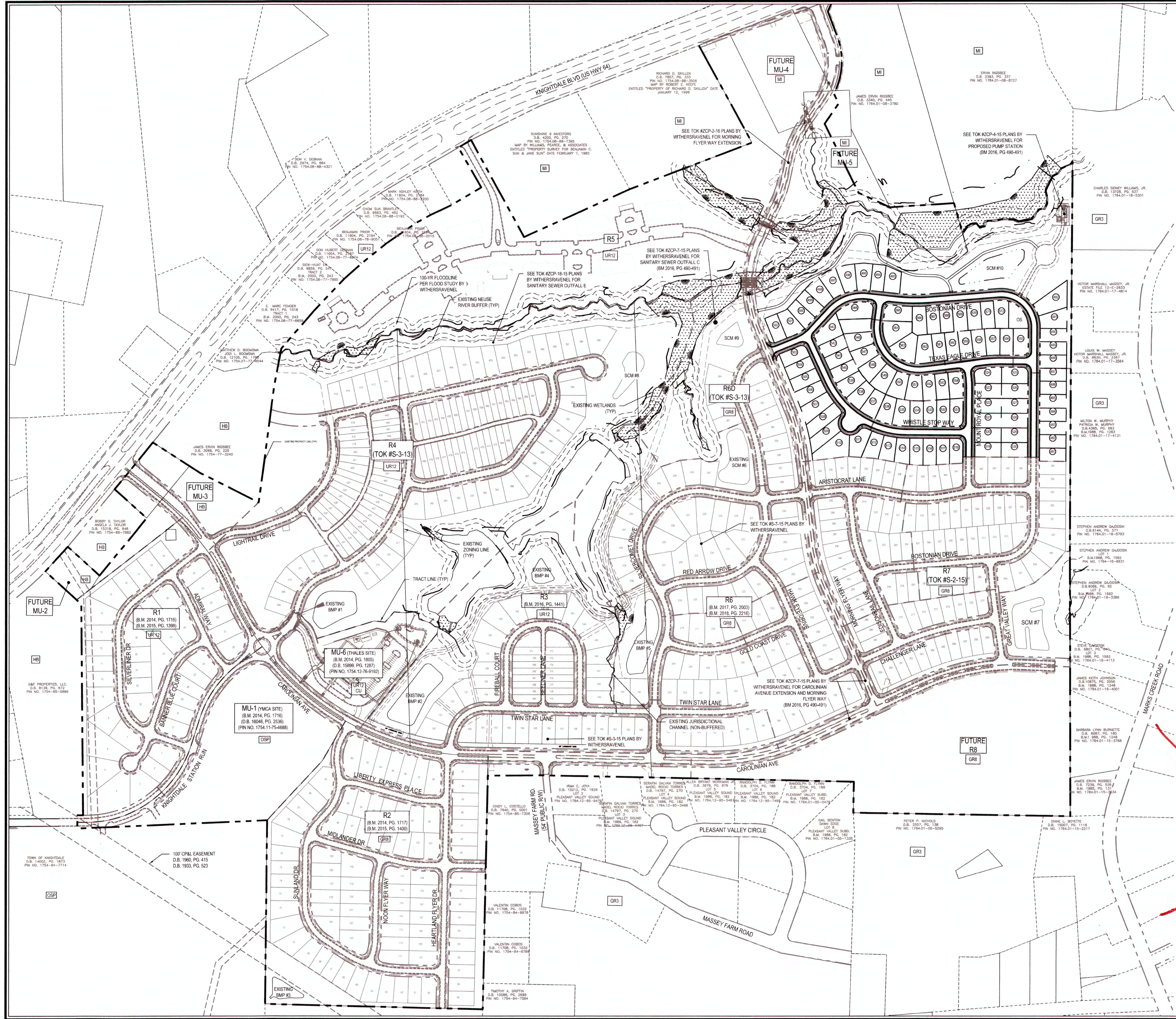


Revisions

1	TOK Comments	06/21/19
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Sheet No.
1.1

K:\09\09-0250\025193\Knightdale Station - R7 North\CAD\Cross Section\1.1 EXISTING CONDITIONS.dwg, Friday, June 21, 2019 2:32:54 PM, DORVIA COLLEEN



SITE DATA
 TOTAL SITE AREA: 278.61 AC

PROPOSED ZONING

TRACT	AREA (AC)	EXISTING/PROPOSED ZONING	PROPOSED USE
R7 NORTH	32.16 AC	GR8	SF

SF: SINGLE-FAMILY
 *TRACT AREAS ARE BASED ON GROSS AREAS INCLUDING OPEN SPACE, RIPARIAN BUFFERS, & PROPOSED RIGHT-OF-WAYS.

TREE CANOPY SUMMARY

OVERALL TREE COVER AREA REQUIRED PER LIA	= 8.90 AC
TREE COVER AREA PROVIDED W/ R1 & R2 (BM 2014, PG 1718)	= 2.19 AC
TREE COVER AREA PROVIDED W/ R3 (TO BE DEDICATED)	= 0.79 AC
TREE COVER AREA PROVIDED W/ R4-C (TO BE DEDICATED)	= 1.34 AC
TREE COVER AREA PROVIDED W/ R10-C (TO BE DEDICATED)	= 0.36 AC
TREE COVER AREA PROVIDED W/ R6D (TO BE DEDICATED)	= 2.22 AC
TREE COVER AREA PROVIDED W/ R4 (TO BE DEDICATED)	= 5.33 AC
TREE COVER AREA PROVIDED W/ R7N (TO BE DEDICATED)	= 2.43 AC
TREE COVER AREA PROVIDED W/ R1,R2,R3,R6,R7,R8D,R4,R7N	= 14.66 AC
PROJECT AREA - R1 & R2	= 41.89 AC
PROJECT AREA - R3	= 20.01 AC
PROJECT AREA - R4-C	= 30.50 AC
PROJECT AREA - R7A-C	= 25.00 AC
THALES	= 4.56 AC
MU-1	= 8.09 AC
PROJECT AREA - R6D	= 8.82 AC
PROJECT AREA - R4	= 38.9 AC
PROJECT AREA - R7N	= 32.16 AC
TOTAL TRACT AREA APPROVED/RECORDED (TO DATE)	= 210.33 AC
TOTAL SITE ACREAGE	= 278.61 AC
TREE CANOPY AREA REQUIRED (TO DATE)	= 278.61 AC
(210.33 AC) x (8.9 AC)	= 6.72 AC

14.66 AC PROVIDED > 6.72 AC REQUIRED (TO DATE)
 REMAINING TREE COVER AREA REQUIRED FOR FUTURE PHASES PER LIA = 0 AC

RECREATIONAL OPEN SPACE SUMMARY

OVERALL RECREATIONAL OPEN SPACE REQUIRED PER LIA	= 17.00 AC (8.50 AC ACTIVE)
OPEN SPACE AREA PROVIDED W/ R1 & R2	= 7.83 AC (ACTIVE)
OPEN SPACE AREA PROVIDED W/ R3	= 2.87 AC (ACTIVE & PASSIVE)
OPEN SPACE AREA PROVIDED W/ R6	= 1.93 AC (ACTIVE & PASSIVE)
OPEN SPACE AREA PROVIDED W/ R7	= 0.10 AC (PASSIVE)
OPEN SPACE AREA PROVIDED W/ R6D	= 0.86 AC (ACTIVE & PASSIVE)
OPEN SPACE AREA PROVIDED W/ R4	= 3.08 AC (ACTIVE & PASSIVE)
OPEN SPACE AREA PROVIDED W/ R7N	= 1.48 AC (ACTIVE & PASSIVE)
OPEN SPACE AREA PROVIDED W/ R1,R2,R3,R6,R7,R8D,R4,R7N	= 18.15 AC
TOTAL TRACT AREA APPROVED/RECORDED (TO DATE)	= 210.33 AC
TOTAL SITE ACREAGE	= 278.61 AC
OPEN SPACE AREA REQUIRED (TO DATE)	= 12.83 AC (6.48 ACTIVE)
(210.33 AC) x (17.0 AC)	= 3581.61 AC
(278.61 AC)	= 4736.37 AC
18.15 AC PROVIDED > 12.34 AC REQUIRED (TO DATE)	
REMAINING RECREATIONAL OPEN SPACE REQUIRED FOR FUTURE PHASES PER LIA = 0.00 AC (0.00 AC ACTIVE)	

REMAINING RECREATIONAL OPEN SPACE REQUIRED FOR FUTURE PHASES PER LIA = 0.00 AC (0.00 AC ACTIVE)

18.15 AC PROVIDED > 12.34 AC REQUIRED (TO DATE)

TREE PROTECTION

TOTAL TREES	12"-23" DBH	24"-36" DBH	36"-47" DBH	48"-59" DBH	60"-71" DBH	REPLACEMENT TREES NEEDED*
TIER 1	0	-	-	-	-	-
TIER 2	95	90	4	1	-	101
TIER 3	52	-	47	5	-	109

*PER TOK UDD SECTION 8.5, REPLACEMENT TREES FOR TIER 2 AND TIER 3 SHALL BE PLANTED AT A RATE OF 1 TREE PER 12" DBH.
 NOTE: 210 - REPLACEMENT TREES WILL BE REQUIRED TO BE PLANTED. REPLACEMENT TREES WILL BE PLANTED IN PROPOSED BUFFER YARD LOCATIONS OR OPEN SPACE. SEE LANDSCAPE PLAN FOR BUFFER YARD PLANTING DETAIL.

TOWN CERTIFICATION THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: *[Signature]* DATE: 7-9-2019
 DEVELOPMENT SERVICES ENGINEER
 THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
 BY: *[Signature]* DATE: 7-9-19
 ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

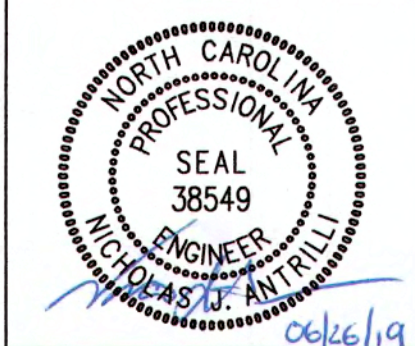
PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

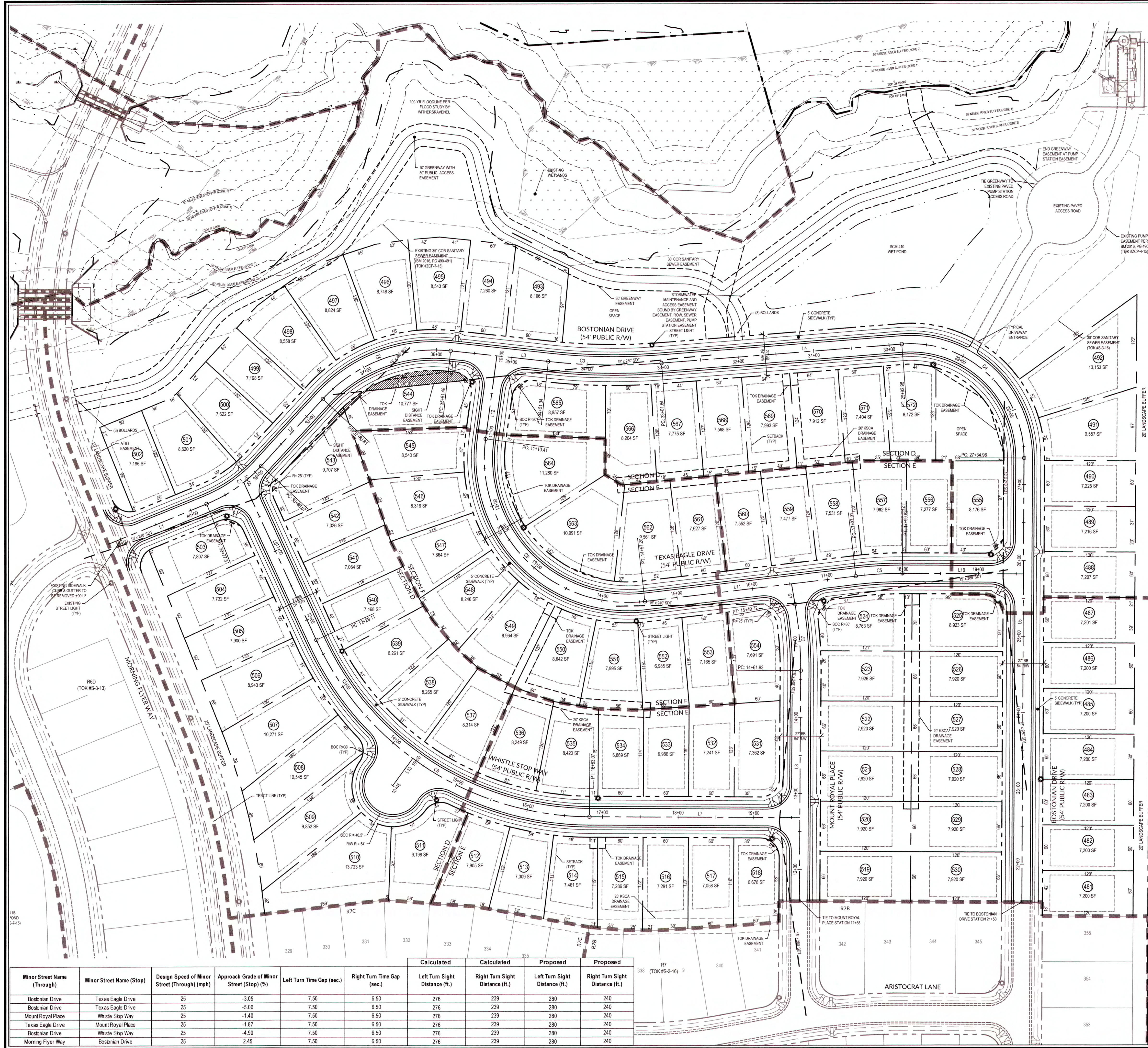
City of Raleigh
 Public Utilities Department
 DATE: 7/31/19
 BY: *[Signature]*

GRAPHIC SCALE
 1 inch = 200 ft.

Job No: 02090251.93
 Date: 01/25/19
 Drawn By: WR
 Designer: WR



Revisions
 1 TOK Comments 06/21/19



- ### GENERAL NOTES
- SEE SHEET 2.0 FOR EXISTING ZONING AND PROPOSED ZONING
 - BOUNDARY SURVEY PERFORMED BY WITHERSRAVENEL
 - WETLANDS AND STREAM BUFFERS DELINEATED AND SURVEYED BY WITHERSRAVENEL
 - PROPERTY ANNEXED INTO TOWN OF KNIGHTDALE SEPT. 3, 2013.
 - WATER ALLOCATION HAS BEEN BASED ON THE UTILITY ALLOCATION AND INFRASTRUCTURE AGREEMENT, D.B. 014722, PAGES 0116 - 0118 & SUBSEQUENT AMENDMENTS.
 - STREET LIGHTS SHALL BE PROVIDED FOR R7N PER LDD SECTION 11.5. STREET LIGHTING POLICY IF UPGRADES FROM THE TOWN'S STANDARD LIGHT SPECIFICATIONS ARE REQUESTED, THE DEVELOPER WILL BE REQUIRED TO PAY THE TOWN THE DIFFERENCE IN THE COSTS TO MAINTAIN THE DESIRED FIXTURE AND POLE COVERING A PERIOD OF 10 YEARS.
 - ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES.
 - THIS PROPERTY DOES NOT LIE WITHIN THE FEMA FLOODPLAIN PER MAP NUMBER 3720175400J AND 3720176400J, WITH AN EFFECTIVE DATE OF MAY 2, 2006.
 - DIVISION OF WATER QUALITY (DWQ) AND/OR UNITED STATES ARMY CORPS OF ENGINEERS (USACE) APPROVAL SHALL BE REQUIRED PRIOR TO CONSTRUCTION WITHIN WETLANDS OR STREAM BUFFER AREAS.
 - THE TURNOUT RADIUS AT ALL INTERSECTIONS SHALL BE A MINIMUM OF 30 FEET MEASURED AT THE BACK OF CURB UNLESS OTHERWISE NOTED. THE TURNOUT RADIUS AT ALL INTERSECTIONS WITH ALLEYS SHALL BE A MINIMUM OF 17.5 FEET MEASURED AT THE BACK OR CURB.
 - ALL RIGHT-OF-WAY SHOWN HEREIN IS PUBLIC RIGHT-OF-WAY, UNLESS OTHERWISE NOTED.
 - NO SIGHT OBSTRUCTION, OR PARTIALLY OBSTRUCTING WALL, FENCE, FOLIAGE, BERRI, SIGN, OR PARKED VEHICLE BETWEEN THE HEIGHTS OF TWO (2) AND EIGHT (8) ABOVE THE CURB LINE ELEVATION OR THE NEAREST TRAVELED WAY IN NO CURB EXISTS SHALL BE PLACED WITHIN A SIGHT TRIANGLE.

CHARLES SIDNEY WILLIAMS, JR. D.B. 13728, PG. 537 PIN NO. 1764.01-18-5301

VICTOR MARSHALL MASSEY, JR. ESTATE FILE 12-E-26333 PIN NO. 1764.01-17-4814

LOUIS W. MASSEY VICTOR MARSHALL MASSEY, JR. D.B. 6630, PG. 2367 PIN NO. 1764.01-17-3564

MILTON W. MURPHY PATRICIA W. MURPHY D.B. 4395, PG. 663 B.M. 1988, PG. 1263 PIN NO. 1764.01-17-4131

ROAD	SPEED LIMIT	CLASSIFICATION
MORNING FLYER WAY	25 MPH	AVENUE
BOSTONIAN DRIVE	25 MPH	LOCAL STREET
MOUNT ROYAL PLACE	25 MPH	LOCAL STREET
TEXAS EAGLE DRIVE	25 MPH	LOCAL STREET
WHISTLE STOP WAY	25 MPH	LOCAL STREET

SITE IMPERVIOUS - R7N

TOTAL TRACT AREA	32.16 AC
SUBDIVISION ROADWAYS, SIDEWALKS, & GREENWAY	4.16 AC
LOT IMPERVIOUS AREA (92 LOTS @ 3,600 SF/LOT)	7.39 AC
PROPOSED PERCENT IMPERVIOUS (11.55 AC @ 32.16 AC)	35.9%
EXISTING PERCENT IMPERVIOUS TO REMAIN (6.4 AC @ 32.16 AC)	1.99%

CONNECTIVITY INDEX

LINKS	NODES	INDEX
R7N	9	6 1.5

LINE TABLE

LINE	BEARING	DISTANCE
L1	S88°00'45"W	140.52'
L2	S42°37'06"W	119.85'
L3	N83°42'56"W	130.14'
L4	S85°33'47"W	318.66'
L5	N0°18'00"E	894.76'
L6	S24°40'21"E	229.11'
L7	S89°41'51"E	277.90'
L8	N0°18'00"E	561.93'
L9	N6°45'28"W	27.35'
L10	S89°41'51"E	160.03'
L11	N83°13'52"E	280.72'
L12	S7°48'21"W	110.41'
L13	S36°08'39"W	44.59'

CURVE TABLE

CURVE	RADIUS	LENGTH	CHORD	BEARING
C1	200.00'	88.64'	87.92'	S55°16'56"W
C2	200.00'	187.33'	180.56'	S69°27'05"W
C3	800.00'	149.79'	149.48'	N89°04'34"W
C4	150.00'	248.03'	220.72'	N47°04'02"W
C5	500.00'	61.71'	61.67'	N86°46'00"E
C6	190.00'	346.78'	300.61'	S44°28'54"E
C7	500.00'	87.79'	87.68'	N4°43'40"W
C8	400.00'	453.96'	429.99'	S57°11'06"E

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 7.9.2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 7.9.19
ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT #
AUTHORIZATION TO CONSTRUCT
DATE

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT #
AUTHORIZATION TO CONSTRUCT
DATE

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

City of Raleigh
Public Utilities Department
DATE: 9/23/19
BY: *[Signature]*

GRAPHIC SCALE
1 inch = 60 ft.

Minor Street Name (Through)	Minor Street Name (Stop)	Design Speed of Minor Street (Through) (mph)	Approach Grade of Minor Street (Stop) (%)	Left Turn Time Gap (sec.)	Right Turn Time Gap (sec.)	Calculated		Proposed	
						Left Turn Sight Distance (ft.)	Right Turn Sight Distance (ft.)	Left Turn Sight Distance (ft.)	Right Turn Sight Distance (ft.)
Boston Drive	Texas Eagle Drive	25	-3.05	7.50	6.50	276	239	280	240
Boston Drive	Texas Eagle Drive	25	-5.00	7.50	6.50	276	239	280	240
Mount Royal Place	Whistle Stop Way	25	-1.40	7.50	6.50	276	239	280	240
Texas Eagle Drive	Mount Royal Place	25	-1.87	7.50	6.50	276	239	280	240
Boston Drive	Whistle Stop Way	25	-4.90	7.50	6.50	276	239	280	240
Morning Flyer Way	Boston Drive	25	2.45	7.50	6.50	276	239	280	240

WithersRavenel
Engineers | Planners | Surveyors

115 Macklewood Drive | Cary, NC 27511 | 919-569-3340 | License # C-0832 | www.withersravenel.com

**KNIGHTDALE STATION
R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

SITE PLAN

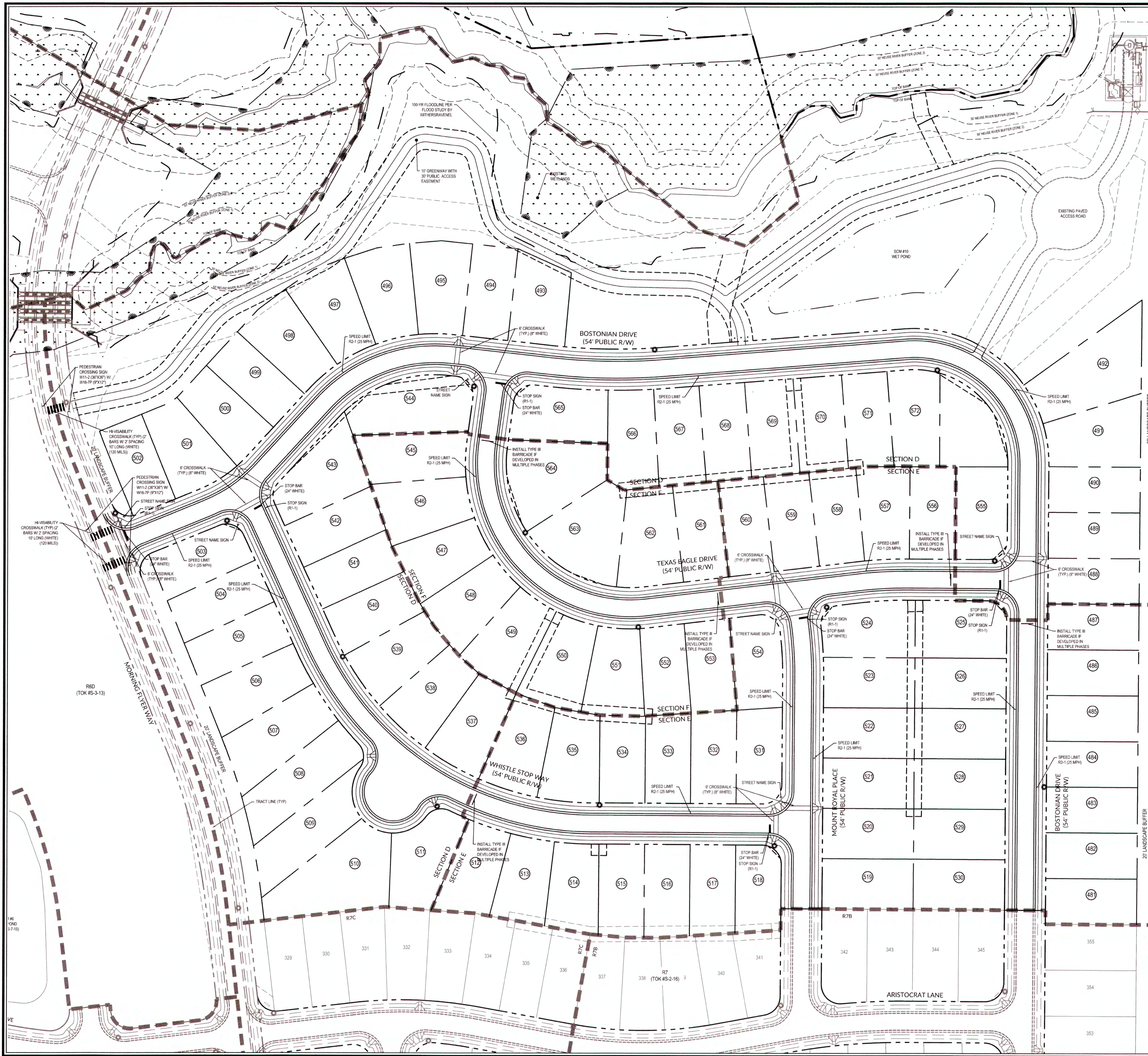
Job No. 02090251.93 | Drawn By: WR
Date: 01/25/19 | Designer: WR

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 38549
NICHOLAS M. AN R.L.L.
06/26/19

Revisions

1	TOK Comments	06/21/19
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Sheet No. **3.1**



- PAVEMENT MARKINGS & SIGNAGE NOTES**
1. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE TO TOWN OF KNIGHTDALE STANDARD AND SPECIFICATIONS, LATEST REVISIONS.
 2. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC IN ACCORDANCE WITH TOWN OF KNIGHTDALE STANDARDS.
 3. ALL SIGNAGE SHALL BE IN ACCORDANCE WITH MUTCD, LATEST REVISION.
 4. STREET NAME SIGNS SHALL FOLLOW THE TOWN OF KNIGHTDALE DETAIL 3.17.

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 7-7-19
ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

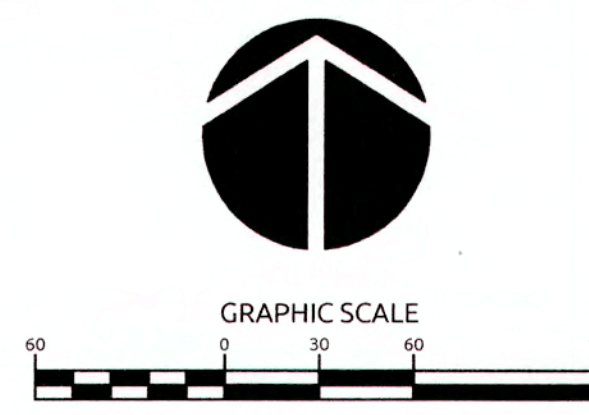
THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # _____
AUTHORIZATION TO CONSTRUCT _____
DATE _____

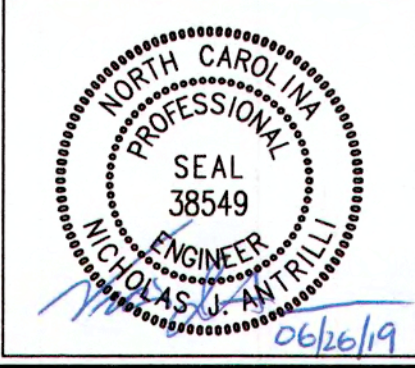
PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # _____
AUTHORIZATION TO CONSTRUCT _____
DATE _____

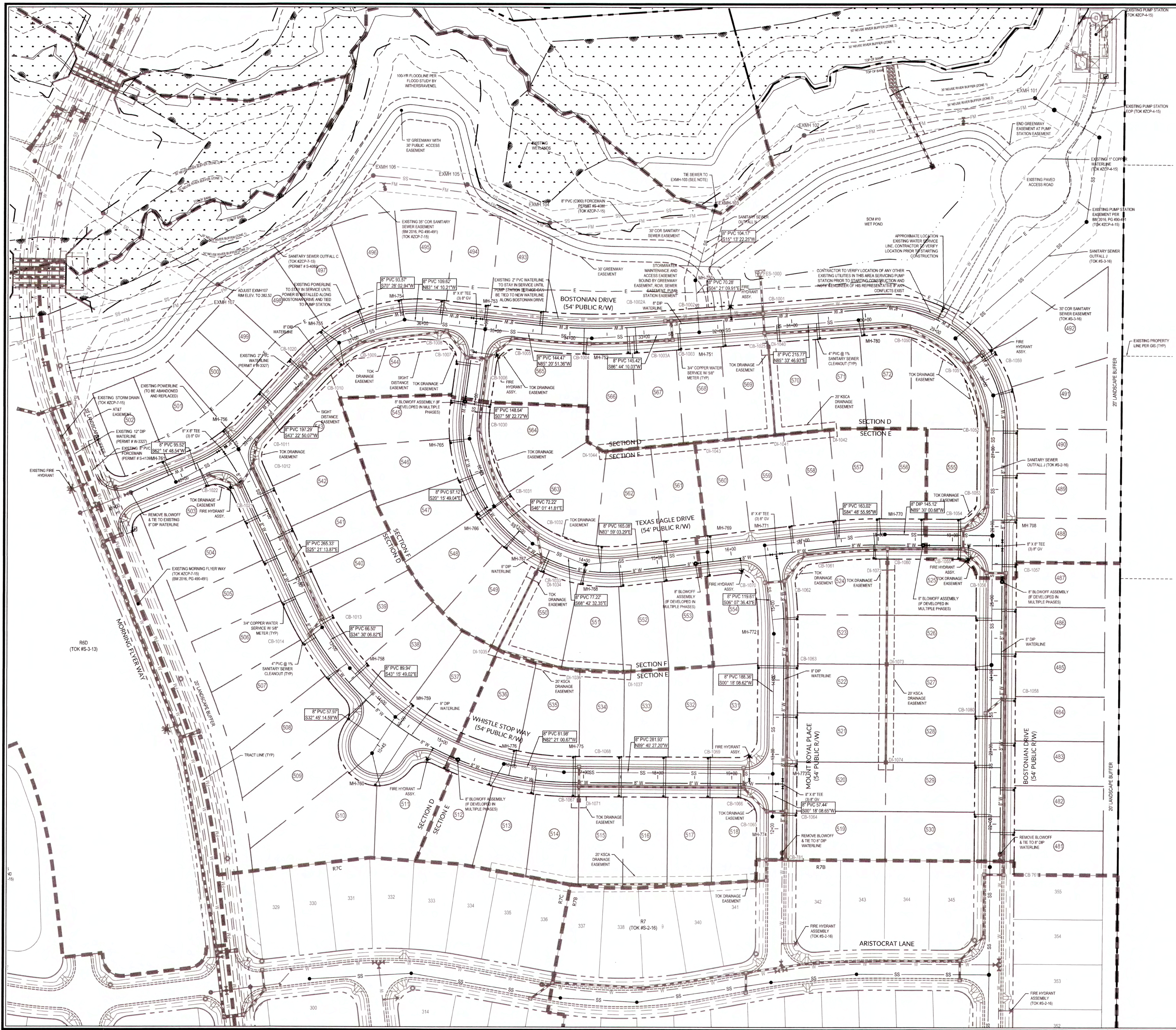


Drawn By: WR
Date: 01/25/19
Designer: WR



Revisions:
1 TOK Comments 06/21/19

K:\09\0250\0250\0250\13\Knightdale Station - R7 North\CAD\Drawings\13 PAVEMENT MARKING AND SIGNAGE PLAN.dwg, Date: Jun 21, 2019 2:35:02 PM, COURTESY COLLEEN



- ### UTILITY NOTES
- ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH CITY OF RALEIGH DESIGN STANDARDS, DETAILS & SPECIFICATIONS (REFERENCE: CORPUD HANDBOOK, CURRENT EDITION)
 - UTILITY SEPARATION REQUIREMENTS:
 - A DISTANCE OF 10' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE OR PUBLIC WATER SUPPLY SOURCE SUCH AS AN UNPROTECTED RESERVOIR USED AS A SOURCE OF DRINKING WATER. IF ADEQUATE LATERAL SEPARATION CANNOT BE ACHIEVED, FERROUS SANITARY SEWER PIPE SHALL BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS. HOWEVER, THE MINIMUM SEPARATION SHALL NOT BE LESS THAN 25' FROM A PRIVATE WELL OR 50' FROM A PUBLIC WELL.
 - WHEN INSTALLING WATER & SEWER MAINS, THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF THIS SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IF THE WATER MAIN IS IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER MUST BE APPROVED BY THE PUBLIC UTILITIES DEPARTMENT. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER TO OUTSIDE DIAMETER.
 - WHERE IT IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENGAGEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS.
 - 5'0" MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER UTILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER.
 - MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS. MAINTAIN 24" MIN. VERTICAL SEPARATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS WHERE ADEQUATE SEPARATIONS CANNOT BE ACHIEVED. SPECIFY DIP MATERIALS & A CONCRETE CRADLE HAVING 9" MIN. CLEARANCE (PER CORPUD DETAILS W-1 & W-2).
 - ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED.
 - ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PRIOR TO CONSTRUCTION.
 - CONTRACTOR SHALL MAINTAIN CONTINUOUS WATER & SEWER SERVICE TO EXISTING RESIDENCES & BUSINESSES THROUGHOUT CONSTRUCTION OF PROJECT. ANY NECESSARY SERVICE INTERRUPTIONS SHALL BE PRECEDED BY A 24 HOUR ADVANCE NOTICE TO THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT.
 - 3.0' MINIMUM COVER IS REQUIRED ON ALL WATER MAINS & SEWER FOREMANS. 4.0' MINIMUM COVER IS REQUIRED ON ALL REUSE MAINS.
 - IT IS THE DEVELOPER'S RESPONSIBILITY TO ABANDON OR REMOVE EXISTING WATER & SEWER SERVICES NOT BEING USED IN REDEVELOPMENT OF A SITE UNLESS OTHERWISE DIRECTED BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT. THIS INCLUDES ABANDONING TAP AT MAIN & REMOVAL OF SERVICE FROM ROW OR EASEMENT PER CORPUD HANDBOOK PROCEDURE.
 - INSTALL 4" PVC SEWER SERVICES @ 1% MINIMUM GRADE WITH CLEANOUTS LOCATED AT ROW OR EASEMENT LINE & SPACED EVERY 75' LINEAR MAXIMUM.
 - PRESSURE REDUCING VALVES ARE REQUIRED ON ALL WATER SERVICES EXCEEDING 80 PSI. BACKFLOWER VALVES ARE REQUIRED ON ALL SANITARY SEWER SERVICES HAVING BUILDING DRAINS LOWER THAN 1.0' ABOVE THE NEAREST UTILITY MANHOLE.
 - ALL ENVIRONMENTAL PERMITS APPLICABLE TO THE PROJECT MUST BE OBTAINED FROM NCDWQ, USACE & FEMA FOR ANY RIPARIAN BUFFER, WETLAND &/OR FLOODPLAIN IMPACTS (RESPECTIVELY) PRIOR TO CONSTRUCTION.
 - NCDOT / RAILROAD ENCROACHMENT AGREEMENTS ARE REQUIRED FOR ANY UTILITY WORK (INCLUDING MAIN EXTENSIONS & SERVICE TAPS) WITHIN STATE OR RAILROAD ROW PRIOR TO CONSTRUCTION.
 - GREASE INTERCEPTOR / OIL WATER SEPARATOR SIZING CALCULATIONS & INSTALLATION SPECIFICATIONS SHALL BE APPROVED BY THE CORPUD PROGRAM COORDINATOR PRIOR TO ISSUANCE OF A BUILDING PERMIT. CONTACT TIM BEASLEY AT (919) 966-2334 OR TIMOTHY.BEASLEY@RALEIGHNC.GOV FOR MORE INFORMATION.
 - CROSS-CONNECTION CONTROL PROTECTION DEVICES ARE REQUIRED BASED ON DEGREE OF HEALTH HAZARD INVOLVED AS LISTED IN APPENDIX B OF THE RULES GOVERNING PUBLIC WATER SYSTEMS IN NORTH CAROLINA. THESE DEVICES ARE THE MINIMUM REQUIREMENTS. THE DEVICES SHALL MEET AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE) STANDARDS OR BE ON THE UNIVERSITY OF SOUTHERN CALIFORNIA APPROVAL LIST. THE DEVICES SHALL BE INSTALLED AND TESTED (BOTH INITIAL AND PERIODIC TESTING THEREAFTER) IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS OR THE LOCAL CROSS-CONNECTION CONTROL PROGRAM. WHICHEVER IS MORE STRINGENT. CONTACT JOANIE HARTLEY AT (919) 966-5923 OR JOANIE.HARTLEY@RALEIGHNC.GOV FOR MORE INFORMATION.

EXISTING MH103 NOTE:
CONTRACTOR SHALL MAKE CONNECTION INTO EXH103 PER CITY OF RALEIGH STANDARD SPECIFICATIONS VIA A CONCRETE CURING MACHINE, AND THE PIPE CONNECTION MUST BE MADE WITH A FLEXIBLE RUBBER BOOT. SEE CITY OF RALEIGH SPECIFICATION FOR ADDITIONAL REQUIREMENTS.

EXISTING WATER & SEWER NOTE:
TOK #2CP-7-15 WATER & SEWER LINES SHOWN CORRESPOND TO COR PERMIT #W-3327 AND #S-4080.

EXISTING UTILITY NOTE:
ALL EXISTING WATERMANS & SEWER FACILITIES TO WHICH THIS PROJECT CONNECTS SHALL BE ACCEPTED BY THE CITY OF RALEIGH FOR MAINTENANCE PRIOR TO RELEASE OF 15' CO IN KNIGHTDALE STATION PER PHASE OF DEVELOPMENT (SECTIONS D,E,F).
REF: 2014 EDITION OF CORPUD HANDBOOK, PAGES 25-32

EXISTING PUMP STATION NOTE:
ALL EXISTING PUMP STATION ELECTRICAL AND WATER SERVICES MUST REMAIN IN SERVICE UNTIL NEW SERVICES CAN BE TIED TO NEW ELECTRICAL AND WATER LINES.

EXISTING MANHOLES NOTE:
ALL EXISTING MANHOLES IN OUTFALLS AND FUTURE ROADWAYS SHALL BE PROTECTED DURING CONSTRUCTION.

WATER METER NOTE:
CLEANOUTS CAN BE ON THE PROPERTY LINE BUT WATER METERS MUST BE FULLY IN THE RIGHT OF WAY OR IN A 2'X2' CORWLE.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER OF THE TOWN OF KNIGHTDALE AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *Scott Hill* DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *Robb* DATE: 7-9-19
ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

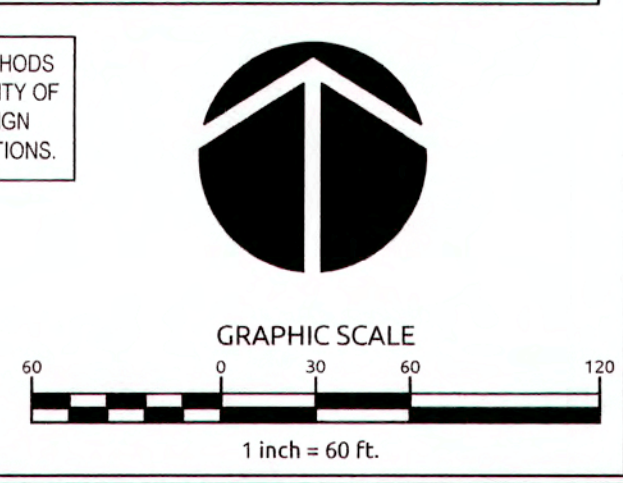
CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # *5-4561*
AUTHORIZATION TO CONSTRUCT *Kpore m. Sample*
DATE: *9/3/19*


PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # *W-3636*
AUTHORIZATION TO CONSTRUCT *Kpore m. Sample*
DATE: *9/3/19*

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.





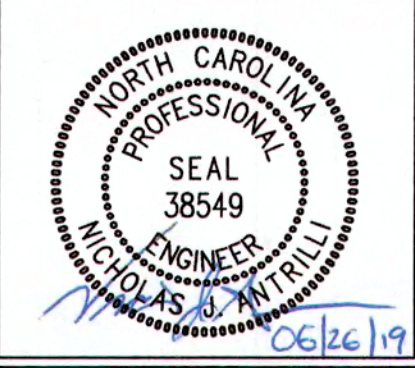
WithersRavenel
Engineers | Planners | Surveyors

**KNIGHTDALE STATION
R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

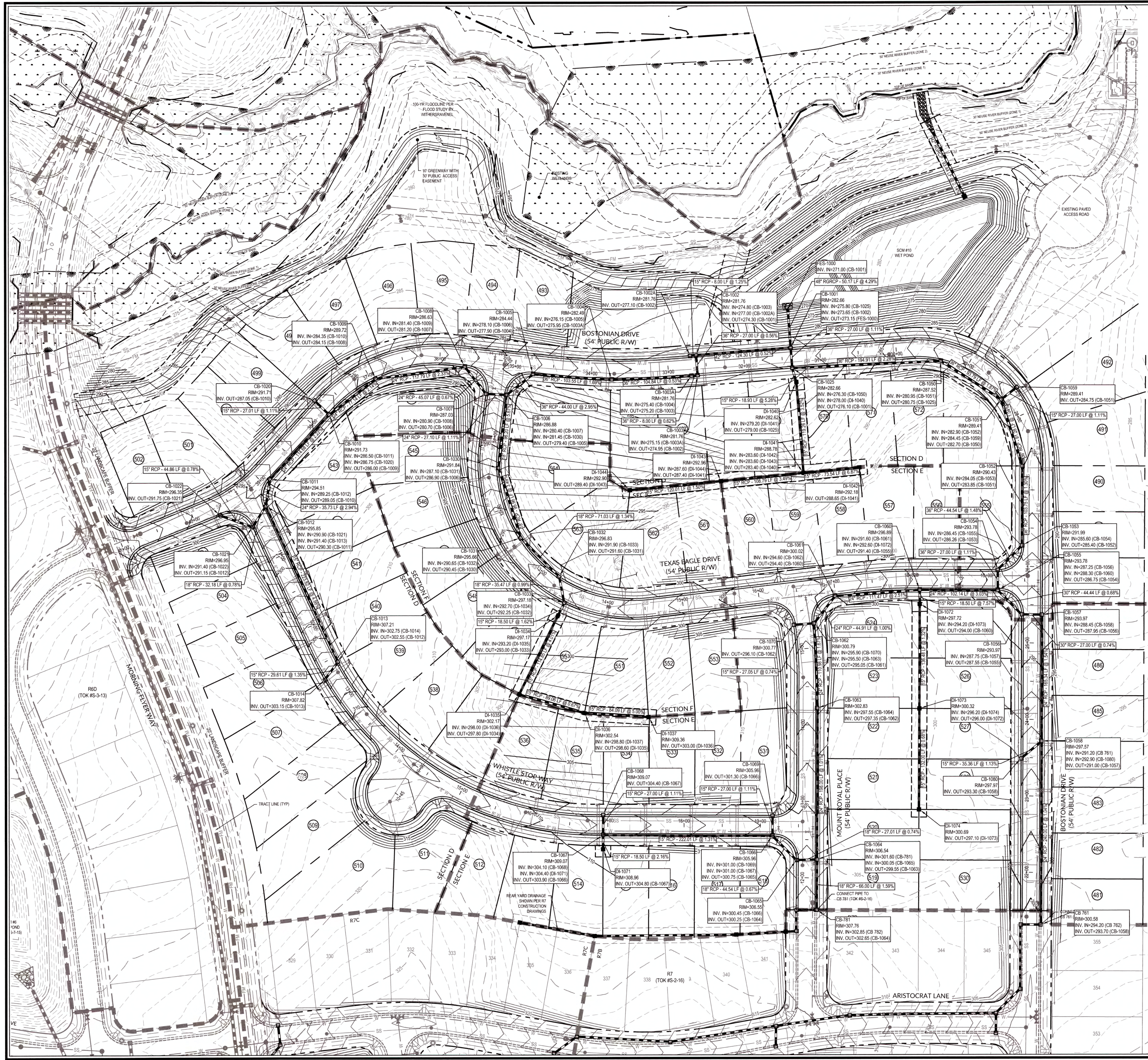
UTILITY PLAN

Job No. 02090251.93	Drawn By WR
Date 01/25/19	Designer WR



Revisions	Date
1 TOK Comments	06/21/19

Sheet No. **4.1**



- GRADING AND DRAINAGE NOTES:**
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS & DETAILS.
 - BOUNDARY SURVEY AND TOPOGRAPHIC SURVEY PERFORMED BY WITHERSRAVENEL, INC. OFFSITE TOPOGRAPHIC INFORMATION PROVIDED BY NC LIDAR.
 - WETLANDS AND STREAM BUFFERS DELINEATED AND SURVEYED BY WITHERSRAVENEL, INC.
 - THIS PROPERTY DOES NOT LIE WITHIN THE FEMA FLOODPLAIN PER MAP NUMBER 3720175400J AND 3720176400J, WITH AN EFFECTIVE DATE OF MAY 2, 2008.
 - RECEIVING WATERCOURSE: UNNAMED TRIBUTARY OF MARKS CREEK IN THE NEUSE RIVER BASIN.
 - THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION. THE LOCATION OF EXISTING UTILITIES SHOWN ON THE PLANS IS BASED ON THE BEST AVAILABLE INFORMATION, BUT CAN BE CONSIDERED ONLY AS APPROXIMATE.
 - ALL STORM DRAINAGE PIPE SHALL HAVE A MINIMUM COVER OF 2 FEET TO THE PIPE CROWN IN TRAFFIC, UNLESS APPROVED BY THE TOWN OF KNIGHTDALE.
 - ALL STORM DRAINAGE PIPE SHALL HAVE A MINIMUM COVER OF 1 FOOT TO THE PIPE CROWN IN NON-TRAFFIC AREAS.
 - STORM SEWER PIPE ENDS SHALL BE FURNISHED WITH REINFORCED CONCRETE PIPE FLARED END SECTION UNLESS OTHERWISE SPECIFIED ON PLANS.
 - EACH DRAINAGE STRUCTURE SHALL HAVE A SHAPED INVERT CONSTRUCTED FROM CONCRETE PER TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS.
 - ENERGY DISSIPATORS SHALL BE INSTALLED AT ALL STORM SEWER DISCHARGE POINTS. A FABRIC OR WASHED STONE BARRIER SHALL BE INSTALLED BETWEEN THE DISSIPATION PAD AND THE NATURAL GROUND. STORM PIPE TRENCH EXCAVATION AND BACKFILLING SHALL BE PERFORMED IN ACCORDANCE WITH TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS AND DETAILS. PLEASE CONTACT THE TOWN OF KNIGHTDALE DEVELOPMENT SERVICES ENGINEER PRIOR TO THE INSTALLATION OF ALL STORM DRAIN PIPE. STORMWATER CALCULATIONS ARE BASED ON A MAXIMUM 3,500 SF OF IMPERVIOUS AREA PER LOT.
 - ALL STORM DRAINAGE PIPE SHALL BE CLASS III REINFORCED CONCRETE PIPE (RCP) UNLESS NOTED OTHERWISE.
 - DISCHARGE BASED ON 10-YR STORM EVENT UNLESS NOTED OTHERWISE.
 - CB-CATCH BASIN; FES-FLARED END SECTION; JB-JUNCTION BOX; YI-YARD INLET (TK #05.03); DI-DROP INLET (TK #5.04)
 - RIM ELEVATION GIVEN FOR CB IS TOP OF CURB, YI OPENING INVERT FOR SLAB TOP, DI IS TOP OF GRATE FOR GRATED INLET, JB IS TOP OF RIM.
 - TK DRAINAGE EASEMENT = PUBLIC EASEMENT. KSCA DRAINAGE EASEMENT = KNIGHTDALE STATION COMMUNITY ASSOCIATION, INC.
 - ALL PUBLIC STORM DRAINAGE FRAMES, GRATES, & HOODS SHALL BE STAMPED W/ 'DRAINS TO RIVER' IN ACCORDANCE WITH TOWN OF KNIGHTDALE STANDARDS.
 - THE USE OF WAFFLE BOXES IS NOT PERMITTED WITHIN PUBLIC RIGHTS OF WAY AND PUBLIC DRAINAGE EASEMENTS.
 - THE CONTRACTOR WILL BE RESPONSIBLE FOR INSTALLING STEPS IN STORM DRAINAGE BOXES GREATER THAN OR EQUAL TO 5.0 FEET DEPTH. THE STEPS SHALL BE INSTALLED ON 16 INCH CENTERS AND SECURED PER TOWN OF KNIGHTDALE SPECIFICATIONS.

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 7-9-19
ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

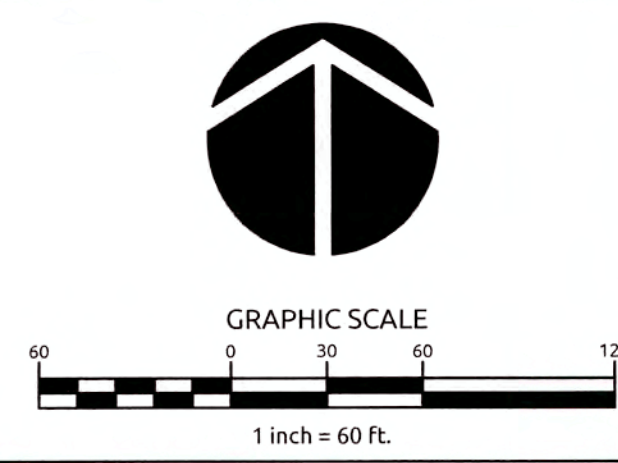
THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # *5-4561*
AUTHORIZATION TO CONSTRUCT *Rose W. Sample*
DATE: *9/3/19*

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # *W-3638*
AUTHORIZATION TO CONSTRUCT *Rose W. Sample*
DATE: *9/3/19*



WithersRavenel
Engineers | Planners | Surveyors

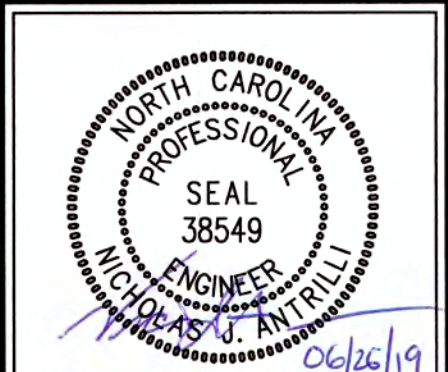
115 MackKernan Drive, Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

**KNIGHTDALE STATION
R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

STORM DRAINAGE PLAN

Job No: 02090251.93
Date: 01/25/19
Drawn By: WR
Designer: WR



Revisions		
1	TOK Comments	06/21/19

Sheet No.
5.1

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PIPE SCHEDULE

STORM SYSTEM DATA							
UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	SIZE	LENGTH	SLOPE	MATERIAL	UPSTREAM INVERT	DOWNSTREAM INVERT
CB-781	CB-1064	18	66.00	1.59%	RCP	302.65	301.60
CB-1001	FES-1000	48	50.17	4.29%	RGRCP	273.15	271.00
CB-1002	CB-1001	42	124.30	0.52%	RCP	274.30	273.65
CB-1002A	CB-1002	15	8.00	1.25%	RCP	277.10	277.00
CB-1003	CB-1002	36	27.00	0.56%	RCP	274.95	274.80
CB-1003A	CB-1003	36	8.00	0.62%	RCP	275.20	275.15
CB-1004	CB-1003A	36	104.84	0.53%	RCP	275.95	275.40
CB-1005	CB-1004	36	103.55	1.69%	RCP	277.90	276.15
CB-1006	CB-1005	36	44.00	2.95%	RCP	279.40	278.10
CB-1007	CB-1006	24	27.10	1.11%	RCP	280.70	280.40
CB-1008	CB-1007	24	45.07	0.67%	RCP	281.20	280.90
CB-1009	CB-1008	24	117.79	2.33%	RCP	284.15	281.40
CB-1010	CB-1009	24	77.14	2.14%	RCP	286.00	284.35
CB-1011	CB-1010	24	114.68	2.22%	RCP	289.05	286.50
CB-1012	CB-1011	24	35.73	2.94%	RCP	290.30	289.25
CB-1013	CB-1012	15	223.82	4.98%	RCP	302.55	291.40
CB-1014	CB-1013	15	29.61	1.35%	RCP	303.15	302.75
CB-1020	CB-1010	15	27.01	1.11%	RCP	287.05	286.75
CB-1021	CB-1012	18	32.18	0.78%	RCP	291.15	290.90
CB-1022	CB-1021	15	44.86	0.78%	RCP	291.75	291.40

STORM SYSTEM DATA							
UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	SIZE	LENGTH	SLOPE	MATERIAL	UPSTREAM INVERT	DOWNSTREAM INVERT
CB-1030	CB-1006	18	96.20	5.67%	RCP	286.90	281.45
CB-1031	CB-1030	18	95.96	3.49%	RCP	290.45	287.10
CB-1032	CB-1031	18	71.03	1.34%	RCP	291.60	290.65
CB-1033	CB-1032	18	35.47	0.99%	RCP	292.25	291.90
CB-1050	CB-1025	36	194.91	2.28%	RCP	280.75	276.30
CB-1051	CB-1050	36	93.79	1.87%	RCP	282.70	280.95
CB-1052	CB-1051	36	91.28	1.04%	RCP	283.85	282.90
CB-1053	CB-1052	36	103.75	1.30%	RCP	285.40	284.05
CB-1054	CB-1053	36	44.54	1.48%	RCP	286.26	285.60
CB-1055	CB-1054	36	27.00	1.11%	RCP	286.75	286.45
CB-1056	CB-1055	30	44.44	0.68%	RCP	287.55	287.25
CB-1057	CB-1056	30	27.00	0.74%	RCP	287.95	287.75
CB-1058	CB-1057	24	165.34	1.54%	RCP	291.00	288.45
CB-1059	CB-1051	15	27.00	1.11%	RCP	284.75	284.45
CB-1060	CB-1055	24	102.14	3.03%	RCP	291.40	288.30
CB-1061	CB-1060	24	111.47	2.51%	RCP	294.40	291.60
CB-1062	CB-1061	24	44.91	1.00%	RCP	295.05	294.60
CB-1063	CB-1062	24	110.98	1.67%	RCP	297.35	295.50
CB-1064	CB-1063	24	198.00	1.01%	RCP	299.55	297.55
CB-1065	CB-1064	18	27.01	0.74%	RCP	300.25	300.05

STORM SYSTEM DATA							
UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	SIZE	LENGTH	SLOPE	MATERIAL	UPSTREAM INVERT	DOWNSTREAM INVERT
CB-1066	CB-1065	18	44.54	0.67%	RCP	300.75	300.45
CB-1067	CB-1066	15	222.01	1.31%	RCP	303.90	301.00
CB-1068	CB-1067	15	27.00	1.11%	RCP	304.40	304.10
CB-1069	CB-1066	15	27.00	1.11%	RCP	301.30	301.00
CB-1070	CB-1062	15	27.05	0.74%	RCP	296.10	295.90
CB-1080	CB-1058	15	35.36	1.13%	RCP	293.30	292.90
CB 761	CB-1058	24	240.00	1.04%	RCP	293.70	291.20
DI-1034	CB-1033	15	18.50	1.62%	RCP	293.00	292.70
DI-1035	DI-1034	15	114.85	4.01%	RCP	297.80	293.20
DI-1036	DI-1035	15	89.06	0.67%	RCP	298.60	298.00
DI-1037	DI-1036	15	84.09	5.00%	RCP	303.00	298.80
DI-1040	CB-1025	15	18.93	5.28%	RCP	279.00	278.00
DI-1041	DI-1040	15	119.26	3.52%	RCP	283.40	279.20
DI-1042	DI-1041	15	73.54	6.87%	RCP	288.65	283.60
DI-1043	DI-1041	15	108.79	3.49%	RCP	287.40	283.60
DI-1044	DI-1043	15	120.01	1.50%	RCP	289.40	287.60
DI-1071	CB-1067	15	18.50	2.16%	RCP	304.80	304.40
DI-1072	CB-1060	15	18.50	7.57%	RCP	294.00	292.60
DI-1073	DI-1072	15	136.48	1.32%	RCP	296.00	294.20
DI-1074	DI-1073	15	132.00	0.68%	RCP	297.10	296.20

STRUCTURE SCHEDULE

STORM STRUCTURE TABLE				
STRUCTURE	RIM EL.	STRUCTURE IN	INVERT IN	INVERT OUT
CB-1001	282.66	CB-1025 CB-1002	275.80 273.65	273.15
CB-1002	281.76	CB-1003 CB-1002A	274.80 277.00	274.30
CB-1002A	281.76			277.10
CB-1003	281.76	CB-1003A	275.15	274.95
CB-1003A	281.76	CB-1004	275.40	275.20
CB-1004	282.49	CB-1005	276.15	275.95
CB-1005	284.44	CB-1006	278.10	277.90
CB-1006	286.88	CB-1007 CB-1030	280.40 281.45	279.40
CB-1007	287.03	CB-1008	280.90	280.70
CB-1008	286.63	CB-1009	281.40	281.20
CB-1009	289.72	CB-1010	284.35	284.15
CB-1010	291.73	CB-1011 CB-1020	286.50 286.75	286.00
CB-1011	294.51	CB-1012	289.25	289.05
CB-1012	295.85	CB-1021 CB-1013	290.90 291.40	290.30
CB-1013	307.21	CB-1014	302.75	302.55
CB-1014	307.82			303.15
CB-1020	291.71			287.05
CB-1021	296.95	CB-1022	291.40	291.15
CB-1022	296.35			291.75
CB-1025	282.66	CB-1050 DI-1040	276.30 278.00	276.10

STORM STRUCTURE TABLE				
STRUCTURE	RIM EL.	STRUCTURE IN	INVERT IN	INVERT OUT
CB-1030	291.84	CB-1031	287.10	286.90
CB-1031	295.66	CB-1032	290.65	290.45
CB-1032	296.83	CB-1033	291.90	291.60
CB-1033	297.18	DI-1034	292.70	292.25
CB-1050	287.52	CB-1051	280.95	280.75
CB-1051	289.41	CB-1052 CB-1059	282.90 284.45	282.70
CB-1052	290.43	CB-1053	284.05	283.85
CB-1053	291.99	CB-1054	285.60	285.40
CB-1054	293.78	CB-1055	286.45	286.26
CB-1055	293.78	CB-1056 CB-1060	287.25 288.30	286.75
CB-1056	293.97	CB-1057	287.75	287.55
CB-1057	293.97	CB-1058	288.45	287.95
CB-1058	297.57	CB 761 CB-1080	291.20 292.90	291.00
CB-1059	289.41			284.75
CB-1060	296.89	CB-1061 DI-1072	291.60 292.60	291.40
CB-1061	300.02	CB-1062	294.60	294.40
CB-1062	300.79	CB-1070 CB-1063	295.90 295.50	295.05
CB-1063	302.83	CB-1064	297.55	297.35
CB-1064	306.54	CB-781 CB-1065	301.60 300.05	299.55
CB-1065	306.55	CB-1066	300.45	300.25

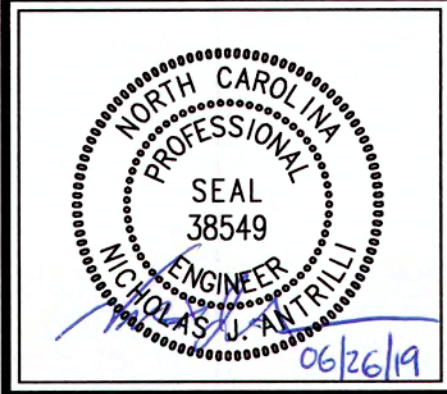
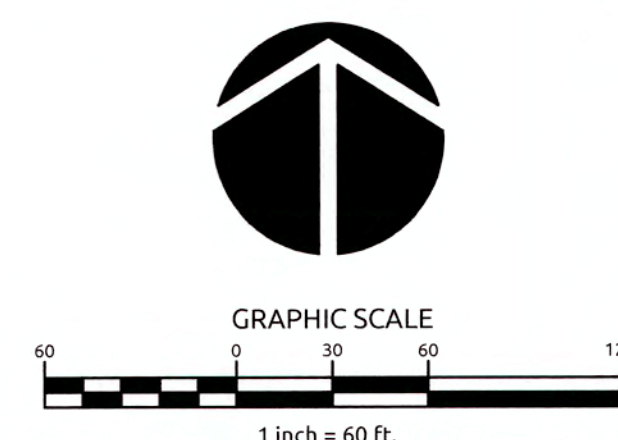
STORM STRUCTURE TABLE				
STRUCTURE	RIM EL.	STRUCTURE IN	INVERT IN	INVERT OUT
CB-1066	305.96	CB-1069 CB-1067	301.00 301.00	300.75
CB-1067	309.07	CB-1068 DI-1071	304.10 304.40	303.90
CB-1068	309.07			304.40
CB-1069	305.96			301.30
CB-1070	300.77			296.10
CB-1080	297.97			293.30
DI-1034	297.17	DI-1035	293.20	293.00
DI-1035	302.17	DI-1036	298.00	297.80
DI-1036	302.54	DI-1037	298.80	298.60
DI-1040	282.62	DI-1041	279.20	279.00
DI-1041	288.78	DI-1042 DI-1043	283.60 283.60	283.40
DI-1042	292.18			288.65
DI-1043	292.96	DI-1044	287.60	287.40
DI-1044	292.90			289.40
DI-1071	308.96			304.80
DI-1072	297.72	DI-1073	294.20	294.00
DI-1073	300.32	DI-1074	296.20	296.00
DI-1074	300.69			297.10

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: [Signature] DATE: 7-9-2019
 DEVELOPMENT SERVICES ENGINEER
 THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
 BY: [Signature] DATE: 7-9-19
 ADMINISTRATOR

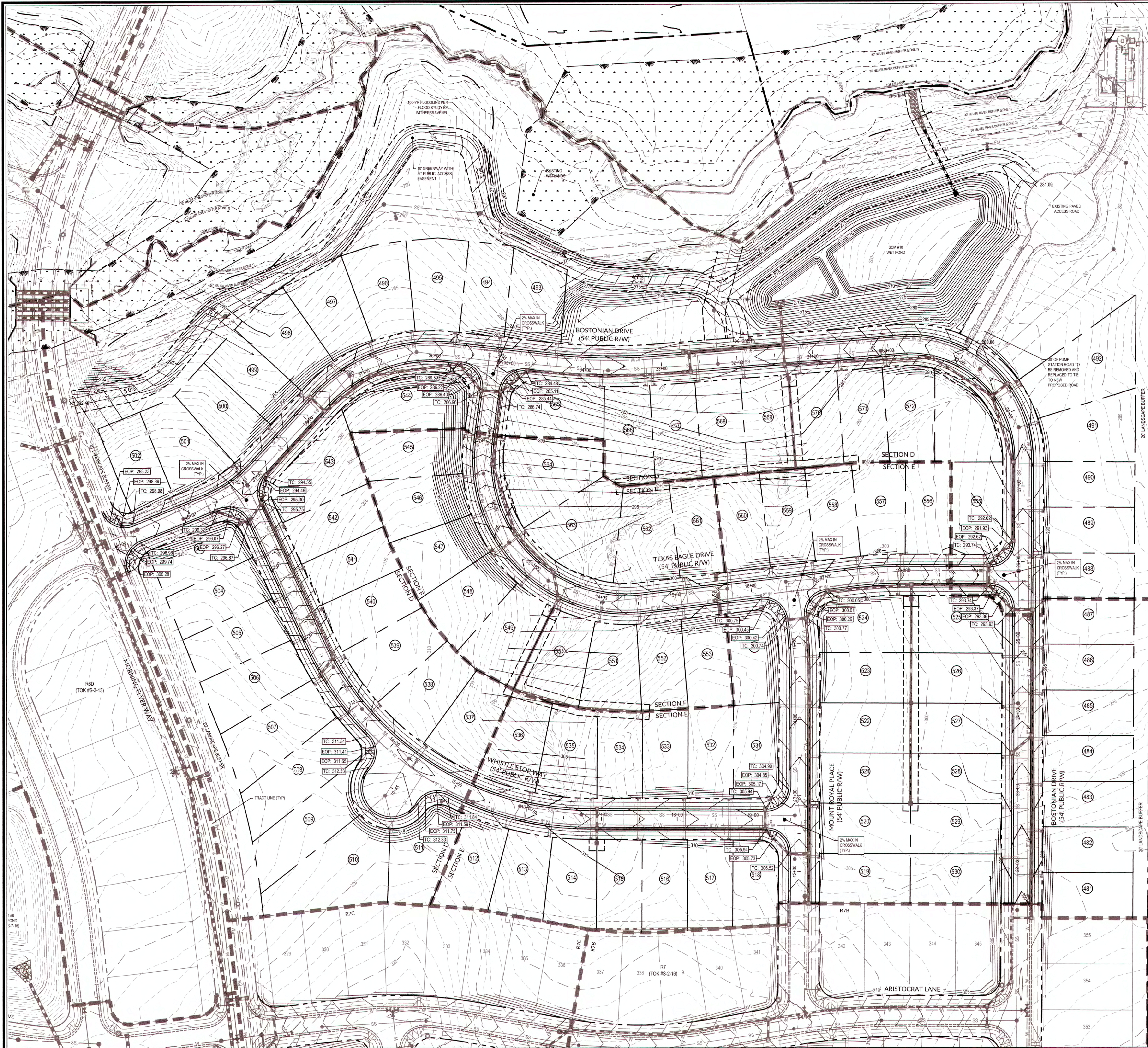
PUBLIC SEWER COLLECTION/EXTENSION SYSTEM
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 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM
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 AUTHORIZATION TO CONSTRUCT _____
 DATE _____



Revisions	Date	Comments
1	TOK Comments	06/21/19

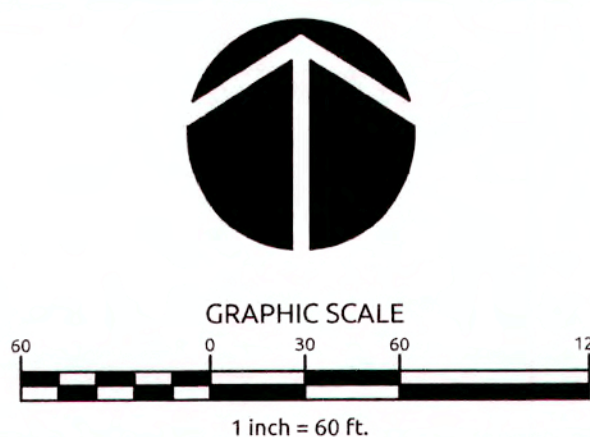
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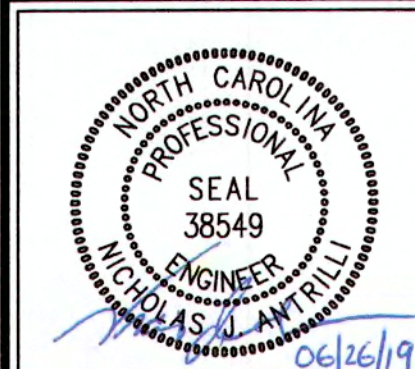
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 BY: [Signature] DATE: 7-9-2019
 DEVELOPMENT SERVICES ENGINEER
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 BY: [Signature] DATE: 7-9-19
 ADMINISTRATOR

~~PUBLIC SEWER COLLECTION/EXTENSION SYSTEM
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 AUTHORIZATION TO CONSTRUCT _____
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 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # _____
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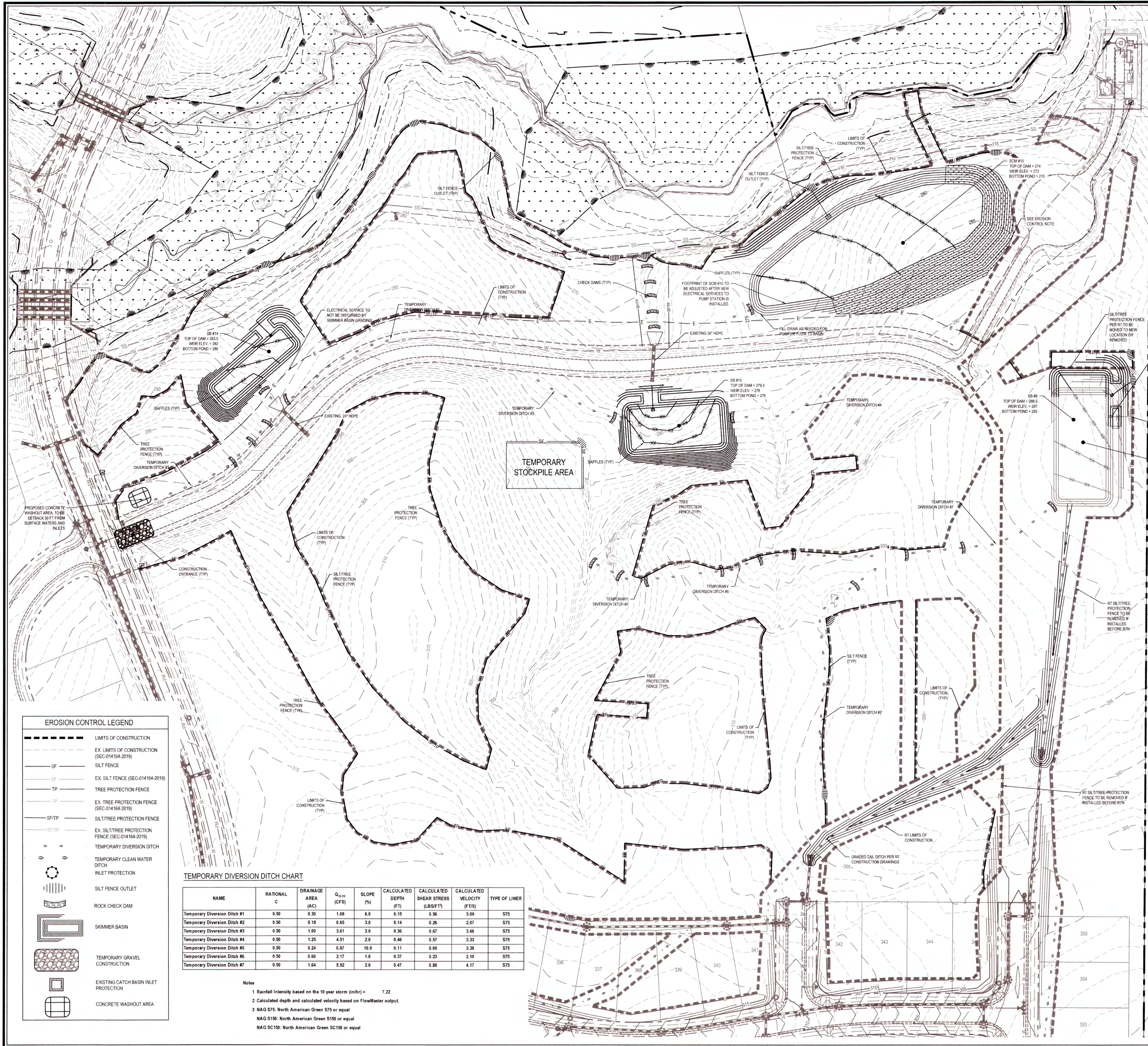
Job No.	02090251.93	Drawn By	WR
Date	01/25/19	Designer	WR



Revisions	
1	TOK Comments 06/21/19

Sheet No.	5.3
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- ### CONSTRUCTION SEQUENCE
- SCHEDULE A PRECONSTRUCTION CONFERENCE WITH THE WATERSHED MANAGER, KARYN PEACOCK, 919-796-8769, OBTAIN A LAND-DISTURBING PERMIT.
 - INSTALL GRAVEL CONSTRUCTION PAD, TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASINS OR OTHER MEASURES AS SHOWN ON THE APPROVED PLAN. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES. SEED TEMPORARY DIVERSIONS, BERMS AND BASINS IMMEDIATELY AFTER CONSTRUCTION. INSTALL INLET PROTECTION TO EXISTING CATCH BASINS.
 - EXISTING PUMP STATION ELECTRICAL AND WATER SERVICES TO NOT BE DISTURBED DURING CONSTRUCTION UNTIL NEW ELECTRICAL AND WATER SERVICES ARE INSTALLED.
 - SCM #10 FOOTPRINT TO BE ADJUSTED AFTER INSTALLATION OF NEW ELECTRICAL SERVICE TO PUMP STATION.
 - DUE TO FILL REQUIRED FOR FINAL GRADE OF BMP, THE RISER STRUCTURE INSTALLED SHALL BE DELAYED UNTIL THE SITE IS BROUGHT UP TO GRADE.
 - CALL 919-796-8769 FOR AN ONSITE INSPECTION BY THE WATERSHED MANAGER TO OBTAIN A CERTIFICATE OF COMPLIANCE.
 - BEGIN CLEARING AND GRUBBING. MAINTAIN DEVICES AS NEEDED. ROUGH GRADE SITE. GRADING NORTH OF BOSTONIAN DRIVE TO BEGIN AFTER BOSTONIAN DRIVE IS BROUGHT TO FINAL GRADE.
 - INSTALL STORM SEWER, IF SHOWN, AND PROTECT INLETS WITH BLOCK AND GRAVEL INLET CONTROLS, SEDIMENT TRAPS OR OTHER APPROVED MEASURES AS SHOWN ON THE PLAN. BEGIN CONSTRUCTION, BUILDING, ETC.
 - STABILIZE SITE AS AREAS ARE BROUGHT UP TO FINISH GRADE WITH VEGETATION, PAVING, DITCH LININGS, ETC. SEED AND MULCH DENUDED AREAS PER GROUND STABILIZATION TIME FRAMES.
 - WHEN CONSTRUCTION IS COMPLETE AND ALL AREAS ARE STABILIZED COMPLETELY, CALL 919-796-8769 FOR AN INSPECTION BY THE WATERSHED MANAGER.
 - IF SITE IS APPROVED, REMOVE TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASINS, ETC. AND SEED OUT OR STABILIZE ANY RESULTING BARE AREAS. ALL REMAINING PERMANENT EROSION CONTROL DEVICES, SUCH AS VELOCITY DISSIPATORS, SHOULD NOW BE INSTALLED.
 - WHEN VEGETATION HAS BECOME ESTABLISHED, CALL FOR A FINAL SITE INSPECTION BY THE WATERSHED MANAGER, 919-796-8769. OBTAIN A CERTIFICATE OF COMPLETION.

- ### BASIN REMOVAL SEQUENCE
- SCHEDULE A SITE MEETING WITH THE ENVIRONMENTAL ENGINEER/CONSULTANT TO DETERMINE IF A BASIN CAN BE REMOVED. INSTALL SILT FENCING OR OTHER TEMPORARY EROSION CONTROL MEASURES AS NEEDED PRIOR TO REMOVAL OF THE BASIN.
 - REMOVE BASIN(S) AND ASSOCIATED TEMPORARY DIVERSION DITCHES. IF CULVERT PIPES NEED TO BE EXTENDED, PERFORM THIS OPERATION AT THIS TIME. FINE GRADE AREA IN PREPARATION FOR SEEDING.
 - PERFORM SEEDBED PREPARATION, SEED, MULCH, AND ASPHALT TACK ANY RESULTING BARE AREAS IMMEDIATELY.
 - INSTALL VELOCITY DISSIPATORS AND/OR LEVEL SPREADERS AS REQUIRED ON THE EROSION CONTROL PLAN.
 - WHEN SITE IS FULLY STABILIZED, CALL ENVIRONMENTAL ENGINEER/CONSULTANT FOR APPROVAL OF REMOVING REMAINING TEMPORARY EROSION CONTROL MEASURES AND ADVICE ON WHEN SITE CAN BE ISSUED A CERTIFICATE OF COMPLETION.

- ### STOCKPILE NOTES
- SEEDING OR COVERING STOCKPILES WITH TARPS OR MULCH IS REQUIRED AND WILL REDUCE EROSION PROBLEMS. TARPS SHOULD BE KEPT IN AT THE TOP OF THE SLOPE TO KEEP WATER FROM RUNNING UNDERNEATH THE PLASTIC.
 - IF A STOCKPILE IS TO REMAIN FOR FUTURE USE AFTER THE PROJECT IS COMPLETE (BUILDERS, ETC.), THE FINANCIAL RESPONSIBLE PARTY MUST NOTIFY WAKE COUNTY OF A NEW RESPONSIBLE PARTY FOR THAT STOCKPILE.
 - THE APPROVED PLAN SHALL PROVIDE FOR THE USE OF STAGED SEEDING AND MULCHING ON A CONTINUAL BASIS WHILE THE STOCKPILE IS IN USE.
 - ESTABLISH AND MAINTAIN A VEGETATIVE BUFFER AT THE TOE OF THE SLOPE (WHERE PRACTICAL).

EROSION CONTROL BLANKET NOTE:
 - PROVIDE EROSION CONTROL BLANKET. SEE DETAIL SHT. 9.3

EROSION CONTROL NOTE:
 FOREBAY WILL NOT BE REQUIRED WHILE SCM IS ACTING AS AN EROSION CONTROL DEVICE.

R7N DENUDED AREA = 13.50 AC

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: DATE: 7-8-2019
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: DATE: 7-9-19
 ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

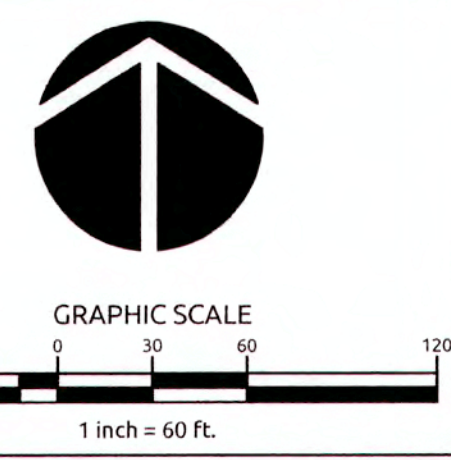
CITY OF RALEIGH
 PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
 PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.



EROSION CONTROL LEGEND

- LIMITS OF CONSTRUCTION
- - - EX. LIMITS OF CONSTRUCTION (SEC-014164-2019)
- SILT FENCE
- - - EX. SILT FENCE (SEC-014164-2019)
- TREE PROTECTION FENCE
- - - EX. TREE PROTECTION FENCE (SEC-014164-2019)
- SILT/TREE PROTECTION FENCE
- - - EX. SILT/TREE PROTECTION FENCE (SEC-014164-2019)
- TEMPORARY DIVERSION DITCH
- TEMPORARY CLEAN WATER DITCH
- INLET PROTECTION
- SILT FENCE OUTLET
- ROCK CHECK DAM
- SKIMMER BASIN
- TEMPORARY GRAVEL CONSTRUCTION
- EXISTING CATCH BASIN INLET PROTECTION
- CONCRETE WASHOUT AREA

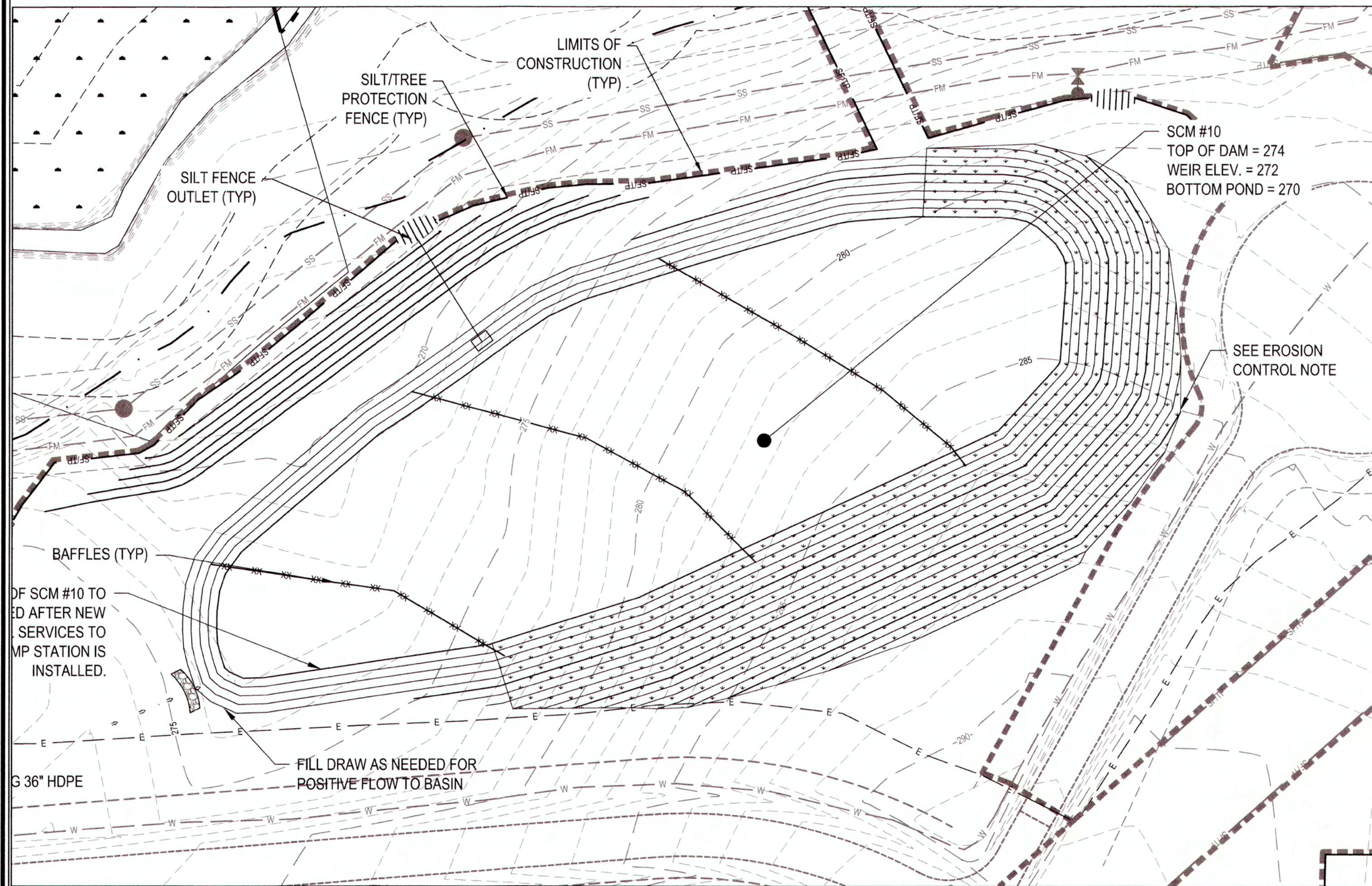
TEMPORARY DIVERSION DITCH CHART

NAME	RATIONAL C	DRAINAGE AREA (AC)	Q_{10} (CFS)	SLOPE (%)	CALCULATED DEPTH (FT)	CALCULATED SHEAR STRESS (LBS/FT ²)	CALCULATED VELOCITY (FT/S)	TYPE OF LINER
Temporary Diversion Ditch #1	0.50	0.30	1.08	6.0	0.15	0.56	3.09	S75
Temporary Diversion Ditch #2	0.50	0.18	0.65	3.0	0.14	0.26	2.07	S75
Temporary Diversion Ditch #3	0.50	1.00	3.61	3.0	0.36	0.67	3.60	S75
Temporary Diversion Ditch #4	0.50	1.25	4.51	2.0	0.46	0.57	3.33	S75
Temporary Diversion Ditch #5	0.50	0.24	0.87	10.0	0.11	0.69	3.38	S75
Temporary Diversion Ditch #6	0.50	0.60	2.17	1.0	0.37	0.23	2.10	S75
Temporary Diversion Ditch #7	0.50	1.64	5.92	3.0	0.47	0.88	4.17	S75

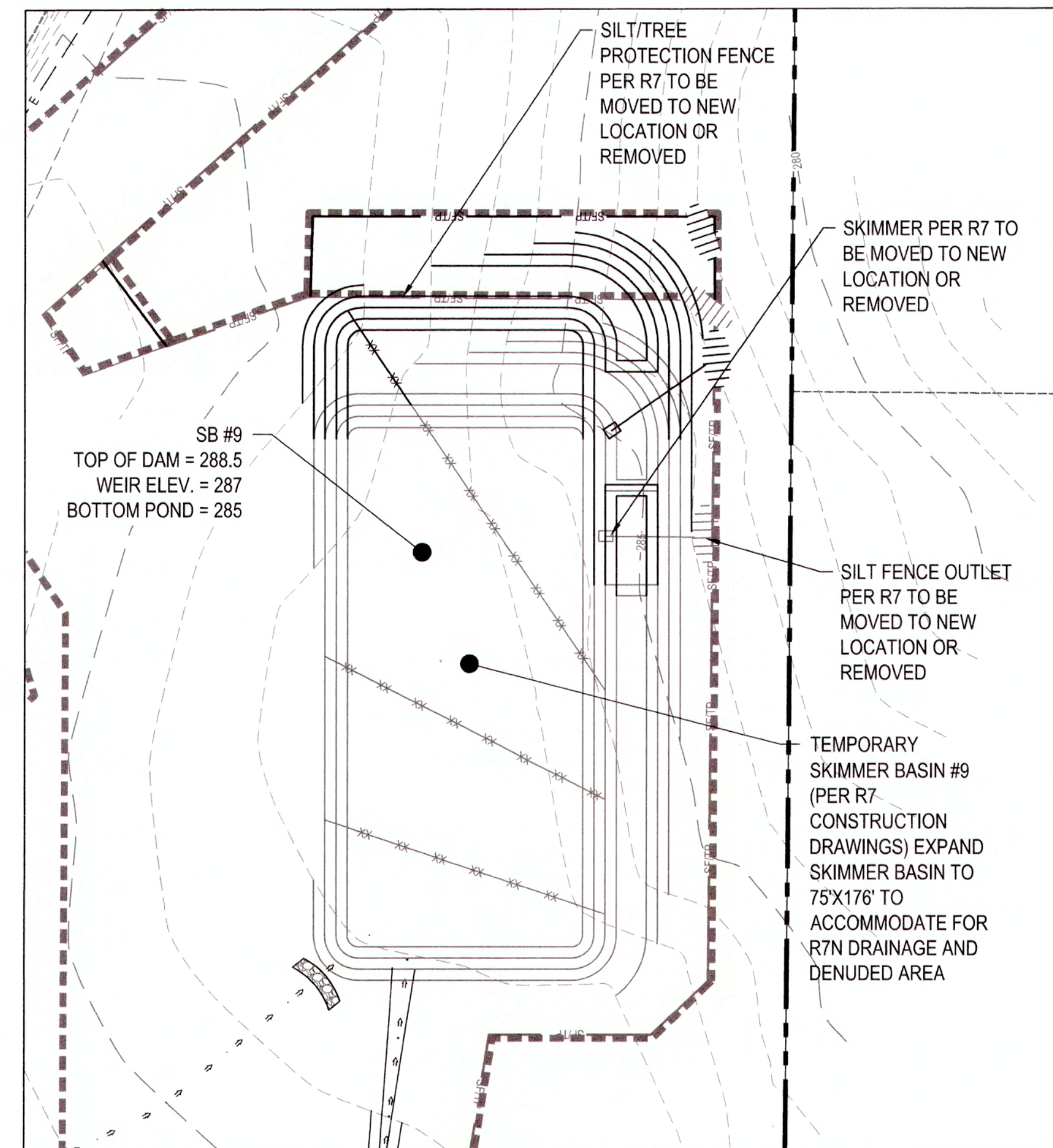
Notes

- Rainfall Intensity based on the 10 year storm (in/hr) = 7.22
- Calculated depth and calculated velocity based on FlowMaster output.
- NAG S75: North American Green S75 or equal
 NAG S150: North American Green S150 or equal
 NAG SC150: North American Green SC150 or equal

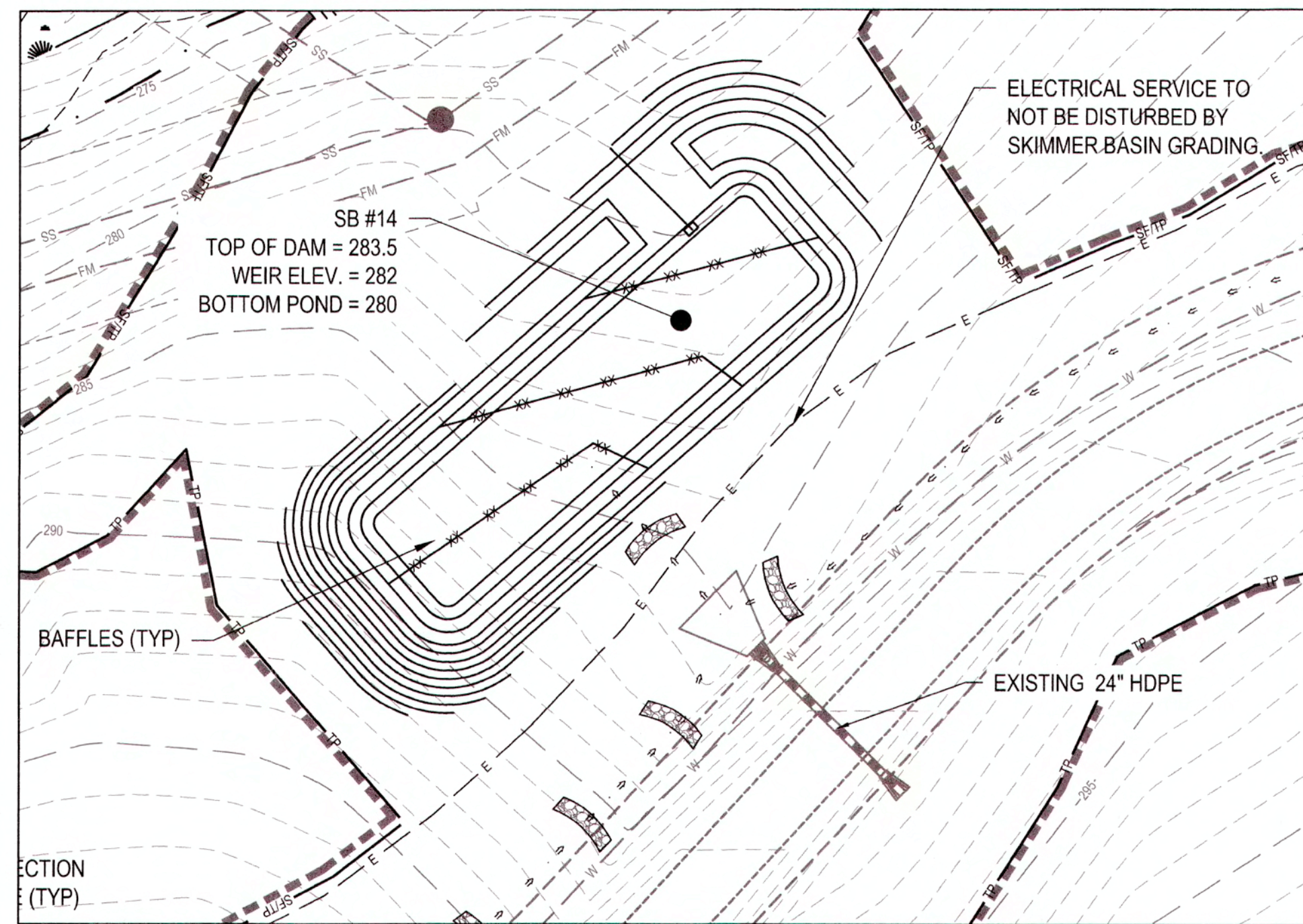
SCM #10



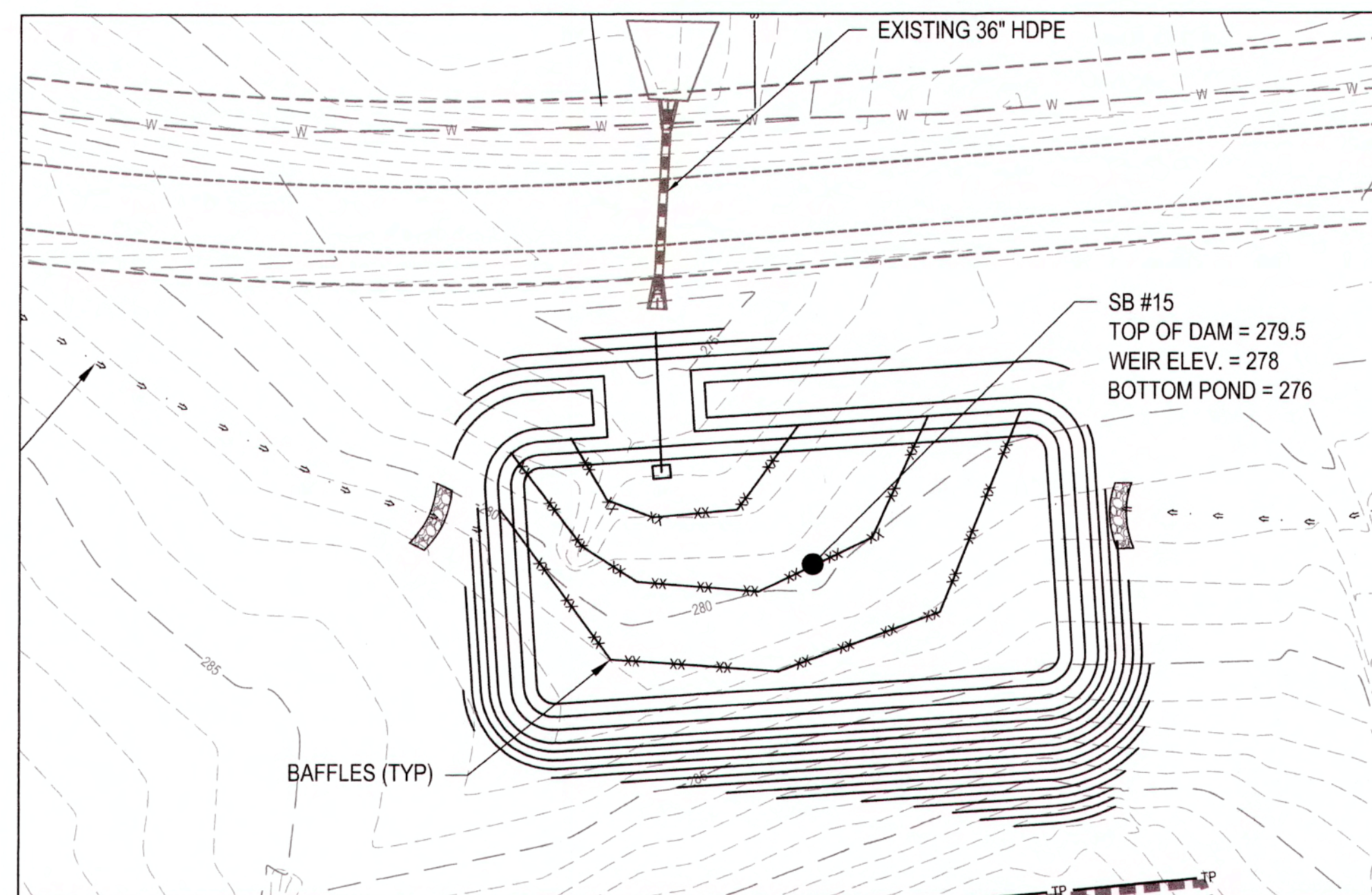
SB #9



SB #14



SB #15



TEMPORARY SKIMMER BASIN DESIGN CHART

BASIN	TYPE	DRAINAGE AREA [AC]	DENUDED AREA [AC]	COMPOSITE RATIONAL C	PEAK FLOW Q10 [CFR]	BASIN DIMENSIONS			WEIR LENGTH [FT]	VOLUME REQUIRED [CF]	VOLUME PROVIDED [CF]	SURFACE AREA REQ. [SF]	SURFACE PROVIDED [SF]	SKIMMER SIZE [IN]	SKIMMER ORIFICE SIZE [IN]
						DEPTH [FT]	LENGTH [FT]	WIDTH [FT]							
SCM #10	SKIMMER	24.0	14.9	0.39	68.2	SEE E.C. PLAN	10	43,200	69,616	29,681	30,308	4.0	3.00		
SB #9	SKIMMER	15.7	6.4	0.39	20.3	2.0	75.0	75.0	19,224	21,464	13,193	13,200	3.0	2.25	
SB #14	SKIMMER	4.5	2.1	0.38	11.5	2.0	120.0	40.0	8,116	8,466	4,926	5,266	2.0	1.5	
SB #15	SKIMMER	7.2	4.2	0.38	19.9	2.0	120.0	66.0	12,342	15,144	8,630	8,712	3.0	2.0	

NOTES:
 SCM #10 WILL BE USED AS A SEDIMENT BASIN DURING SITE CONSTRUCTION.
 CALCULATED SURFACE AREA IS BASED ON RESERVOIR ELEVATION.
 CALCULATED WEIR LENGTH IS BASED ON Q10 FLOWING THROUGH SPILLWAY WITH 0.5 FT MAXIMUM DEPTH.
 1' OF FREEBOARD IS SHOWN PROVIDED FOR THE BASINS. VOLUME CALCULATION DOES NOT INCLUDE FREEBOARD.
 SURFACE AREA REQUIREMENT FOR A SKIMMER SEDIMENT BASIN DETERMINED PER NCSDWR EROSION CONTROL MANUAL (435 SPCS FOR 10 YR STORM).
 VOLUME REQUIREMENT FOR A SKIMMER SEDIMENT BASIN DETERMINED PER NCSDWR EROSION CONTROL MANUAL (1500 CF PER DRAINAGE AREA).
 10-YR RAINFALL INTENSITY = 7.22 IN/HR

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 7-9-2019
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 7-9-19
 ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

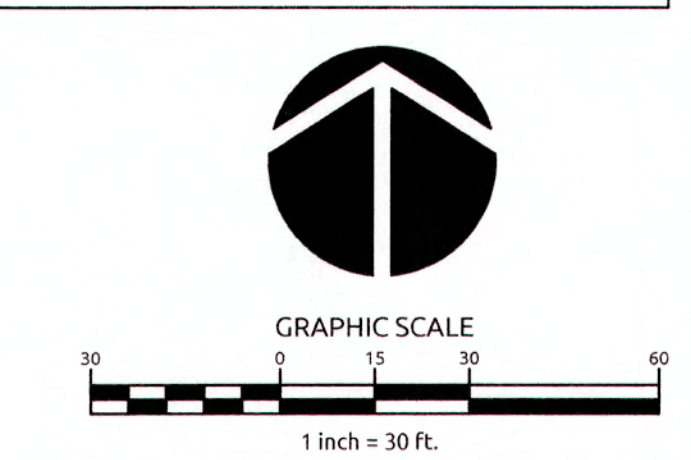
THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____



WithersRavenel
 Engineers | Planners | Surveyors
 115 MacKinnon Drive | Cary, NC 27511 | 919.469.3340 | License # C-0832 | www.withersravenel.com

**KNIGHTDALE STATION
 R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

SKIMMER BASIN DETAILS

Job No: 02090251.93
 Date: 01/25/19
 Drawn By: WR
 Designer: WR

NORTH CAROLINA
 PROFESSIONAL
 SEAL
 38549
 ENGINEER
 WILSON AS ANITALL
 06/26/19

Revisions:
 1 TOK Comments 06/21/19

Sheet No.
6.1

K:\0709-02090251.93 Knightdale Station-R7 North\CADD\Cont Drawings\01-01_PBE EROSION CONTROL PLAN.dwg, Date: 21/07/2019 2:46:23 PM, D:\RYAN COLLIER



EROSION CONTROL LEGEND

- LIMITS OF CONSTRUCTION
- - - EX. LIMITS OF CONSTRUCTION (SEC-014164-2019)
- SF — SILT FENCE
- TP — EX. SILT FENCE (SEC-014164-2019)
- TP — TREE PROTECTION FENCE
- TP — EX. TREE PROTECTION FENCE (SEC-014164-2019)
- SF/TP — SILT/TREE PROTECTION FENCE
- SF/TP — EX. SILT/TREE PROTECTION FENCE (SEC-014164-2019)
- ○ ○ TEMPORARY DIVERSION DITCH
- ○ ○ TEMPORARY CLEAN WATER DITCH
- ○ ○ INLET PROTECTION
- ○ ○ SILT FENCE OUTLET
- ○ ○ ROCK CHECK DAM
- SKIMMER BASIN
- TEMPORARY GRAVEL CONSTRUCTION
- EXISTING CATCH BASIN INLET PROTECTION
- CONCRETE WASHOUT AREA

VELOCITY DISSIPATOR DESIGN CHART

NAME	PILE SIZE (IN)	DISCHARGE 10-YR (CFD)	VELOCITY (FT/S)	LENGTH (FT)	WIDTH AT BEGINNING (FT)	WIDTH AT END (FT)	THICKNESS (IN)	STONE CLASS
FES-1000	48	79	19.86	40	12	20	22	1

ALL DISSIPATORS SHALL HAVE FILTER FABRIC UNDERLINERS

EROSION CONTROL BLANKET NOTE:
 - PROVIDE EROSION CONTROL BLANKET. SEE DETAIL SHT. 9.3

CONSTRUCTION SEQUENCE NOTE:
 SEE SHEET 6.0 FOR BASIN REMOVAL SEQUENCE.

EROSION CONTROL NOTE:
 FOREBAY WILL NOT BE REQUIRED WHILE SCM IS ACTING AS AN EROSION CONTROL DEVICE.

R7N DENUDED AREA = 13.50 AC

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 7-8-2019
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 7-9-19
 ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
 PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
 PUBLIC UTILITIES DEPARTMENT PERMIT # _____
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 DATE _____

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

GRAPHIC SCALE
 1 inch = 60 ft.

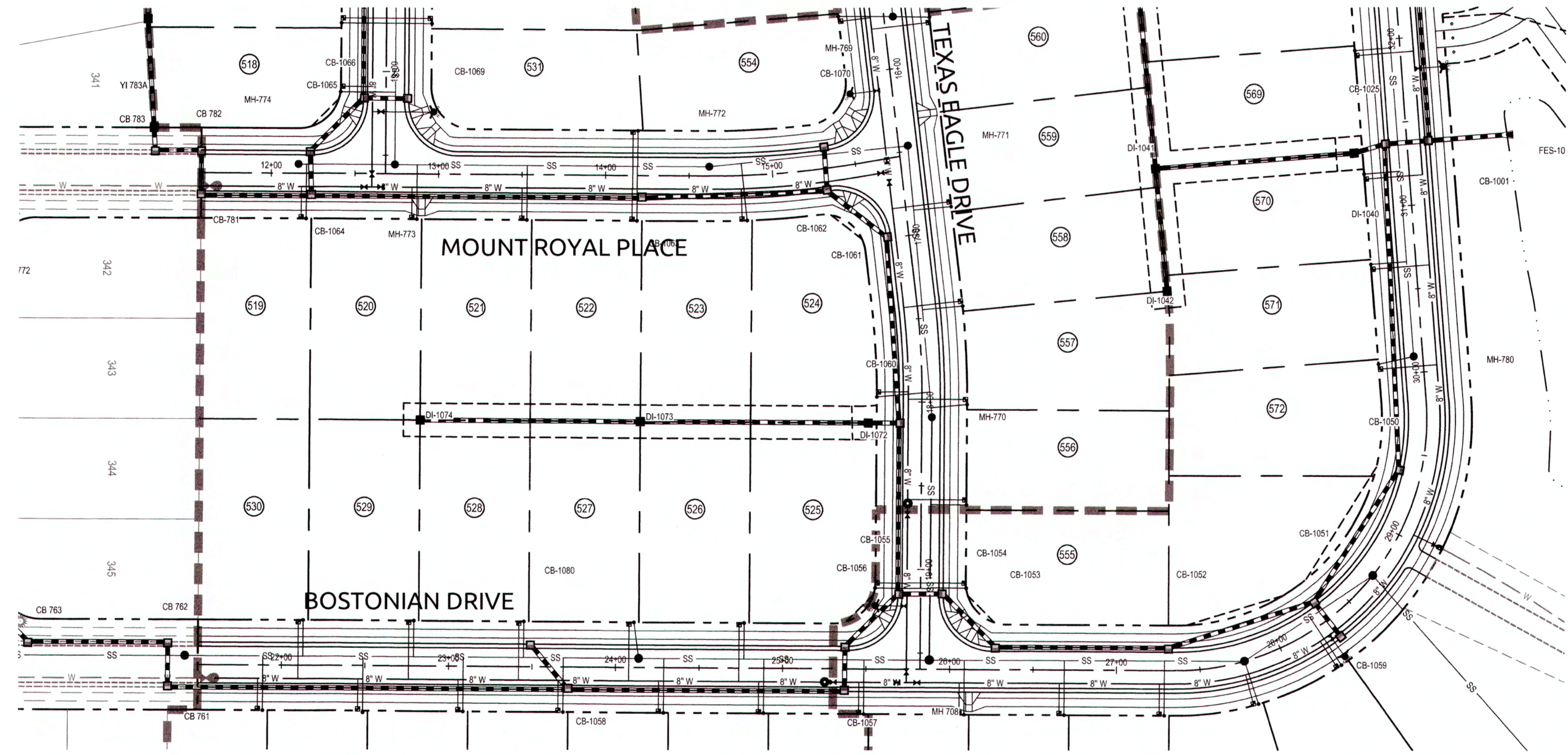
Job No. 02090251.93
 Date 01/25/19
 Drawn By WR
 Designer WR

PROFESSIONAL SEAL
 38549
 NORTH CAROLINA
 ENGINEERS
 WITHERS RAVENEL
 06/26/19

Revisions
 1 TOK Comments 06/21/19

Sheet No.
6.2

K:\0709\0207090251.93\Knightdale Station - R7 North\CAD\Cont Drawings\6.2 POST EROSION CONTROL PLAN.dwg, Friday, June 21, 2019 2:47:09 PM, DORRVA, COLLEEN



PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # 5-4561
 AUTHORIZATION TO CONSTRUCT Approved Sample
 DATE 9/3/19

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

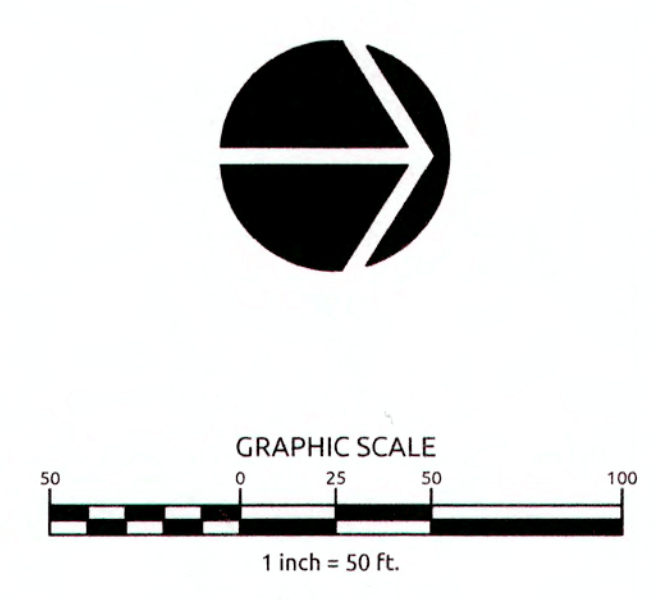
CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # W-3638
 AUTHORIZATION TO CONSTRUCT Approved Sample
 DATE 9/3/19

TOWN CERTIFICATION, THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: [Signature] DATE: 7-8-2019
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: [Signature] DATE: 7-9-19
 ADMINISTRATOR



WithersRavenel
Engineers | Planners | Surveyors

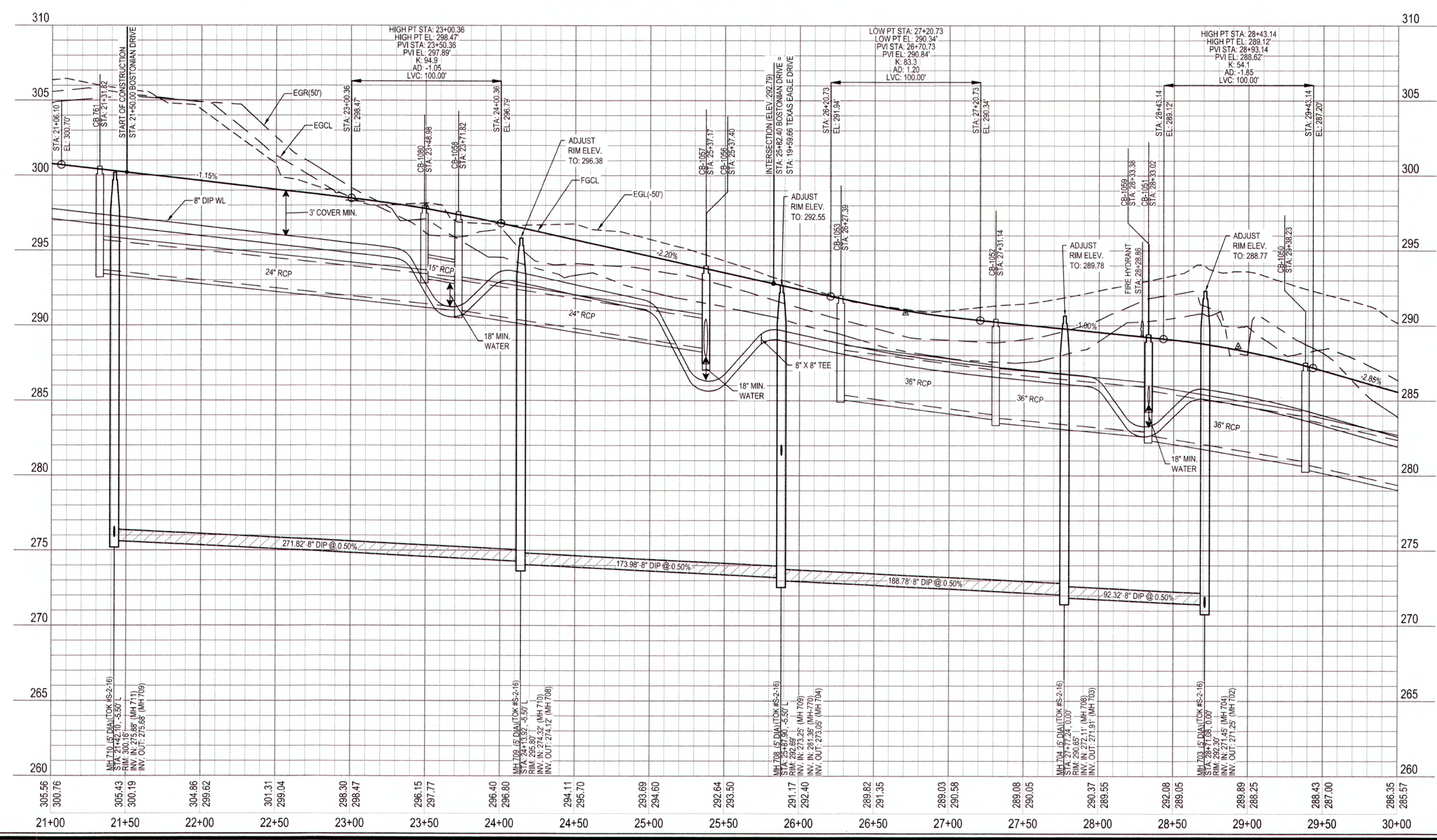
115 MackKeean Drive | Cary, NC 27511 | E: 919.469.3340 | F: 919.469.3342 | www.withersravenel.com

**KNIGHTDALE STATION
R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

BOSTONIAN DRIVE

SCALE:
 1" = 50' HORIZ.
 1" = 5' VERT.



ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

WATERLINE NOTE:
 IF MINIMUM CLEARANCE CANNOT BE ACHIEVED WITHOUT EXCEEDING MAXIMUM PIPE DEFLECTION FOR THE WATERLINE, THEN CONTRACTOR TO INSTALL 45° VERTICAL BENDS PER COR DETAIL W-12.

CLASS 1 STRUCTURAL MATERIAL NOTE:
 CLASS 1 STRUCTURAL MATERIAL REQUIRED FROM EXISTING GROUND TO SPRING LINE OF PROPOSED STORM PIPE IN FILL CONDITIONS. SEE LATEST TOK STANDARD SPECIFICATIONS.

CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES: N/A

PUBLIC UTILITIES: (Signature) 9/3/19

STORMWATER: N/A

PLANNING: N/A

FIRE: N/A

URBAN FORESTRY: N/A

ATTENTION CONTRACTORS

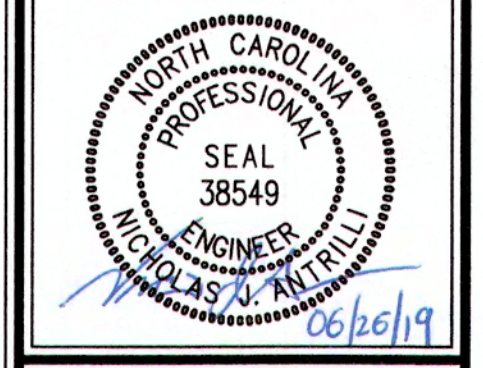
THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 998-4542 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTEAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

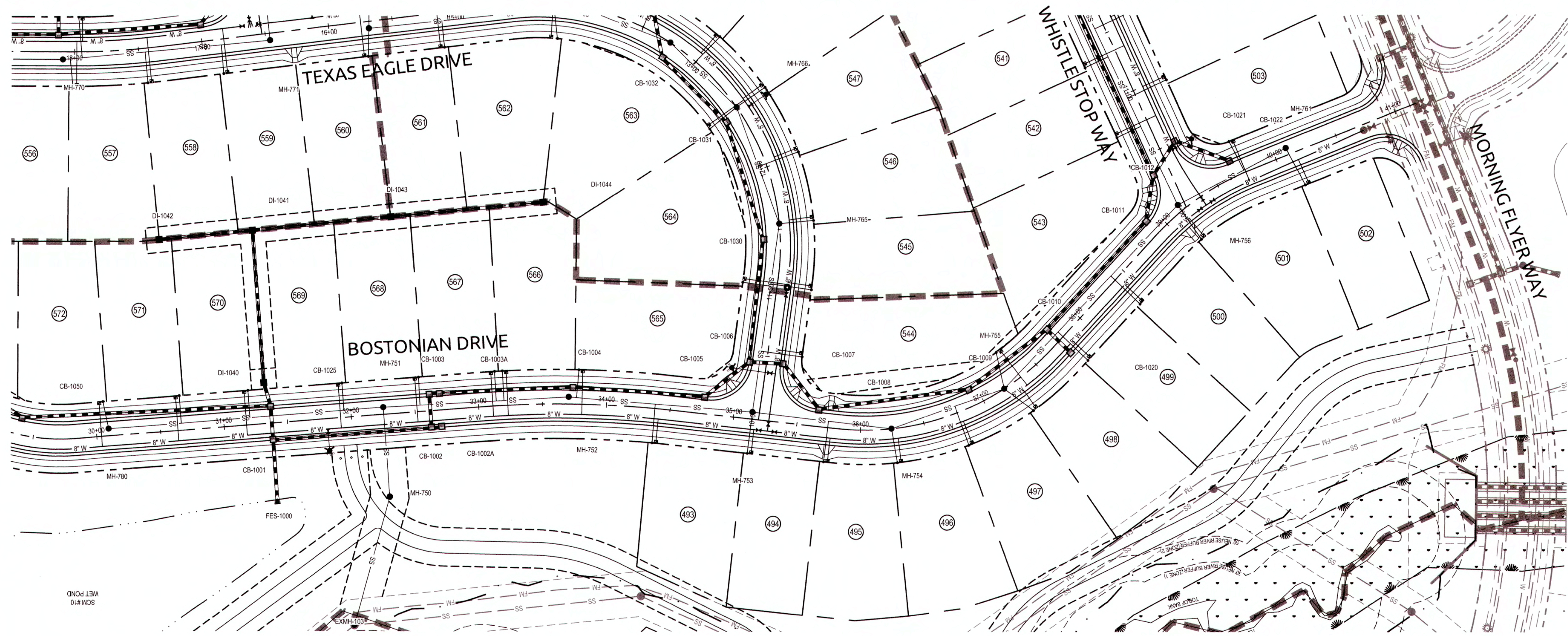
**BOSTONIAN DRIVE PLAN
AND PROFILE**

Job No. 02090251 93
 Date 01/25/19
 Drawn By WR
 Designer WR



Revisions	
1	TOK Comments 06/21/19

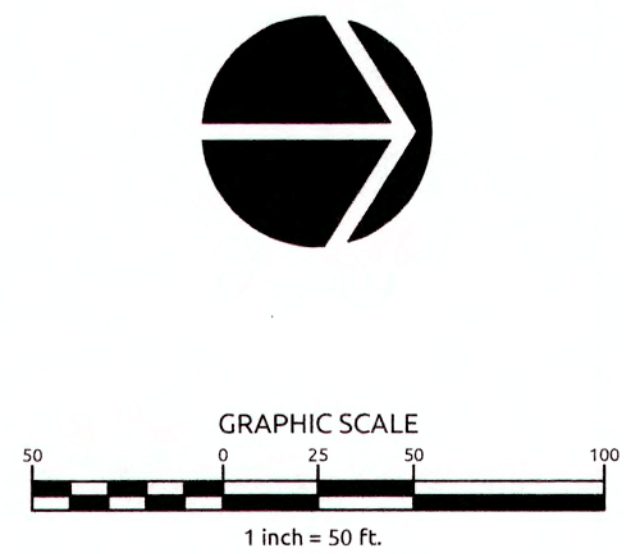
K:\09\05\05\0102\15\Knightdale Station - R7 North\CAD\Drawings\7.1 - 7.1 PLAN AND PROFILES.dwg - Tuesday, June 28, 2018 8:23:14 AM - DURVA COLLEN



PUBLIC SEWER COLLECTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # 5-4501
 AUTHORIZATION TO CONSTRUCT Loara M. Sample
 DATE 9/3/19

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # W-3635
 AUTHORIZATION TO CONSTRUCT Loara M. Sample
 DATE 9/3/19

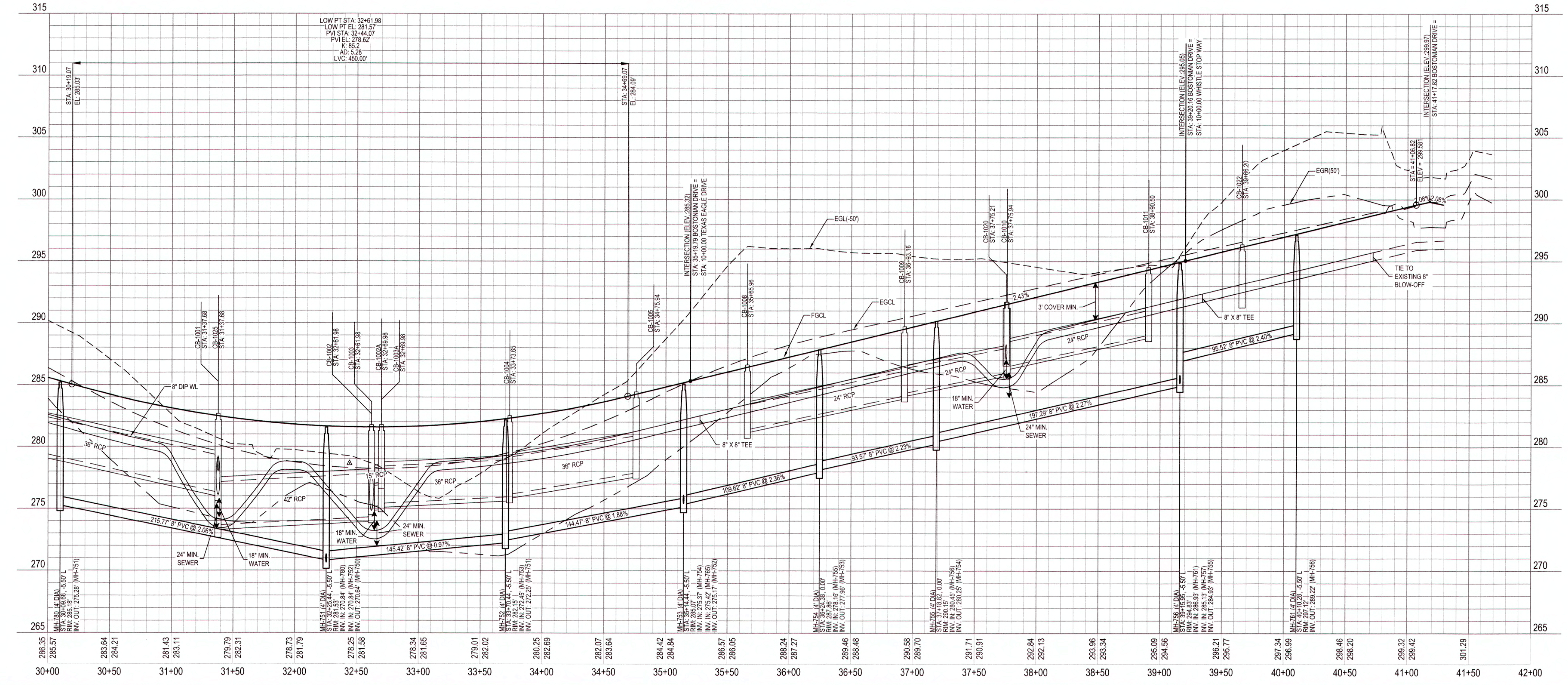
TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: Scott Hill DATE: 7-8-2019
 DEVELOPMENT SERVICES ENGINEER
 THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
 BY: CB16 DATE: 7-7-19
 ADMINISTRATOR



WithersRavenel
 Engineers | Planners | Surveyors
 115 MacKinnon Drive | Cary, NC 27511 | P: 919.669.3300 | F: 919.669.3300 | www.withersravenel.com

**KNIGHTDALE STATION
 R7 NORTH**
 TOWN OF KNIGHTDALE, NORTH CAROLINA

BOSTONIAN DRIVE



SCALE:
 1" = 50' HORIZ.
 1" = 5' VERT.

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

WATERLINE NOTE:
 IF MINIMUM CLEARANCE CANNOT BE ACHIEVED WITHOUT EXCEEDING MAXIMUM PIPE DEFLECTION FOR THE WATERLINE, THEN CONTRACTOR TO INSTALL 45' VERTICAL BENDS PER COR DETAIL W-12.

CLASS 1 STRUCTURAL MATERIAL NOTE:
 CLASS 1 STRUCTURAL MATERIAL REQUIRED FROM EXISTING GROUND TO SPRING LINE OF PROPOSED STORM PIPE IN FILL CONDITIONS. SEE LATEST TOK STANDARD SPECIFICATIONS.

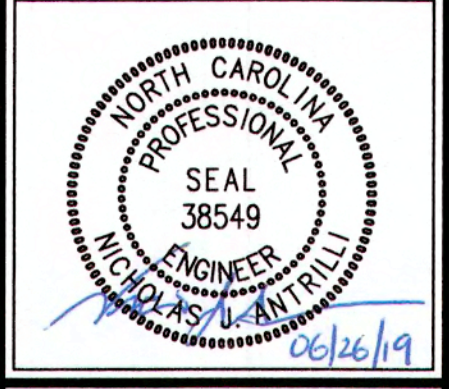
CITY OF RALEIGH
 ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES: N/A
 PUBLIC UTILITIES: AS 9/3/19
 STORMWATER: N/A
 PLANNING: N/A
 FIRE: N/A
 URBAN FORESTRY: N/A

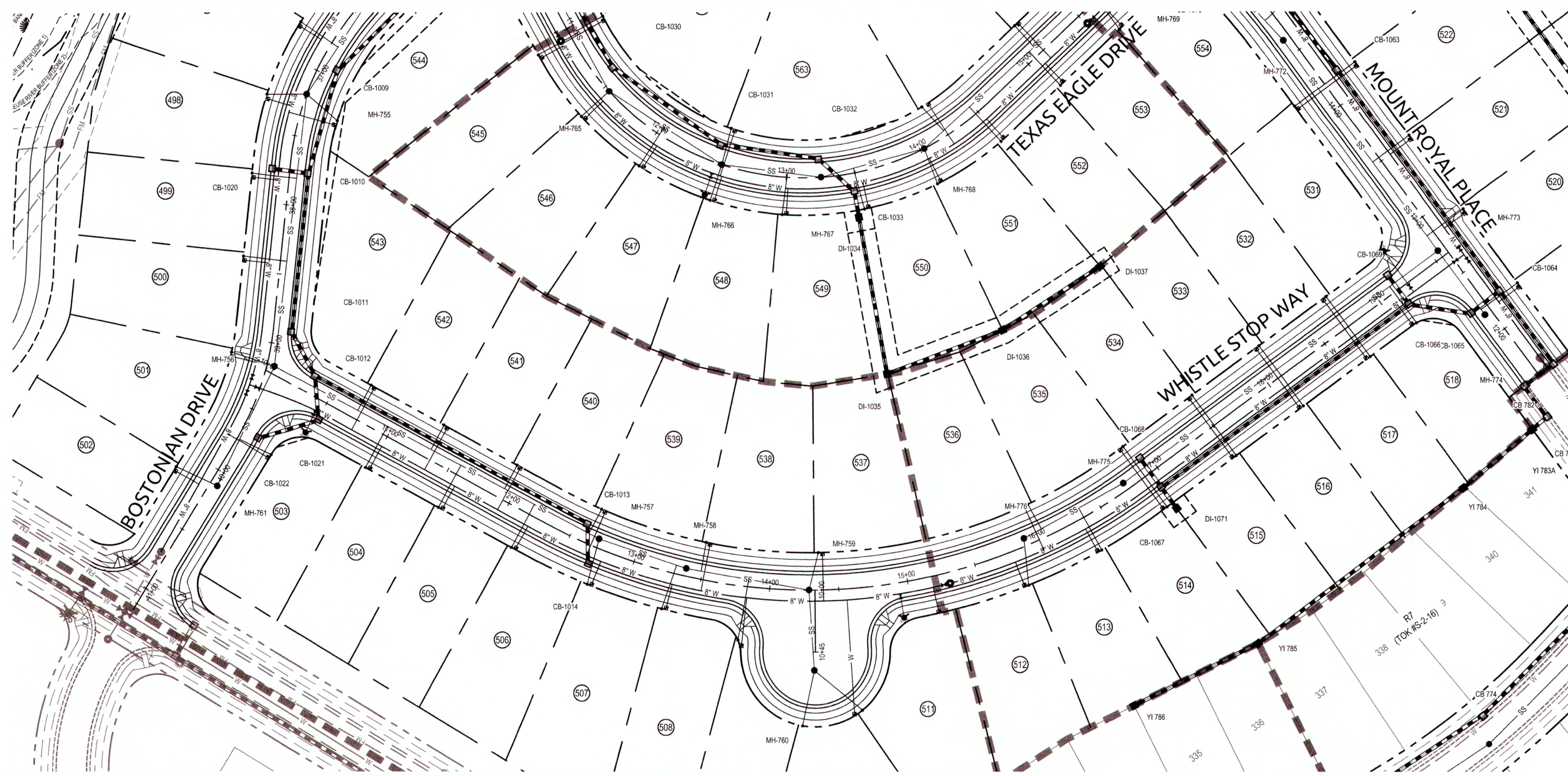
ATTENTION CONTRACTORS
 THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 996-4540 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.
 FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.
 FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

**BOSTONIAN DRIVE PLAN
 AND PROFILE**

Job No. 02090251.93 Drawn By WR
 Date 01/25/19 Designer WR



Revisions	Date	Comments
1	TOK Comments	06/21/19



PUBLIC SEWER COLLECTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # S-4561
 AUTHORIZATION TO CONSTRUCT 9/3/19 P. New M. Sample
 DATE 9/3/19

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # W-3658
 AUTHORIZATION TO CONSTRUCT P. New M. Sample
 DATE 9/3/19

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: [Signature] DATE: 7-8-2019
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
 BY: [Signature] DATE: 7-9-19
 ADMINISTRATOR

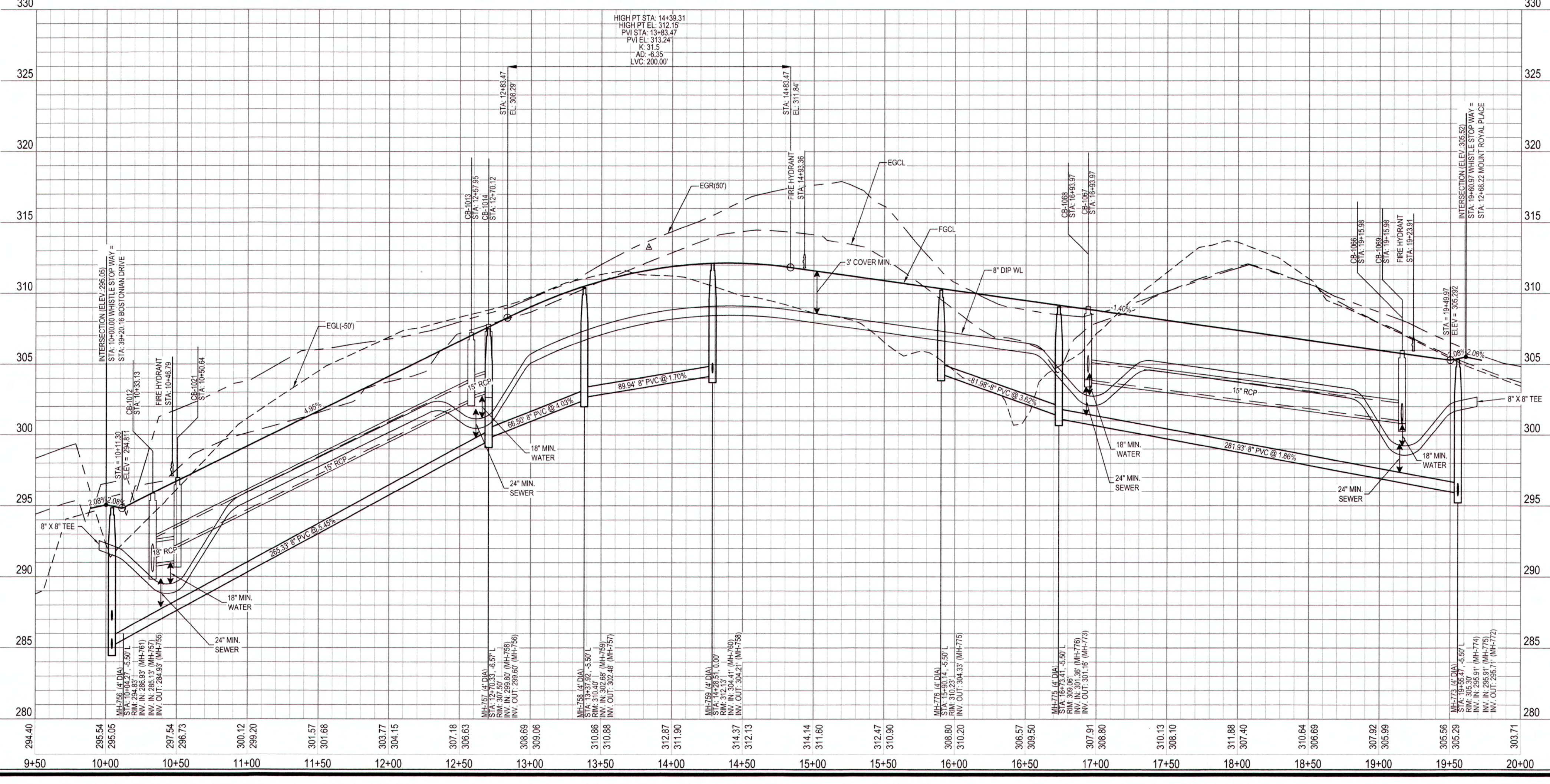
WithersRavenel
 Engineers | Planners | Surveyors

115 MackKen Drive | Cary, NC 27511 | 919-469-3340 | License # C-0832 | www.withersravenel.com

**KNIGHTDALE STATION
 R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

WHISTLE STOP WAY



SCALE:
 1" = 50' HORIZ.
 1" = 5' VERT.

ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

WATERLINE NOTE:
 IF MINIMUM CLEARANCE CANNOT BE ACHIEVED WITHOUT EXCEEDING MAXIMUM PIPE DEFLECTION FOR THE WATERLINE, THEN CONTRACTOR TO INSTALL 45° VERTICAL BENDS PER COR DETAIL W-12.

CLASS 1 STRUCTURAL MATERIAL NOTE:
 CLASS 1 STRUCTURAL MATERIAL REQUIRED FROM EXISTING GROUND TO SPRING LINE OF PROPOSED STORM PIPE IN FILL CONDITIONS SEE LATEST TOK STANDARD SPECIFICATIONS.

CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION-SERVICES	N/A
PUBLIC UTILITIES	<u>P. New M. Sample</u>
STORMWATER	N/A
PLANNING	N/A
FIRE	N/A
URBAN-FORESTRY	N/A

ATTENTION CONTRACTORS

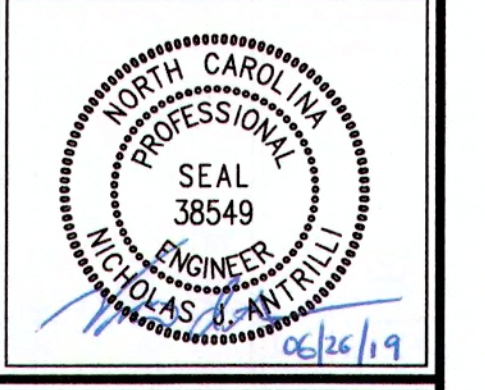
THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 996-4540 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTEAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

**WHISTLE STOP WAY PLAN
 AND PROFILE**

Job No: 02090251.93
 Date: 01/25/19
 Drawn By: WR
 Designer: WR

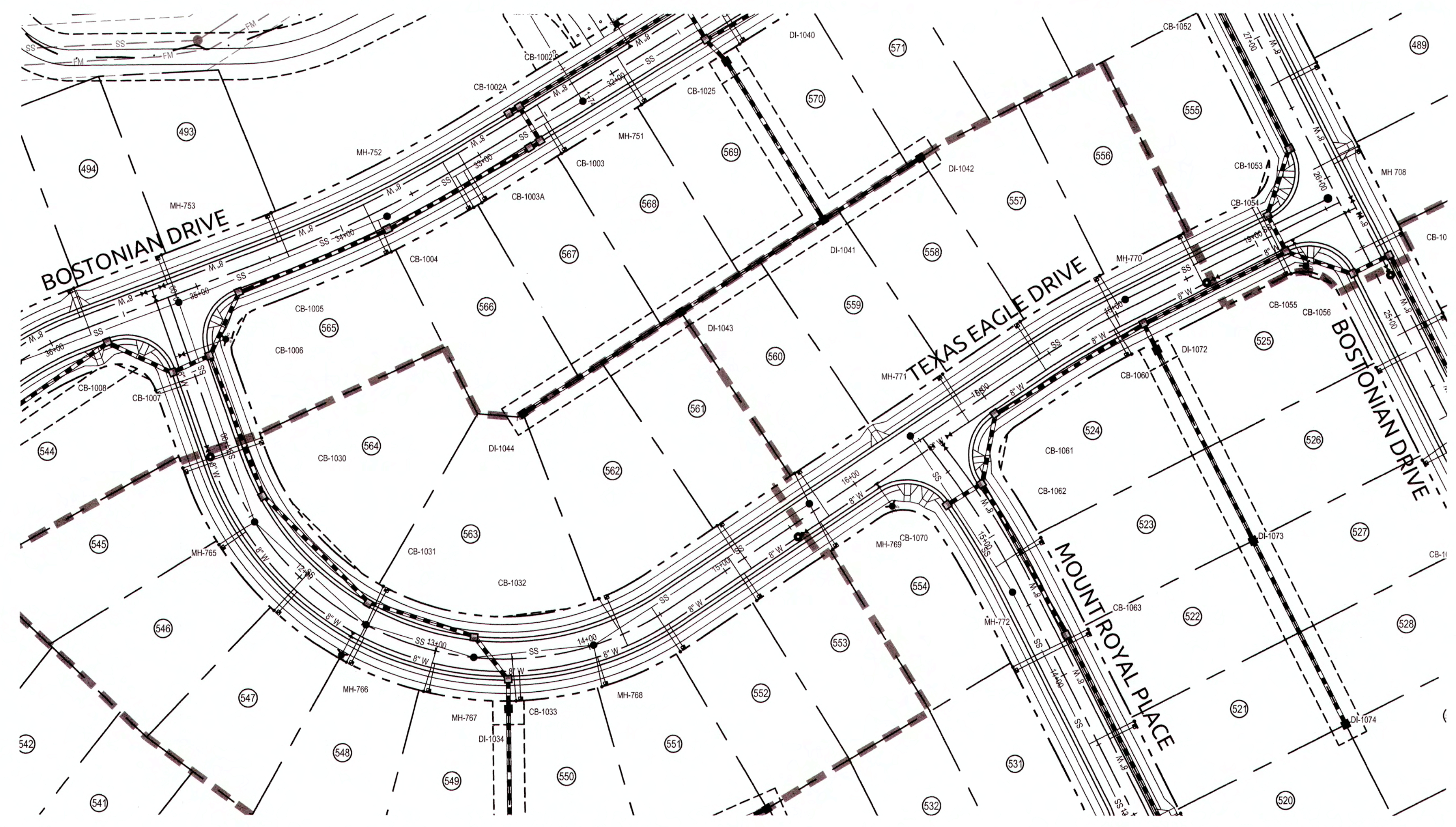


Revisions

1	TOK Comments	06/21/19
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Sheet No.
7.3

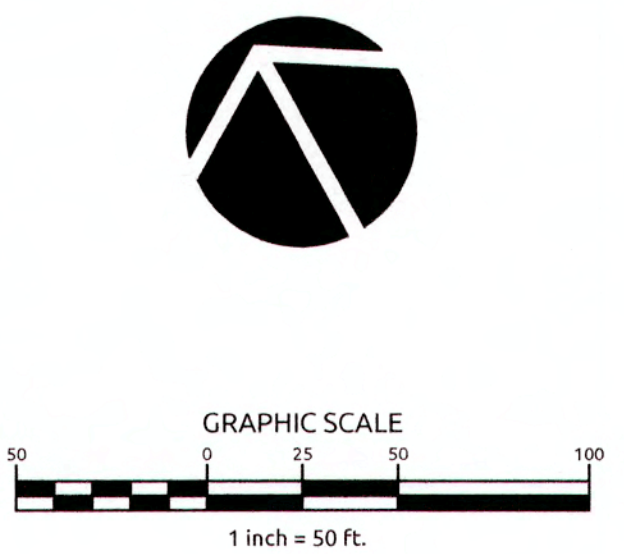
K:\09\04\020\020251.93\Knightdale Station - R7 North\CAD\Civil\Drawings\7.1 - 7.3 PLAN AND PROFILE.dwg - 1.dwg, June 22, 2019 12:45:45 AM - DURYSO, COLLEEN



PUBLIC SEWER COLLECTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # 5-4561
 AUTHORIZATION TO CONSTRUCT R. O'Connell Sample
 DATE 9/3/19

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # W-3638
 AUTHORIZATION TO CONSTRUCT R. O'Connell Sample
 DATE 9/3/19

TOWN CERTIFICATION THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: Scott Hill DATE: 7-8-2019
 DEVELOPMENT SERVICES ENGINEER
 THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
 BY: [Signature] DATE: 7-9-19
 ADMINISTRATOR

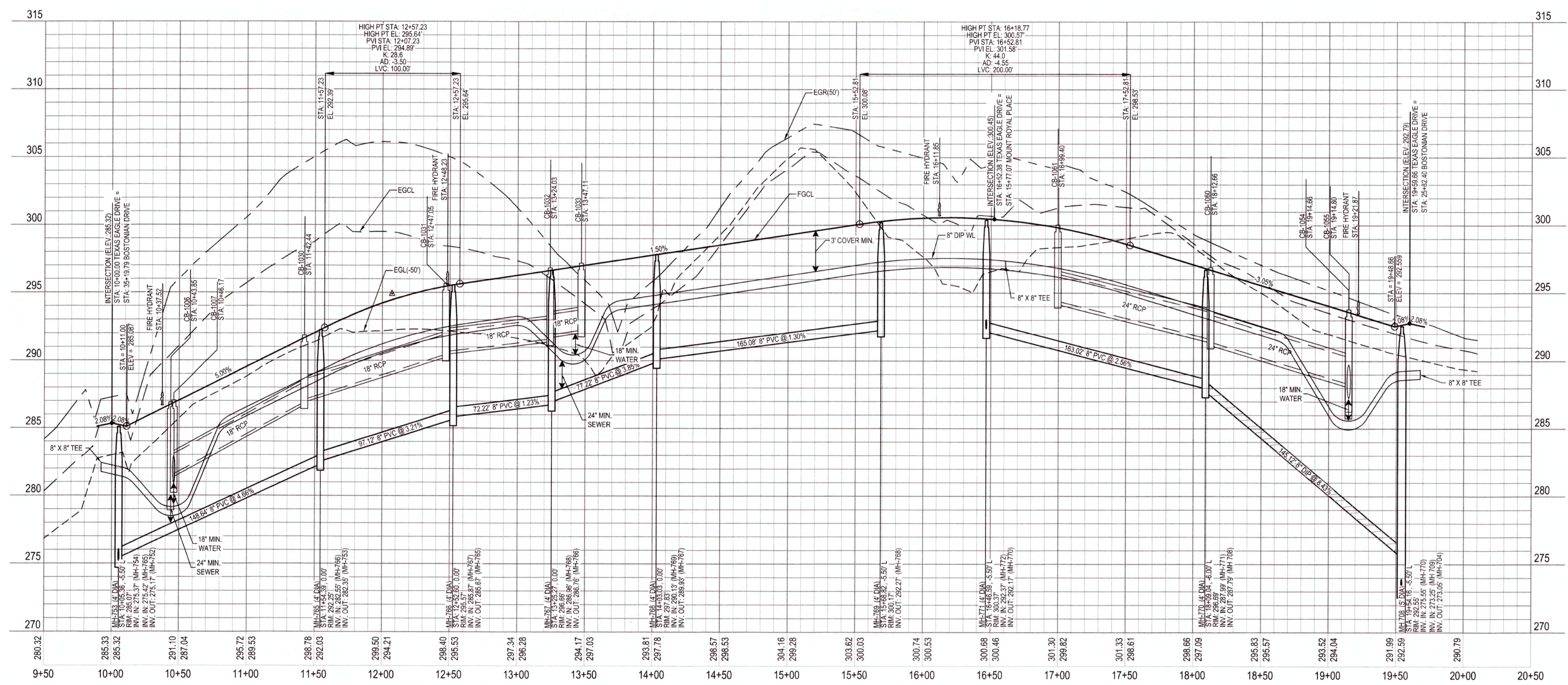


WithersRavenel
 Engineers | Planners | Surveyors

**KNIGHTDALE STATION
 R7 NORTH**
 TOWN OF KNIGHTDALE, NORTH CAROLINA

TEXAS EAGLE DRIVE

SCALE:
 1" = 50' HORIZ.
 1" = 5' VERT.



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WATERLINE NOTE:
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CLASS 1 STRUCTURAL MATERIAL NOTE:
 CLASS 1 STRUCTURAL MATERIAL REQUIRED FROM EXISTING GROUND TO SPRING LINE OF PROPOSED STORM PIPE IN FILL CONDITIONS SEE LATEST TOK STANDARD SPECIFICATIONS.

CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES	N/A
PUBLIC UTILITIES	<u>[Signature]</u>
STORMWATER	N/A
PLANNING	N/A
FIRE	N/A
URBAN FORESTRY	N/A

ATTENTION CONTRACTORS

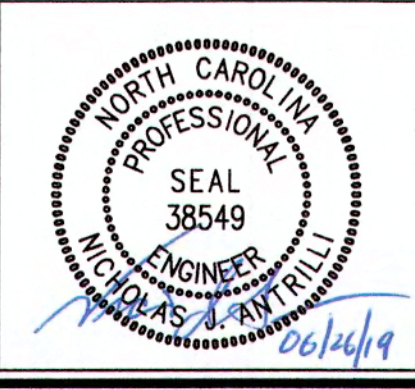
THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 996-4542 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

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**TEXAS EAGLE DRIVE PLAN
 AND PROFILE**

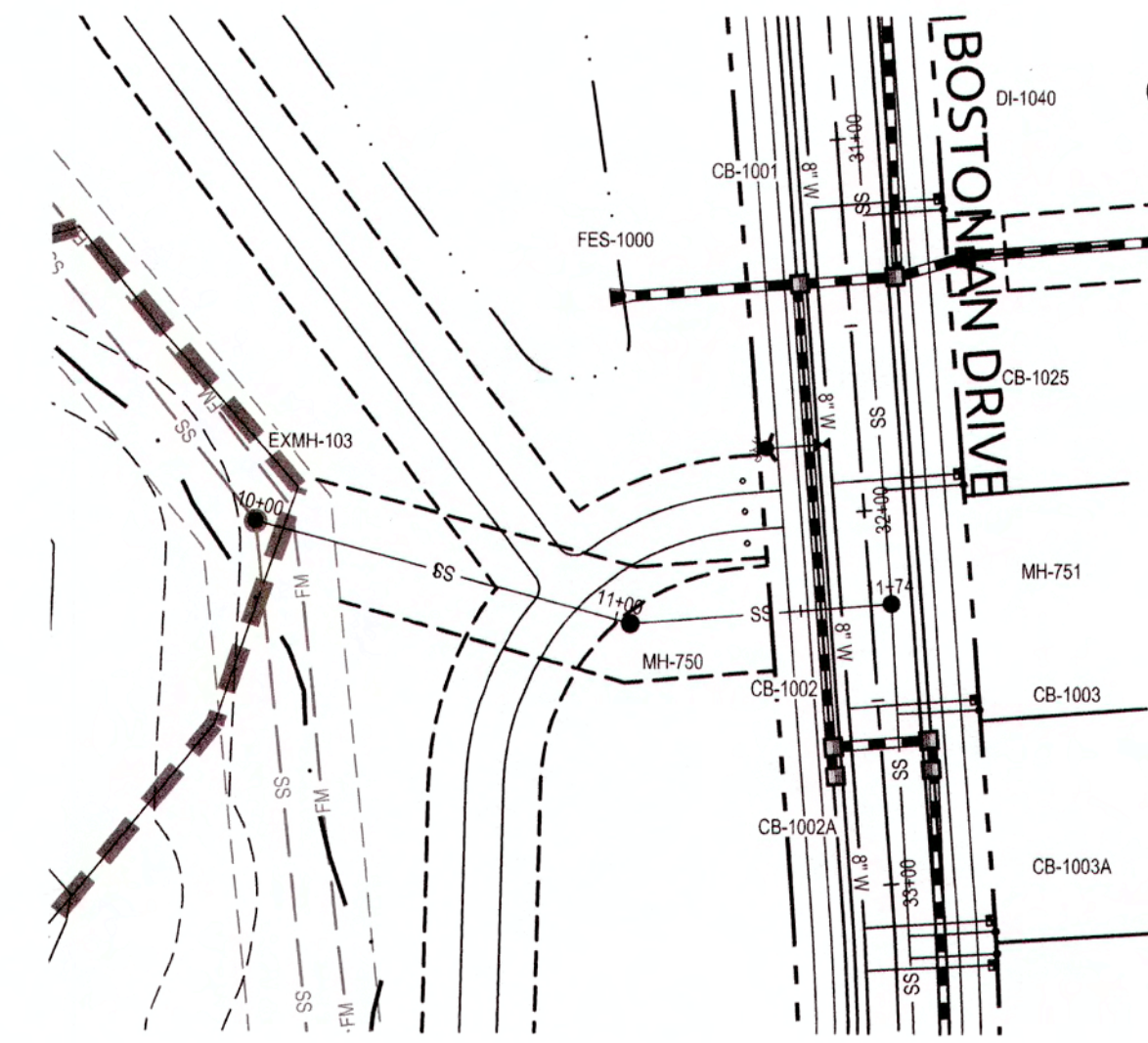
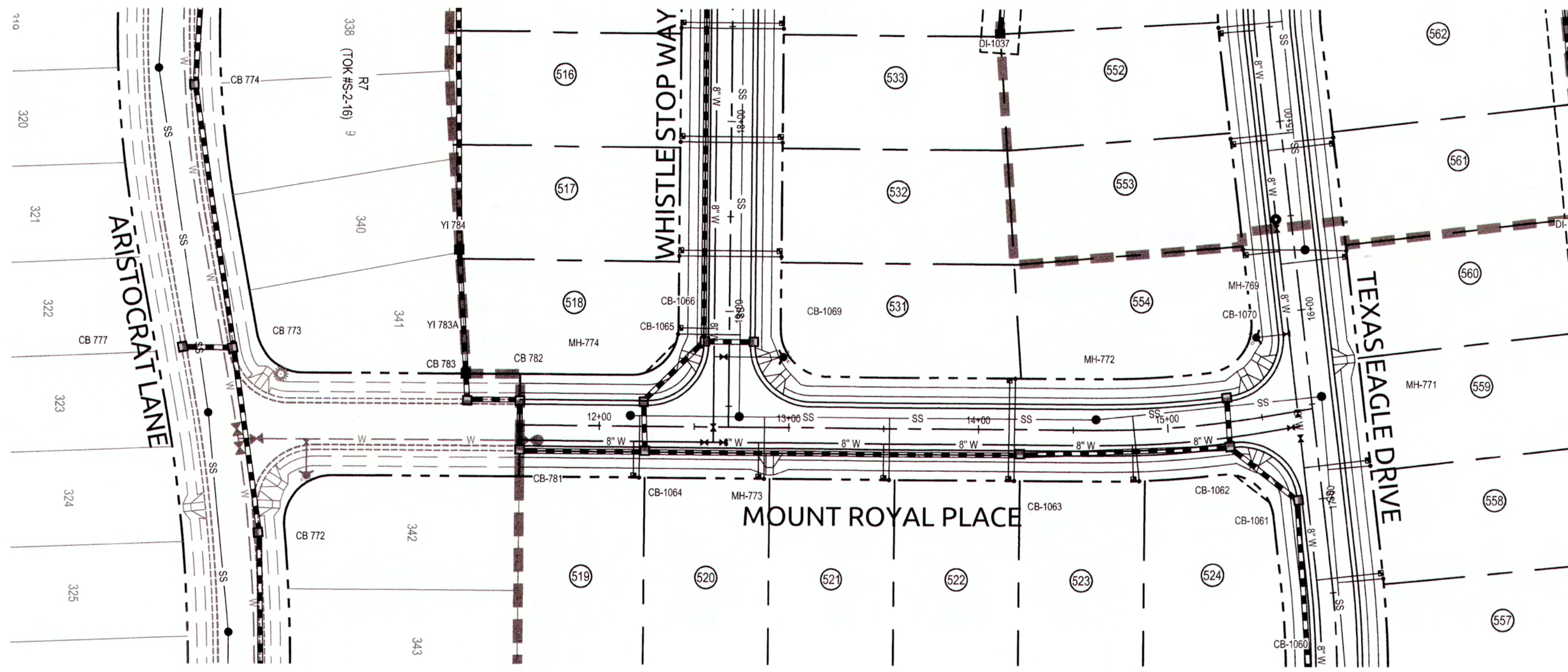
Job No. 02090251.93
 Date 01/25/19
 Drawn By WR
 Designer WR



Revisions

1	TOK Comments	06/21/19
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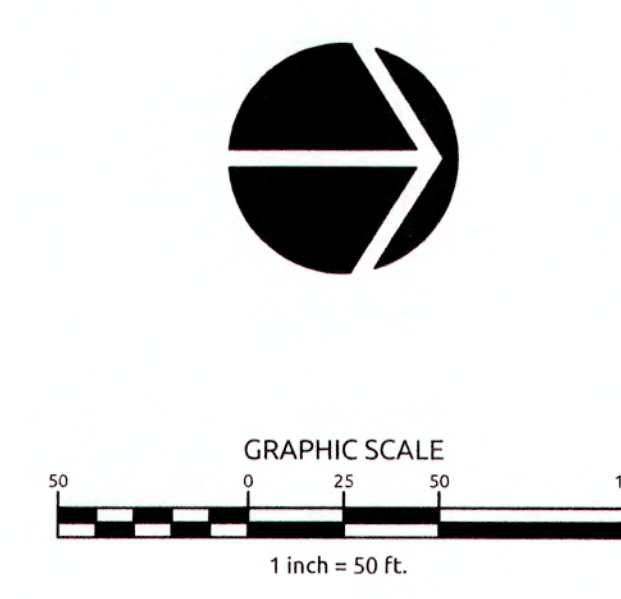
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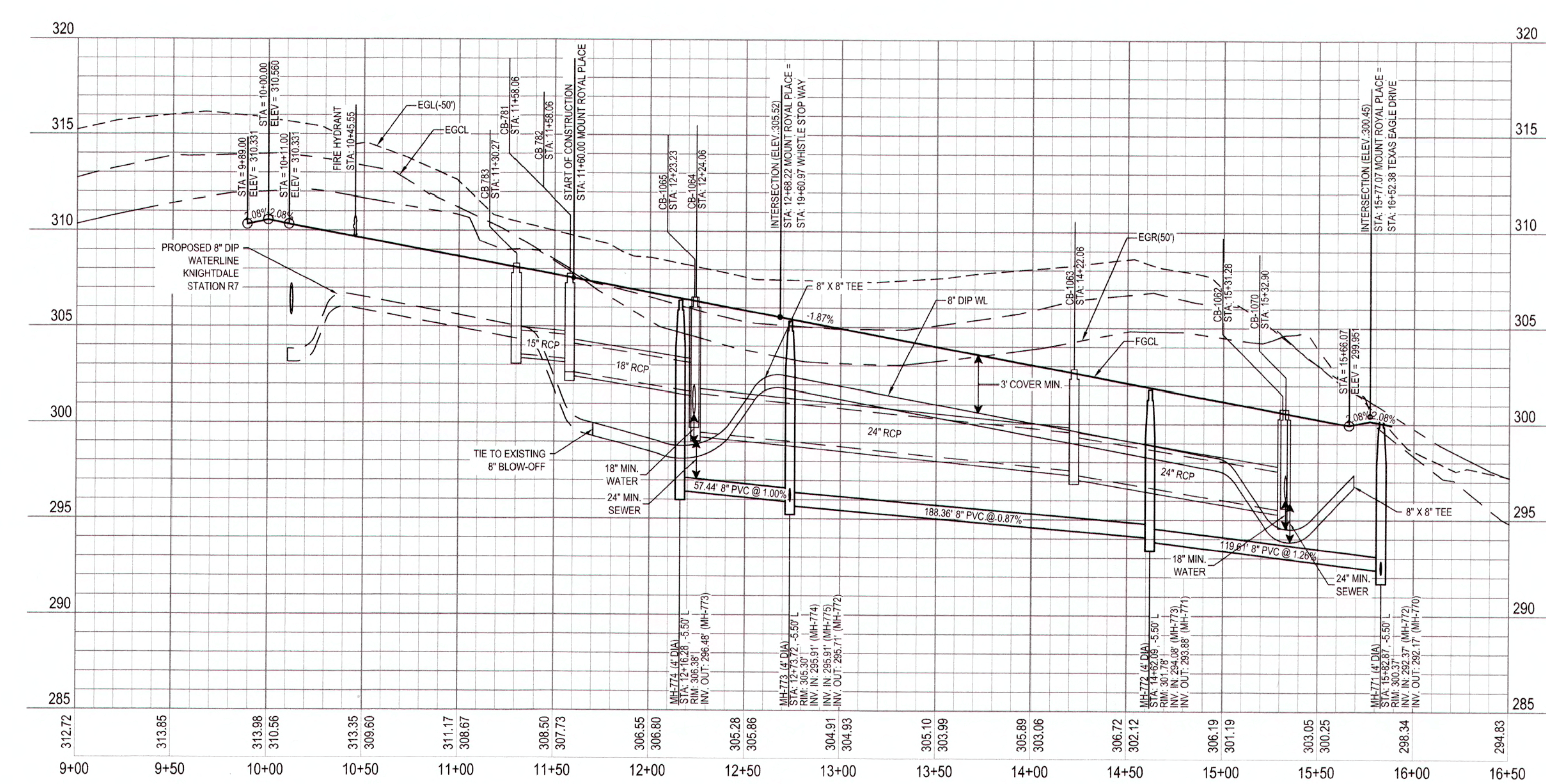
PUBLIC SEWER COLLECTION/EXTENSION SYSTEM
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 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # 5-4561
 AUTHORIZATION TO CONSTRUCT As per M. Sample
 DATE 9/3/19

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
 CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # W-3636
 AUTHORIZATION TO CONSTRUCT As per M. Sample
 DATE 9/3/19

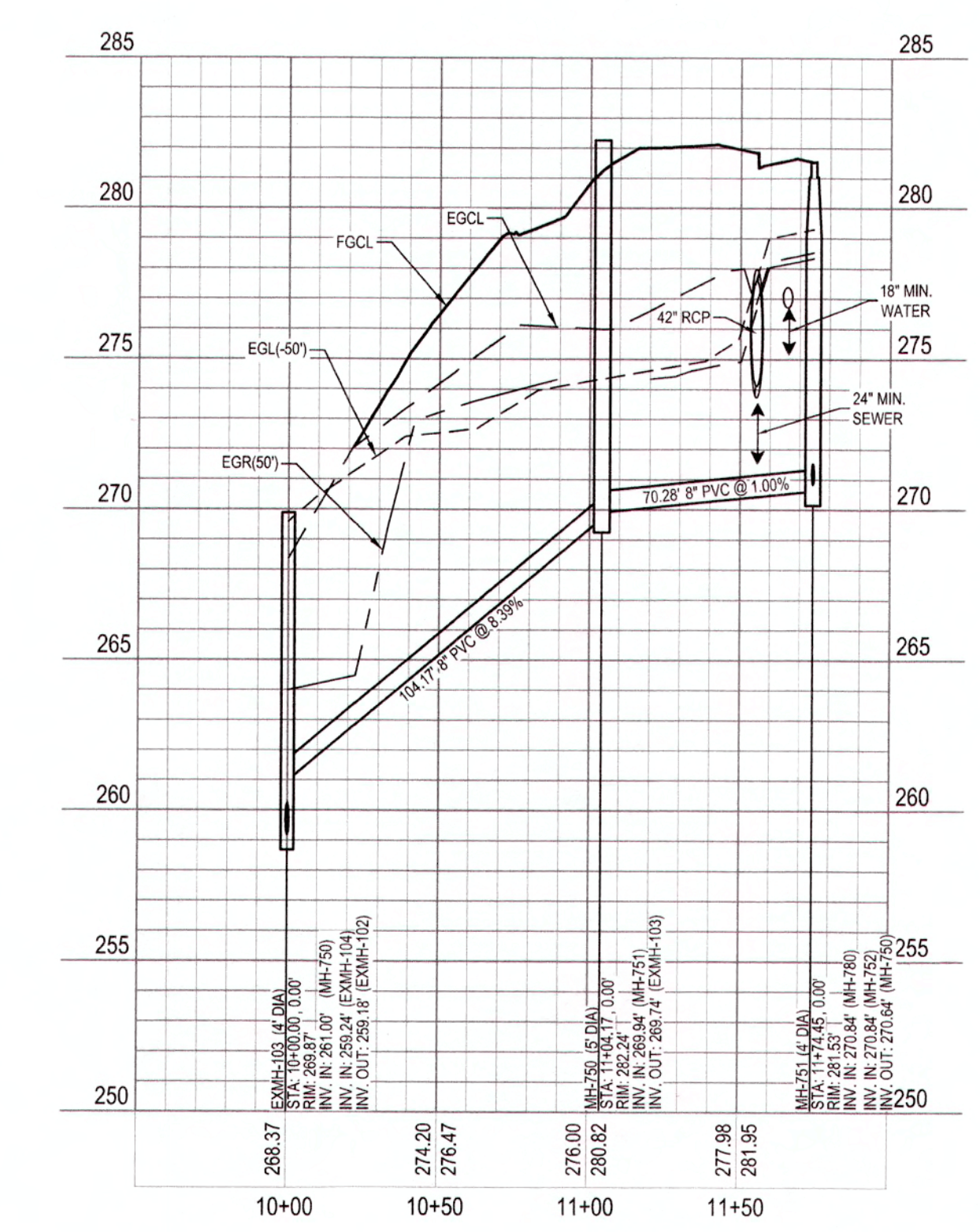
TOWN CERTIFICATION THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: Scott All DATE: 7-8-2019
 DEVELOPMENT SERVICES ENGINEER
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 BY: [Signature] DATE: 7-9-19
 ADMINISTRATOR



MOUNT ROYAL PLACE



SANITARY SEWER OUTFALL N



SCALE:
 1" = 50' HORIZ.
 1" = 5' VERT.

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CITY OF RALEIGH
 ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.
 TRANSPORTATION SERVICES: N/A
 PUBLIC UTILITIES: 43
 STORMWATER: N/A
 PLANNING: N/A
 FIRE: N/A
 URBAN FORESTRY: N/A

ATTENTION CONTRACTORS
 THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 996-4542 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.
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WithersRavenel
 Engineers | Planners | Surveyors

**KNIGHTDALE STATION
 R7 NORTH**

TOWN OF KNIGHTDALE, NORTH CAROLINA

**MOUNT ROYAL PLACE & SS
 OUTFALL N PLAN AND
 PROFILE**

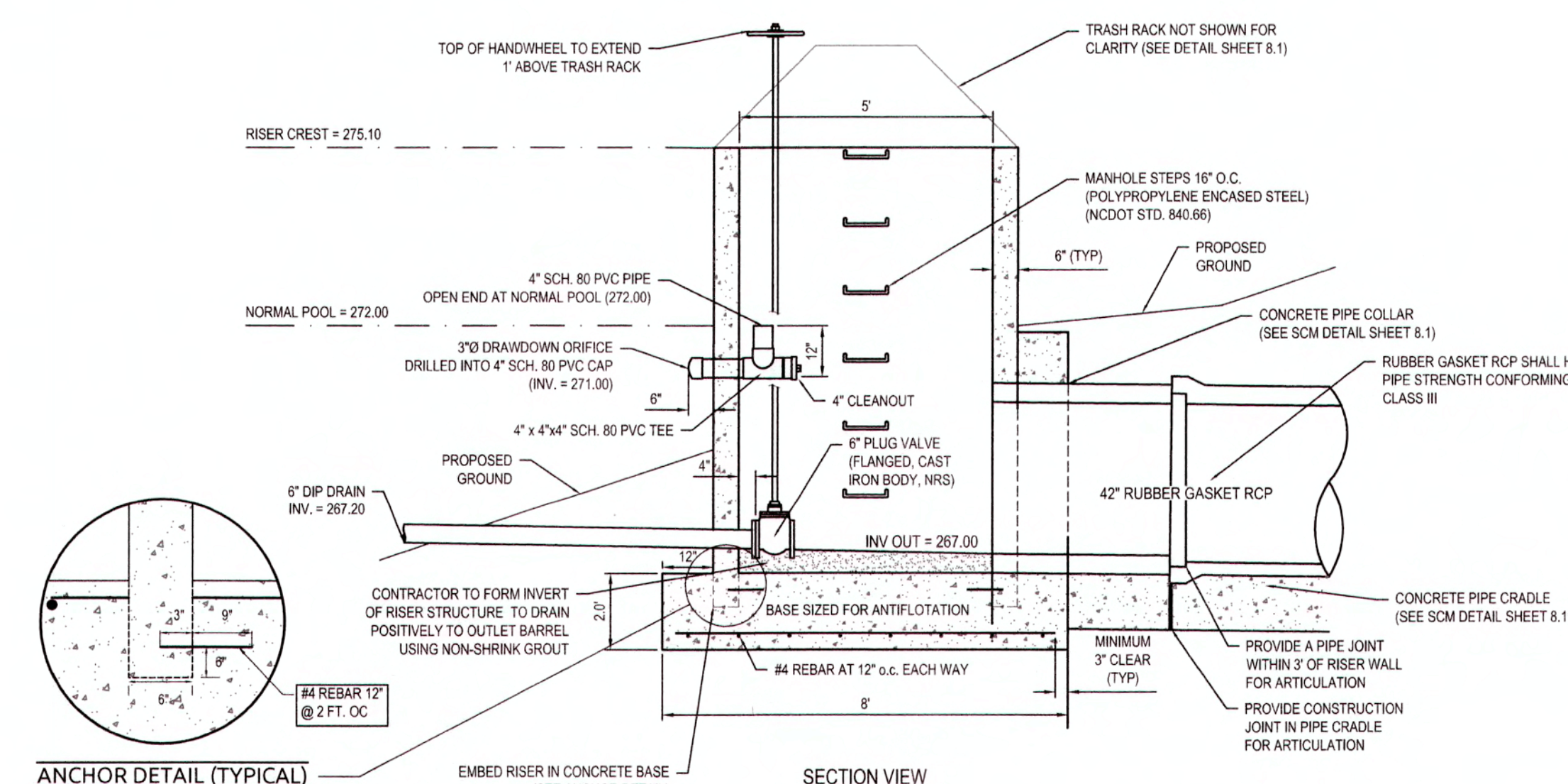
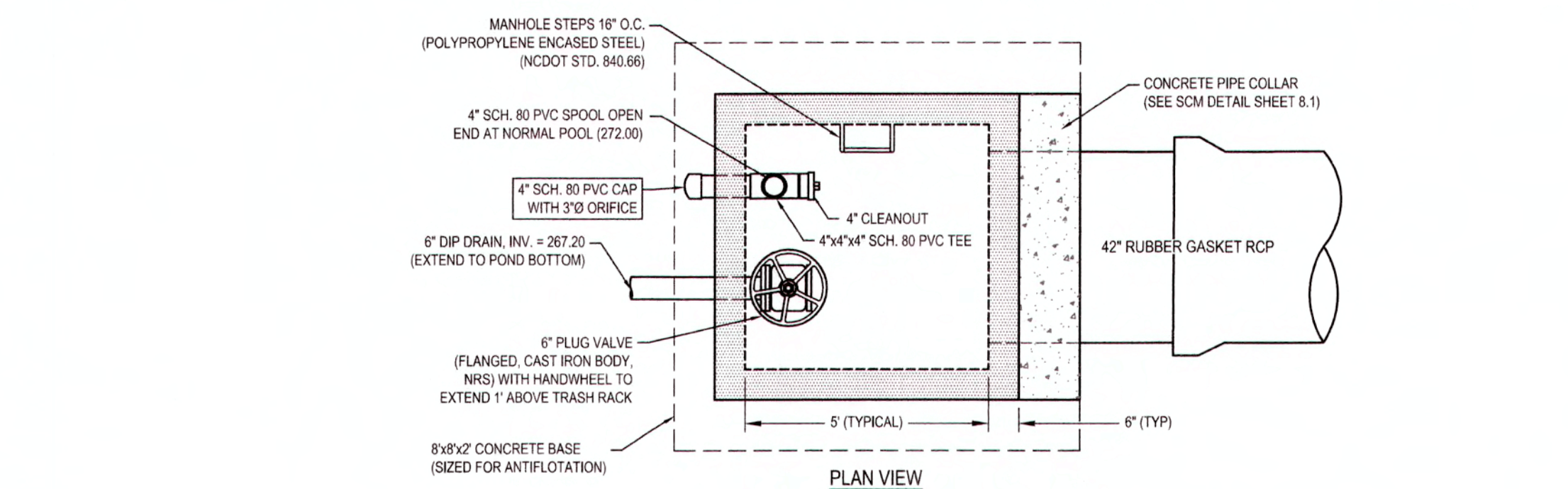
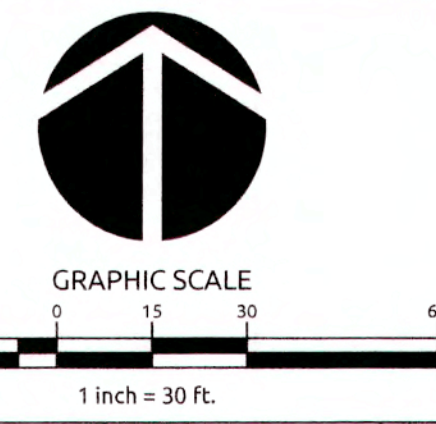
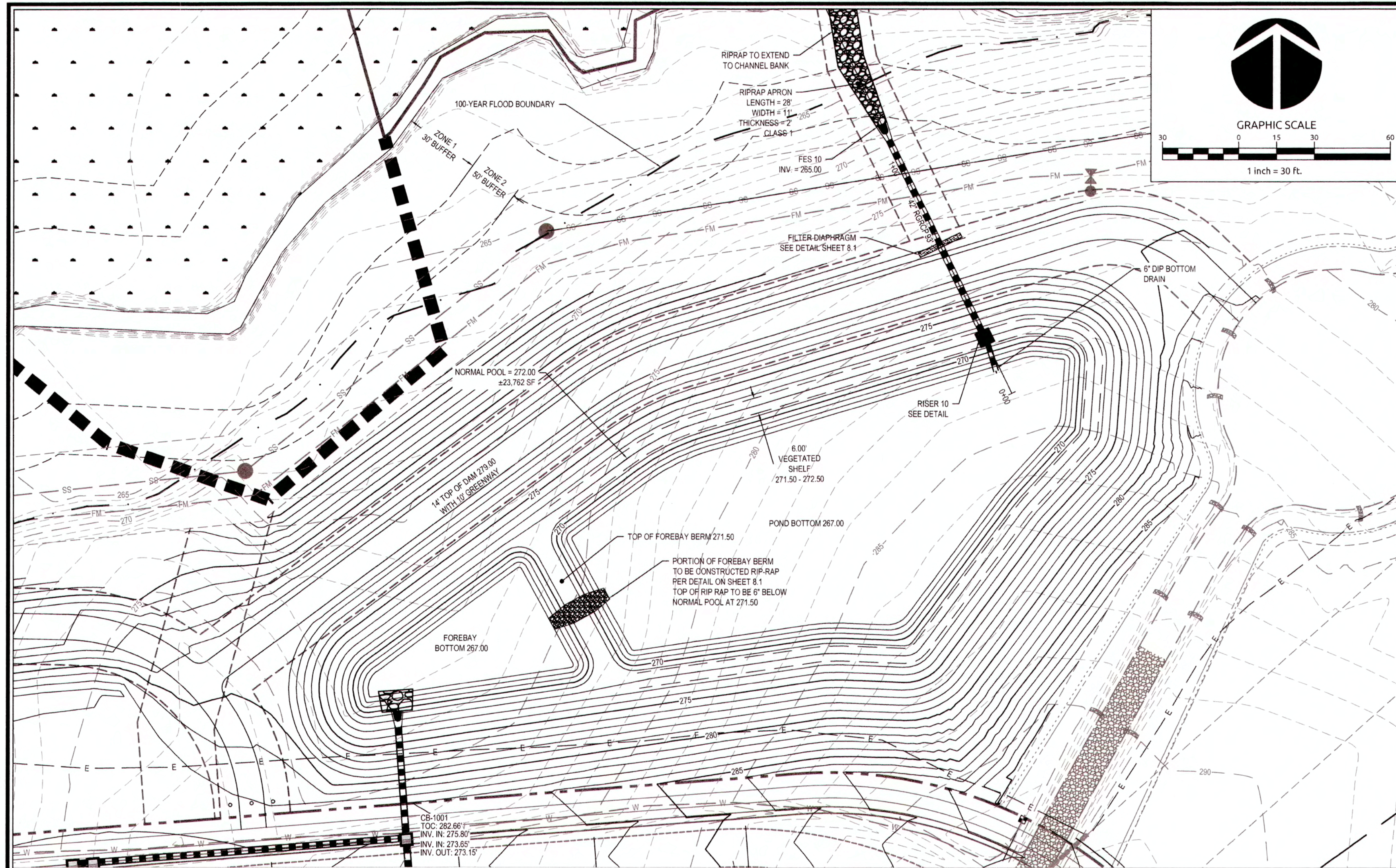
Job No: 02090251.93
 Date: 01/25/19
 Drawn By: WR
 Designer: WR

**NORTH CAROLINA
 PROFESSIONAL
 SEAL
 38549
 ENGINEER
 MICHAEL S. Y. ATTELL
 06/26/19**

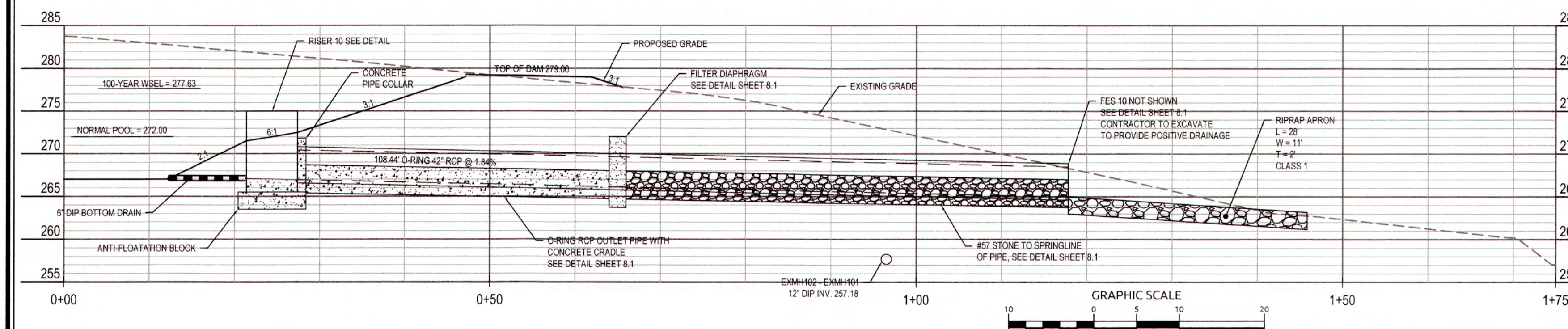
Revisions:
 1 TOK Comments 06/21/19

Sheet No:
7.5

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SCM #10 RISER DRAWDOWN DEVICE DETAIL
NOT TO SCALE



POND GRADING DETAIL
NOT TO SCALE

STORMWATER CONTROL MEASURE (SCM) NOTES

- PRIOR TO BEGINNING CONSTRUCTION, ANY DISCREPANCIES IN THE PLANS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGN ENGINEER FOR RESOLUTION. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL CURRENT TOWN OF KNIGHTDALE STANDARDS AND SPECIFICATIONS.
- THE GEOTECHNICAL ENGINEER SHALL COMPLETE A GEOTECHNICAL EXPLORATION OF THE EXISTING EMBANKMENT AND PROVIDE A REPORT EVALUATING THE SUITABILITY OF EXISTING SOILS PRIOR TO CONTRACTOR COMPLETING IMPROVEMENTS.
- THE GEOTECHNICAL ENGINEER SHALL EVALUATE EXISTING AND BORROW SOILS FOR SUITABILITY OF DAM CONSTRUCTION AND SLOPE STABILITY. PROFESSIONAL CERTIFICATION OF EMBANKMENT CONSTRUCTION IS REQUIRED FOR AS-BUILT CERTIFICATION.
- EMBANKMENT TO BE CONSTRUCTED PER THE FOLLOWING SPECIFICATIONS UNLESS SUPERSEDED BY GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
 - BORROW MATERIALS FOR USE AS EMBANKMENT FILL SHALL BE FREE OF ORGANICS, ROOTS AND OTHER WOODY VEGETATION OR ORGANIC DEBRIS. MATERIALS SHALL CONSIST OF SOILS WHICH CLASSIFY AS SC, SM, CL, CL-CH AND ML IN ACCORDANCE WITH THE UNIFIED CLASSIFICATION SYSTEM OR AS APPROVED BY THE GEOTECHNICAL ENGINEER WITH A MAXIMUM PARTICLE SIZE OF 3" OR LESS IN MEAN DIAMETER.
 - SOIL MATERIALS USED FOR EARTH FILL WHICH ARE CONSIDERED PERMEABLE OR WHICH EXHIBIT SIGNIFICANT SHRINKSWELL SHALL NOT BE USED IN THE EMBANKMENT UNLESS SPECIFICALLY APPROVED BY ONSITE GEOTECHNICAL ENGINEER.
 - FILL SHALL BE PLACED IN 8" MAXIMUM LOOSE LIFTS UNDER THE SUPERVISION OF THE GEOTECHNICAL ENGINEER. FILL SHALL BE BROUGHT UP BY BENCHING INTO THE EXISTING SLOPE. THE MAXIMUM HEIGHT OF 2 FEET SHALL BE USED FOR EACH BENCH LIFT TAKING CARE TO REMOVE ROOT STRUCTURES AS THE FILL PROCEEDS. SURFACE OF EACH LIFT SHALL BE SCARIFIED PRIOR TO PLACEMENT OF THE NEXT LIFT IN ORDER TO EFFECTIVELY TIE THE FILL LIFTS TOGETHER.
 - ALL COMPACTION SHALL BE TESTED BY THE SAND CONE METHOD (ASTM D-1586) OR

NUCLEAR METHOD (ASTM D-6938) AT A RATE OF AT LEAST ONE TEST PER 5,000 SF PER ONE FOOT OF COMPACTED FILL THICKNESS IN GENERAL AREA FILLS AND ONE TEST PER 50 LINEAL FEET PER LIFT ALONG THE BARREL. THE MINIMUM COMPACTION SHOULD BE 95% OF THE MAXIMUM STANDARD PROCTOR DENSITY (ASTM D-698) AT MOISTURE CONTENTS VARYING FROM 2 PERCENT BELOW TO 3 PERCENT ABOVE OPTIMUM MOISTURE CONTENT WITHIN 3FT OF THE FINAL GRADE.

EMBANKMENT AND SEE SLOPES OF THE BASIN SHALL BE STABILIZED PER SEEDING SCHEDULE ON EROSION CONTROL DETAILS SHEET OR SCHEDULED. SEE LANDSCAPE PLAN SHEET L1.1.

DURING CONSTRUCTION, THE SCM IS TO BE USED AS AN EROSION CONTROL DEVICE. THE FOREBAY WILL NOT BE REQUIRED WHILE SCM IS ACTING AS AN EROSION CONTROL DEVICE.

ALL PERMANENT STRUCTURES (I.E. RISER BOX, OUTLET PIPES, CONCRETE CRADLES, SPILLWAY FILTER, ETC.) ARE TO BE INSTALLED WITH THE INITIAL DAM CONSTRUCTION. CONTRACTOR TO PROVIDE SHOP DRAWINGS TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING STRUCTURES.

ONCE THE SITE HAS BEEN STABILIZED, CONTRACTOR SHALL OBTAIN APPROVAL BY EROSION CONTROL INSPECTOR IN ORDER TO REMOVE EROSION CONTROL DEVICES.

ONCE ALL SEDIMENT AND EROSION CONTROL DEVICES HAVE BEEN REMOVED, THE SCM SHALL BE CONVERTED TO A PERMANENT SCM.

ALL SEDIMENT SHALL BE REMOVED AND DISPOSED OF PROPERLY.

INTERIOR SCAM GRASSING SHALL BE CONSTRUCTED PER THIS PLAN.

SCM SHALL BE PLANTED PER PLANT SCHEDULE ON LANDSCAPE PLAN SHEET

TOWN OF KNIGHTDALE REQUIRES FINAL CERTIFICATION OF SCM BY PROFESSIONAL ENGINEER.

CLAY LINER SPECIFICATIONS:

THE CLAY LINER FOR THE WET POND SHALL BE AT LEAST 8" THICK AND MEET THE FOLLOWING SPECIFICATIONS:

- UNIFIED SOIL CLASSIFICATION SYSTEM DESIGNATION OF CL, CH, ML, SC
- MINIMUM OF 40% PASSING #200 SIEVE

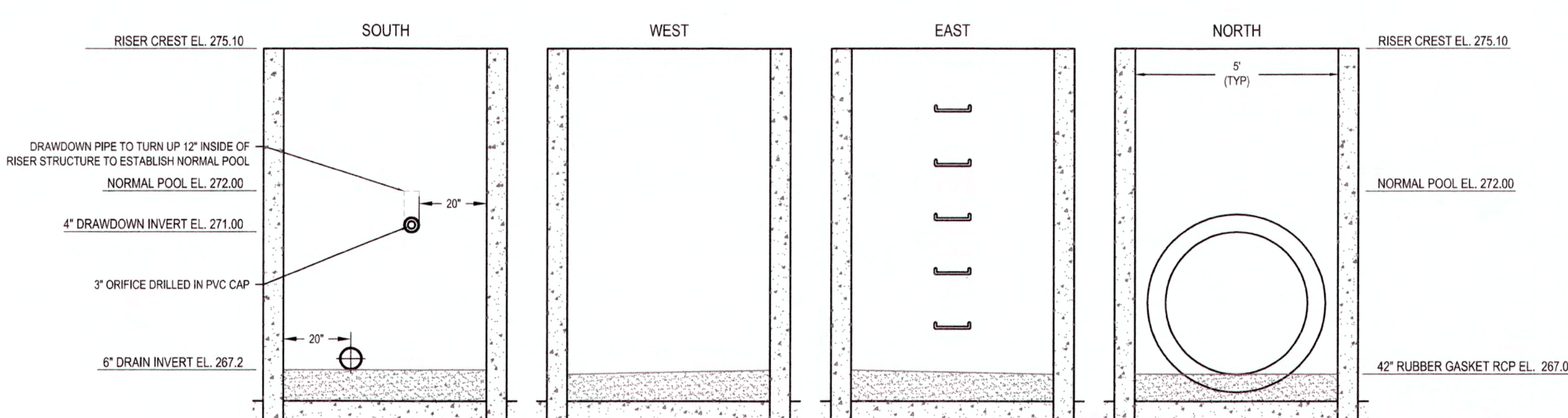
PRECAST CONCRETE MATERIALS

- ALL PRECAST CONCRETE STRUCTURES SHALL CONFORM TO ASTM C913 (RECTANGULAR) OR C478 (ROUND).
- ALL REINFORCED CONCRETE PIPE SHALL CONFORM TO ASTM C78, CLASS III (UNLESS OTHERWISE NOTED).
- RUBBER GASKETED JOINTS (O-RING) SHALL CONFORM TO ASTM C443 & ASTM C361.
- NON O-RING JOINTS SHALL CONFORM TO ASTM C390.

LANDSCAPING NOTES:

- REFER TO SHEET L1.0 FOR LANDSCAPE SCREENING & SHEET L1.1 FOR PLANTING REQUIREMENTS.

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SCM #10 RISER WALL ELEVATIONS
NOT TO SCALE

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

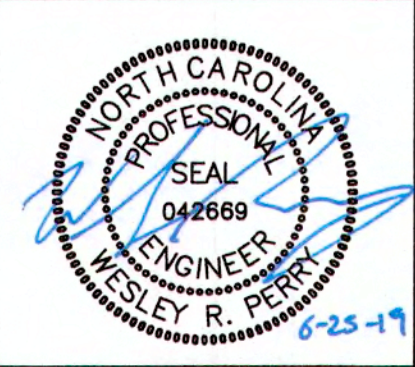
DEVELOPMENT SERVICES ENGINEER: DATE: 7-8-2019

ADMINISTRATOR: DATE: 7-9-19

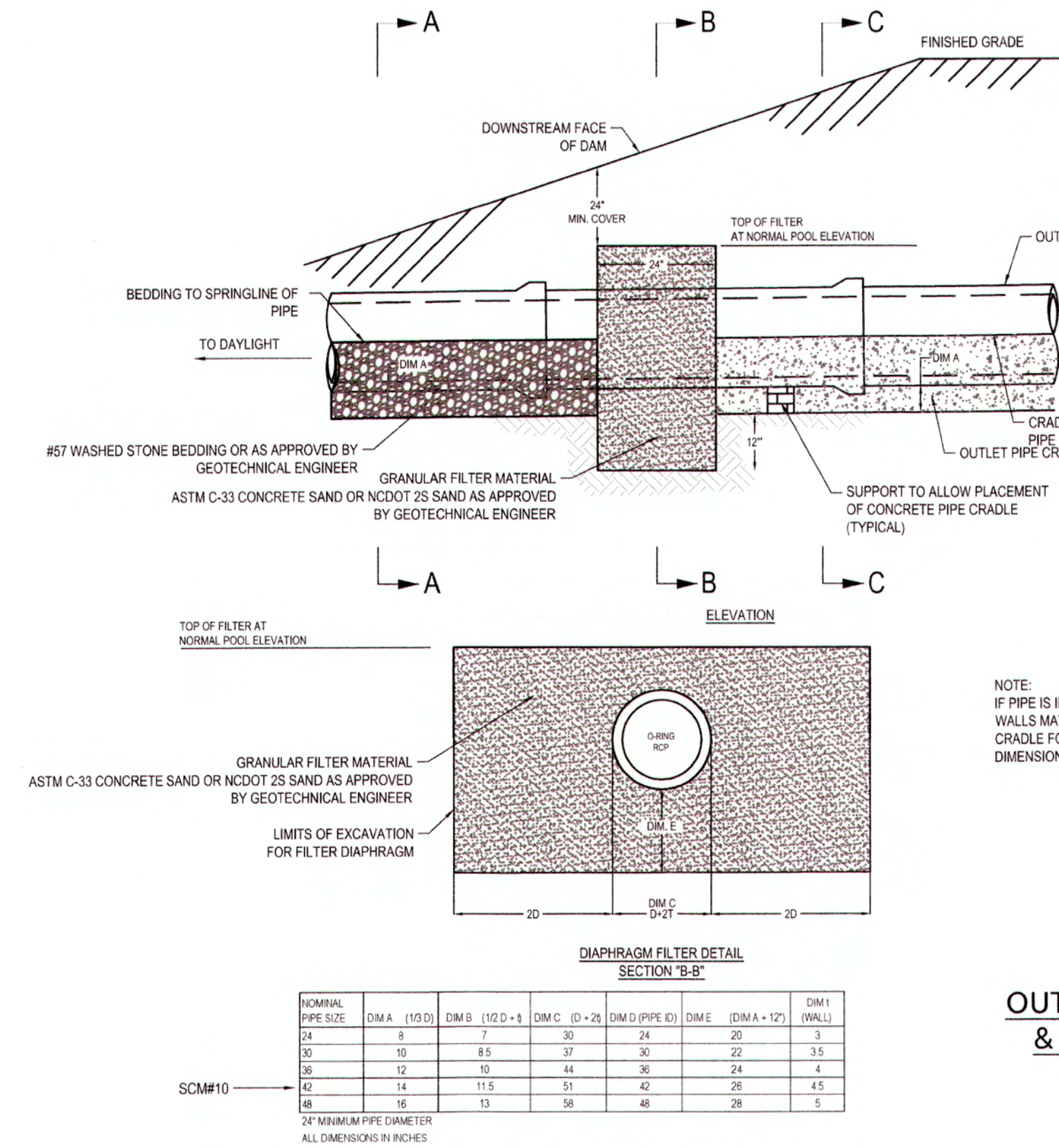
PUBLIC SEWER COLLECTION/EXTENSION SYSTEM: THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

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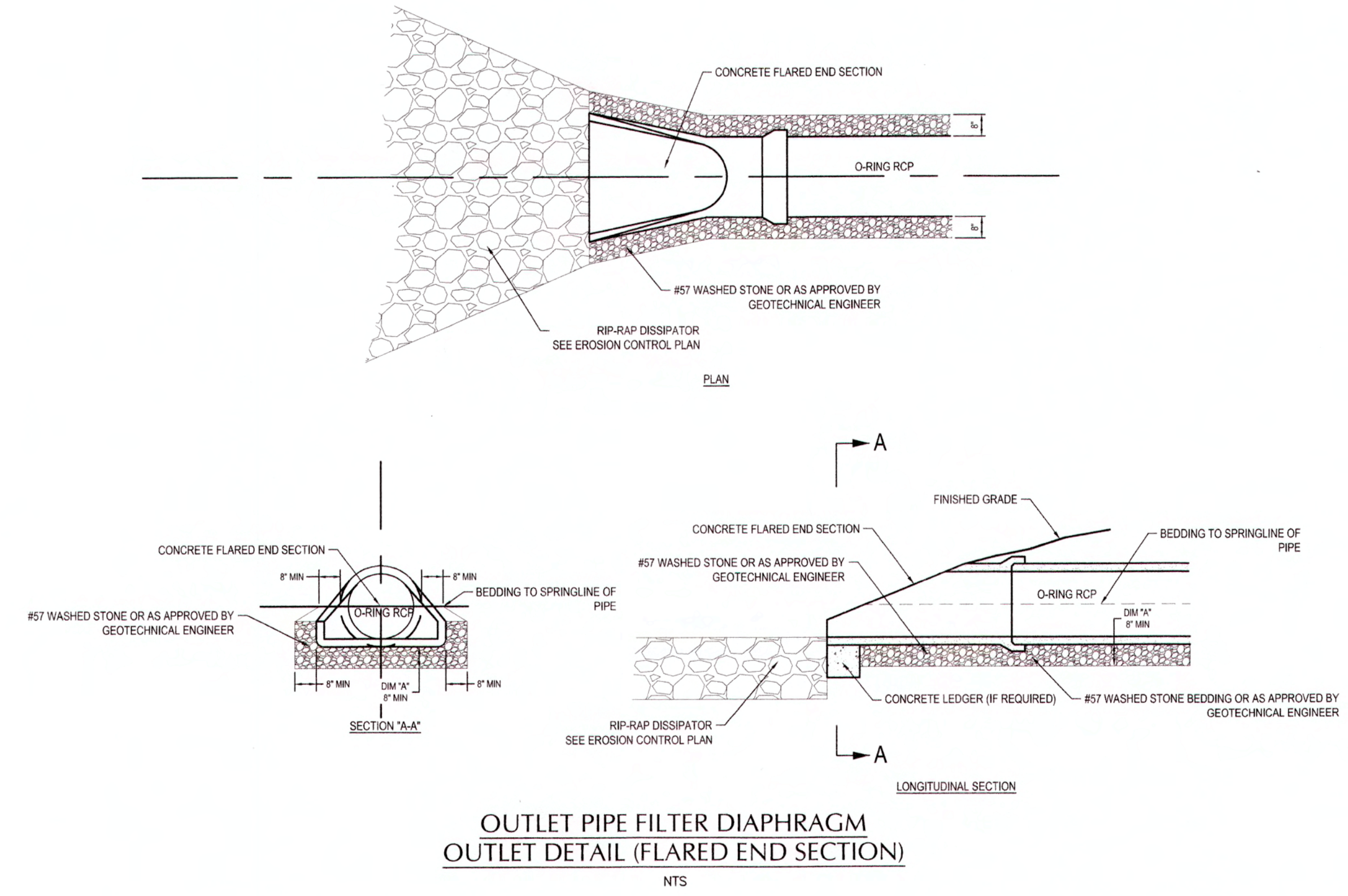
CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT #: AUTHORIZATION TO CONSTRUCT DATE:



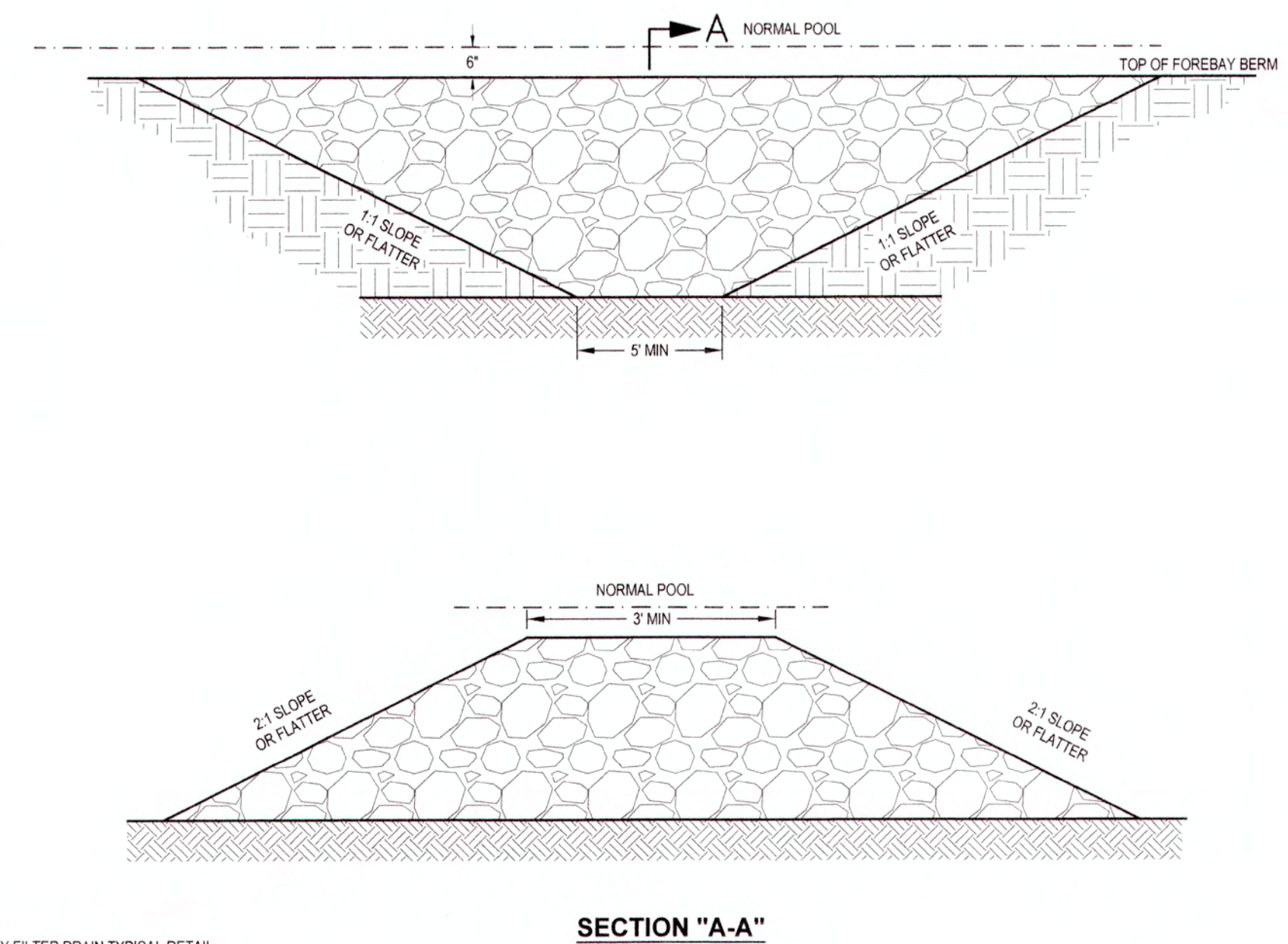
Revisions	Date	Description
1	06/21/19	TOK Comments



OUTLET PIPE DIAPHRAGM & CONCRETE CRADLE DETAIL
NOT TO SCALE



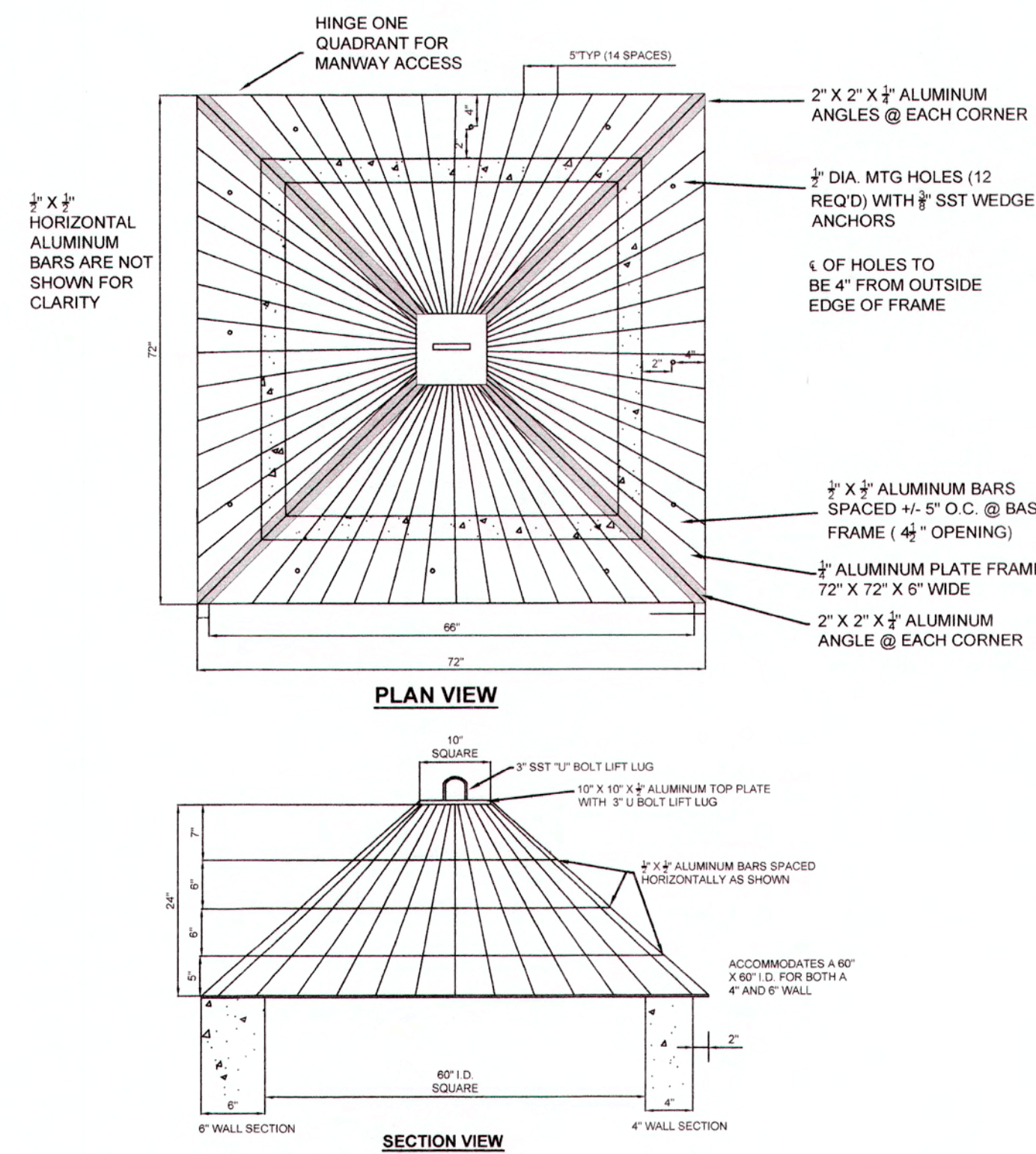
OUTLET PIPE DIAPHRAGM OUTLET DETAIL (FLARED END SECTION)
NTS



FOREBAY FILTER DRAIN TYPICAL DETAIL

- BOTTOM WIDTH SHALL BE NO LESS THAN 5'
- USE NCDOT CLASS "B" RIP RAP TO FILL SPILLWAY
- SLOPES FROM SPILLWAY BOTTOM TO TOP OF BERM SHOULD BE NO STEEPER THAN 1:1

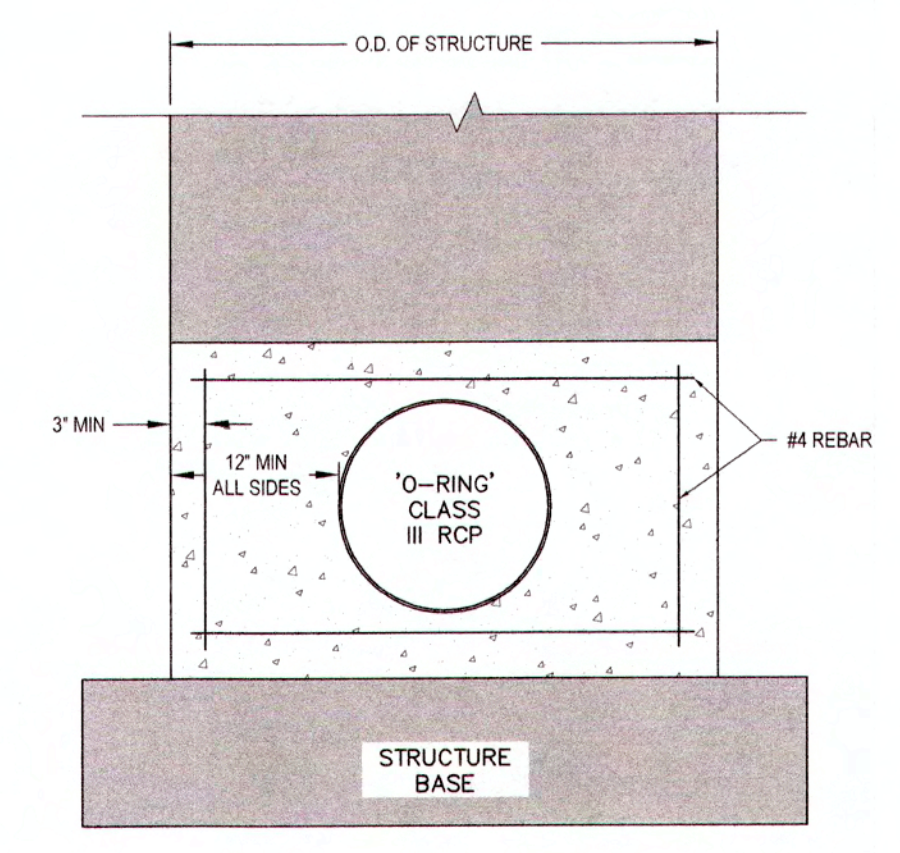
FOREBAY FILTER DRAIN DETAIL



NOTES

- TRASH RACK DETAIL BASED ON POMONA PIPE PRODUCTS' STANDARD ALUMINUM BAR & ANGLE PEAKED ROOF TRASH RACK WITH ONE QUADRANT HINGED FOR MANWAY ACCESS TO FIT 60"x60" I.D. CONCRETE RISER WITH 6" OR 8" THICK WALLS.
- TRASH RACK TO BE POWDER-COATED BLACK.

5' TRASH RACK



NOTE: INSTALL VERTICAL DOWELS IN FOUNDATION CONCRETE AS HOLDING BARS FOR CONCRETE COLLAR REBAR.

CONCRETE COLLAR DETAIL
NTS

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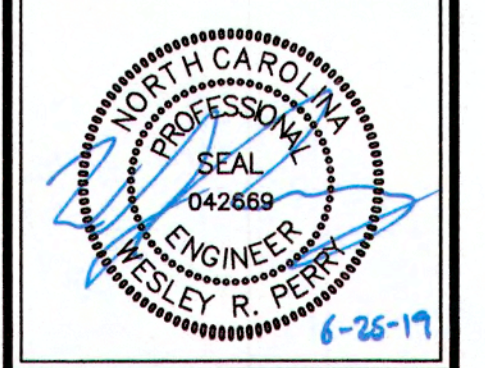
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BY: *[Signature]* DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 7-9-19
ADMINISTRATOR

Job No.	0209025153	Drawn By	WR
Date	01/25/19	Designer	WR

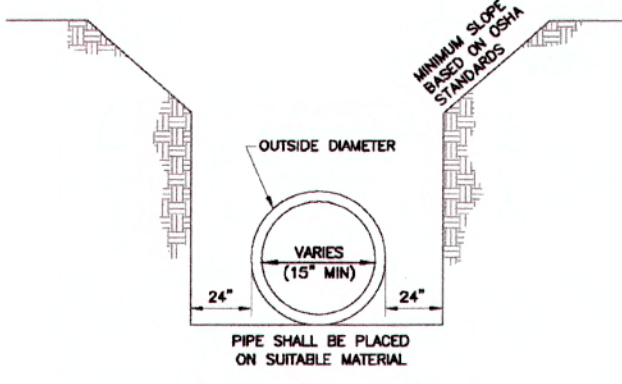


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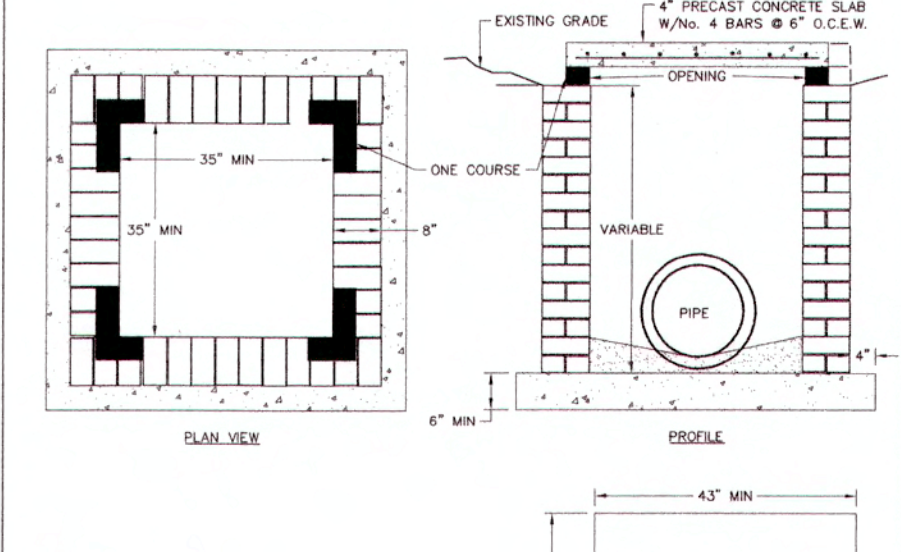
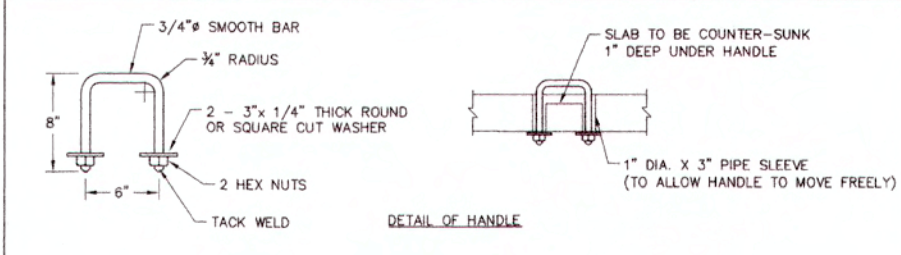
K:\09\0250\025153\Knightdale Station - R7 North\CAD\Civil Drawings\B.04.1 SCM PLAN & DETAILS.dwg Friday, June 21, 2019 8:42:46 PM - D:\RYAN.COLEN

NOTES:

1. A MINIMUM OF 24" FROM OUTSIDE DIAMETER OF PIPE TO SIDE OF TRENCH MUST BE ALLOWED FOR COMPACTION OF FILL MATERIAL. BACKFILLING OF TRENCHES SHALL BE ACCOMPLISHED IMMEDIATELY AFTER THE PIPE IS LAID. THE FILL AROUND THE PIPE SHALL BE PLACED IN LAYERS NOT TO EXCEED 6" UNDER NO CIRCUMSTANCES SHALL WATER BE PERMITTED TO BE IN UNCONTROLLED TRENCHES AFTER THE PIPE HAS BEEN PLACED. COMPACTION REQUIREMENTS SHALL BE ATTAINED BY THE USE OF MECHANICAL TAMPS ONLY. EACH AND EVERY LAYER OF BACKFILL SHALL BE PLACED LOOSE AND THOROUGHLY COMPACTED INTO PLACE.
2. ALL BACKFILL MATERIAL SHALL HAVE AN IN PLACE COMPACTED DENSITY OF AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DENSITY.
3. THE FINAL 24" OF BACKFILL MATERIAL SHALL BE COMPACTED TO 100% OF THE STANDARD PROCTOR MAXIMUM DENSITY.
4. ALL TRENCHING OPERATIONS SHALL MEET OSHA STANDARDS.
5. BACKFILL MATERIAL BENEATH ROADWAY SHALL BE SELECT BACKFILL MATERIAL.

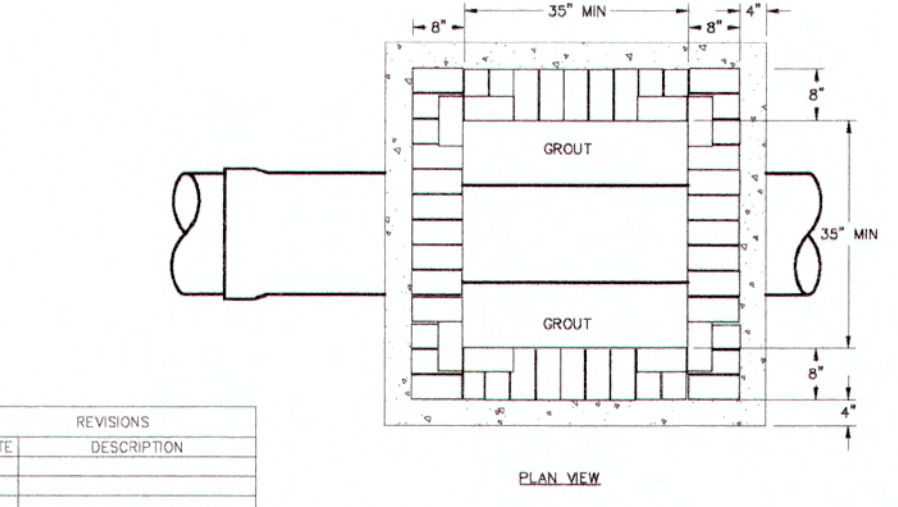
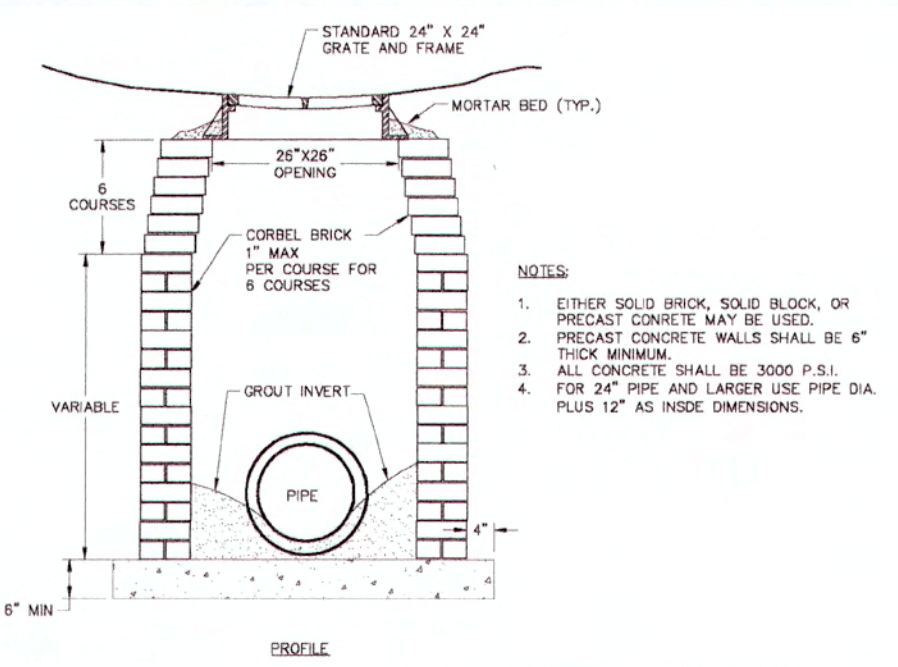


REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		TRENCH FOR STORM DRAIN PIPES	5.02

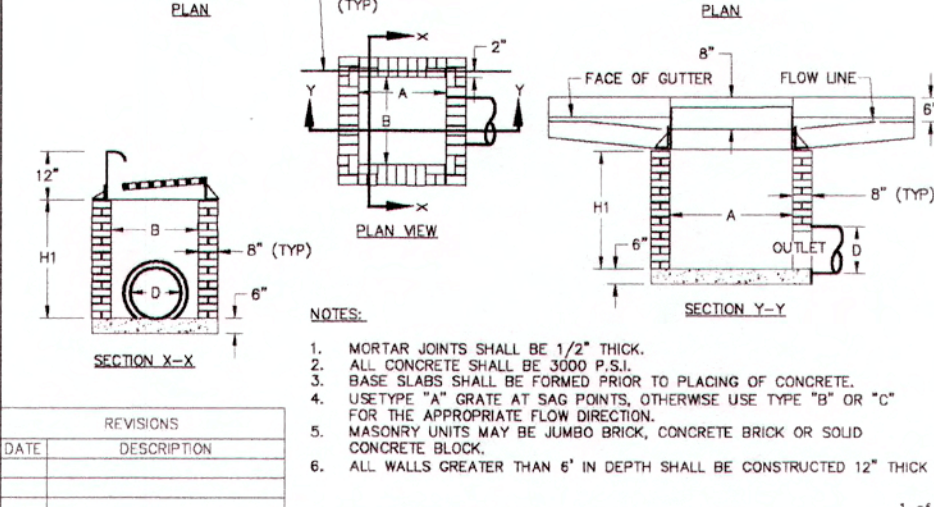
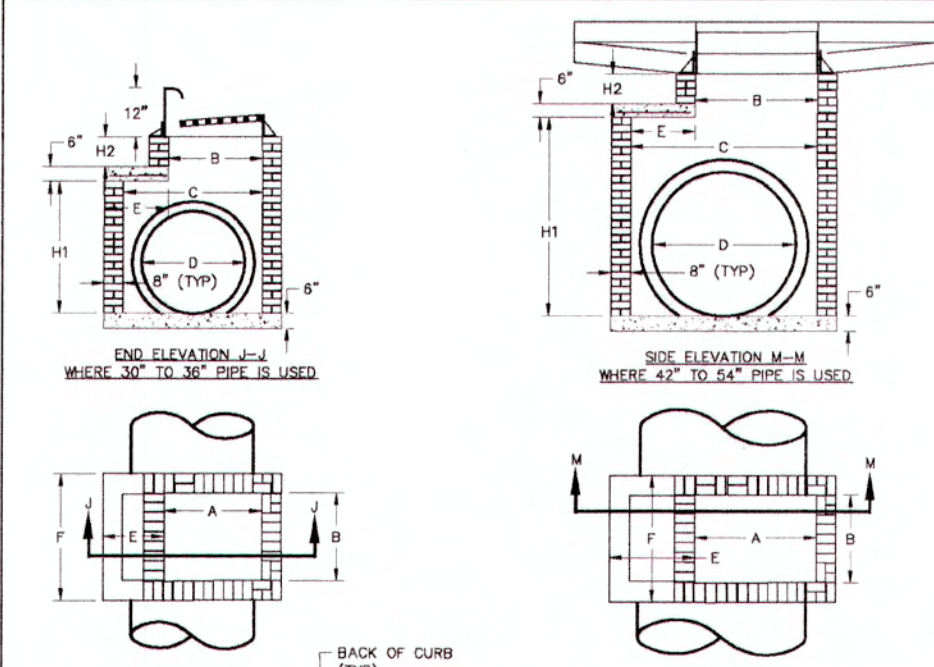


- NOTES:**
1. EITHER SOLID BRICK, SOLID BLOCK OR PRECAST CONCRETE MAY BE USED.
 2. PRECAST CONCRETE WALLS SHALL BE 6" THICK MINIMUM.
 3. ALL CONCRETE SHALL BE 3000 P.S.I. FOR 24" PIPE AND LARGER USE PIPE DIA. PLUS 12" AS INSIDE DIMENSIONS.

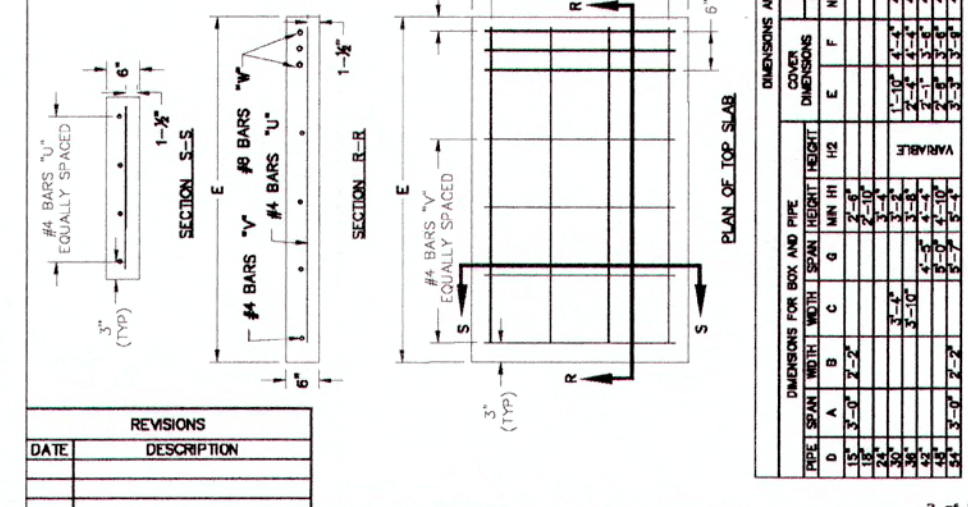
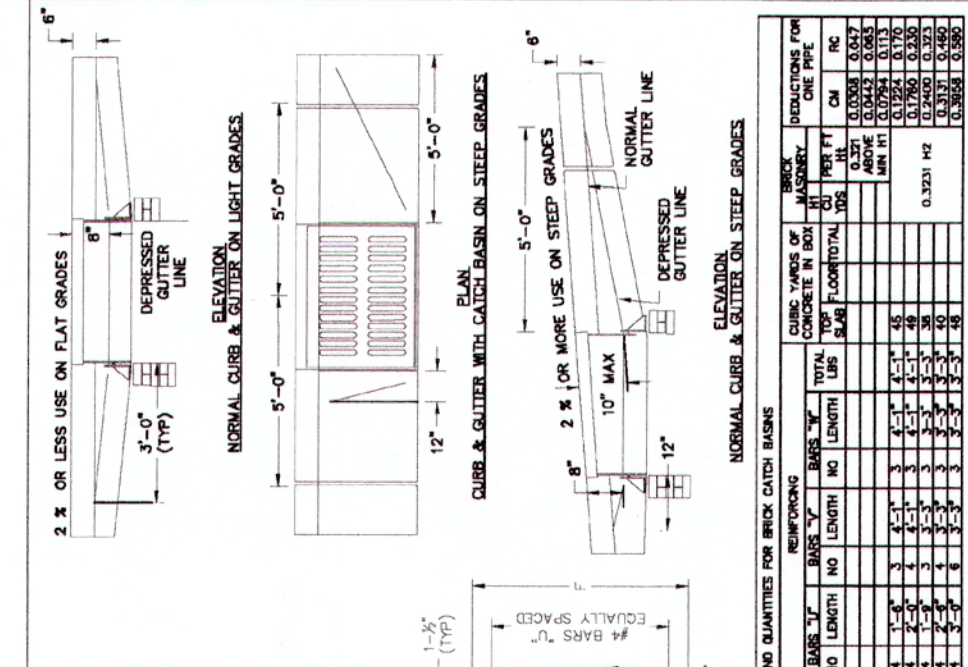
REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		STANDARD YARD INLET WITH CONCRETE SLAB	5.03



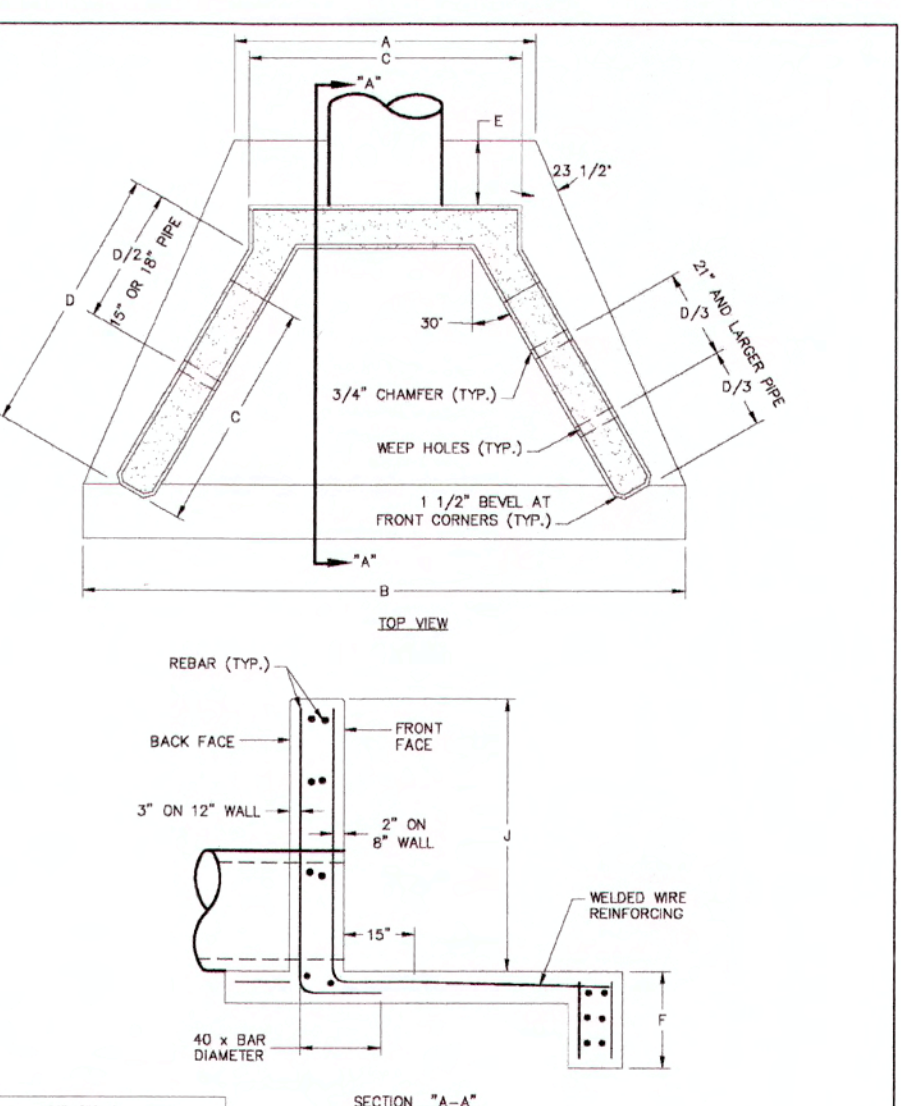
REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		STANDARD DROP INLET WITH GRATE AND FRAME	5.04



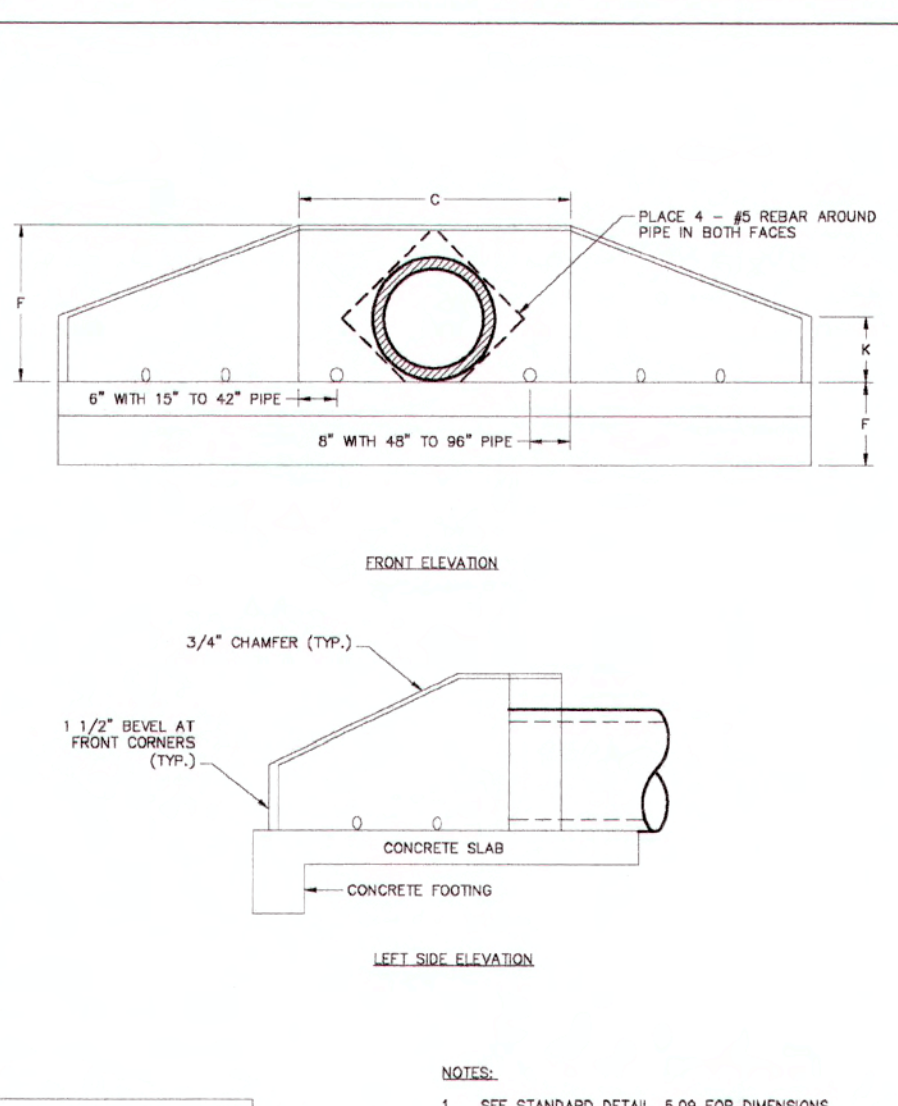
REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		STANDARD CURB INLET	5.05



REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		STANDARD CURB INLET	5.05



REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		STANDARD REINFORCED CONCRETE HEADWALL WITH WINGWALLS	5.06



REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		STANDARD REINFORCED CONCRETE HEADWALL WITH WINGWALLS	5.06

PIPE DIAMETER	PIPE WALL THICKNESS	SLAB THICKNESS	SLAB REINFORCEMENT	WINGWALL THICKNESS	WINGWALL REINFORCEMENT	HEADWALL THICKNESS	HEADWALL REINFORCEMENT
6"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
8"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
10"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
12"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
15"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
18"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
20"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
24"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
30"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
36"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
42"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
48"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
54"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
60"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
72"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
84"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
96"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
108"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
120"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.

REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		DIMENSIONS FOR HEADWALL WITH WINGWALLS	5.09

PIPE DIAMETER	PIPE WALL THICKNESS	SLAB THICKNESS	SLAB REINFORCEMENT	WINGWALL THICKNESS	WINGWALL REINFORCEMENT	HEADWALL THICKNESS	HEADWALL REINFORCEMENT
6"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
8"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
10"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
12"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
15"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
18"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
20"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
24"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
30"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
36"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
42"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
48"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
54"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
60"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
72"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
84"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
96"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
108"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.
120"	4"	4"	4 #4 @ 12" O.C.	4"	4 #4 @ 12" O.C.	12"	4 #4 @ 12" O.C.

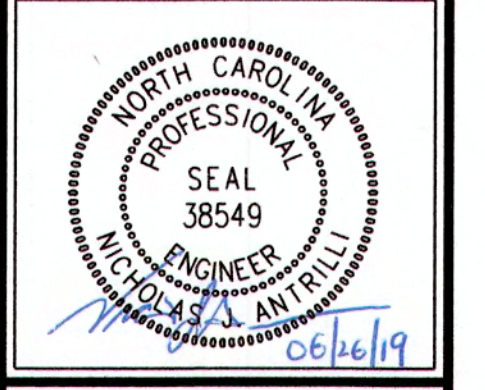
REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		DIMENSIONS FOR HEADWALL WITH WINGWALLS	5.09

TOWN CERTIFICATION, THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *S. K. Hill* DATE: 7-2-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

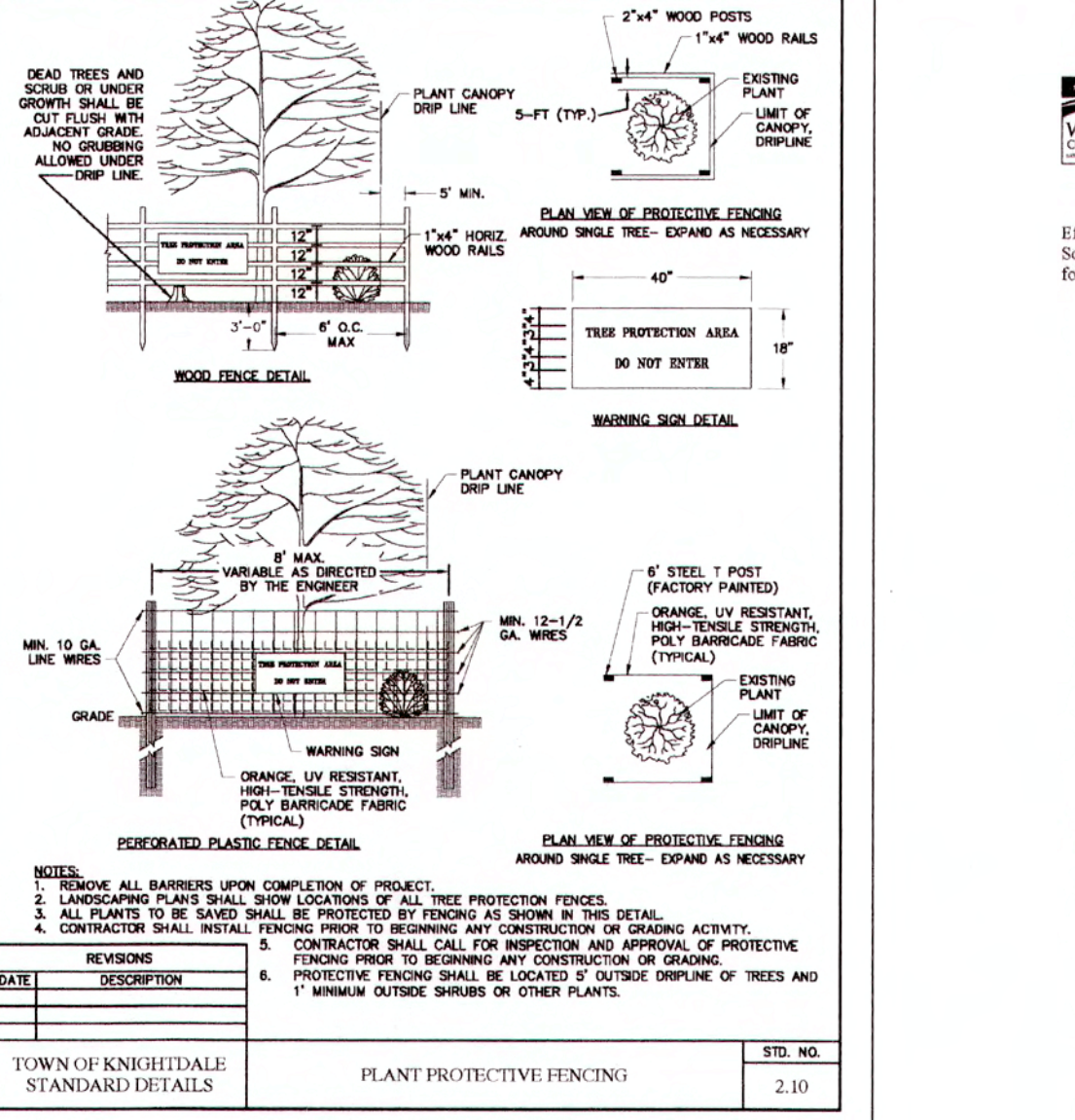
BY: *C. B. Hill* DATE: 7-9-19
ADMINISTRATOR



Revisions	DATE	DESCRIPTION
1	TOK Comments	06/21/19

K:\09\02090251.93\Knightdale Station - R7 North\CAD\Civil\Drawings\19-01-25\DETAILS.dwg, Friday, June 21, 2019 3:02:33 PM - D:\WETA.COLLEEN

SEEDING SCHEDULE		
SEEDING PERIOD	SEEDING TYPE	APPLICATION RATE (LBS/ACRE)
AUGUST 15 - NOVEMBER 01	TALL FESCUE	300
NOVEMBER 01 - MARCH 01	TALL FESCUE AND HYDRATED LIMESTONE	300
MARCH 01 - APRIL 15	TALL FESCUE	300
APRIL 15 - JUNE 30	MULLED COMMON BERMUDAGRASS	25
JULY 01 - AUGUST 15	TALL FESCUE AND HYDRATED LIMESTONE	150
SEEDING PERIOD	SEEDING TYPE	APPLICATION RATE (LBS/ACRE)
MARCH 01 - JUNE 01	SEEDING PERIOD	APPLICATION RATE (LBS/ACRE)
MARCH 01 - APRIL 15	TALL FESCUE OR	120
MARCH 01 - APRIL 15	MULLED COMMON BERMUDAGRASS	25
JUNE 01 - SEPTEMBER 01	TALL FESCUE AND HYDRATED LIMESTONE	120
JUNE 01 - SEPTEMBER 01	MULLED COMMON BERMUDAGRASS	25
SEPTEMBER 01 - MARCH 01	TALL FESCUE OR	120
SEPTEMBER 01 - MARCH 01	MULLED COMMON BERMUDAGRASS	25

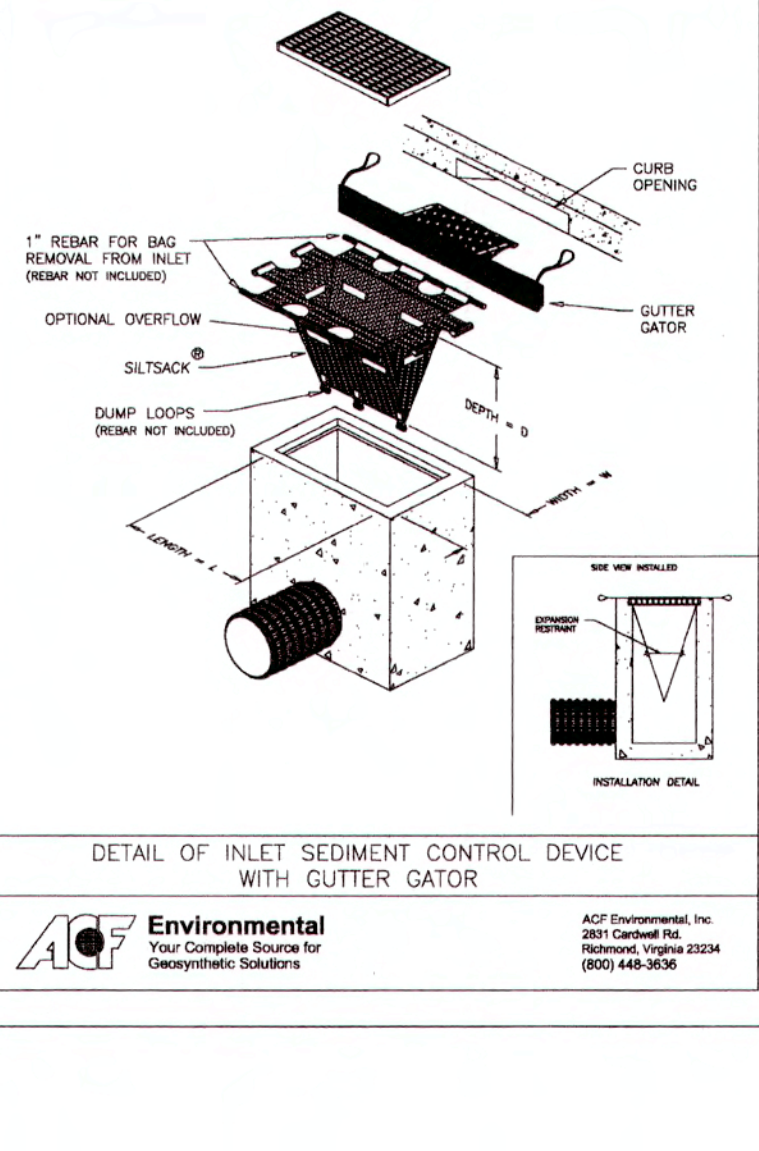


WAKE COUNTY Environmental Services

Effective September 1, 2008

Soil stockpiles shall be located on the approved plan and shall adhere to the following requirements:

- 25-foot temporary maintenance and access easement shall be shown around all proposed stockpiles (erosion control measures surrounding the stockpile shall be shown at the outer limit of this easement).
- Stockpile footprints shall be setback a minimum of 25' from adjacent property lines.
- A rock shall be provided on the approved plan that stockpile height shall not exceed 3.5 feet.
- Stockpile slopes shall be 2:1 or flatter.
- Approved BMPs shall be shown on a plan to control any potential sediment loss from a stockpile.
- Stockpiling materials adjacent to a ditch, drainageway, watercourse, wetland, stream buffer, or other body of water shall be avoided unless an alternative location is demonstrated to be unavailing.
- Any concentrated flow likely to affect the stockpile shall be diverted to an approved BMP.
- Off-site spoil or borrow areas must be in compliance with Wake County and State Regulations. All spoil areas over an acre are required to have an approved sediment control plan. Developer/Contractor shall notify Wake County of any off-site disposal of soil, prior to disposal. Fill of FEMA Floodways and Non-enforcement Areas are prohibited except as otherwise provided by subsection 18-102.2 of the Wake County Unified Development Ordinance (certifications and permits required).

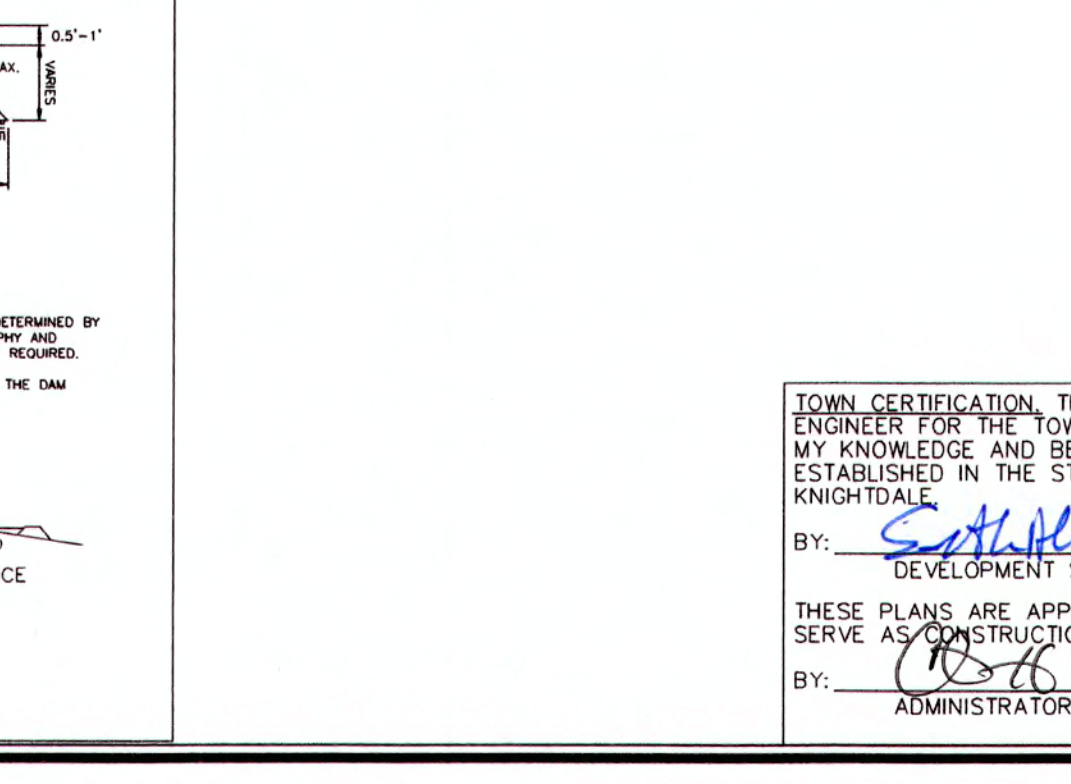
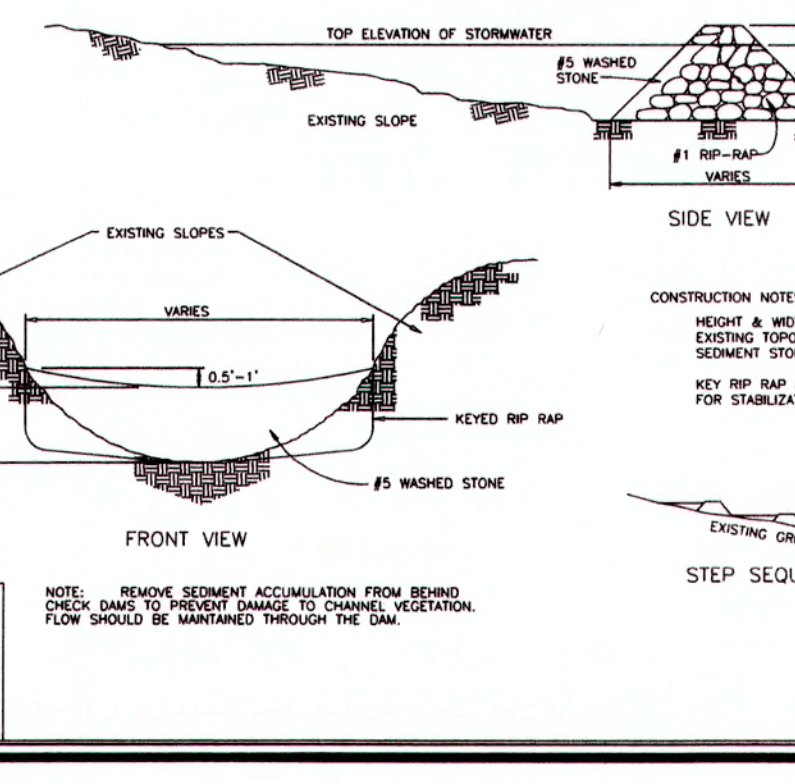
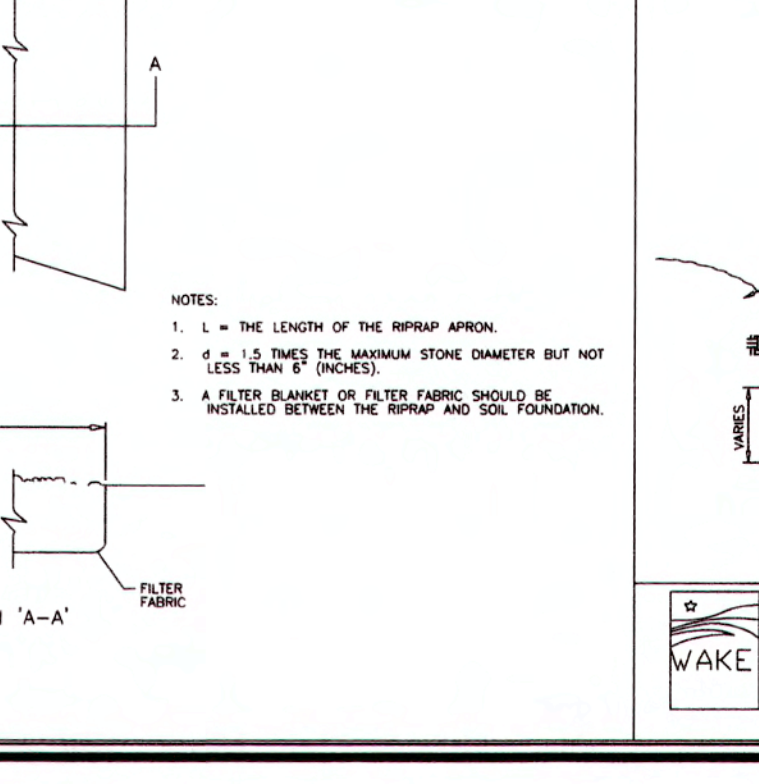
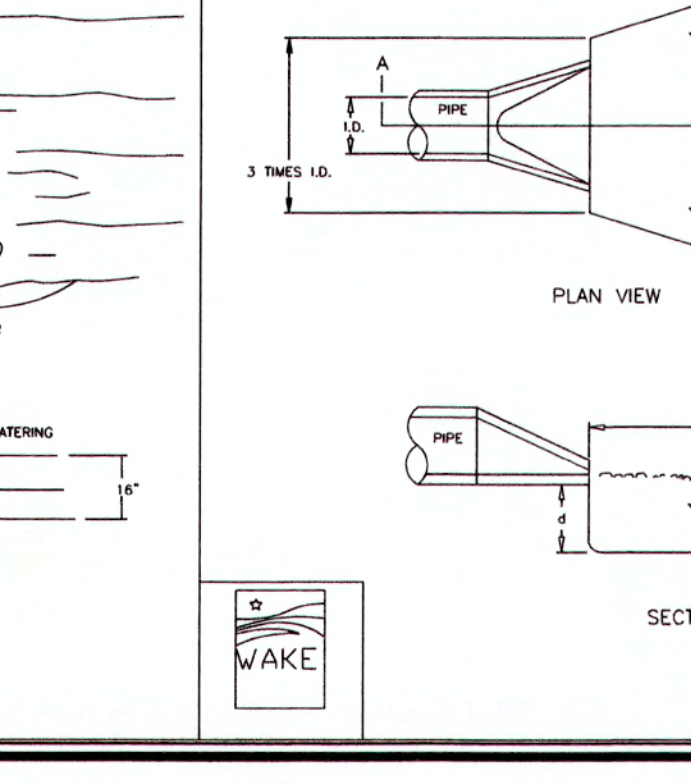
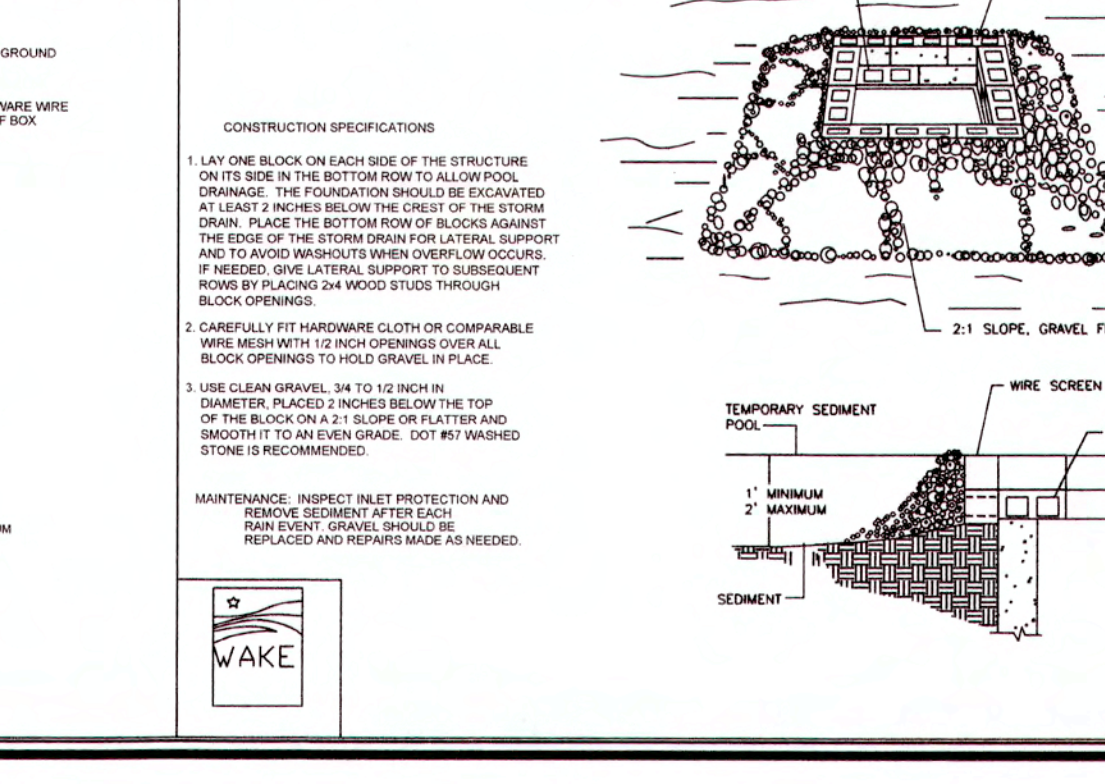
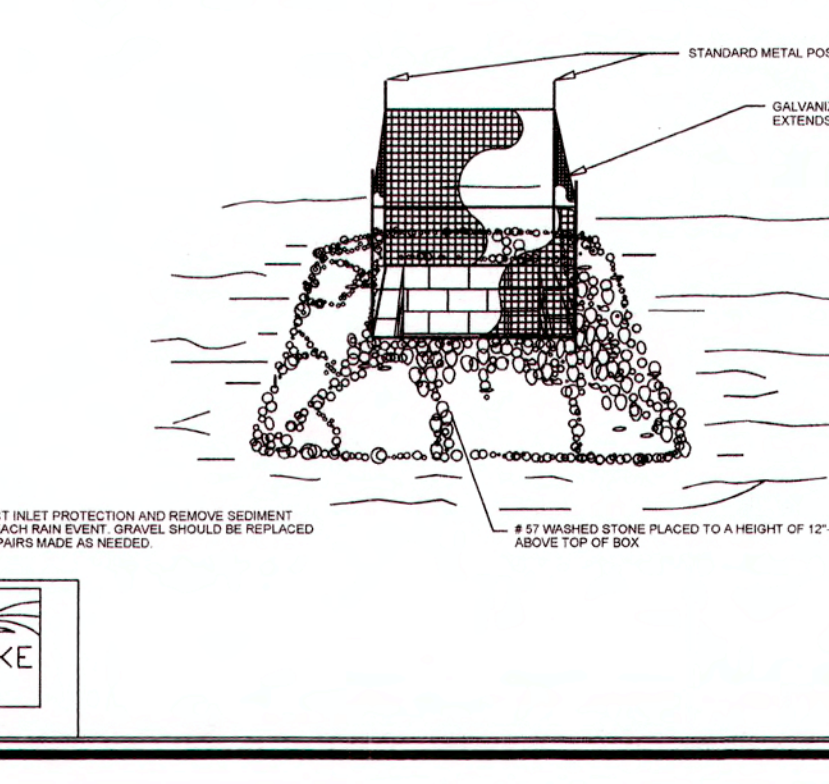
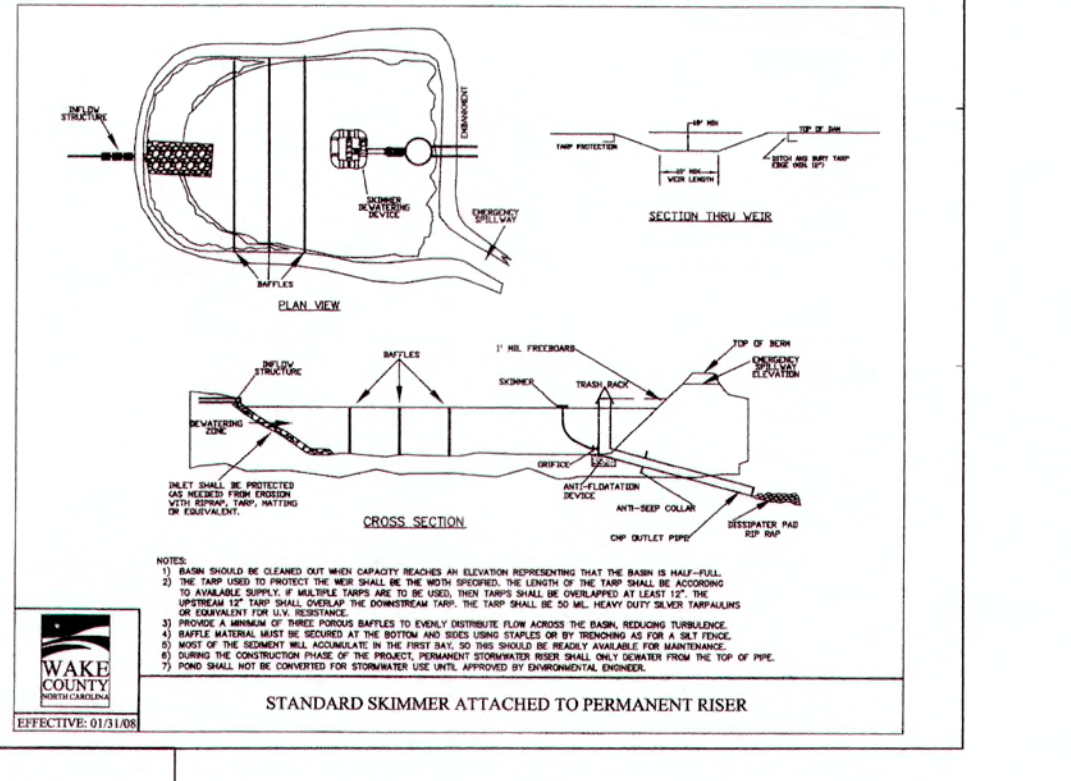
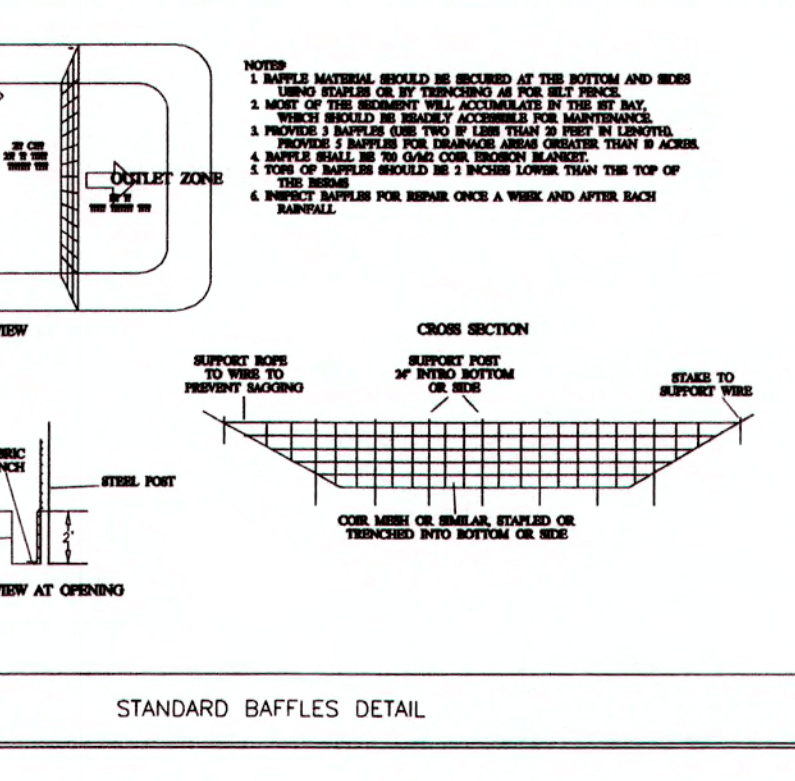
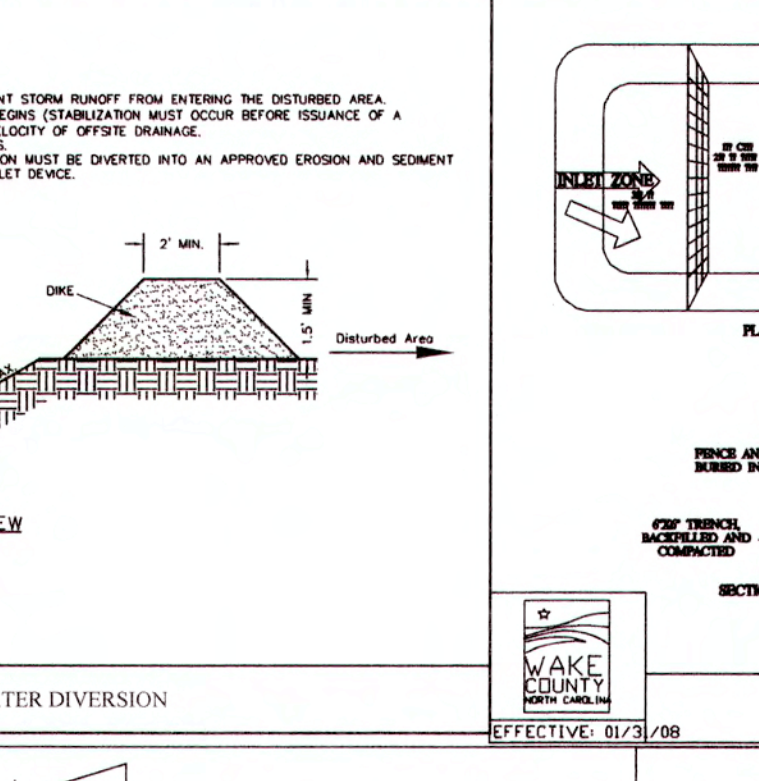
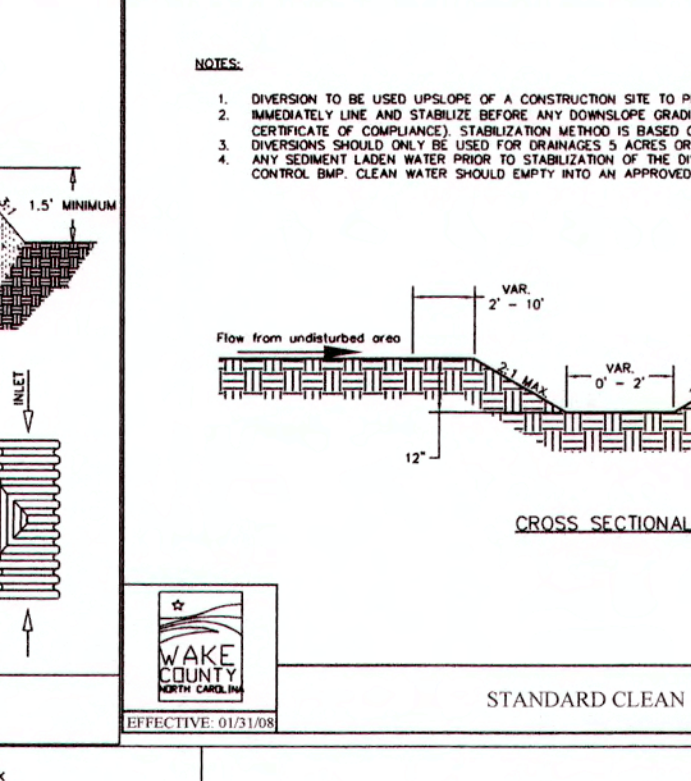
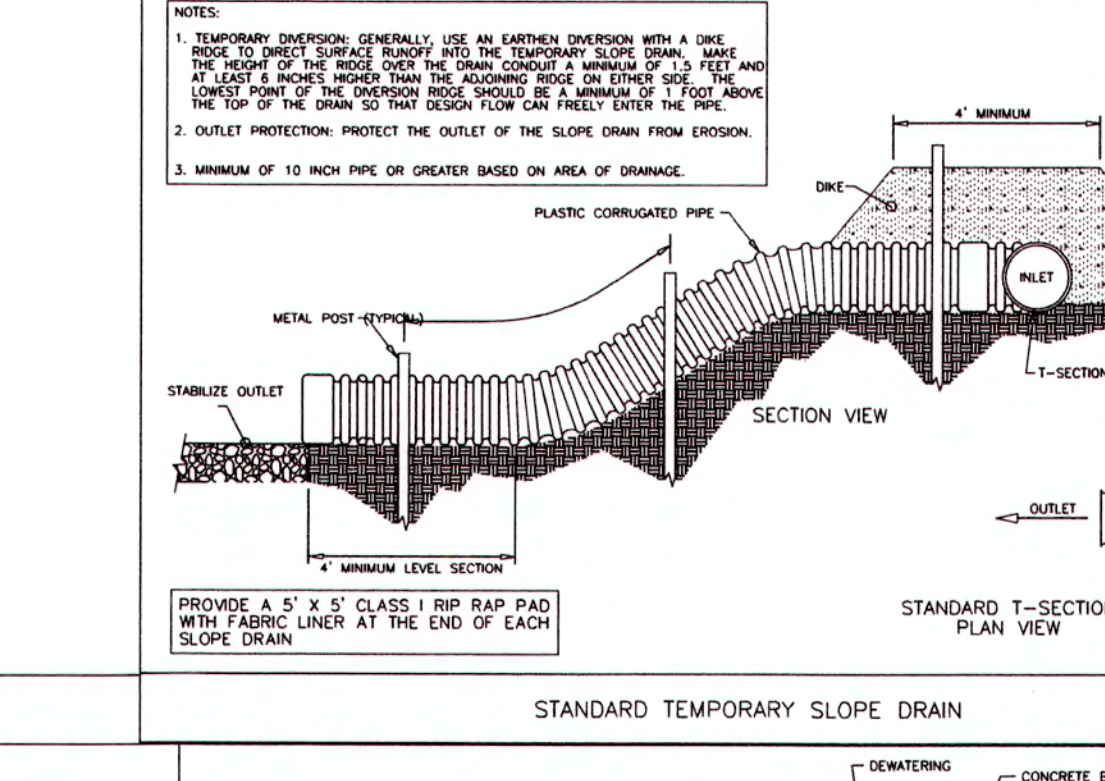
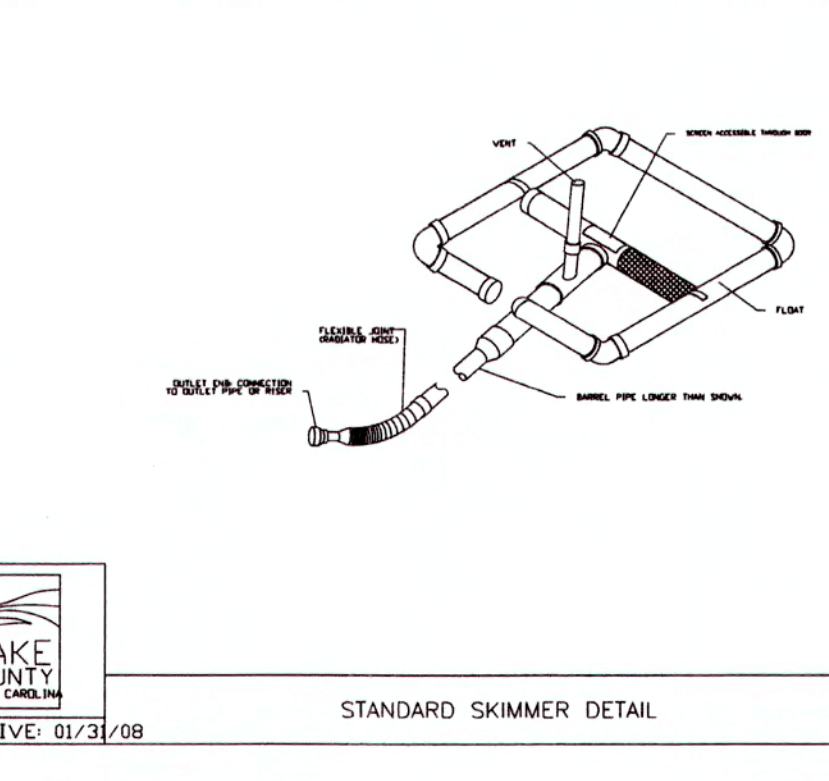
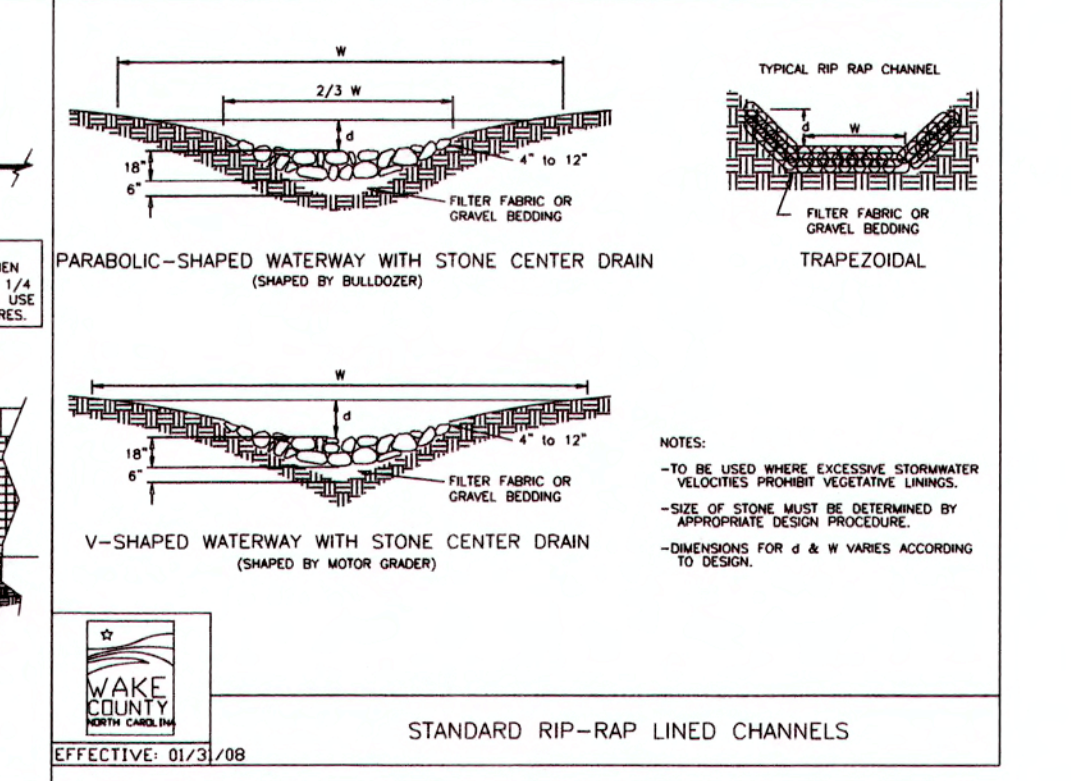
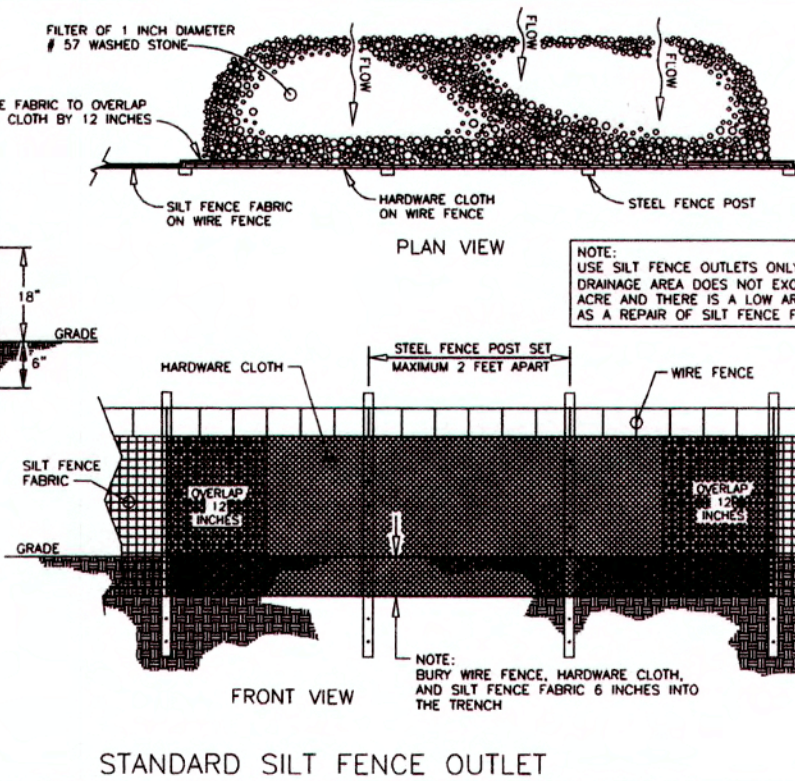
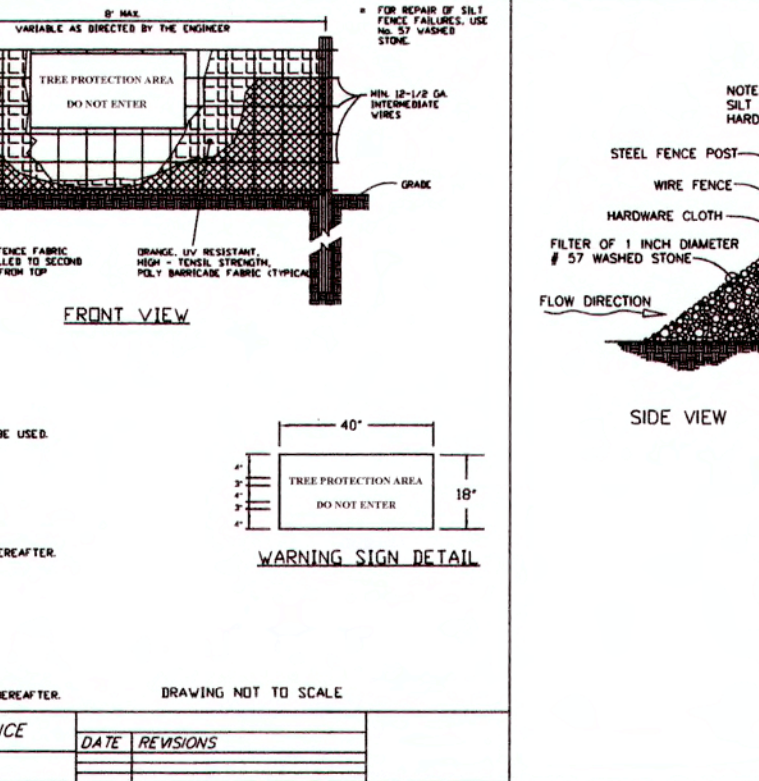
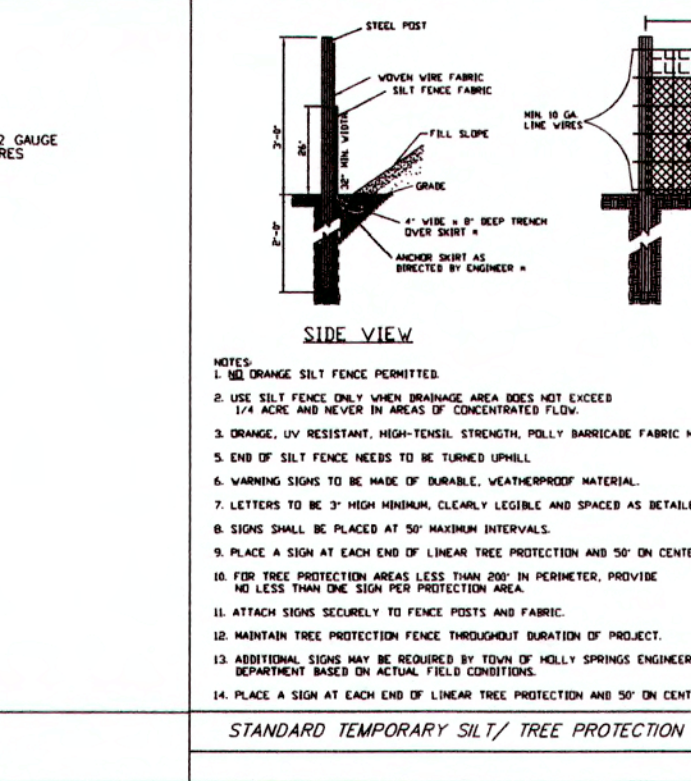
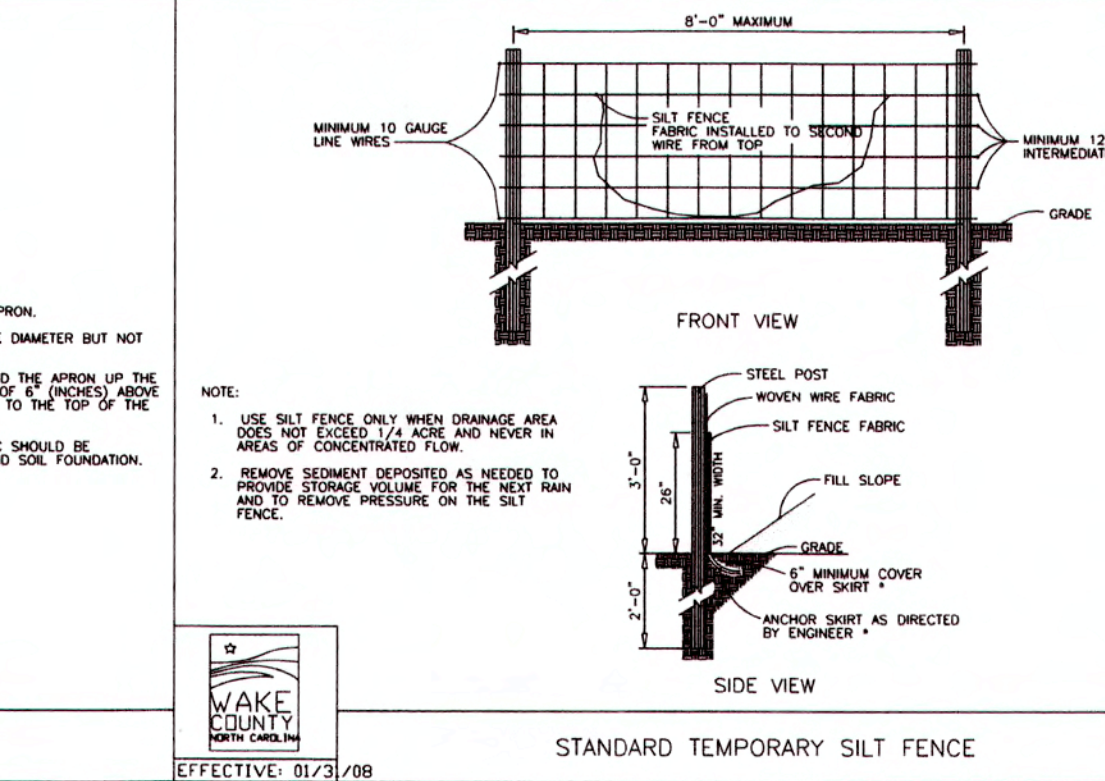
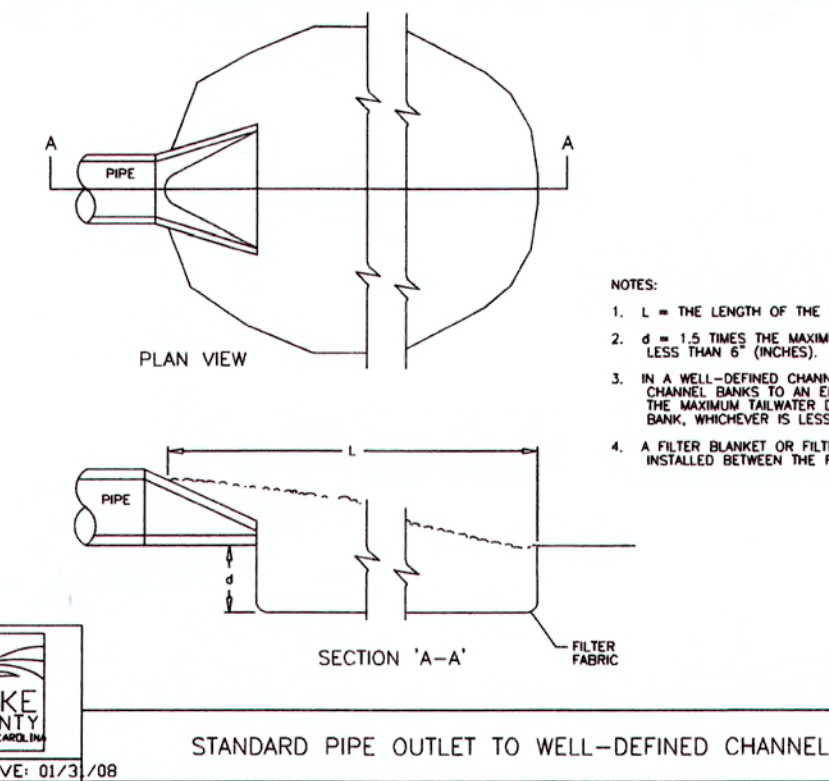
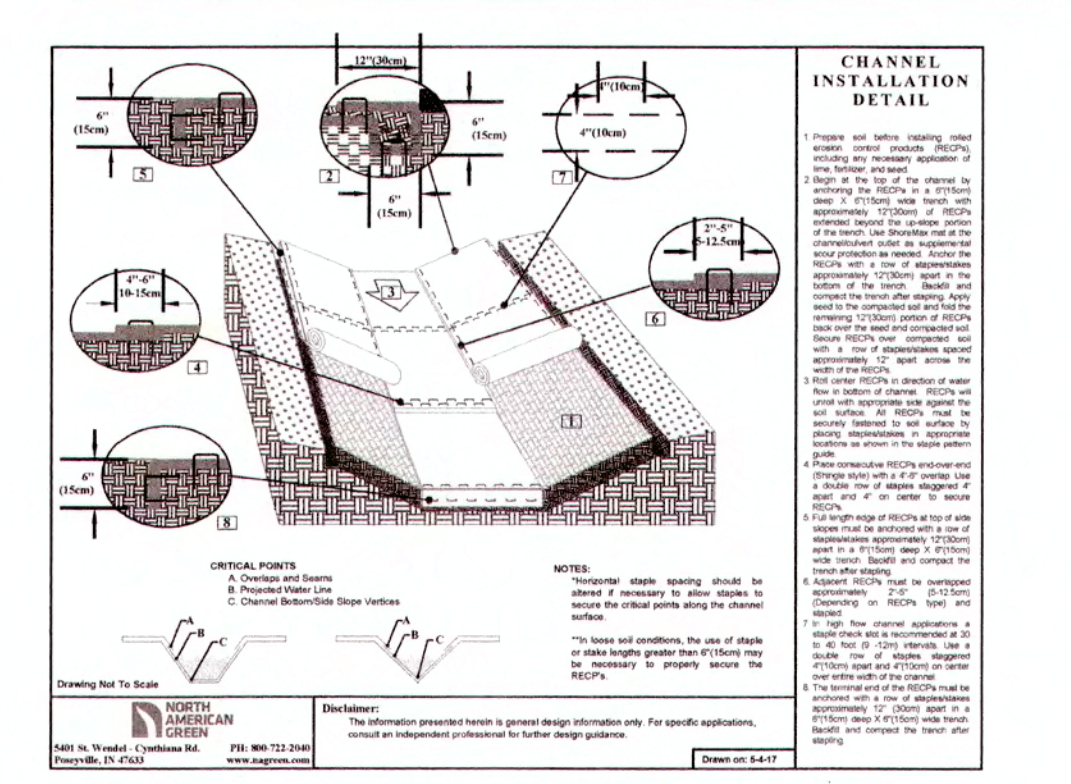
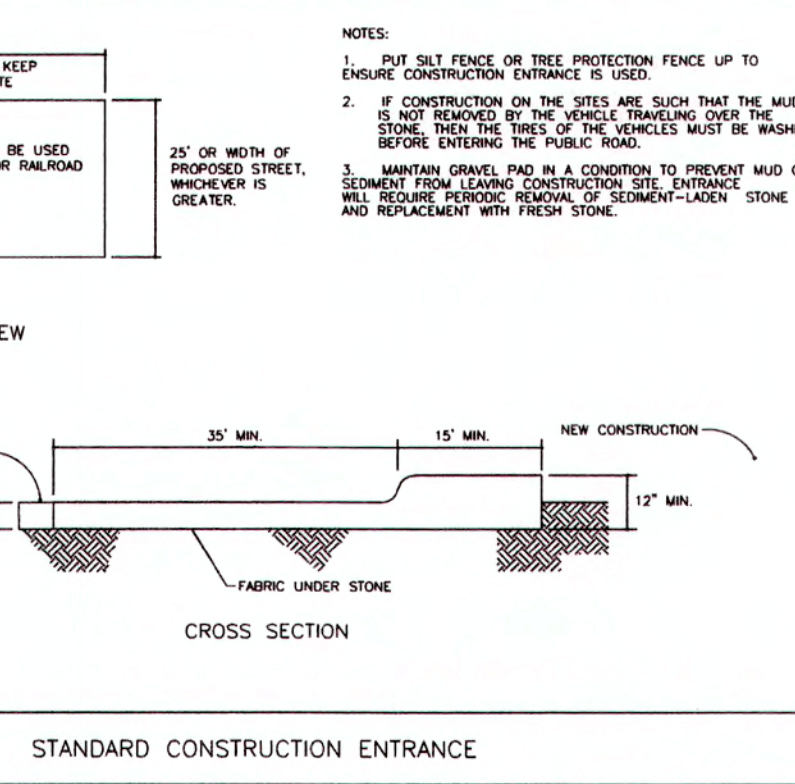
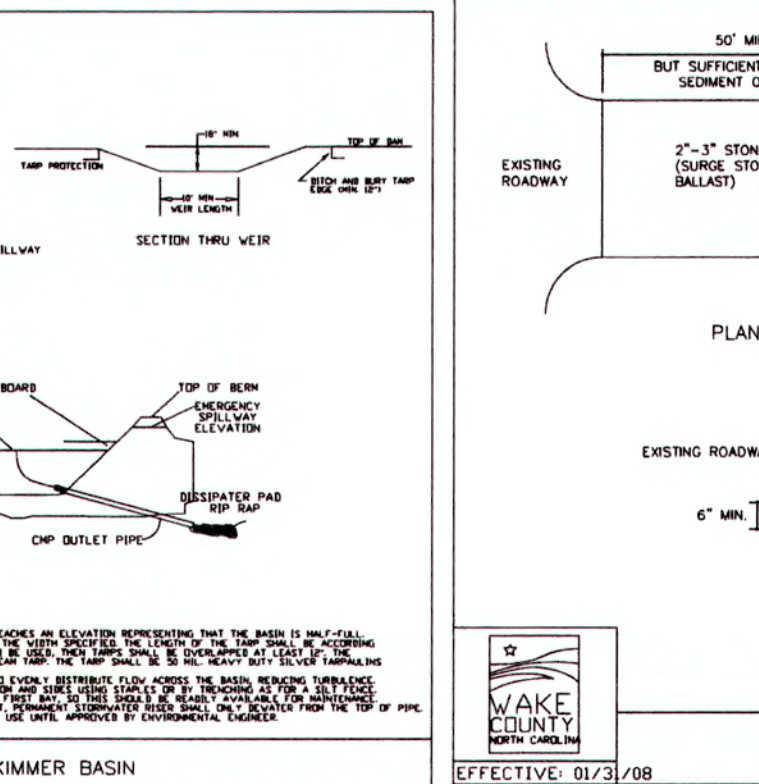
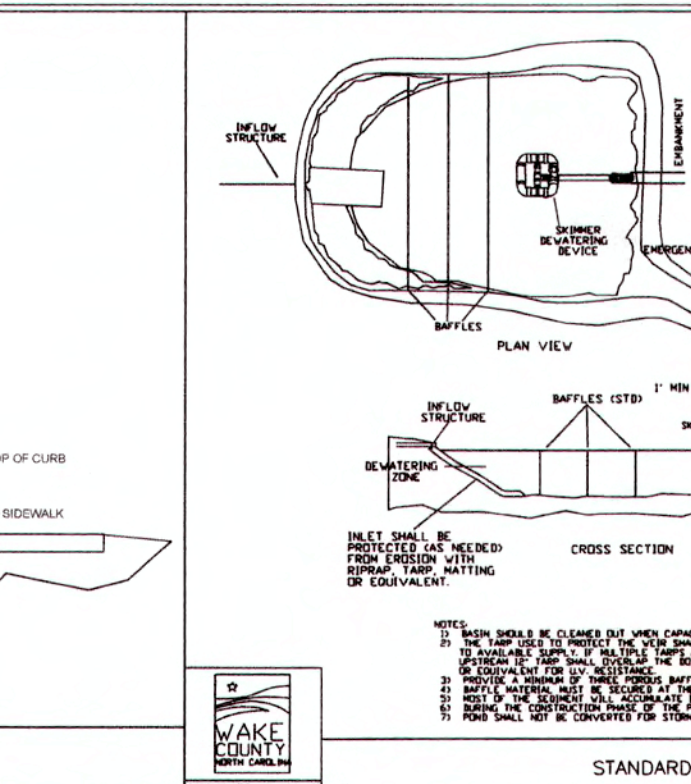
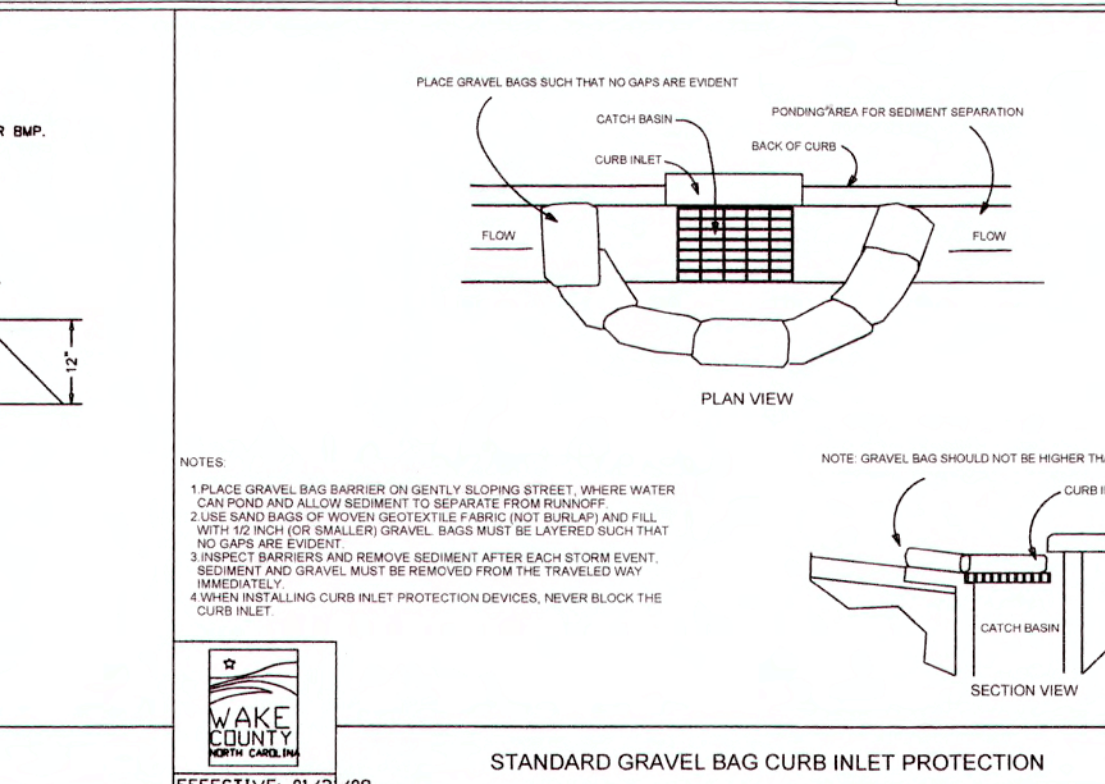
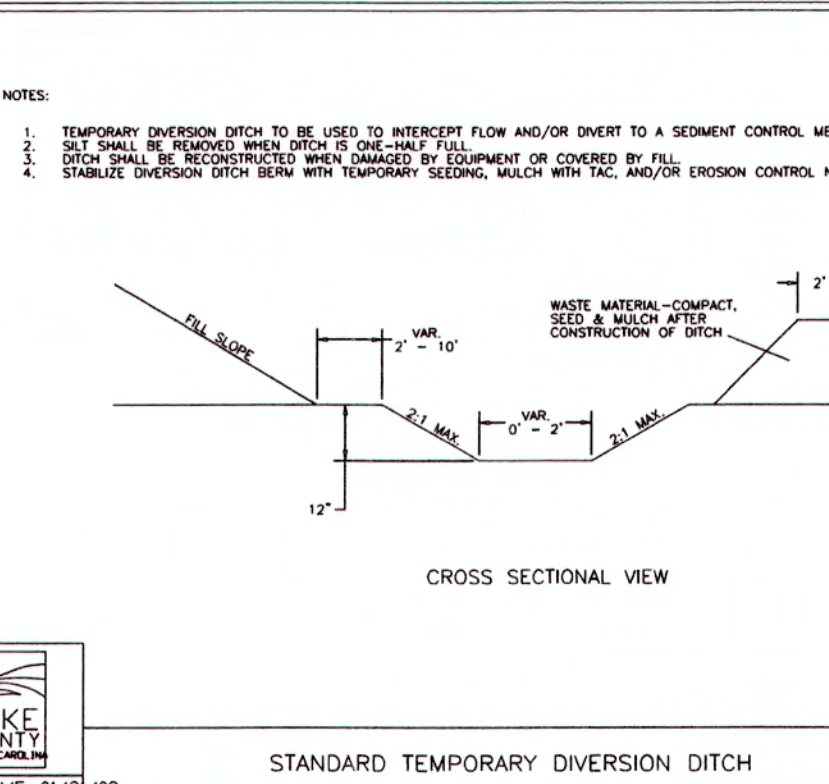
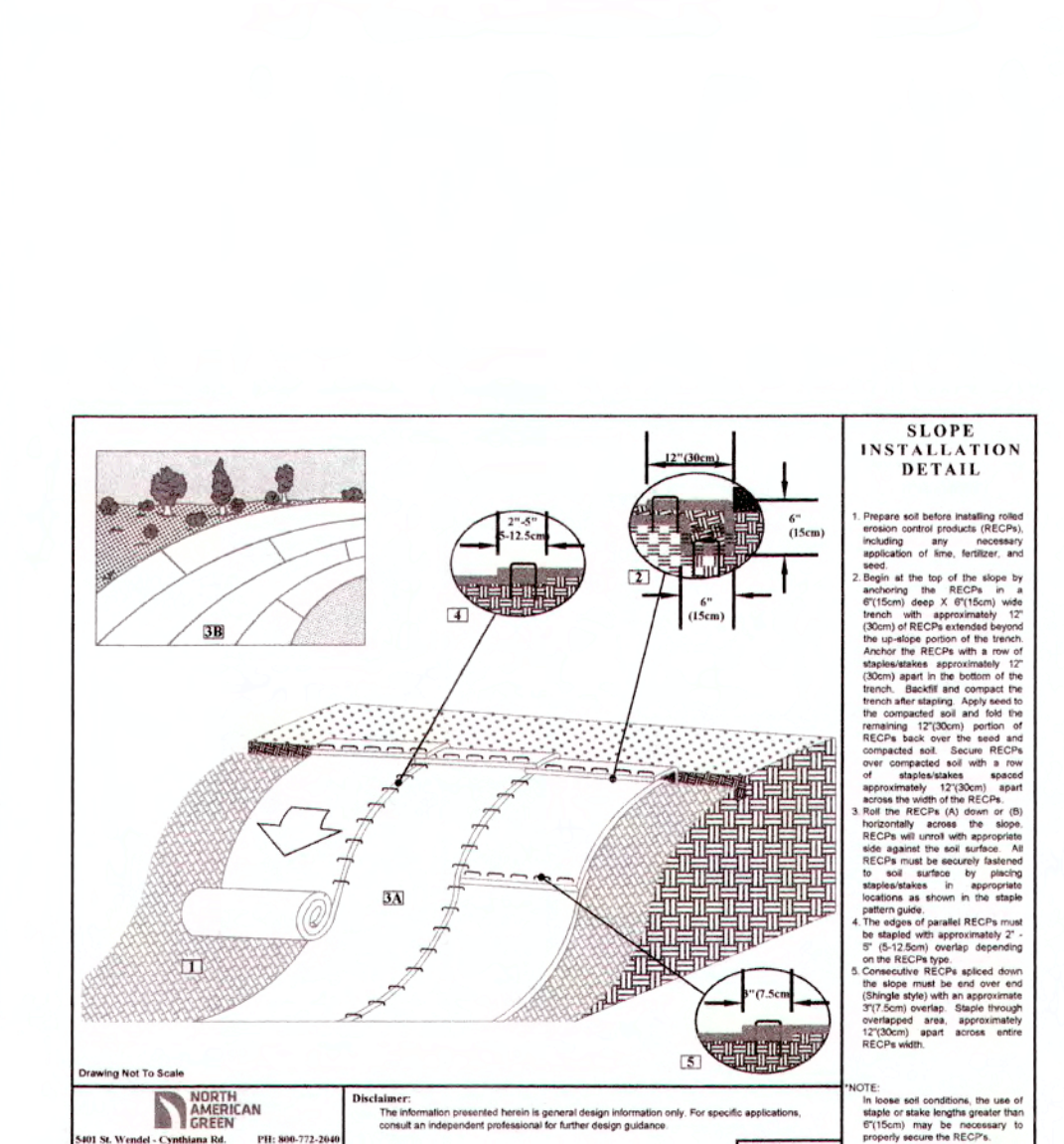


SILT FILTER SPECIFICATIONS

REGULAR FLOW SILT FENCE

HI-FLOW SILT FENCE

DI-ABSORBANT SILT FENCE



WithersRavenel
Engineers | Planners | Surveyors

115 Macklemin Drive | Cary, NC 27511 | 919-469-3300 | License # C-0832 | www.withersravenel.com

KNIGHTDALE STATION R7 NORTH

EROSION CONTROL DETAILS

Job No. 02090251.93
Date 01/25/19
Drawn By WR
Designer WR

NORTH CAROLINA PROFESSIONAL SEAL 38549
NICHOLAS A. WITTELL
ENGINEER

Revisions

1	TOK Comments	06/21/19
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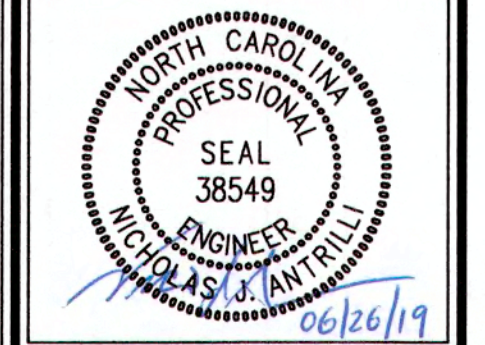
TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

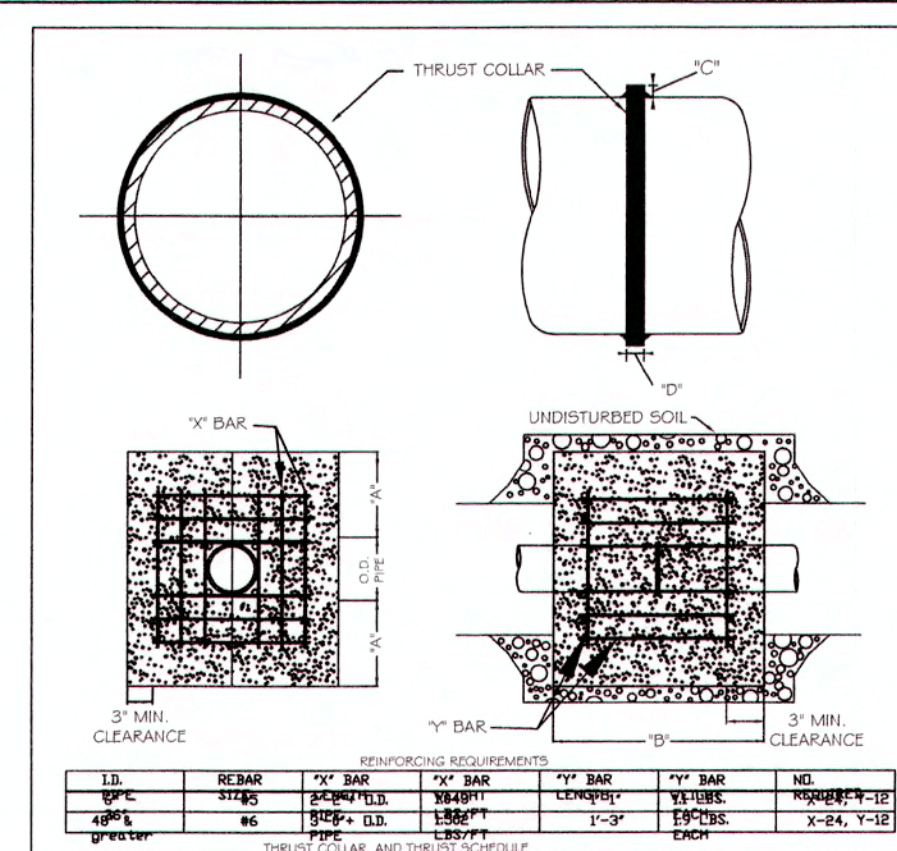
DATE: 7-9-19
ADMINISTRATOR

Sheet No. 9.3

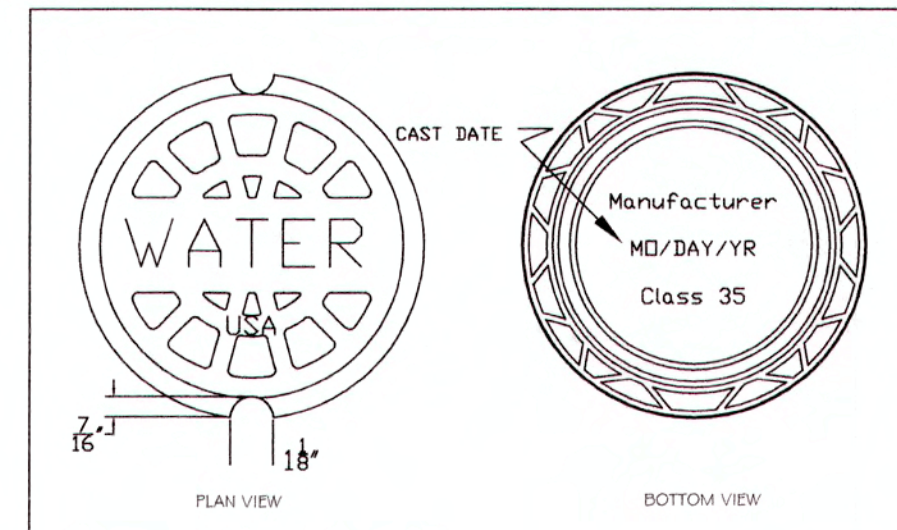
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Date: 01/25/19 Designer: WR



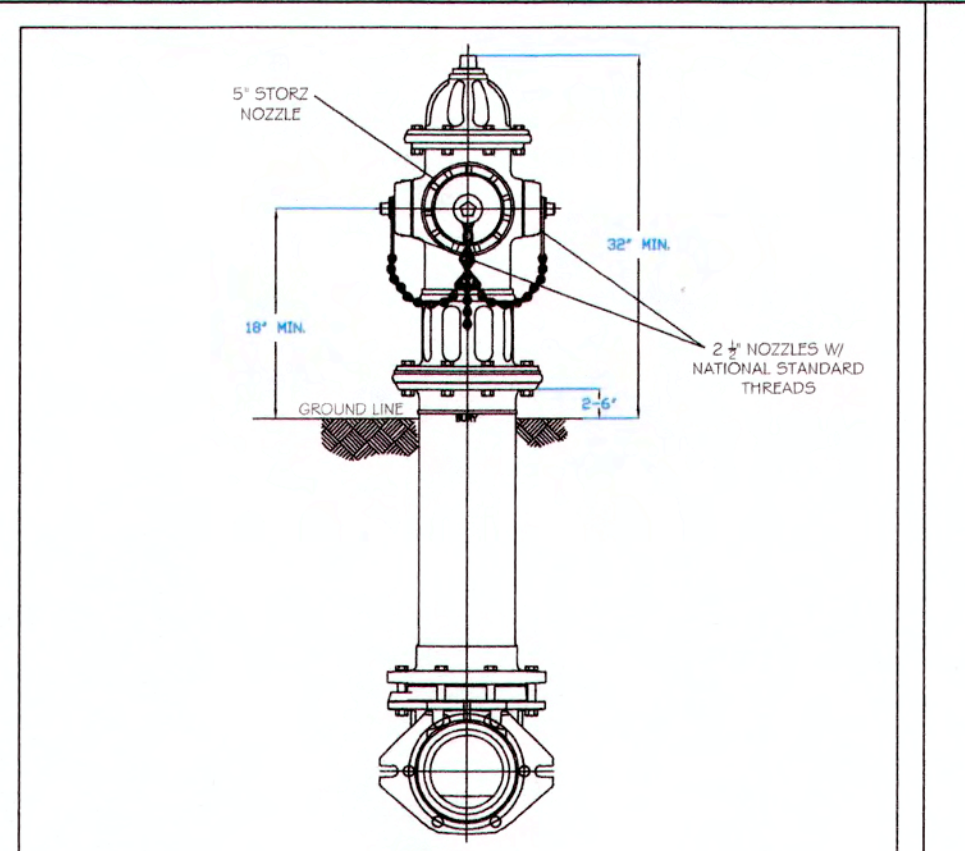
Revisions
1 TOK Comments 06/21/19



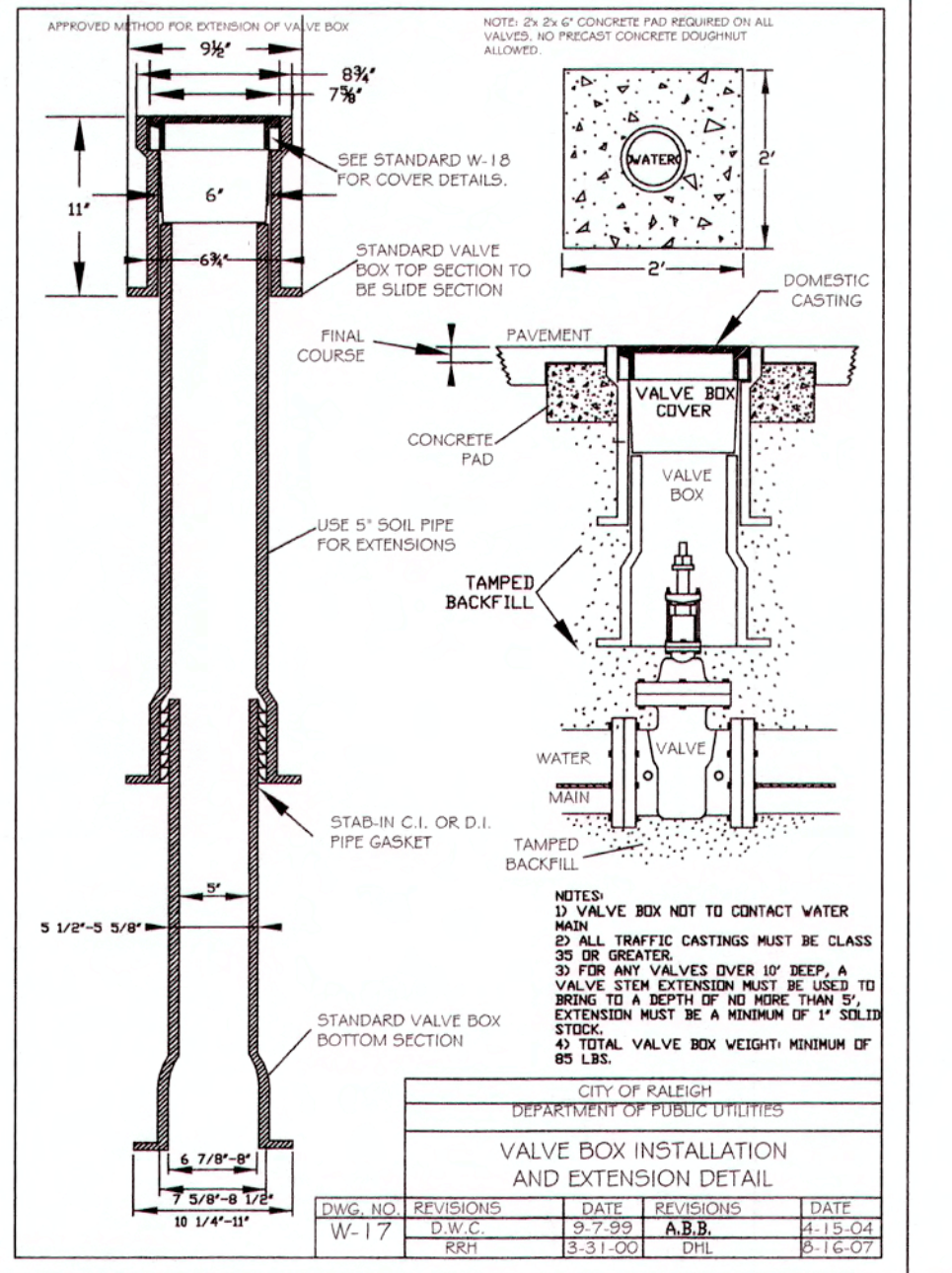
REINFORCING REQUIREMENTS		REINFORCING REQUIREMENTS	
D. PIPE	MIN. BAR	D. PIPE	MIN. BAR
12"	1-#4	12"	1-#4
18"	1-#4	18"	1-#4
24"	1-#4	24"	1-#4
30"	1-#4	30"	1-#4
36"	1-#4	36"	1-#4



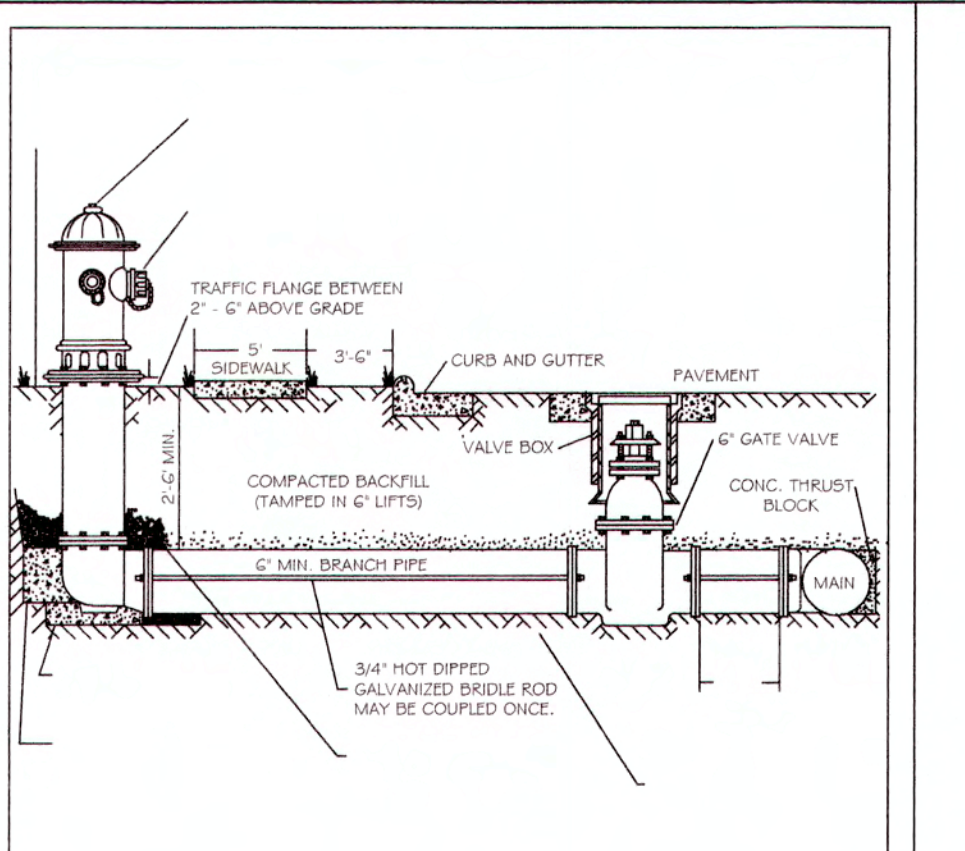
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W-13	REV.	12-15-17	J.P.S.	12-15-17



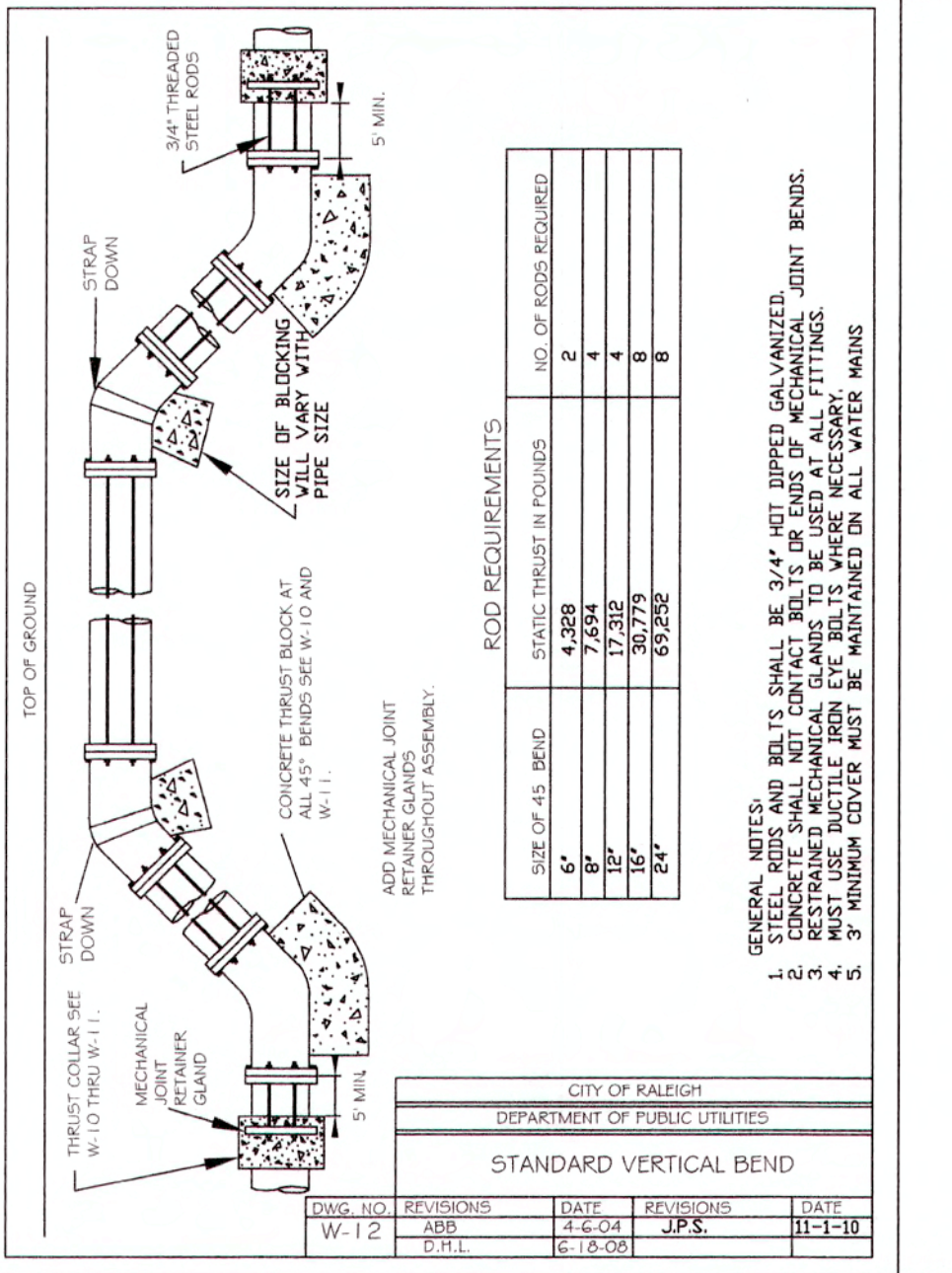
REINFORCING REQUIREMENTS		REINFORCING REQUIREMENTS	
D. PIPE	MIN. BAR	D. PIPE	MIN. BAR
12"	1-#4	12"	1-#4
18"	1-#4	18"	1-#4
24"	1-#4	24"	1-#4
30"	1-#4	30"	1-#4
36"	1-#4	36"	1-#4



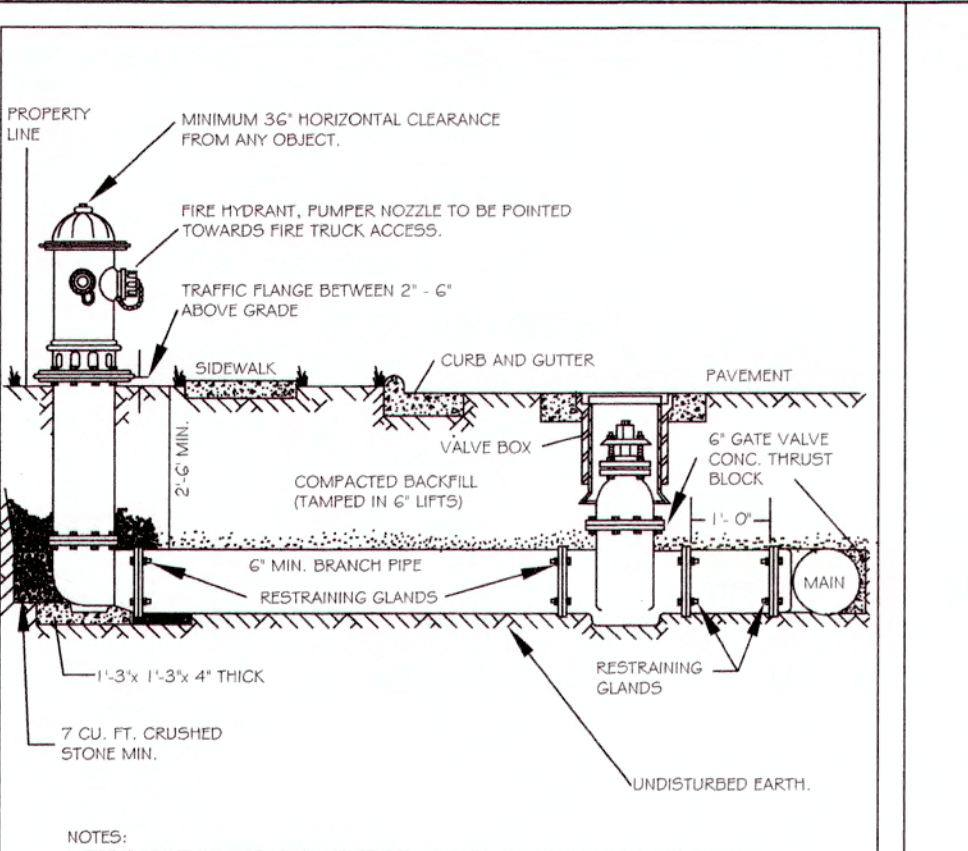
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		07-20-17	J.P.S.	07-20-17



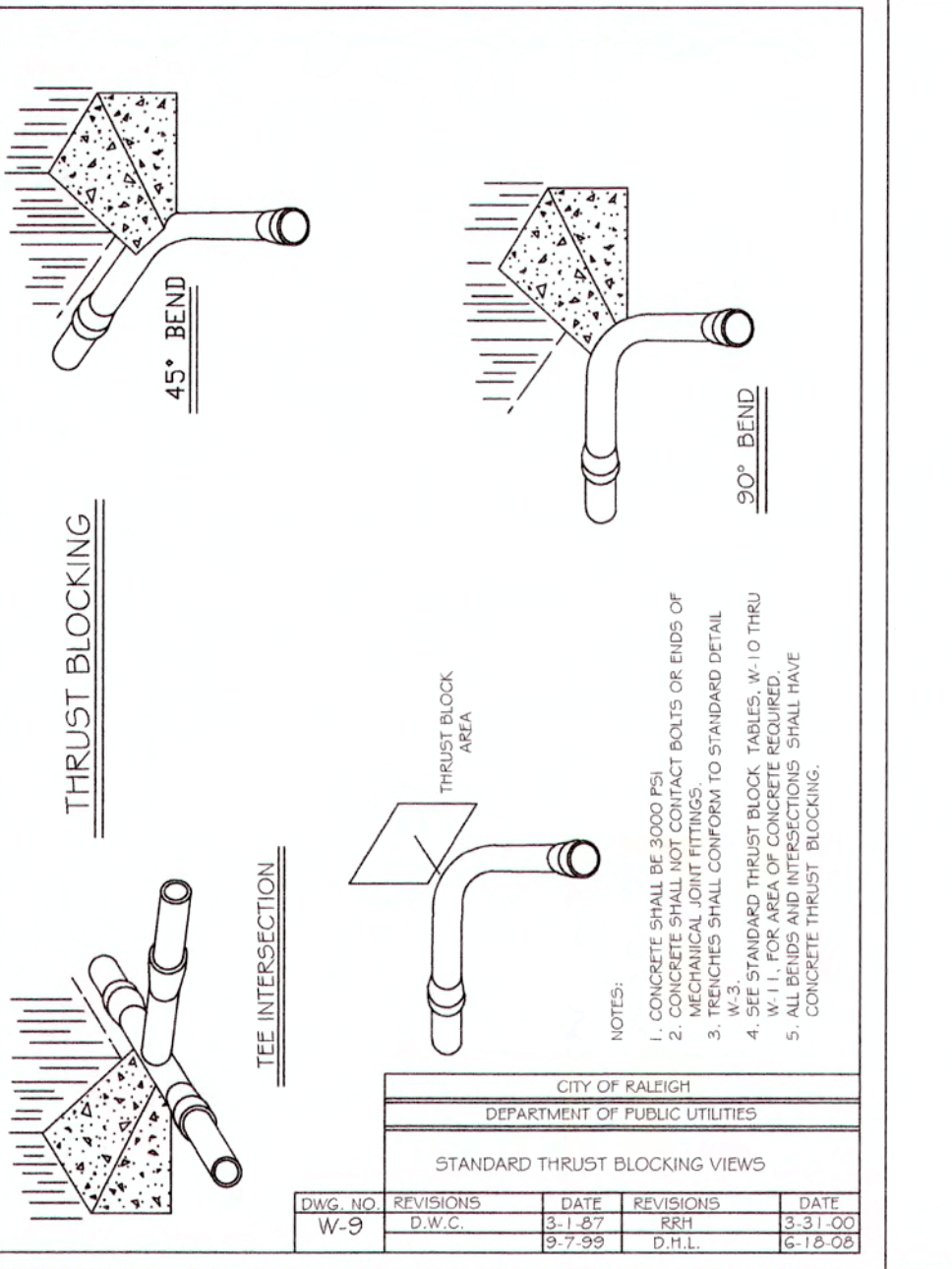
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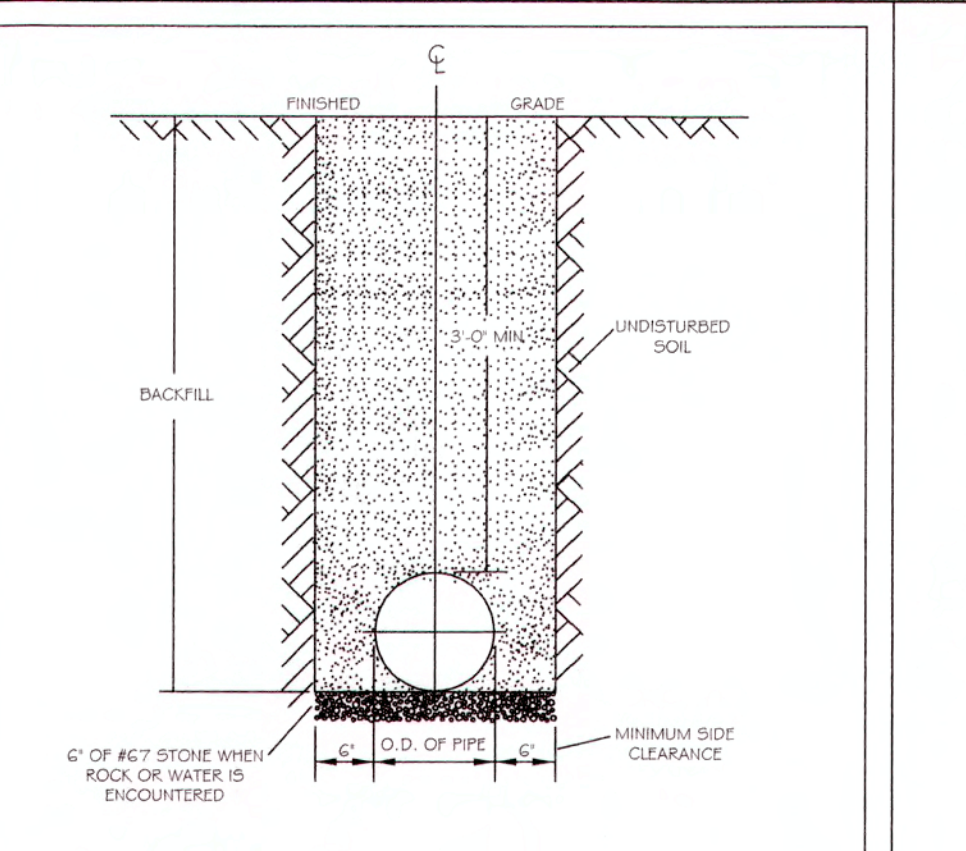
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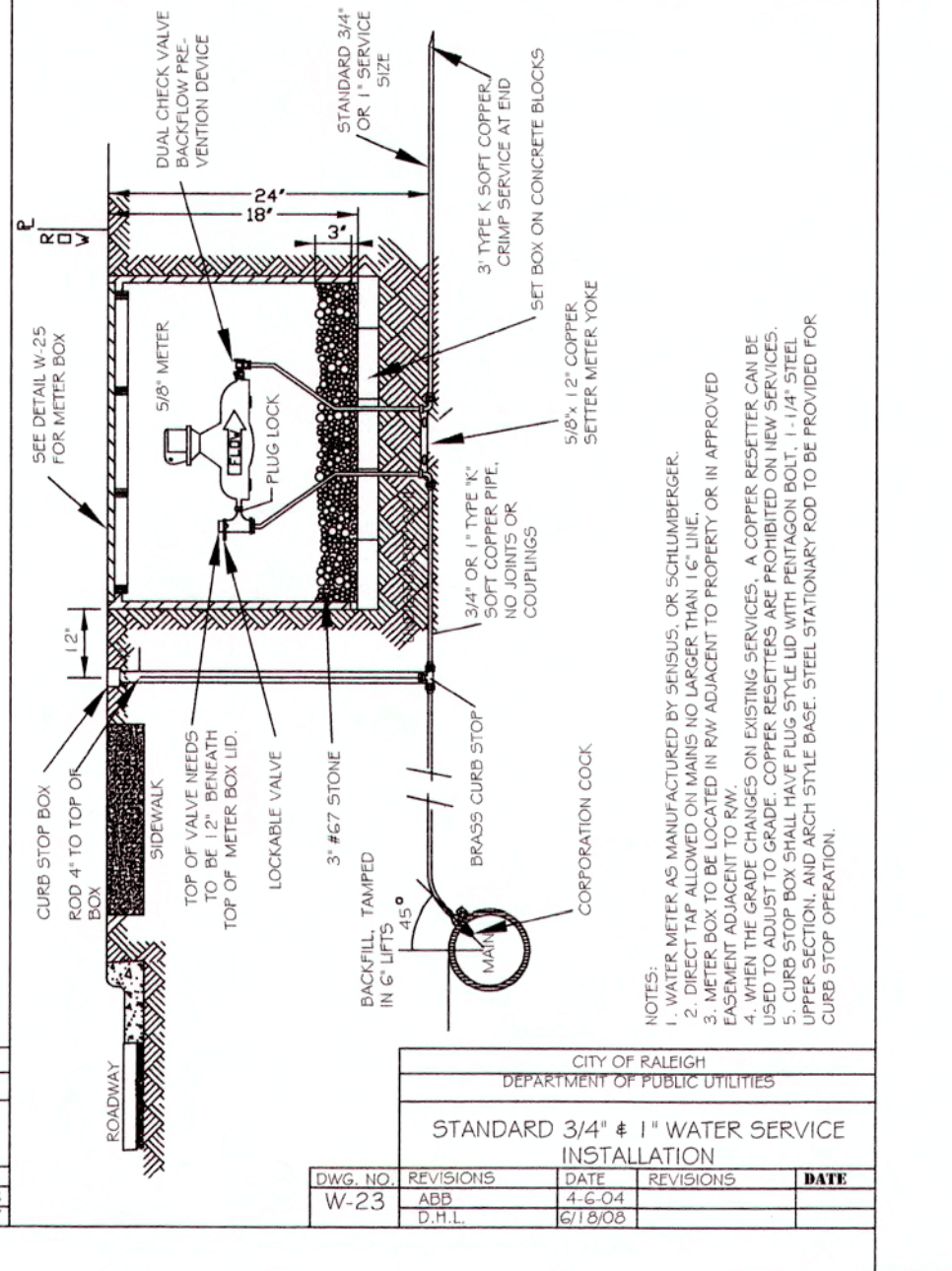
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W-4	REV.	07-20-17	J.P.S.	07-20-17



DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-9	REV.	07-20-17	J.P.S.	07-20-17



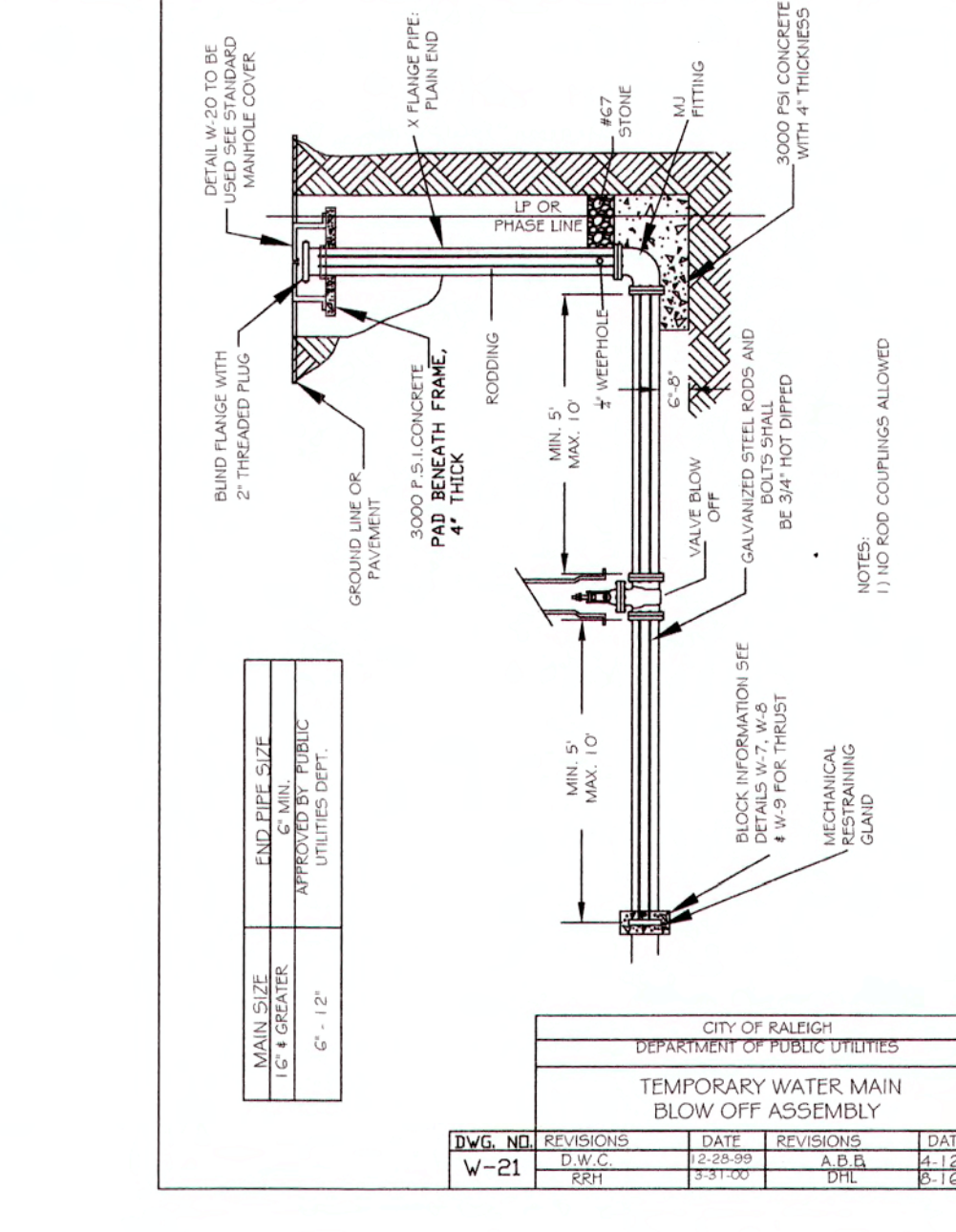
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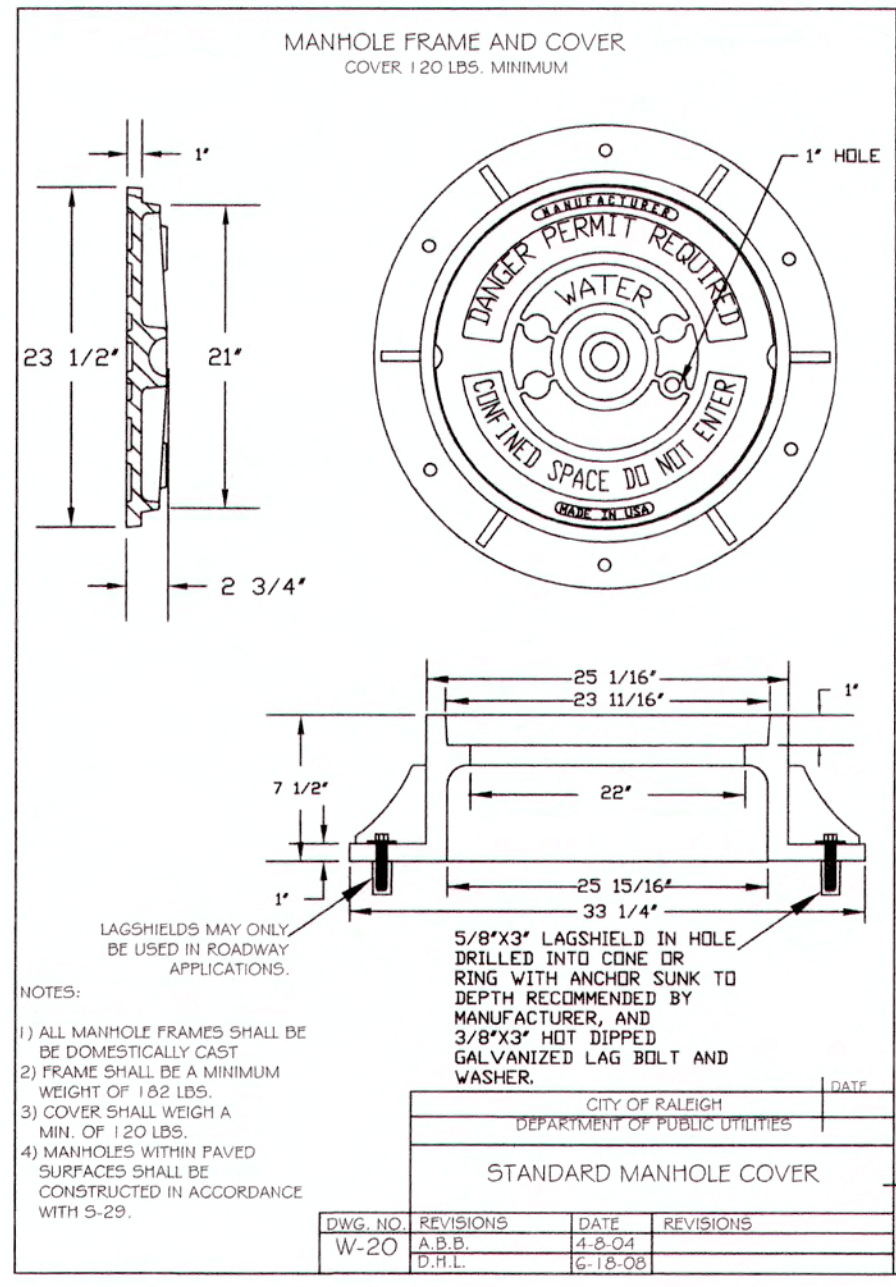
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W-23	REV.	07-20-17	J.P.S.	07-20-17

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS BASED ON TEST PRESSURE OF 200 P.S.I.										
ALL AREAS GIVEN IN SQUARE FEET										
SIZE AND DEGREE OF BEND	1/4\"/>									
11 1/4"	1.108	1	1	1	1	1	1	2	1	
22 1/2"	2.207	1	2	2	1	1	1	3	1	
45"	4.288	2	3	3	1	1	2	5	1	
90"	7.996	2	4	5	1	1	2	8	1	
PLUG	5.655	2	3	4	1	1	2	6	1	
11 1/4"	1.970	1	1	2	1	1	1	2	1	
22 1/2"	3.922	1	2	3	1	1	1	4	1	
45"	7.694	2	4	5	1	1	2	8	1	
90"	14.215	4	8	9	2	2	4	15	2	
PLUG	10.053	3	5	6	2	2	3	10	1	
11 1/4"	4.433	2	3	3	1	1	2	5	1	
22 1/2"	8.826	3	5	6	2	2	3	9	1	
45"	17.312	5	9	11	3	3	5	18	2	
90"	31.983	8	16	19	4	4	8	32	4	
PLUG	22.619	6	12	14	3	3	6	23	3	
11 1/4"	7.881	2	4	5	1	1	2	8	1	
22 1/2"	15.691	4	8	10	2	2	4	16	2	
45"	30.779	8	16	19	4	4	8	31	4	
90"	56.861	15	29	35	8	8	15	57	6	
PLUG	40.213	10	21	25	5	5	10	41	5	

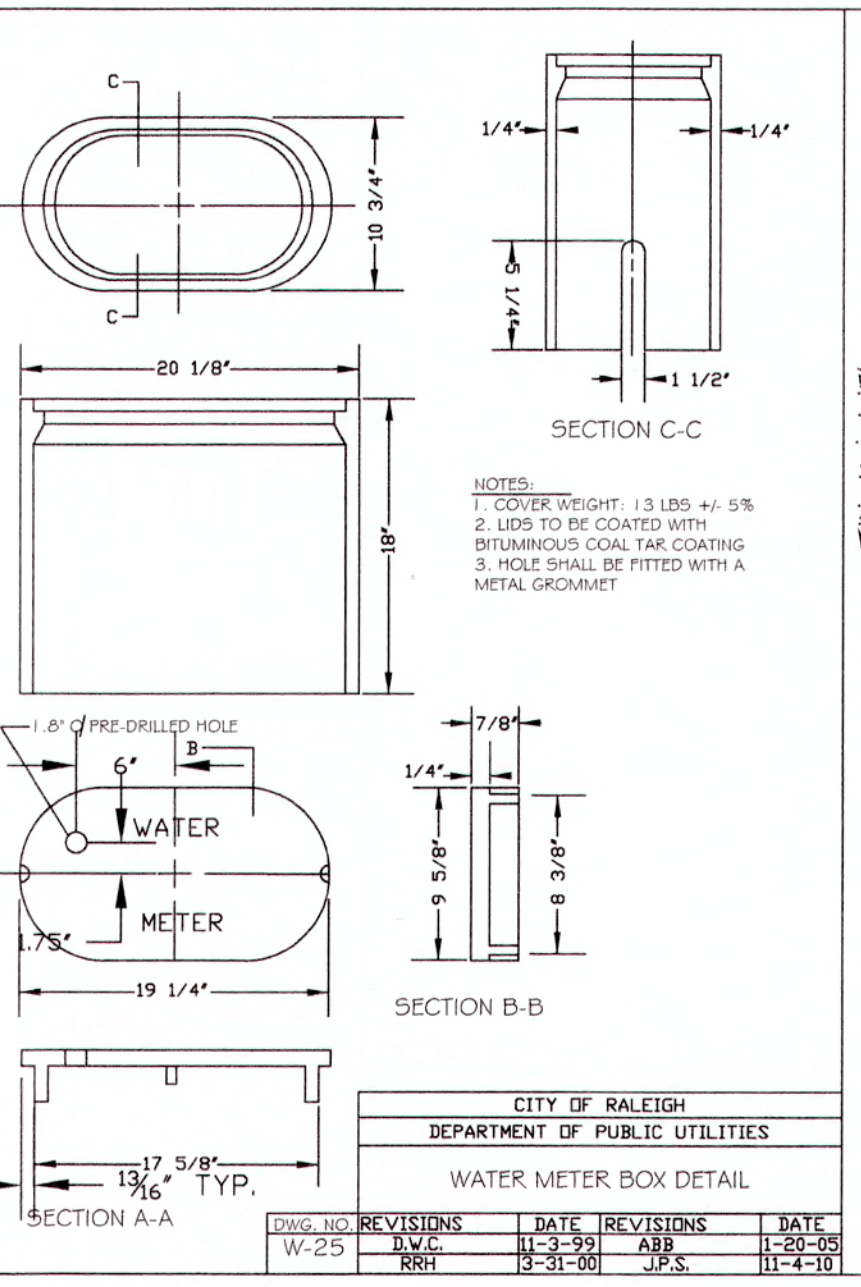
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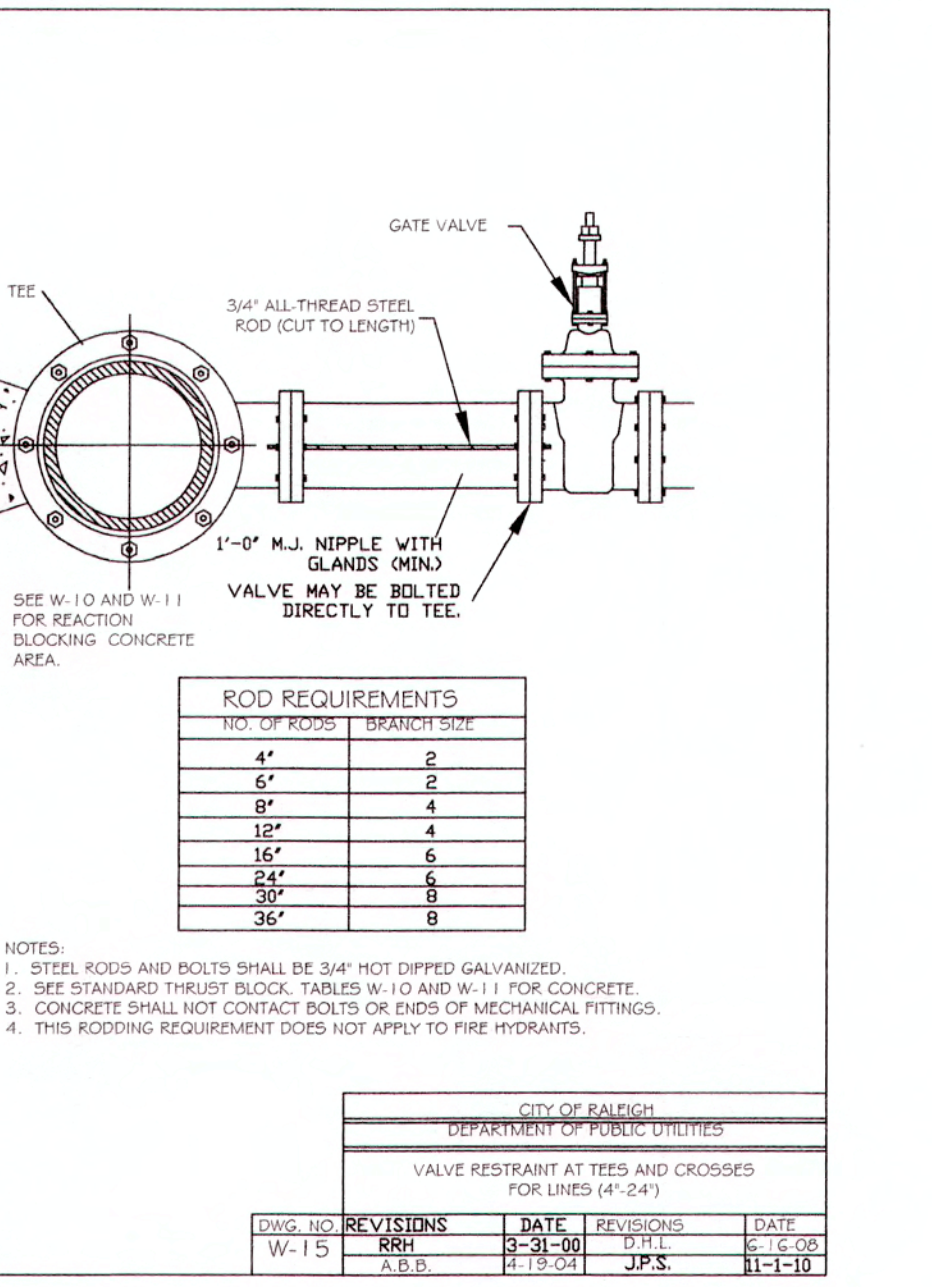
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DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
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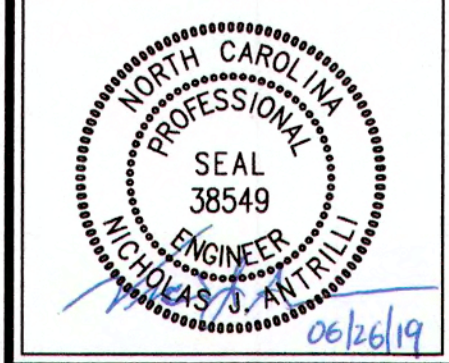
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W-25	REV.	07-20-17	J.P.S.	07-20-17



DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-15	REV.	07-20-17	J.P.S.	07-20-17

CITY OF RALEIGH	
ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.	
TRANSPORTATION-SERVICES N/A	
PUBLIC UTILITIES 95	
STORMWATER-N/A	
PLANNING-N/A	
FIRE-N/A	
URBAN-FORESTRY-N/A	

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
BY: *W. J. Antrill* DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER
THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
BY: *W. J. Antrill* DATE: 7-7-19
ADMINISTRATOR



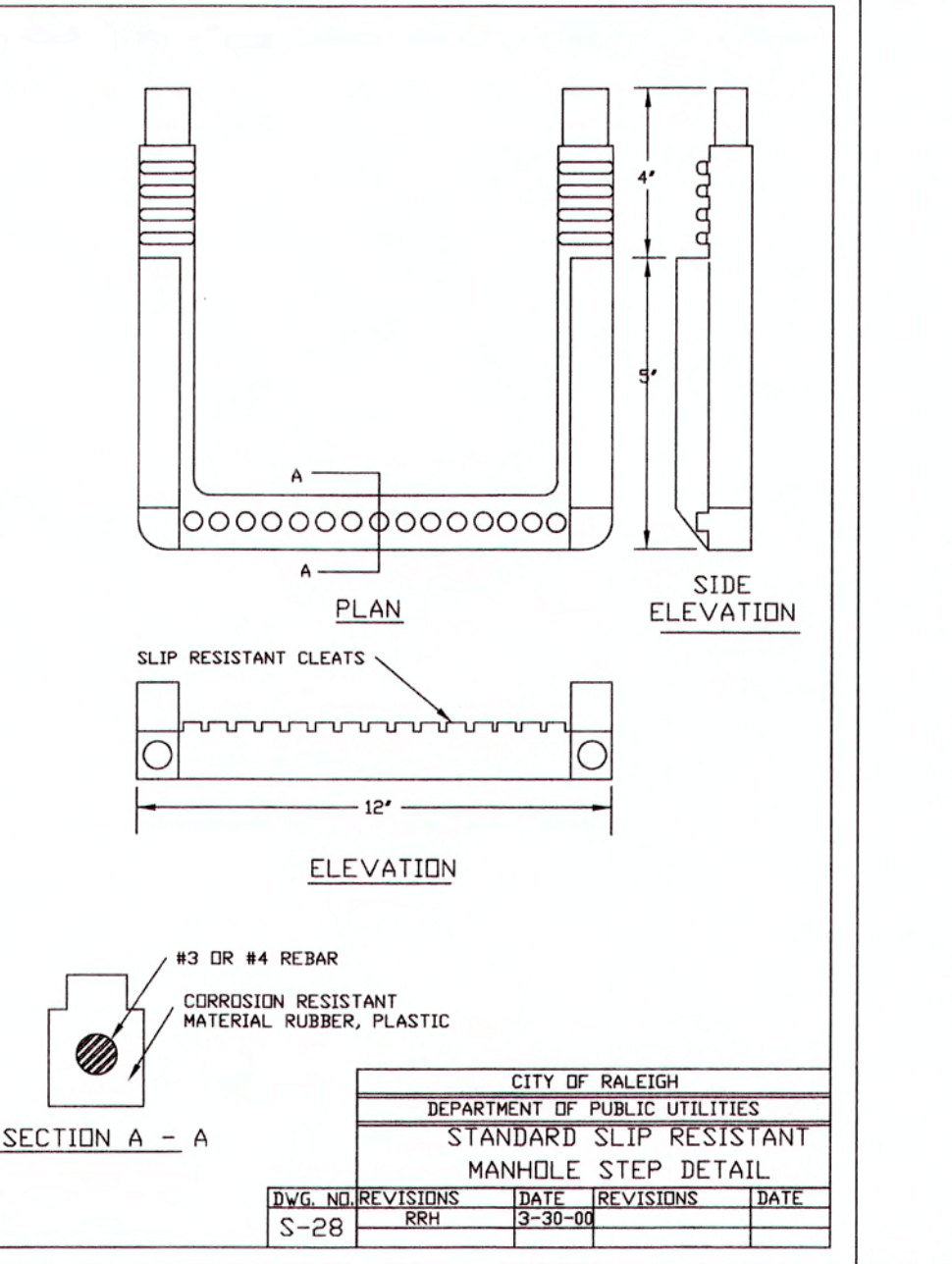
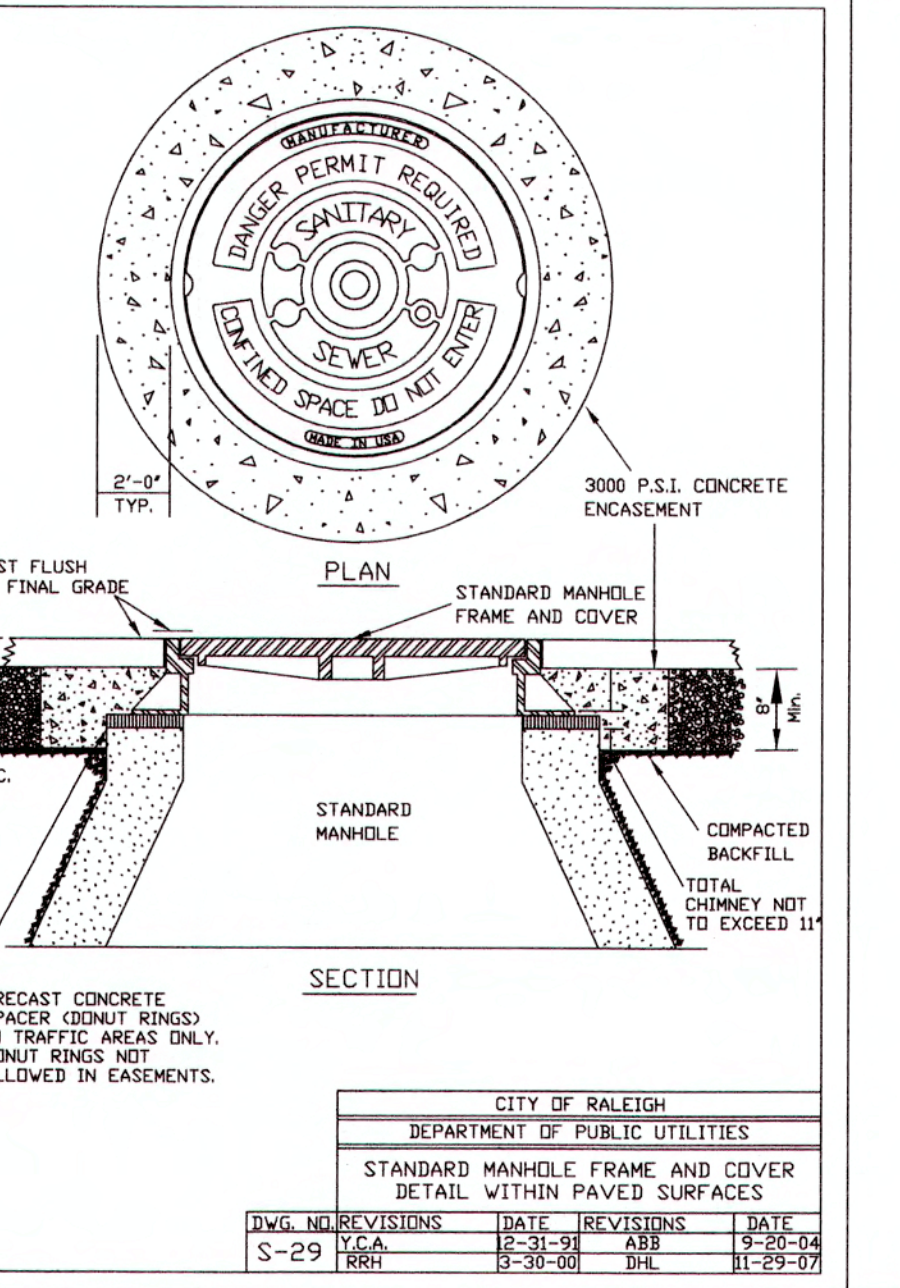
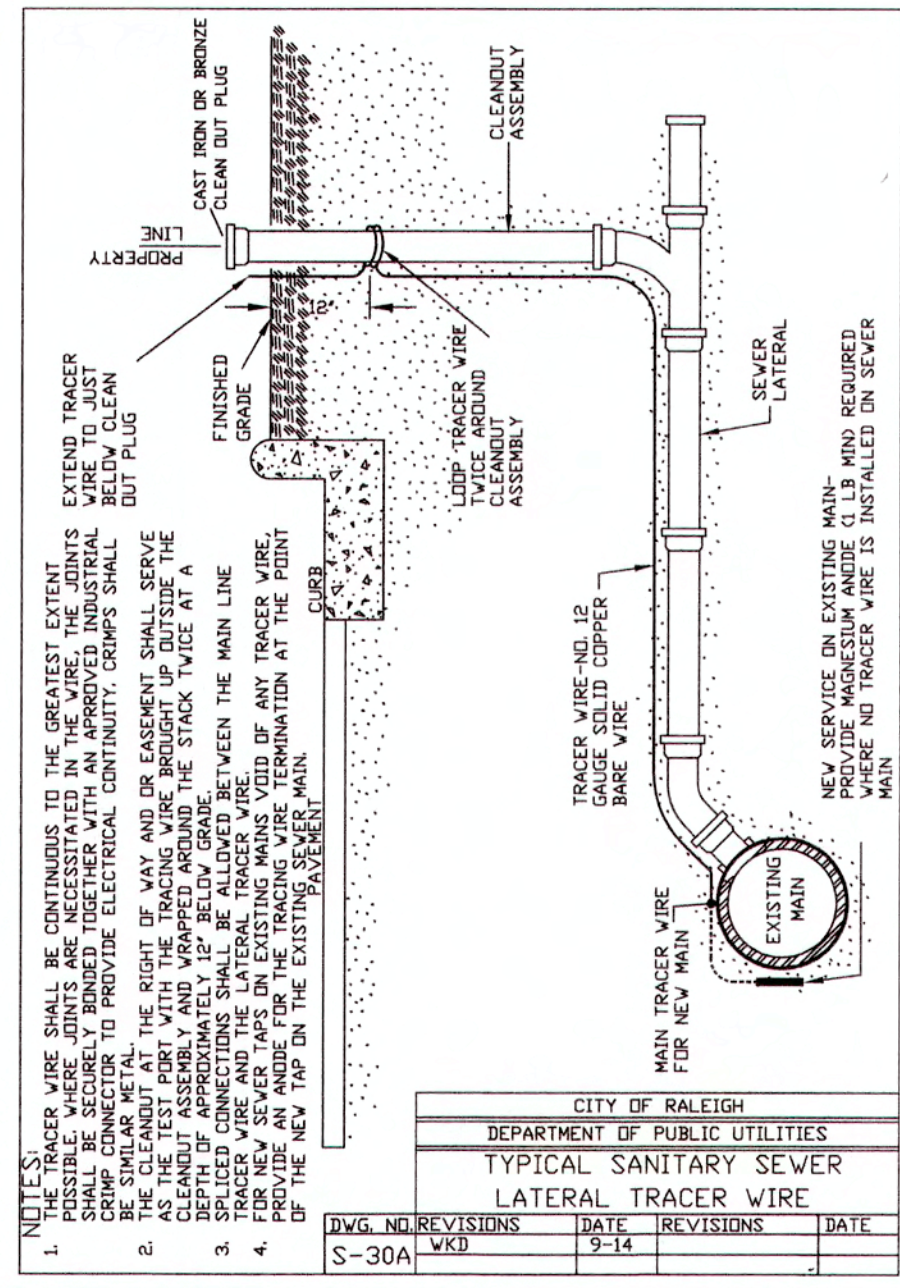
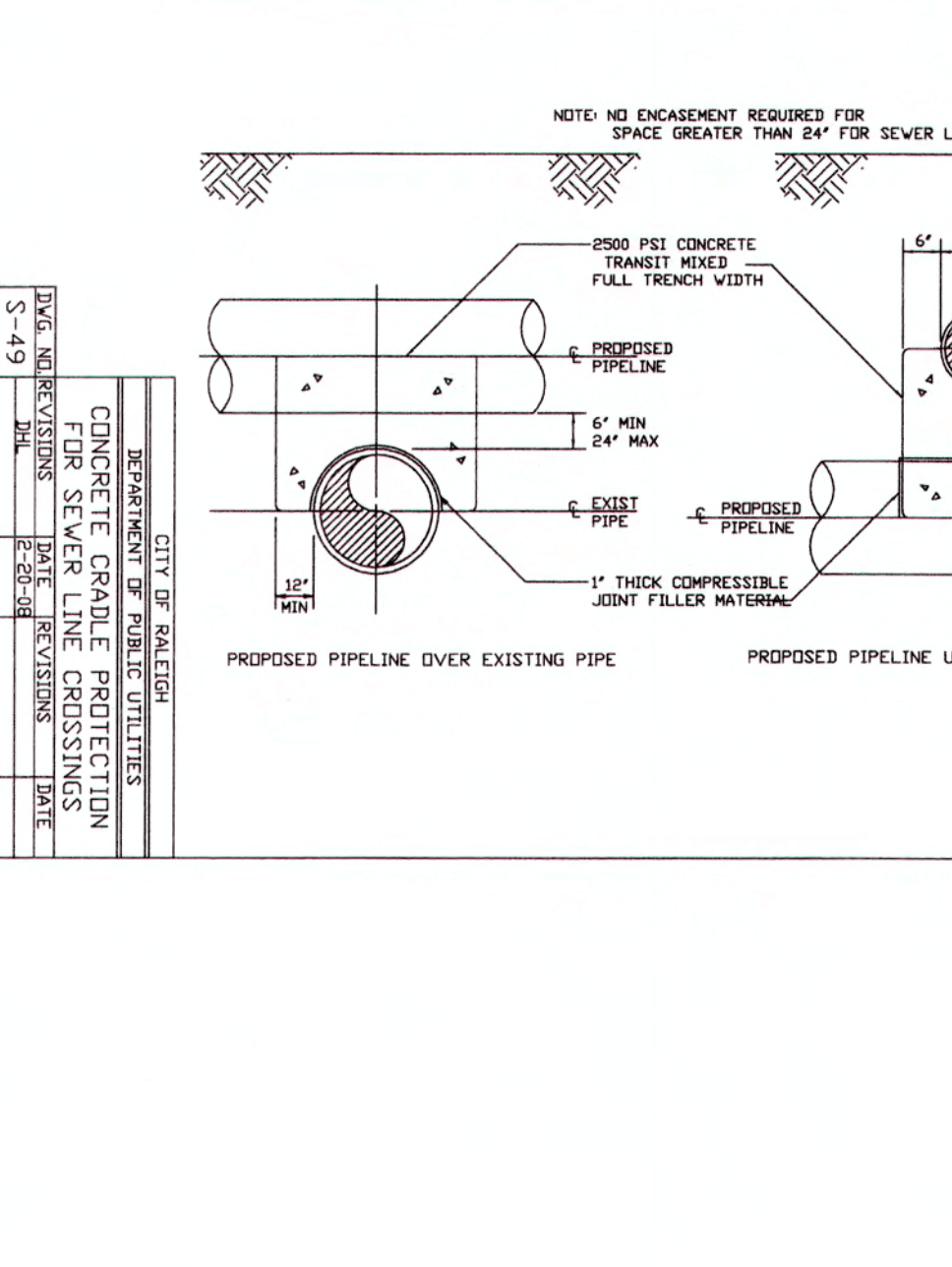
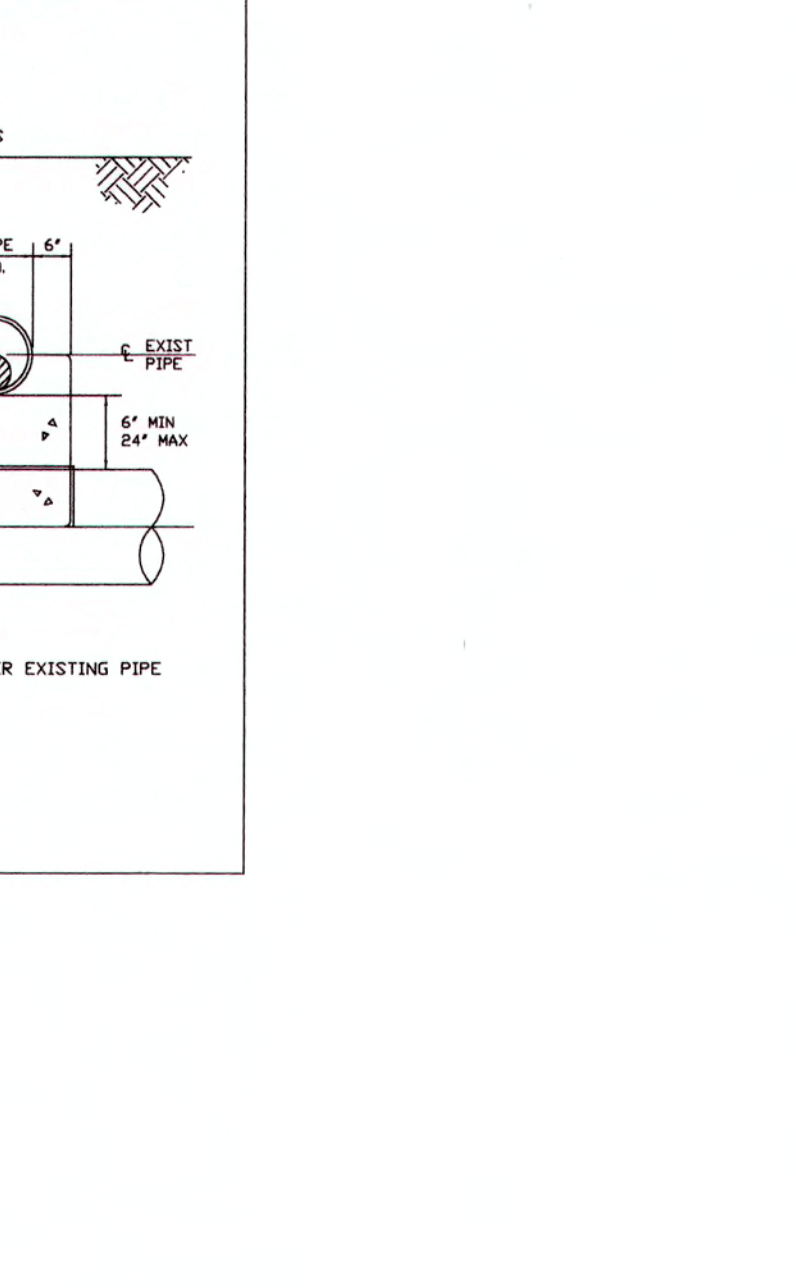
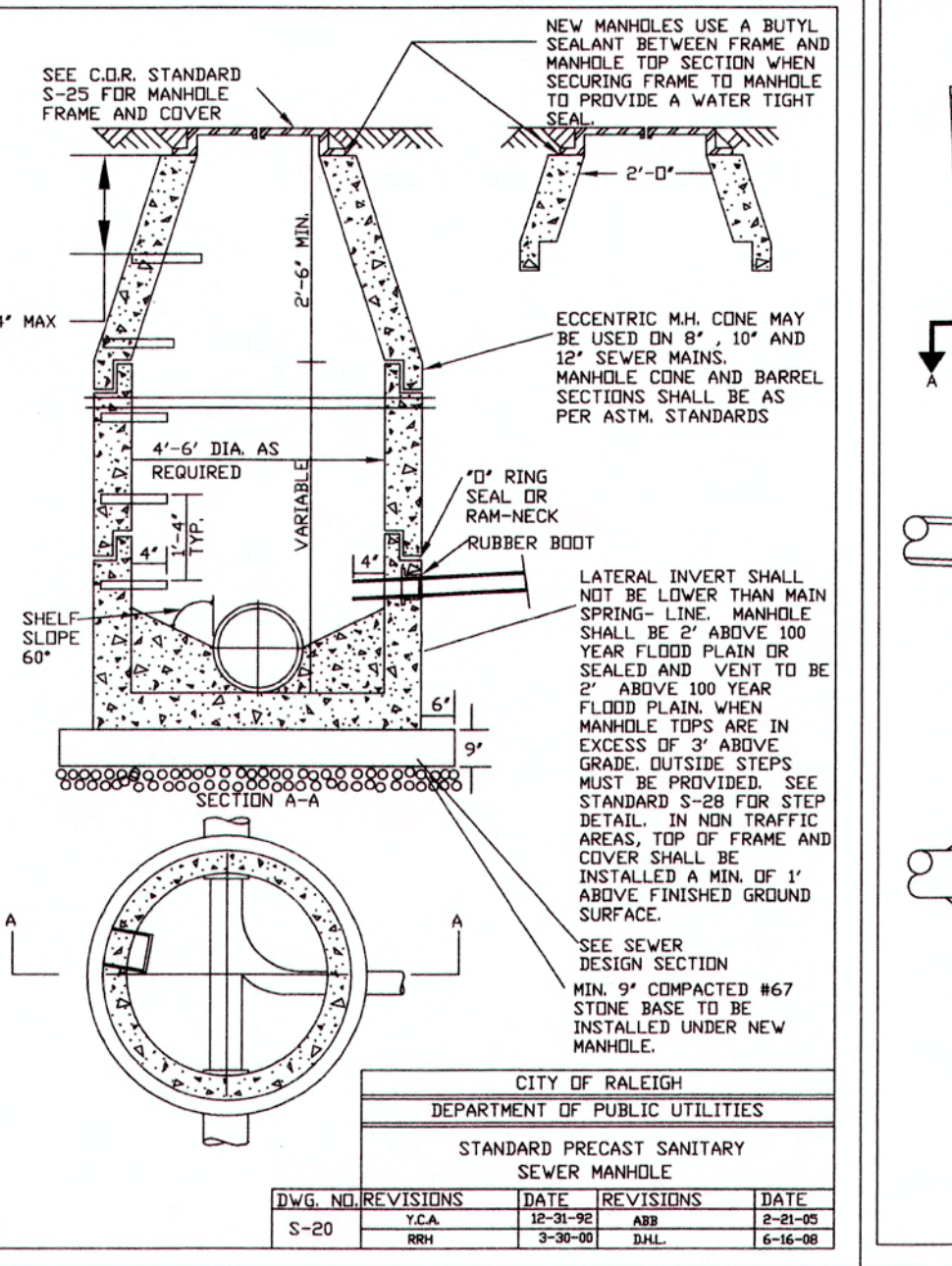
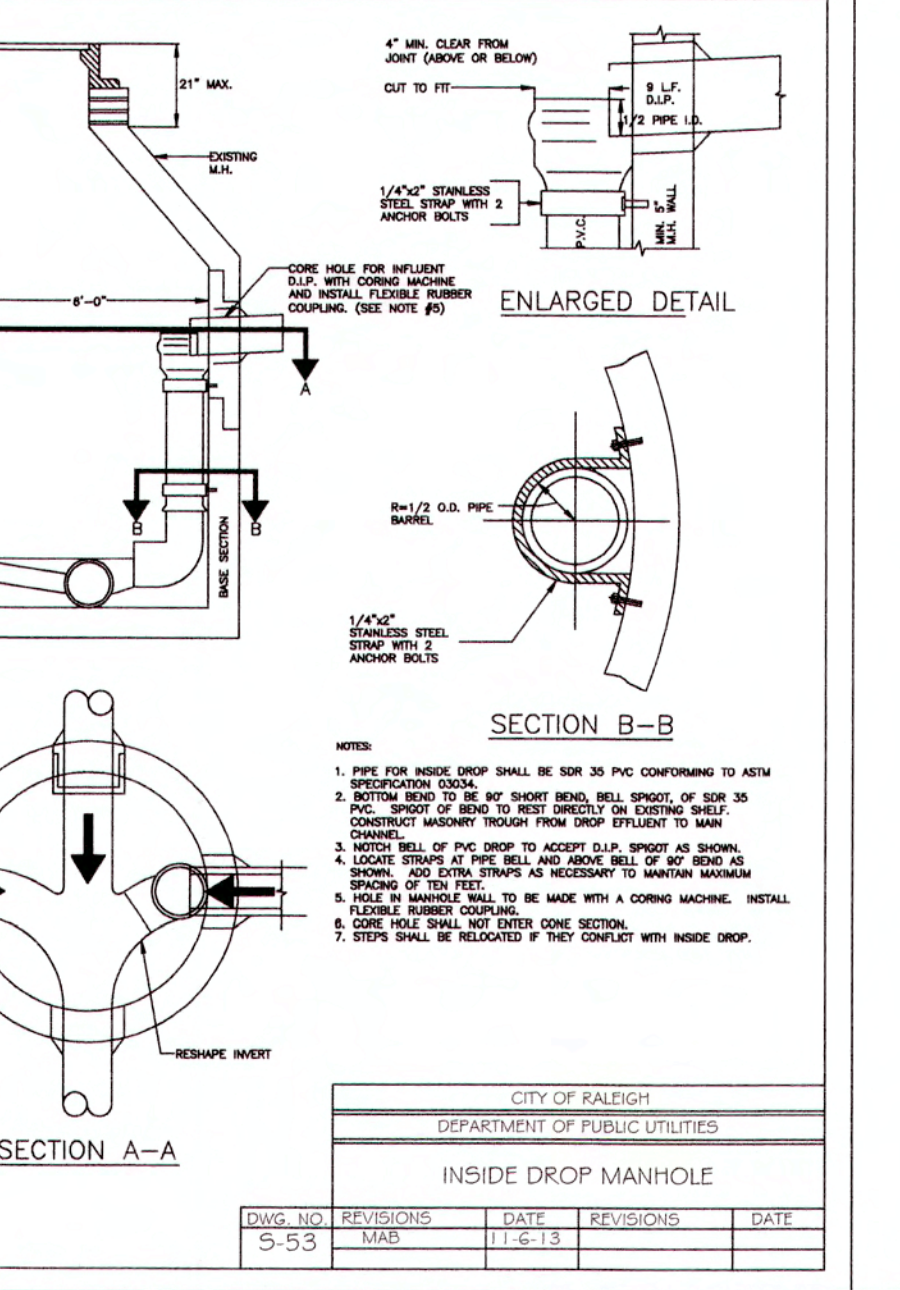
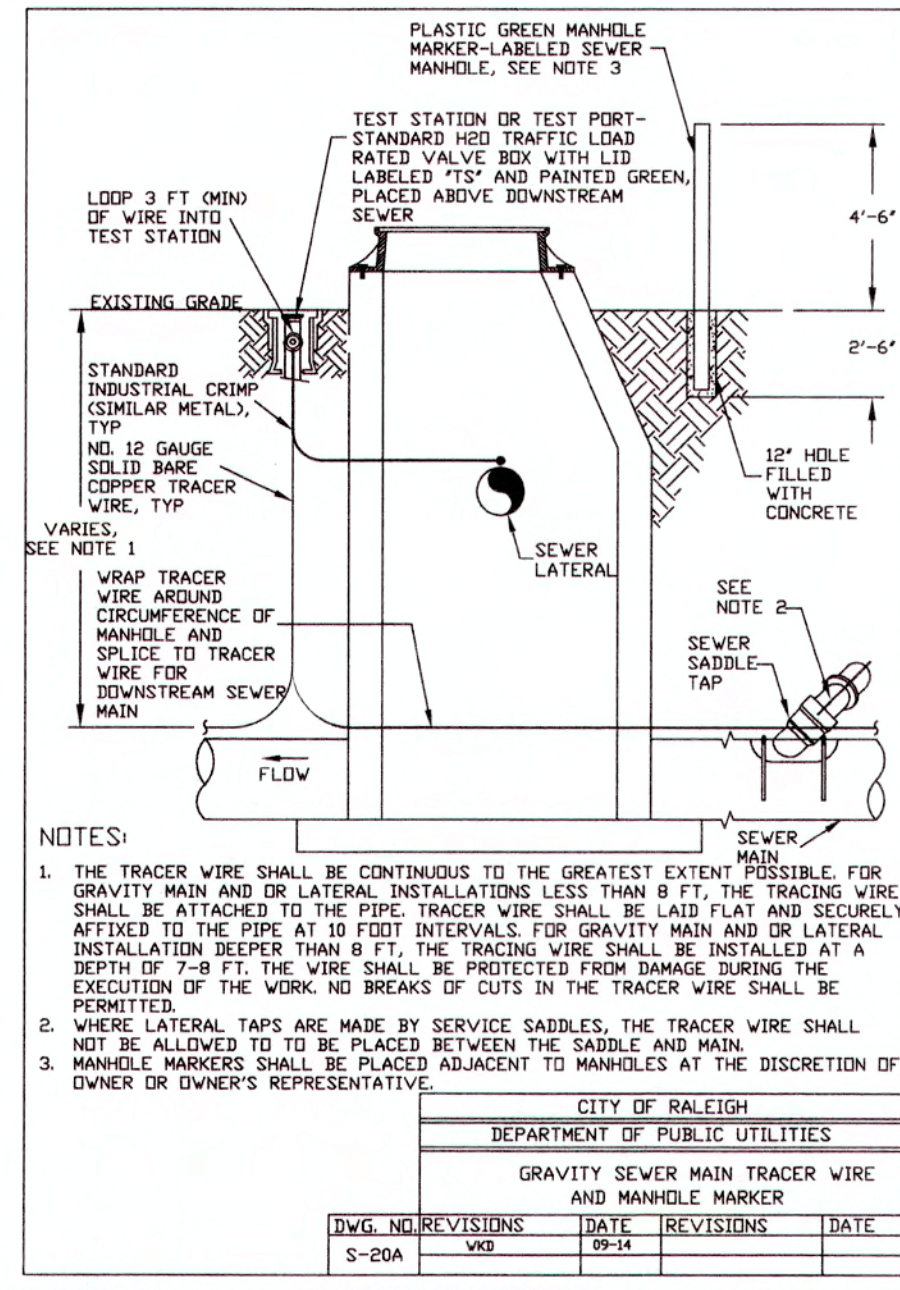
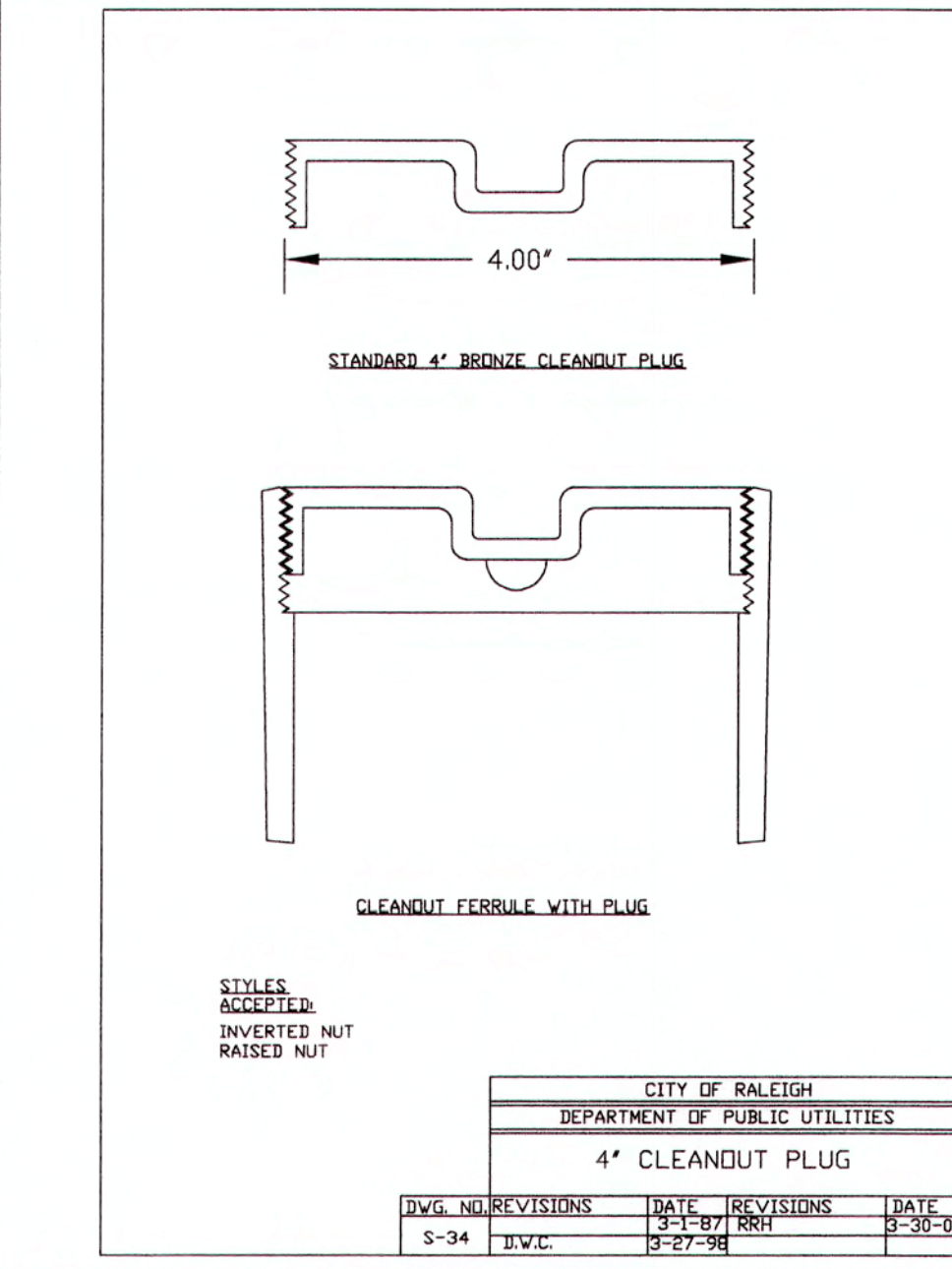
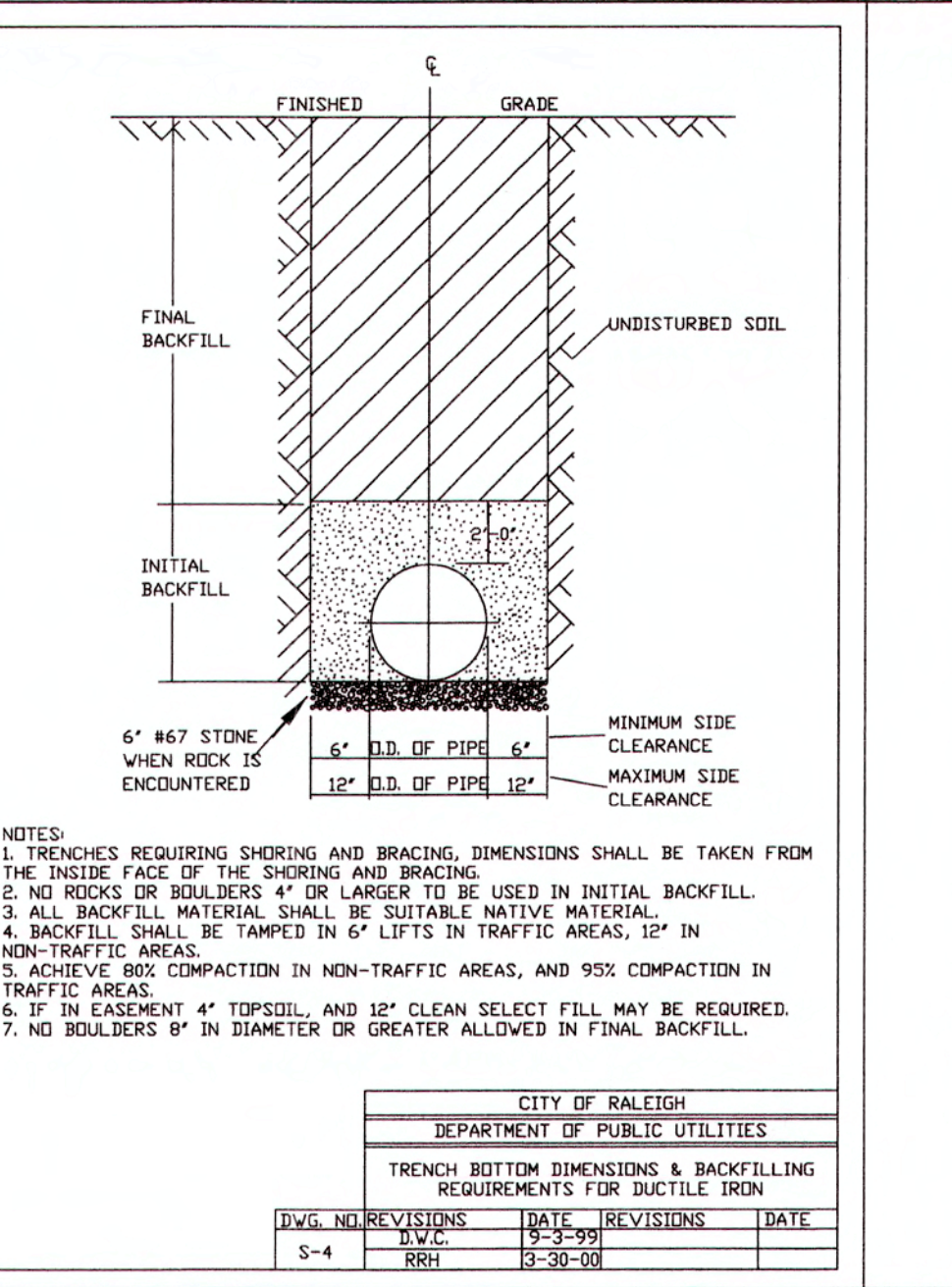
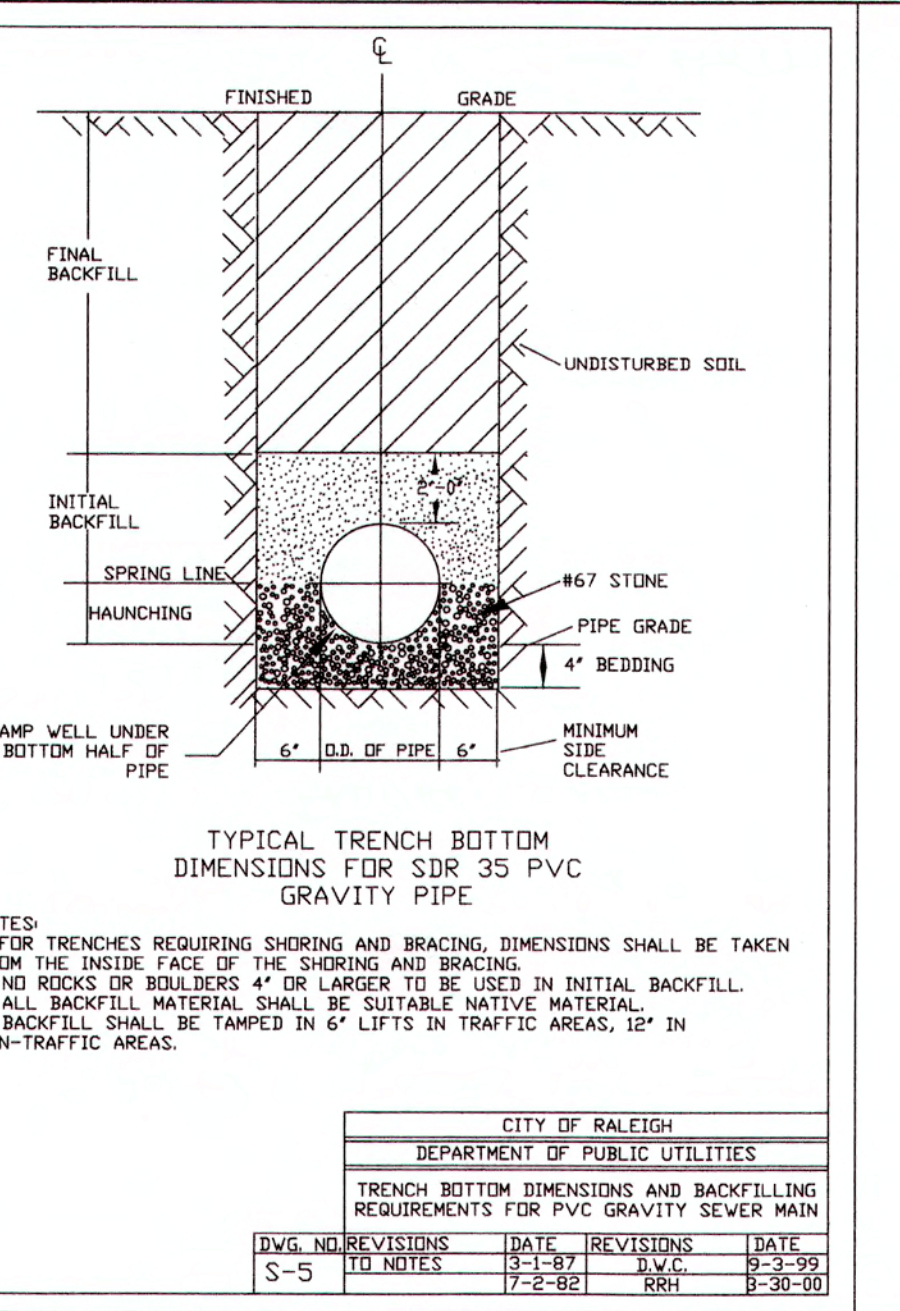
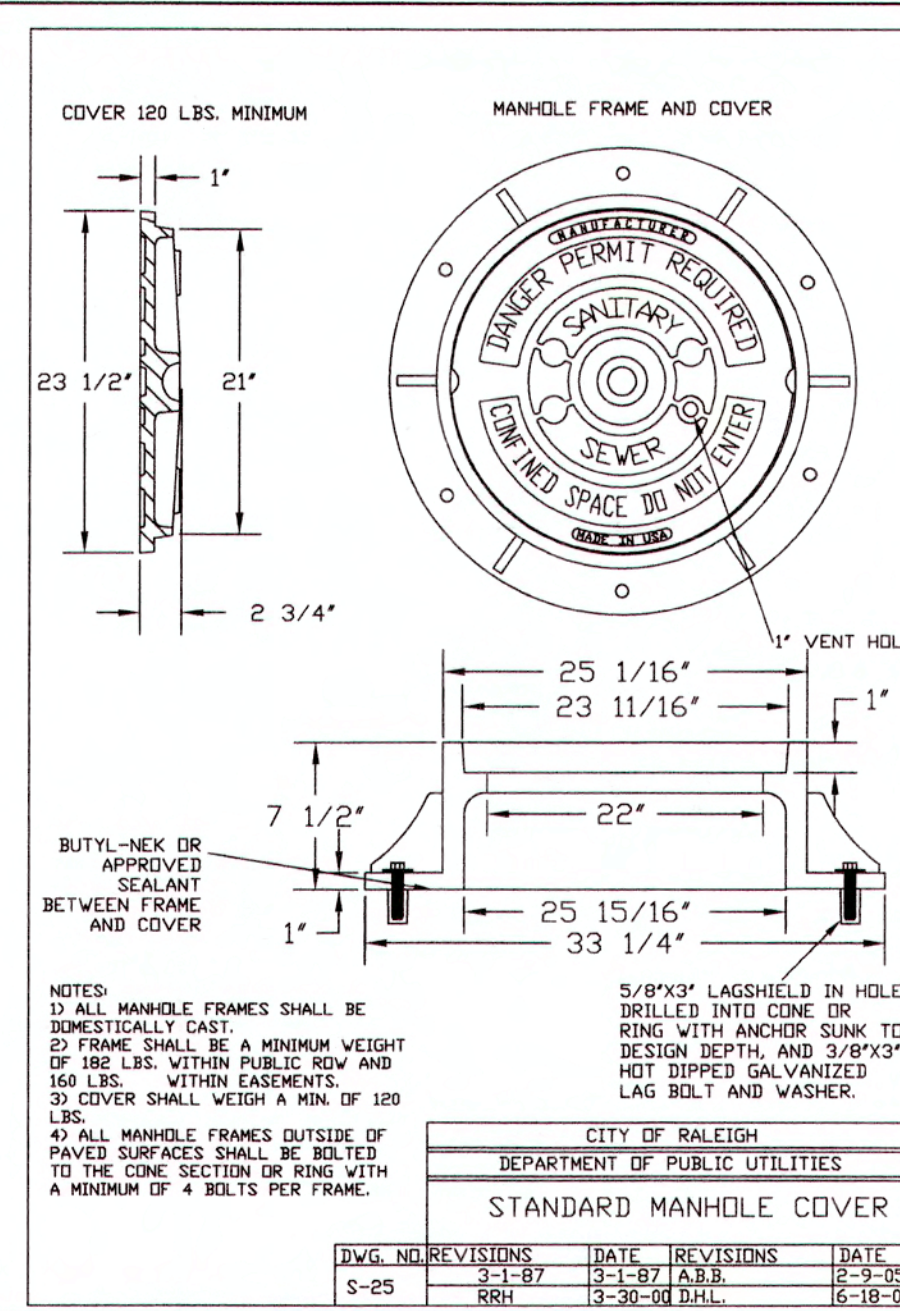
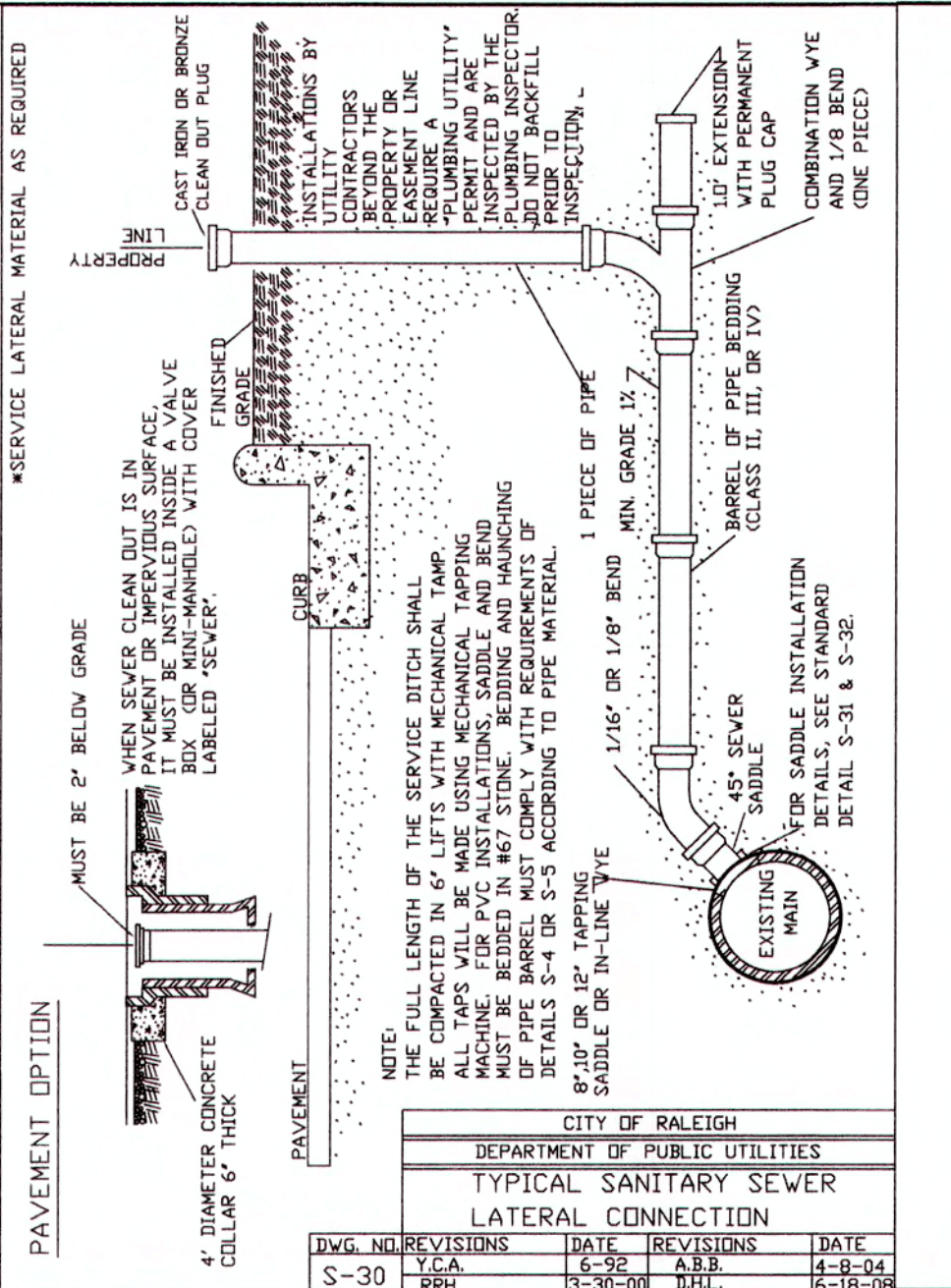
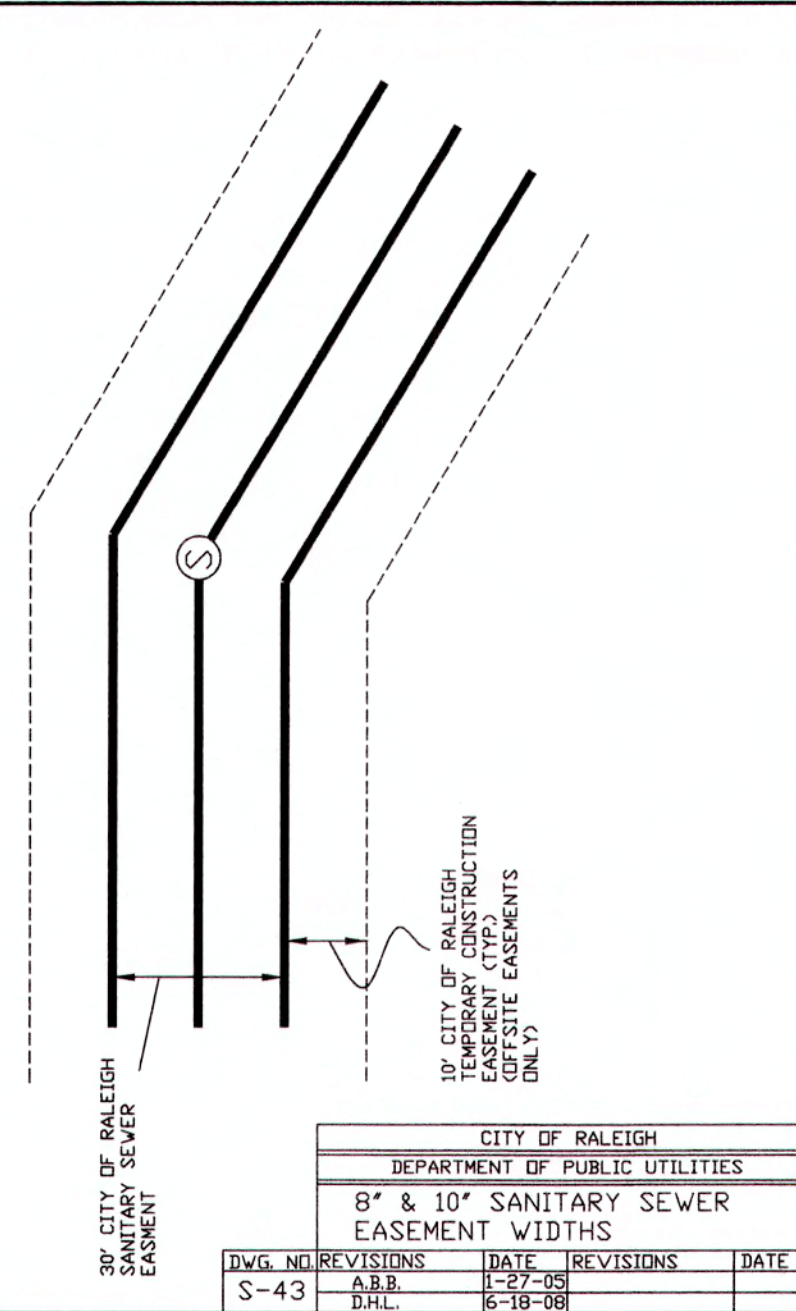
Revisions	1	TOK Comments	06/21/19
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TOWN CERTIFICATION. THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 7-9-19
ADMINISTRATOR



K:\09\05\05\02090251.93\Knightdale Station - R7 North\CD\02090251.93-SEWER-Utility Details.dwg, June 21, 2019 10:27:19 AM - D:\09\05\05\02090251.93\CD\02090251.93-SEWER-Utility Details.dwg

NCG01-DETAIL GROUND STABILIZATION AND HANDLING PLAN

EFFECTIVE: 04/01/19

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT
Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes

Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
<ul style="list-style-type: none"> Temporary grass seed covered with straw or other mulches and tackifiers Hydroseeding Roller erosion control products with or without temporary grass seed Appropriately applied straw or other mulch Plastic sheeting 	<ul style="list-style-type: none"> Permanent grass seed covered with straw or other mulches and tackifiers Geotextile fabrics such as permanent soil reinforcement matting Hydroseeding Shrubs or other permanent plantings covered with mulch Uniform and evenly distributed ground cover sufficient to restrain erosion Structural methods such as concrete, asphalt or retaining walls Roller erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

- Select flocculants that are appropriate for the soils being exposed during construction, selecting from the NC DWR List of Approved PAMS/Flocculants.
- Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
- Apply flocculants at the concentrations specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions.
- Provide ponding area for containment of treated Stormwater before discharging offsite.
- Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

- Maintain vehicles and equipment to prevent discharge of fluids.
- Provide drip pans under any stored equipment.
- Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
- Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- Remove leaking vehicles and construction equipment from service until the problem has been corrected.
- Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

- Never bury or burn waste. Place litter and debris in approved waste containers.
- Provide a sufficient number and size of waste containers (e.g. dumpster, trash receptacle) on site to contain construction and domestic wastes.
- Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
- Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
- Anchor all lightweight items in waste containers during times of high winds.
- Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
- Dispose waste off-site at an approved disposal facility.
- On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

- Do not dump paint and other liquid waste into storm drains, streams or wetlands.
- Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Contain liquid wastes in a controlled area.
- Containment must be labeled, sized and placed appropriately for the needs of site.
- Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

- Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
- Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
- Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

- Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
- Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
- Provide stable stone access point when feasible.
- Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

CONCRETE WASHOUTS

- Do not discharge concrete or cement slurry from the site.
- Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
- Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
- Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
- Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
- Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
- Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
- Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
- Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
- At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

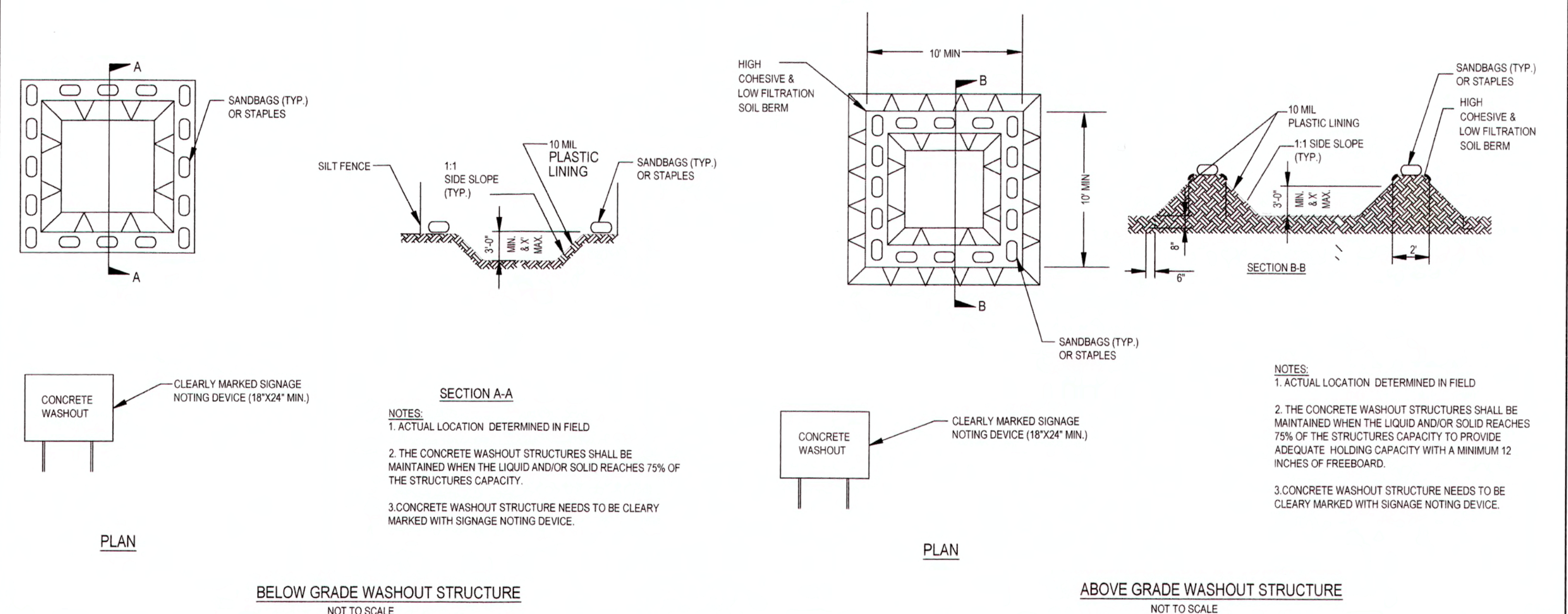
HERBICIDES, PESTICIDES AND RODENTICIDES

- Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
- Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
- Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
- Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

- Create designated hazardous waste collection areas on-site.
- Place hazardous waste containers under cover or in secondary containment.
- Do not store hazardous chemicals, drums or bagged materials directly on the ground.

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



NCG01-SELF INSPECTION, RECORDKEEPING & REPORTING

EFFECTIVE: 04/01/19

PART III SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the inspection record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those unattended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&S Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&S measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

- Occurrences that must be reported**
Permittees shall report the following occurrences:
(a) Visible sediment deposition in a stream or wetland.
(b) Oil spills if:
 - They are 25 gallons or more,
 - They are less than 25 gallons but cannot be cleaned up within 24 hours,
 - They cause sheen on surface waters (regardless of volume), or
 - They are within 100 feet of surface waters (regardless of volume).
 - Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.
 - Anticipated bypasses and unanticipated bypasses.
 - Noncompliance with the conditions of this permit that may endanger health or the environment.
- Reporting Timeframes and Other Requirements**
After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Division's Emergency Response personnel at (800) 662-7956, (800) 858-0368 or (919) 733-3300.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	<ul style="list-style-type: none"> Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	<ul style="list-style-type: none"> Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release. A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the noncompliance, and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. [40 CFR 122.41(i)(6)]. Division staff may waive the requirement for a written report on a case-by-case basis.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment [40 CFR 122.41(i)(7)]	<ul style="list-style-type: none"> Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the noncompliance, and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. [40 CFR 122.41(i)(6)]. Division staff may waive the requirement for a written report on a case-by-case basis.

PART III SELF-INSPECTION, RECORDKEEPING AND REPORTING

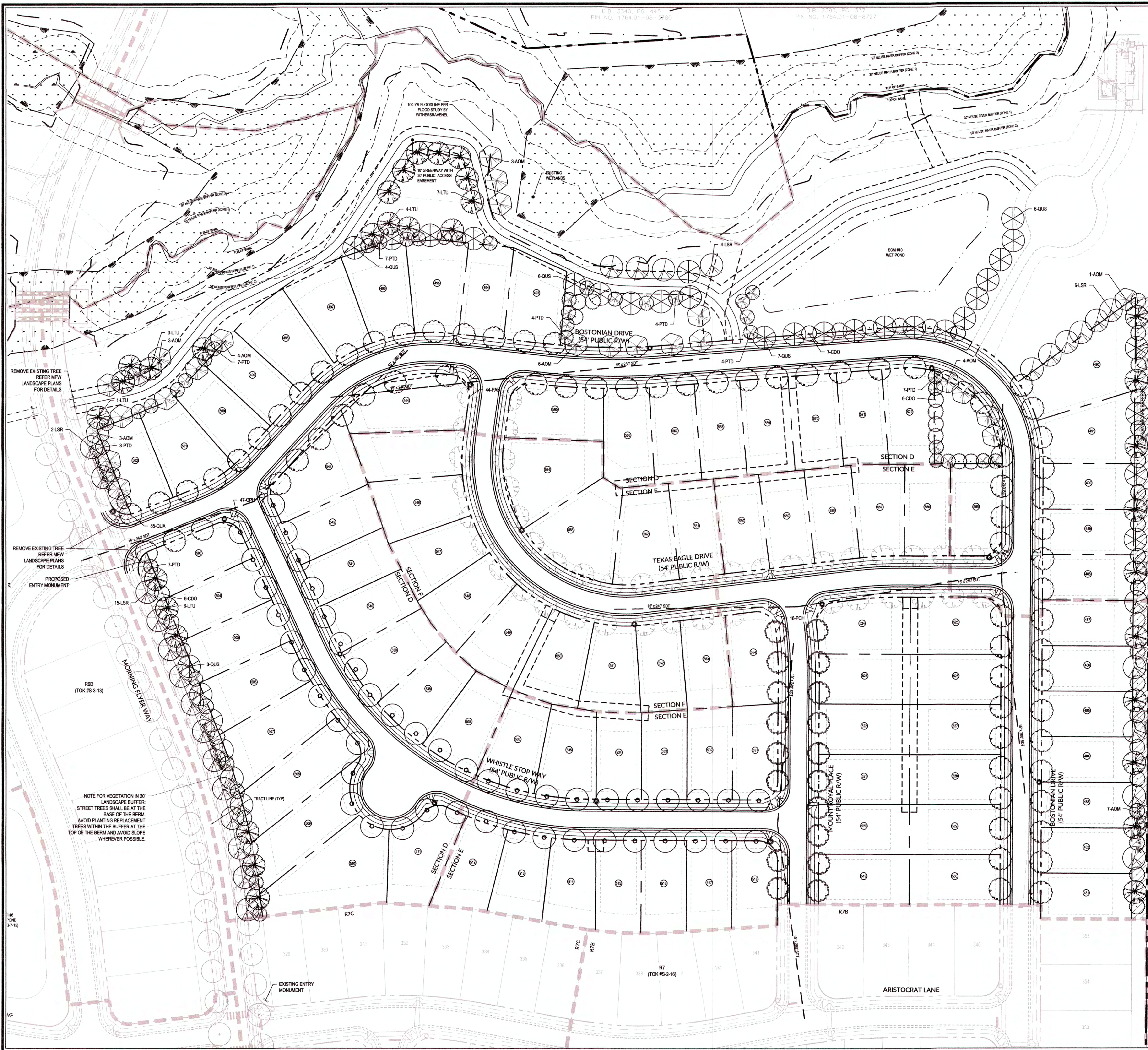
SECTION B: RECORDKEEPING

The approved E&S plan as well as any approved deviation shall be kept on the site. The approved E&S plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&S plan shall be documented in the manner described:

Item to Document	Documentation Requirements
(a) Each E&S Measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&S Plan.	Initial and date each E&S Measure on a copy of the approved E&S Plan or complete, date and sign an inspection report that lists each E&S Measure shown on the approved E&S Plan. This documentation is required upon the initial installation of the E&S Measures or if the E&S Measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&S Plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&S Plan.	Initial and date a copy of the approved E&S Plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&S Measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&S Measures.	Initial and date a copy of the approved E&S Plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation

- In addition to the E&S Plan documents above, the following items shall be kept on the site and available for agency inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:
- This general permit as well as the certificate of coverage, after it is received.
 - Records of inspections made during the previous 30 days. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.
 - All data used to complete the Notice of Intent and other inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]



CHARLES SIDNEY
D.B. 13728,
PIN NO. 1764.01-

VICTOR MARSHALL
ESTATE FILE 12-
PIN NO. 1764.01-

LOUIS W. MAS
VICTOR MARSHALL, JR.
D.B. 9630, PG.
PIN NO. 1764.01-

MILTON W. MSH
PATRICIA W. MSH
D.B. 4395,
B.M. 1988, 1
PIN NO. 1764.01-

100-YR FLOODLINE PER
FLOOD STUDY BY
WITHERSRAVENEL

10' GREENWAY WITH
5' PUBLIC ACCESS
EASEMENT

EXISTING WETLANDS

SCM #10
WET POND

REMOVE EXISTING TREE
REFER MFW
LANDSCAPE PLANS
FOR DETAILS

REMOVE EXISTING TREE
REFER MFW
LANDSCAPE PLANS
FOR DETAILS

PROPOSED
ENTRY MONUMENT

NOTE FOR VEGETATION IN 27'
LANDSCAPE BUFFER:
STREET TREES SHALL BE AT THE
BASE OF THE BERM.
AVOID PLANTING REPLACEMENT
TREES WITHIN THE BUFFER AT THE
TOP OF THE BERM AND AVOID SLOPE
WHEREVER POSSIBLE.

EXISTING ENTRY
MONUMENT

ALL MATERIALS & CONSTRUCTION METHODS
SHALL BE IN ACCORDANCE WITH ALL CITY OF
RALEIGH & TOWN OF KNIGHTDALE DESIGN
STANDARDS, DETAILS, AND SPECIFICATIONS.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE
ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF
MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS
ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF
KNIGHTDALE.

BY: *Scott Hill* DATE: 7-8-2019
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND
SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *Heidi* DATE: 7-9-19
ADMINISTRATOR

~~PUBLIC
SEWER COLLECTION/EXTENSION SYSTEM~~

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE
CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND
CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE
STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # _____
AUTHORIZATION TO CONSTRUCT _____
DATE _____

~~PUBLIC
WATER DISTRIBUTION/EXTENSION SYSTEM~~

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE
CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND
CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE
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CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # _____
AUTHORIZATION TO CONSTRUCT _____
DATE _____

GRAPHIC SCALE
1 inch = 60 ft.

WithersRavenel
Engineers | Planners | Surveyors

KNIGHTDALE STATION
R7 NORTH

TOWN OF KNIGHTDALE, NORTH CAROLINA

LANDSCAPE PLAN

Job No. 02090251.93 Drawn By WR
Date 01/25/19 Designer WR

1960
NORTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
MILTON W. MSH
06/07/19

Revisions

Sheet No.
L1.0

K:\09\02090251.93\Knightdale Station - R7 North\CAD\Cover Drawing\11.0 LANDSCAPE PLAN.dwg: Friday, June 7, 2019 8:11:59 AM - NANTHAR, SARIWETA

GENERAL LANDSCAPE NOTES

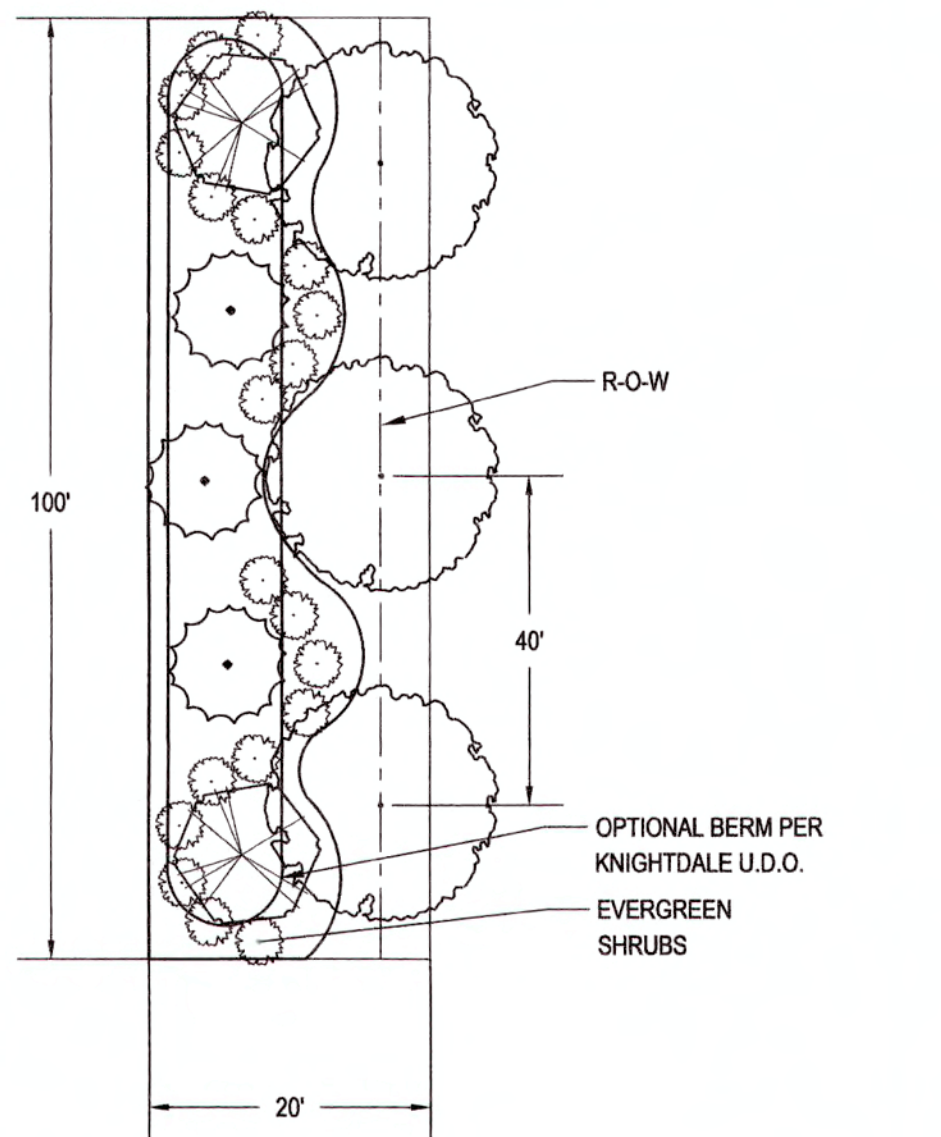
- LANDSCAPED AREAS SHALL NOT CONTAIN ANY DEVELOPMENT, IMPERVIOUS SURFACES OR SITE FEATURES THAT DO NOT FUNCTION TO MEET THE APPLICABLE STANDARDS FOR THAT AREA OR THAT REQUIRE REMOVAL OF EXISTING SIGNIFICANT VEGETATION.
- NO GRADING, DEVELOPMENT OR LAND-DISTURBING ACTIVITIES SHALL OCCUR WITHIN AREA BUFFER YARD IF FOREST CANOPY, SPECIMEN TREES OR SIGNIFICANT VEGETATION EXISTS WITHIN THESE AREAS, UNLESS APPROVED BY THE ADMINISTRATOR. IF GRADING WITHIN A BUFFER YARD IS PROPOSED, SLOPES 1:3 OR LESS ARE ENCOURAGED TO ENSURE PROPER TRANSITION OF GRADES TO THE ADJACENT PROPERTY AND TO FACILITATE LANDSCAPING AND MAINTENANCE.
- PERMANENT OFF-SITE LANDSCAPE EASEMENTS MAY BE USED TO MEET REQUIRED BUFFER YARDS PROVIDED THAT THE SIZE OR SHAPE OF THE EASEMENT SIGNIFICANTLY RESTRICTS THE ABILITY TO REASONABLY USE THE PROPERTY AND MEET THE BUFFER YARD REQUIREMENTS. THESE EASEMENTS MUST BE RECORDED PRIOR TO OR IN CONJUNCTION WITH THE APPROVAL OF THE SITE OR SUBDIVISION PLAN.
- NEW PLANT MATERIAL SHOULD COMPLEMENT EXISTING VEGETATION NATIVE TO THE SITE. THE USE OF DROUGHT TOLERANT, INDIGENOUS, NATIVE AND/OR REGIONALLY GROWN SPECIES OF TREES, SHRUBS AND GROUND COVERS IS ENCOURAGED IN ORDER TO MAKE PLANTED AREAS COMPATIBLE WITH EXISTING NATIVE HABITATS AND TO REDUCE DEPENDENCY ON IRRIGATION.
- ALL INSTALLATIONS SHALL BE IN ACCORDANCE WITH TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS & DETAIL MANUAL. LANDSCAPING SHOULD BE OF SUFFICIENT SIZE SO THAT MATURE APPEARANCE WILL BE ACHIEVED WITHIN (3) YEARS OF INSTALLATION FOR SHRUBS AND WITHIN (5) YEARS OF INSTALLATION FOR TREES, WHERE THE MINIMUM SIZE REQUIREMENTS OVERLAP THE HIGHER STANDARD SHALL PREVAIL.
- EACH CANOPY TREE SHALL BE PROVIDED WITH A MINIMUM IMPERVIOUS GROUND AREA OF 33 SF FOR ROOT GROWTH (EXCEPTION: STREET TREES) AND SHOULD BE PLANTED ON SLOPES NOT TO EXCEED 1:4 VERTICAL TO HORIZONTAL DISTANCE.
- GROUND COVER MUST BE PLANTED WITH ON-CENTER SPACING EQUIVALENT TO THE AVERAGE MATURE SPREAD FOR EACH PARTICULAR SPECIES.
- ALL NEW PLANT MATERIAL SHALL BE OF GOOD QUALITY, FREE FROM DISEASE, INSTALLED IN SOUND MANNER, MULCHED (3" LAYER) AND MEET STANDARDS SET FORTH IN THE AMERICAN STANDARD FOR NURSERY STOCK BY AMERICAN NURSERY & LANDSCAPE ASSOCIATION (ANLA). THE SELECTION OF PLANTS, PLANTING METHODS, MINIMUM HEIGHT, ROOT BALL AND CONTAINER SIZE, NUMBER OF BRANCHES AND WIDTH, SHALL CONFORM TO THE AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE ANLA FOR THAT TYPE OF TREE OR SHRUB AT THE TIME OF INSTALLATION.
- ALL NEW TREES SHALL ALSO BE PROPERLY GUYPED AND STAKED AT THE TIME OF PLANTING.
- ADEQUATE DRAINAGE AND MULCHING SHALL BE PROVIDED IN ALL CASES, PARTICULARLY FOR MEDANS AND ISLANDS.
- INSTALLATION PRACTICES SHALL BE UTILIZED WHICH PRESERVE AND REPLACE EXISTING TOPSOIL OR AMEND THE SOIL TO REDUCE COMPACTION.
- ALL PORTIONS OF A LANDSCAPED AREA NOT PLANTED WITH SHRUBS AND TREES OR COVERED BY A WALL OR OTHER SCREENING DEVICE SHALL BE PLANTED WITH GROUND COVER AND/OR GRASS, OR COVERED WITH NATURAL MULCH WITH A MINIMUM DEPTH OF 2".
- WHERE A CANOPY TREE IS REQUIRED AND OVERHEAD UTILITY LINES EXIST, (2) UNDERSTORY TREES SHALL BE SUBSTITUTED WITH THE APPROVAL OF THE ADMINISTRATOR.
- NOTHING SHALL BE PLANTED OR INSTALLED WITHIN AN UNDERGROUND OR OVERHEAD UTILITY EASEMENT OR DRAINAGE EASEMENT WITHOUT THE CONSENT OF THE TOWN AND THE EASEMENT HOLDER AT THE TIME OF MASTER PLAN APPROVAL.
- CONTRACTOR SHALL MAINTAIN ALL NEARBY PLANT MATERIAL THROUGHOUT TIME OF INSTALLATION.
- ALL LANDSCAPING, MULCHING AND SEEDING SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROVED SITE PLAN AND THE STANDARDS OF THIS CHAPTER PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY. REQUESTS FOR A DELAY IN COMPLYING WITH THIS REQUIREMENT WILL BE CONSIDERED FOLLOWING A WRITTEN REQUEST DIRECTED TO THE ADMINISTRATOR. SUCH REQUEST FOR A DELAY SHALL NOTE THE TIMEFRAME IN WHICH THE PLANTING SHALL BE COMPLETED. CERTIFICATES OF OCCUPANCY WILL BE ISSUED WITH THE APPROVAL OF A REQUEST FOR PLANTING DELAY, IF DEEMED REASONABLE.
- THE TOWN MAY ISSUE A TEMPORARY CERTIFICATE OF OCCUPANCY FOR A PERIOD OF 30-180 DAYS, RELATIVE TO THE NEXT PLANTING SEASON, WHILE THE TOWN OF KNIGHTDALE MAY ALSO ISSUE A TEMPORARY CERTIFICATE OF OCCUPANCY FOR A PERIOD NOT TO EXCEED 30 DAYS.
- WHERE SIGHT TRIANGLES FOR DRIVES OR STREETS OVERLAP SCREENING, GROUND COVER VEGETATION SHALL BE USED EXCLUSIVELY (EXCEPTION: SINGLE-FAMILY DRIVES & DRIPKES).
- ALL SIDES OF PARKING LOTS SHALL BE SCREENED WITH A TYPE 'A' BUFFER YARD. SIDES ADJACENT TO AN ARTERIAL SHALL BE SCREENED WITH A TYPE 'B' BUFFER YARD. OTHER VEHICLE ACCOMMODATION AREAS SHALL BE SCREENED FROM OFF-SITE VIEW WITH A TYPE 'B' BUFFER YARD.
- ABOVE GROUND UTILITIES AND ENCLOSED CONTAINMENT AREAS FOR TRASH AND RECYCLABLES SHALL BE SCREENED BY ELEMENTS OF A TYPE 'B' BUFFER YARD THAT PERTAIN TO SEMI-OPAQUE SCREENS UP TO 6' IN HEIGHT OR THE HEIGHT OF THE UTILITY OR ENCLOSURE, WHICHEVER IS LESS.

BERMS WITH A FENCE OR WALL:

- ALL BERMS SHALL NOT EXCEED A SLOPE WITH MAXIMUM RISE OF 1" TO A RUN OF 2", A MAXIMUM HEIGHT OF 4' AND A MAXIMUM WIDTH OF 40% OF THE REQUIRED BUFFER WIDTH.
- BERMS SHALL BE STABILIZED WITH A GROUND COVER OR OTHER SUITABLE VEGETATION OR PERMANENT SLOPE RETENTION DEVICE. BERMS TALLER THAN 4' SHALL BE APPROVED BY THE ADMINISTRATOR ON A CASE BY CASE BASIS, BUT SHALL CONFORM TO THE SLOPE AND WIDTH RESTRICTIONS AS PREVIOUSLY DETAILED.

MAINTENANCE:

- THE OWNER(S) OR THE PROPERTY SHALL BE RESPONSIBLE FOR ALL NATURAL AND PHYSICAL FEATURES REQUIRED BY THE LANDSCAPE SECTION OF THE UDO AND SHALL PRESERVE AND MAINTAIN THESE FEATURES IN HEALTHY GROWING CONDITIONS, REPLACE THEM WHEN NECESSARY, AND KEEP THE AREAS AROUND THEM FREE OF REFUSE AND DEBRIS IN A MANNER THAT PREVENTS REFUSE AND DEBRIS FROM WASHING ONTO PUBLIC RIGHTS-OF-WAY.
- THE USE OF IRRIGATION IS PERMITTED IN ALL REQUIRED LANDSCAPING AREAS AS REQUIRED BY THE LANDSCAPING SECTION OF THE UDO AND MAY CONNECT TO THE PUBLIC WATER SYSTEM SUBJECT TO THE REQUIREMENTS OF THE TOWN'S STANDARDS SPECIFICATIONS AND DETAILS MANUAL, AND OTHER APPLICABLE TOWN ORDINANCES OR POLICIES. THE USE OF MOISTURE METERING DEVICES AND AUTOMATIC TIERERS WITH ANY IRRIGATION SYSTEM IS REQUIRED. THE USE OF XERISCAPE PRACTICES AND DRIP IRRIGATION IS ALSO ENCOURAGED, UNLESS OTHERWISE REQUIRED.
- ALL VEGETATION SHOULD BE ALLOWED TO REACH AND BE MAINTAINED AT ITS MATURE SIZE.
- TREE TOPPING (THE REMOVAL OF MORE THAN 25% OF A TREE'S CANOPY) IS CONSIDERED TO BE DAMAGE AND MIS-CONFIGUREMENT AND SHALL BE PROHIBITED ON ALL TREES ON PUBLIC PROPERTY. PUBLIC RIGHT-OF-WAY REQUIRED TREE SAVE AREAS AND PARKING LOT LANDSCAPING AREAS UNLESS OTHERWISE APPROVED BY THE LAND USE REVIEW BOARD (LURB). TREE LOCATIONS WHERE PROPER PRUNING PRACTICES ARE IMPRACTICAL MAY BE EXEMPTED FROM THIS ARTICLE AT THE DETERMINATION OF THE ADMINISTRATOR.
- THE OWNER OF ANY TREE OR SHRUB ON PRIVATE PROPERTY THAT OVERHANGS ANY PUBLIC RIGHT-OF-WAY WITHIN THE TOWN SHALL PRUNE THE BRANCHES SO THAT SUCH BRANCHES SHALL NOT OBSTRUCT THE LIGHT FROM ANY STREET LAMP OR OBSTRUCT THE VIEW OF ANY STREET INTERSECTION AND SO THAT THERE SHALL BE A CLEAR SPACE OF 8' ABOVE THE SURFACE OF THE STREET OR SIDEWALK.
- THE TOWN OF KNIGHTDALE PUBLIC WORKS DIRECTOR IS AUTHORIZED TO PRUNE TREES AND SHRUBS FROM PUBLIC PROPERTIES AND PUBLIC RIGHTS-OF-WAY.
- THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) IS AUTHORIZED TO PRUNE TREES AND SHRUBS IN THE PUBLIC RIGHTS-OF-WAY OWNED BY THE STATE OF NORTH CAROLINA.
- THE REMOVAL BY ANY ENTITY OF A TREE OR SHRUB THAT IS DEAD, INFECTED BY DISEASE, OR DETERMINED TO BE A HAZARD TO PUBLIC SAFETY AND WELFARE AND SUBSEQUENT REPLACEMENT MAY BE APPROVED BY THE ADMINISTRATOR. TREES REMOVED MUST BE REPLACED IN ACCORDANCE WITH THE REPLACEMENT PROVISIONS OF THE UDO.
- OWNERS SHALL REMOVE ALL DEAD, DISEASED OR HAZARDOUS TREES AND SHRUBS AS WELL AS ANY BROKEN OR DECAYED LIMBS WHICH CONSTITUTE A MENACE TO THE SAFETY OF THE PUBLIC. THE TOWN SHALL HAVE THE RIGHT TO CAUSE THE REMOVAL OF ANY DEAD OR DISEASED TREES AND SHRUBS ON PRIVATE PROPERTY WHEN SUCH TREE OR SHRUB CONSTITUTES A HAZARD TO LIFE AND PROPERTY, HARBOR INSECTS OR DISEASE WHICH CONSTITUTES A POTENTIAL THREAT TO OTHER VEGETATION IN THE TOWN. THE ADMINISTRATOR WILL NOTIFY PROPERTY OWNER(S) OF THE REQUIREMENT TO REMOVE SUCH TREES, SHRUBS OR LIMBS. REMOVAL SHALL BE DONE AT THE OWNER(S) EXPENSE WITHIN 60 DAYS AFTER THE DATE OF SERVICE OF THE WRITTEN NOTICE. FAILURE TO COMPLY WITH SUCH PROVISIONS SHALL CONSTITUTE A VIOLATION OF THE TOWN OF KNIGHTDALE ORDINANCE AND SHALL BE SUBJECT TO THE APPLICABLE PROCEDURES AND PENALTIES.
- WHEN REMOVING TREES AND SHRUBS, STAMPS SHALL BE REMOVED OR GROUND MINIMUM DEPTH OF 4".
- IN THE EVENT THAT ANY REQUIRED VEGETATION IS SEVERELY DAMAGED DUE TO AN UNUSUAL WEATHER OCCURRENCE OR NATURAL DISASTER, THE OWNER SHALL HAVE (1) GROWING SEASON TO REPLACE OR REPLANT FOLLOWING THE EVENT OR FOLLOWING THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY FOR ANY EVENT-RELATED SITE RECONSTRUCTION, WHICHEVER IS LATER.
- VEGETATION WITHIN A REQUIRED TREE PROTECTION OR LANDSCAPED AREA THAT DIES WITHIN (1) YEAR OF CONSTRUCTION COMPLETION SHALL BE REMOVED AND REPLACED WITH NEW VEGETATION OF EQUAL OR GREATER SIZE BY THE CONTRACTOR PROVIDING THE WARRANT. SHOULD ANY VEGETATION REQUIRED IN A TREE PROTECTION OR LANDSCAPED AREA DIE AFTER THE EXPIRATION OF THE WARRANTY, THE PROPERTY OWNER SHALL REPLACE IT WITHIN 180 DAYS WITH VEGETATION OF EQUAL OR GREATER SIZE.
- A PLAN DENOTING THE PROPOSED LOCATION AND SPECIES OF REPLACEMENTS SHALL BE SUBMITTED TO THE TOWN OF KNIGHTDALE FOR APPROVAL. THE ADMINISTRATOR MAY ELECT TO PRESENT THE PLAN TO THE LURB FOR FINAL APPROVAL.
- ALL VEGETATION SHALL BE REPLACED IN A MANNER THAT SATISFIES THE APPLICABLE TYPE, AMOUNT AND PERFORMANCE CRITERIA REQUIRED BY THE TOWN OF KNIGHTDALE UDO.
- THE ADMINISTRATOR MAY INSPECT THE SITE ONCE A YEAR AFTER THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY IN ORDER TO ENSURE COMPLIANCE WITH THE APPROVED SITE PLAN AND TO ENSURE THAT THE VEGETATION AND LANDSCAPING IS PROPERLY MAINTAINED. THE ADMINISTRATOR MAY ISSUE A NOTICE OF VIOLATION TO COMPLY WITH THE PROVISIONS OF THE KNIGHTDALE ORDINANCE IF WARRANTED UPON AN INSPECTION.



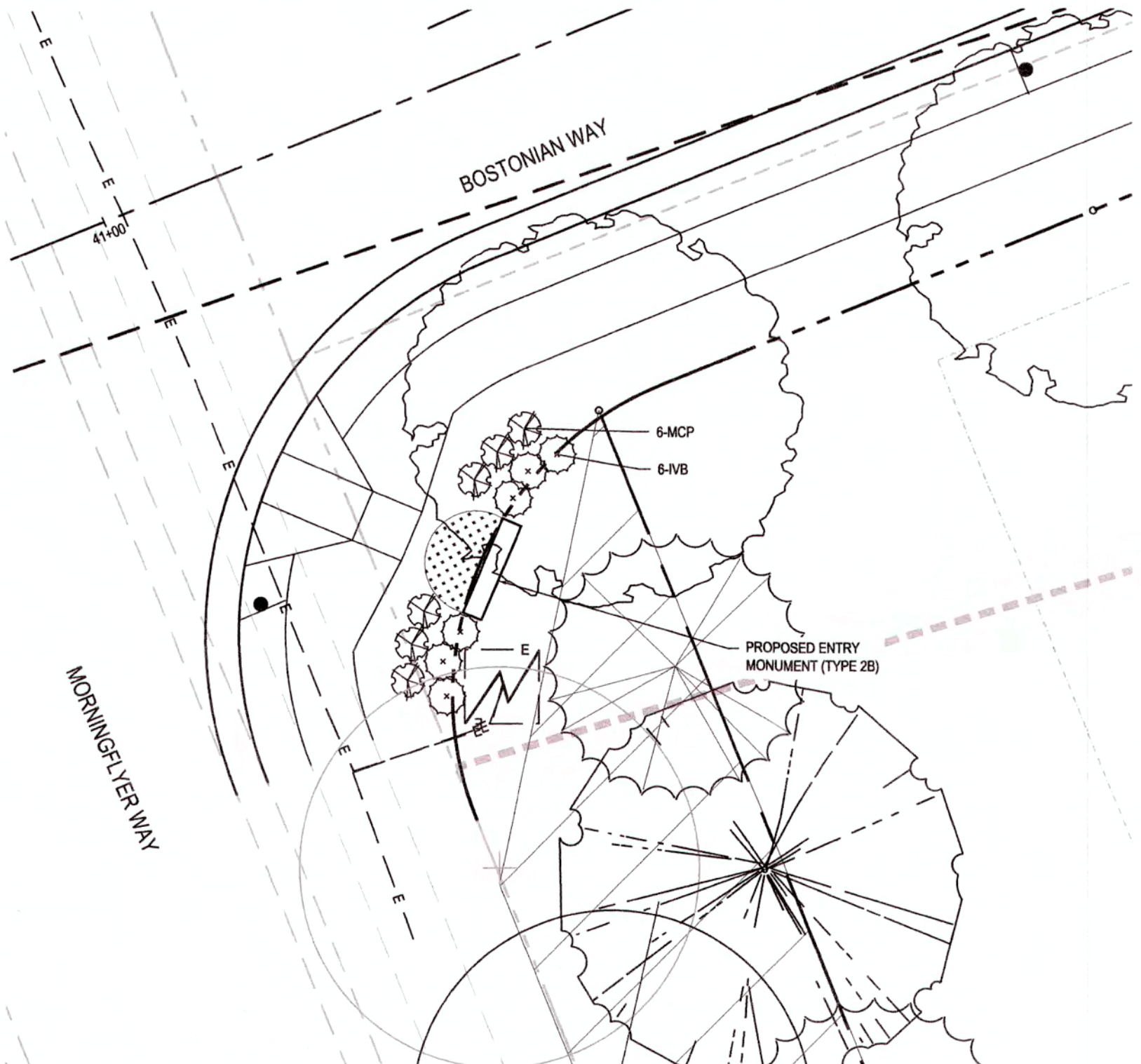
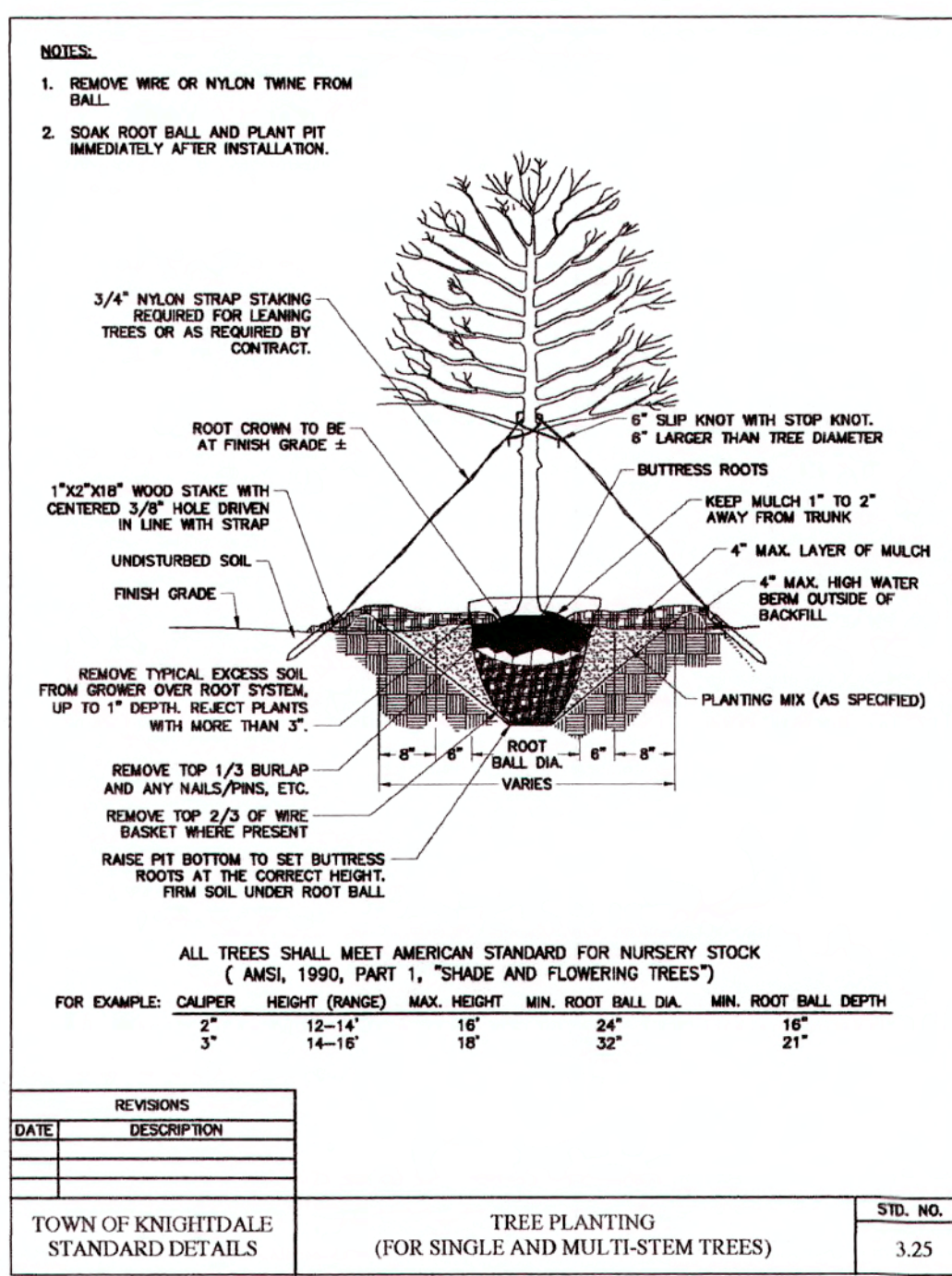
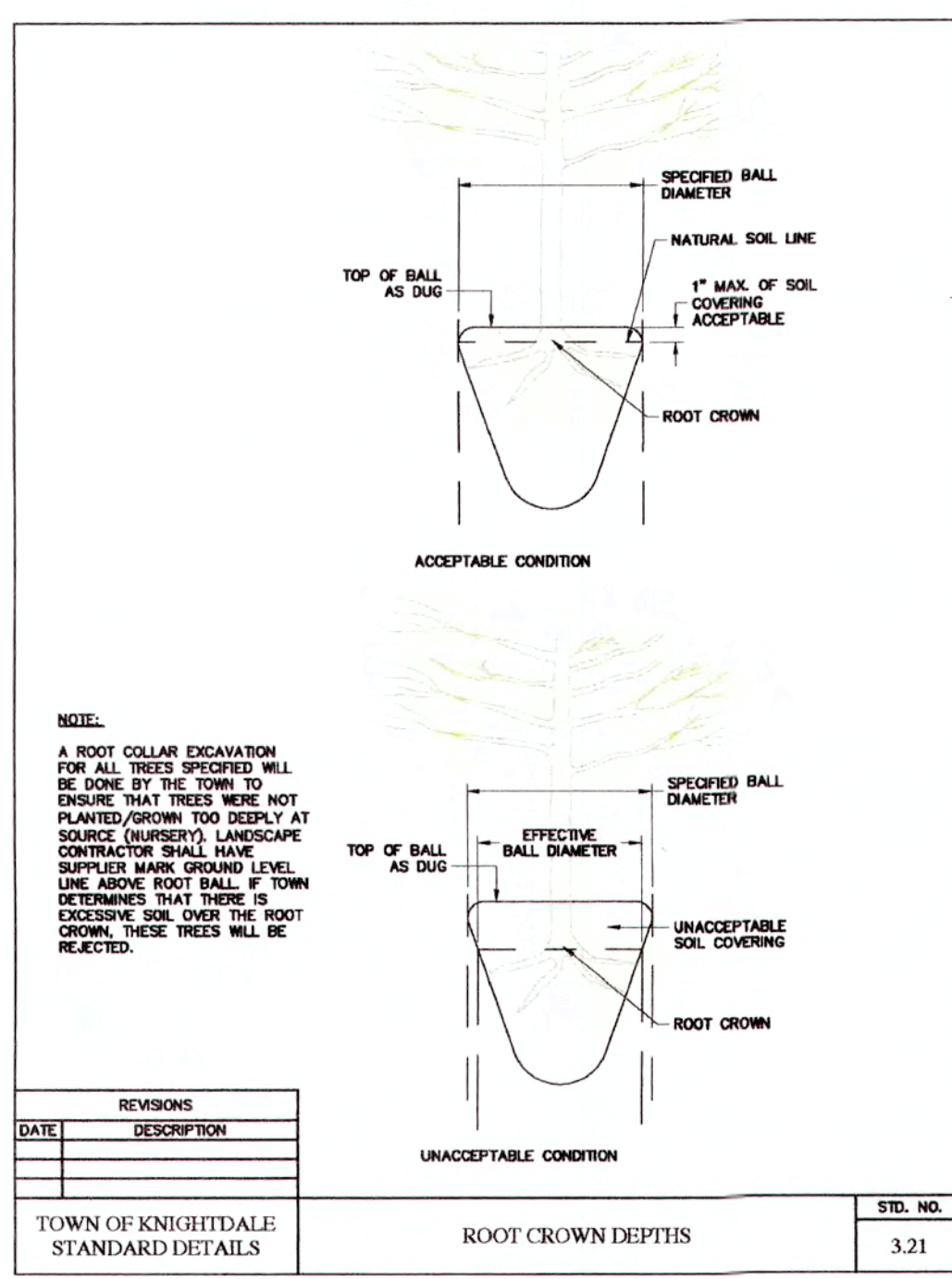
20' LANDSCAPE YARD BUFFER DETAIL WITH OPTIONAL BERM
NOT TO SCALE

ALL BERMS SHALL NOT EXCEED:
 • A SLOPE WITH MAXIMUM RISE OF ONE (1) FOOT TO A RUN OF THREE (3) FEET,
 • A MAXIMUM HEIGHT OF FOUR (4) FEET AND
 • A MINIMUM TOP OF BERM WIDTH OF TWO (2) FEET.
 • BERMS SHALL BE STABILIZED WITH A GROUND COVER OR OTHER SUITABLE VEGETATION OR PERMANENT SLOPE RETENTION DEVICE.
 • BERMS TALLER THAN FOUR (4) FEET SHALL BE APPROVED BY THE ADMINISTRATOR ON A CASE BY CASE BASIS, BUT SHALL CONFORM TO THE SLOPE AND WIDTH RESTRICTIONS AS PREVIOUSLY DETAILED.

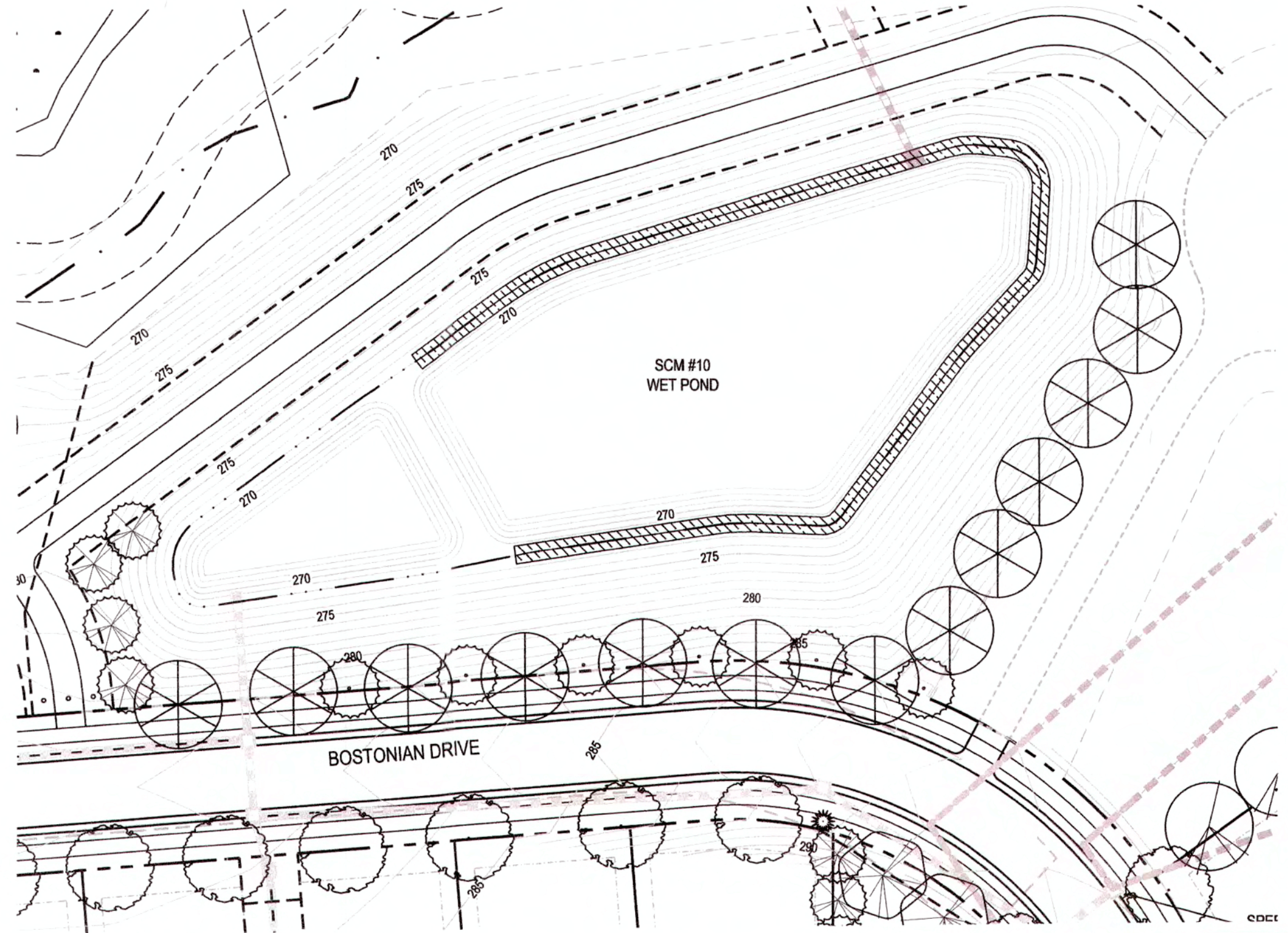
MINIMUM PLANTING REQUIREMENTS
TOTAL LENGTH OF BUFFER ALONG MORNING LAYER WAY = 665 L.F.
 SHRUBS (20 PER 100 L.F.) = 121
 MATURE HEIGHT = 6' HT.
 INSTALLED SIZE = 18" HT.
 TOTAL SHRUBS PROVIDED = 121
 CANOPY TREES (3 PER 100 L.F.) = 18
 TOTAL TREES PROVIDED = 18
 UNDERSTORY TREES (5 PER 100 L.F.) = 30
 TOTAL UNDERSTORY TREES PROVIDED = 30

MINIMUM PLANTING REQUIREMENTS
TOTAL LENGTH OF BUFFER AT EASTERN PROPERTY BOUNDARY = 886 L.F.
 SHRUBS (20 PER 100 L.F.) = 162
 MATURE HEIGHT = 6' HT.
 INSTALLED SIZE = 18" HT.
 TOTAL SHRUBS PROVIDED = 162
 CANOPY TREES (3 PER 100 L.F.) = 24
 TOTAL TREES PROVIDED = 24
 UNDERSTORY TREES (5 PER 100 L.F.) = 40
 TOTAL UNDERSTORY TREES PROVIDED = 40

TREE REPLACEMENT QUANTITY CALCULATIONS
 REFER TO SHEET 2.1 SITE PLAN FOR TREE REPLACEMENT CALCULATIONS.
 TOTAL TREE REPLACEMENT REQUIRED = 212
 40% EVERGREEN PROVIDED = 85
 60% DECIDUOUS PROVIDED = 127



TYPICAL LANDSCAPE PLAN FOR SIGN MONUMENT
NOT TO SCALE



SCM #10 WET POND
SCALE 1" = 40'-0"

LANDSCAPE CALCULATIONS:

- RESIDENTIAL LANDSCAPING**
- 1 CANOPY TREE / 2,000 SF OF LOT AREA (OR A FRACTION THEREOF UP TO 20,000 SF)
 - UTILITY EASEMENTS SHALL NOT BE INCLUDED IN LOT AREA.
 - EXISTING LARGE TREES MEASURING MORE THAN 6" DBH MAY BE COUNTED TOWARDS REQUIREMENT.
 - FOUNDATION PLANTINGS CONSISTING OF EVERGREEN SHRUBS SHALL BE INSTALLED ALONG THE ENTIRE FOUNDATION WALL OF THE BUILDING. (MIN. 2' HEIGHT AND 4" O.C.)
- STREET TREE PLANTINGS**
- CANOPY TREES TO BE INSTALLED AT A MINIMUM AVERAGE DISTANCE OF 40' O.C. IN A PLANTING STRIP (MIN. WIDTH OF 5').
 - WHERE OVERHEAD UTILITIES EXIST PRIOR TO DEVELOPMENT, UNDERSTORY TREES MAY BE SUBSTITUTED.
 - STREET TREES SHALL BE PLACED AT LEAST 10' FROM LIGHT POLES AND 12' FROM ELECTRICAL TRANSFORMERS IN ORDER TO ALLOW THESE UTILITIES TO BE SAFELY SERVICED (UNDERSTORY TREES MAY BE PLACED WITHIN 5' OF SUCH DEVICES).
 - STREET TREES SHALL BE DECIDUOUS HARDWOODS AND SHALL MEET THE CRITERIA SET FORTH IN PREVIOUS NOTES/DETAILS.

(STYLE 2B, TOTAL NUMBER OF MONUMENTS - 1)

KNIGHTDALE STATION PLANT SCHEDULE - ENTRY MONUMENTS

PLANT TYPE	QTY	KEY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	HEIGHT	NOTES
SHRUBS & GROUND COVER	6	IVB	Ilex vomitoria 'Bordeaux'	Bordeaux Dwarf Yew Holly	CONT.	3 Gal	18"-24"	30" O.C.
	87	ANM	Seasonal Color	Annual Plantings	CONT.	Flat		12" O.C. (1' 15")
GRASSES	6	MCP	Muhlenbergia capillaris	Pink Malt Grass	CONT.	3 Gal	18"-24"	MATCHED; 3' O.C.

STREET TREES PLANT SCHEDULE

PLANT TYPE	QTY	KEY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	HEIGHT	NOTES
CANOPY TREE	44	PAB	Platanus x acerifolia 'Bloodgood'	London Plane Tree	B&B	2"	8'	MATCHED
STREET TREES	18	PCH	Pistacia chinensis	Chinese Pistache	B&B	2"	8'	MATCHED
	47	QPH	Quercus phellos	Willow Oak	B&B	2"	8'	MATCHED
	73	QUA	Quercus acutissima	Sawtooth Oak	B&B	2"	8'	MATCHED

REPLACEMENT TREES PLANT SCHEDULE

PLANT TYPE	QTY	KEY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	HEIGHT	NOTES
CANOPY TREES	41	COO	Cedrus deodora	Deodar Cedar	B&B	2"	8'-10'	MATCHED
	43	PTD	Pinus taeda	Loblolly Pine	B&B	2 1/2"	12'-14'	MATCHED
	31	ACM	Acer rubrum 'October Glory'	October Glory Maple	B&B	2 1/2"	12'-14'	MATCHED
	32	LSR	Liquidambar styraciflua 'Rotundiloba'	Frailless Sweetgum	B&B	2 1/2"	12'-14'	MATCHED
	30	QUS	Quercus shumardii	Shumard Oak	B&B	2 1/2"	12'-14'	MATCHED
	32	LTU	Liriodendron tulipifera	Tulip Poplar	B&B	2 1/2"	12'-14'	MATCHED

VEGETATED SHELF = 3,190 SF w/ 50 HERB. PLANTS / 200 SF = 1,595 PLANTS

PLANT TYPE	QTY	BOTANICAL NAME	COMMON NAME	ROOT	NOTES
HERBACEOUS	265	Azalea speciosa	Swamp Azalea	CONT.	MIN. 24" - 36" O.C.
	265	Carex tenera	Quill Sedge	CONT.	MIN. 24" - 36" O.C.
	265	Eupatorium altissimum	Joe Pye Weed	CONT.	MIN. 24" - 36" O.C.
	267	Lobelia cardinalis	Cardinal Flower	CONT.	MIN. 24" - 36" O.C.
	267	Rhynchospora colorata	Slamash White-top	CONT.	MIN. 24" - 36" O.C.
	267	Saccharum baldwinii	Narrow Plumegrass	CONT.	MIN. 24" - 36" O.C.

NOTES:

- ON THE DAM AND DAM EMBANKMENT SLOPES, TURF GRASS PROVIDES STABILITY AND ENHANCES ACCESS TO THE FACILITY FOR MAINTENANCE. DEC RECOMMENDS PERENNIAL GRASSES SUCH AS HYBRID BERBERIS OR CENTAUDE IN THE COASTAL PLAIN AND PIEDMONT, AND COOL SEASON TURF GRASS SUCH AS FESCUE AND BLUEGRASS IN THE MOUNTAINS. WEEPING LOVE GRASS IS NOT ALLOWED BECAUSE IT DOES NOT PROVIDE LONG-TERM SLOPE STABILIZATION.
- THE DAM STRUCTURE, INCLUDING FRONT AND BACK EMBANKMENT SLOPES, OF THE POND SHALL BE VEGETATED WITH NON-CLIMBING TURF GRASS. TREES AND SHRUBS SHALL NOT BE ALLOWED.
- THE VEGETATED SHELF SHALL BE PLANTED WITH A MINIMUM OF (3) DIVERSE SPECIES OF HERBACEOUS, NATIVE VEGETATION AT A MINIMUM DENSITY OF 50 PLANTS PER 200 SQUARE FEET OF SHELF AREA.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

DATE: 7.8.2019
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

DATE: 7.9.19
 ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

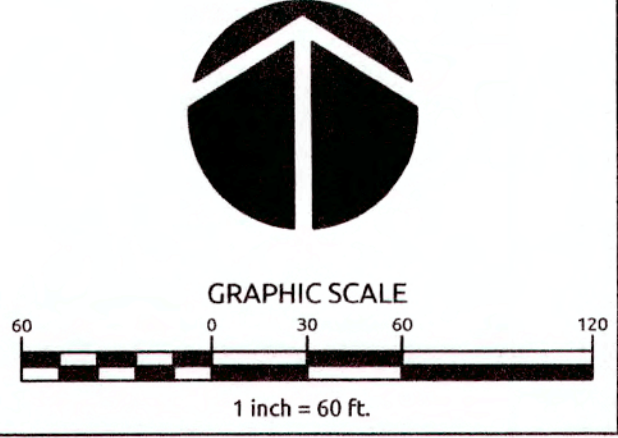
THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
 PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
 PUBLIC UTILITIES DEPARTMENT PERMIT # _____
 AUTHORIZATION TO CONSTRUCT _____
 DATE _____



Revisions

No.	Description

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